

Ch. 10. 1922

THE IDEAL FITTER

AMERICAN & IDEAL
RADIATORS BOILERS

1922



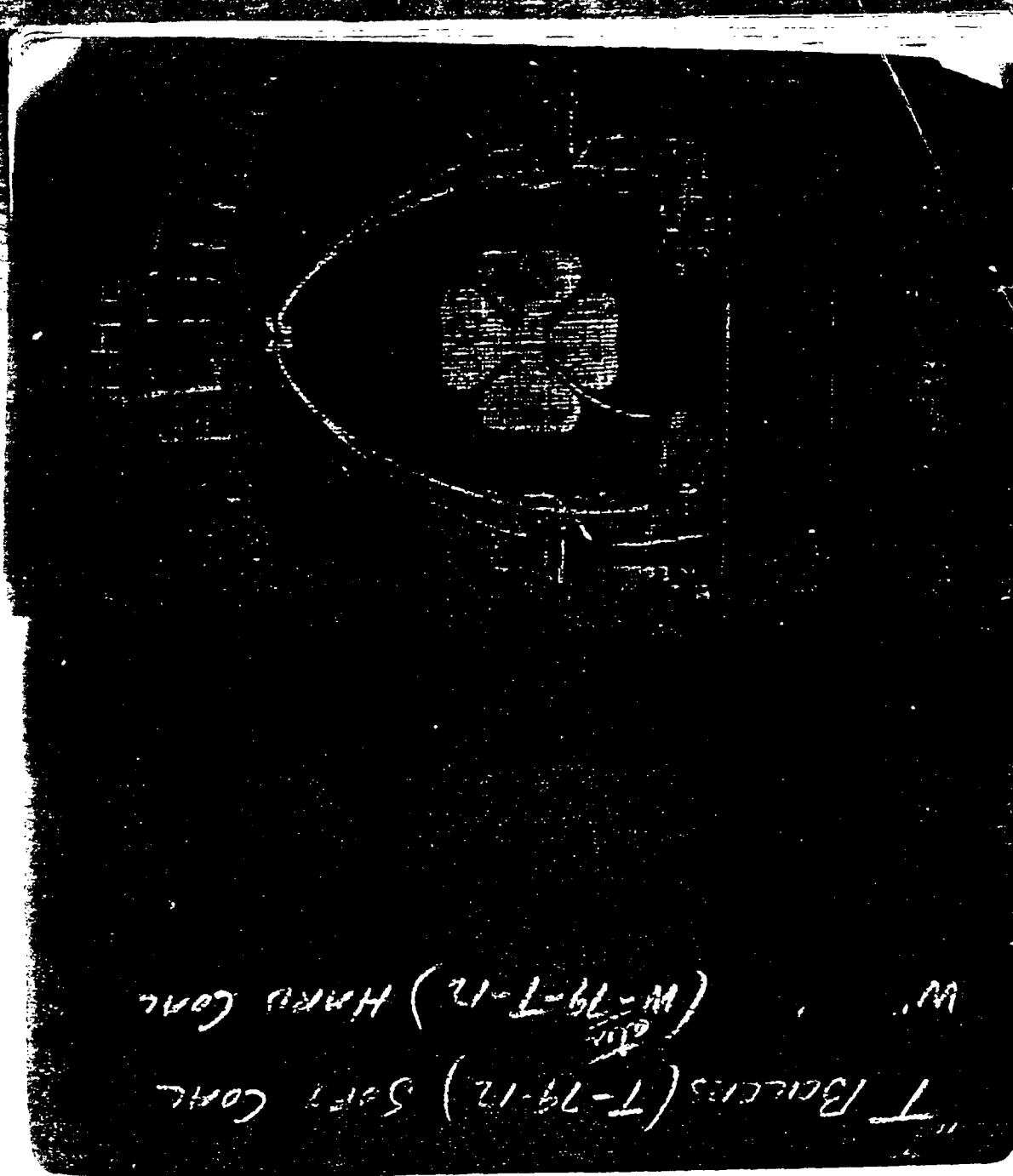
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AMERICAN RADIATOR COMPANY

For Sales Offices, see next page

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PLAINTIFF'S
EXHIBIT
AST-368



"T BACIDS (T-79-12) SOFT COAL
W. (W-79-12) HARD COAL

AMERICAN RADIATOR COMPANY

General Offices: 810-822 So. Michigan Ave., Chicago, Ill.
General Sales Dept.: 1807 Elmwood Ave., Buffalo, N. Y.

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Introductory

This edition of THE IDEAL FITTER introduces many new products to our friends and patrons. As these new Boilers, Radiators, Heating Specialties, and Vacuum Cleaners have successfully put off the existing tests of our Research Laboratories, we are confident they will likewise find great favor with you.

In the boiler field we offer the Hot Water Boilers, a fitting companion for the famous hot water "A" Heat Machine. The new line of Hot Water Tube Boilers is complete from 600 to 15,000 square feet steam capacity, making the most efficient, economical, moderate priced boiler available for small homes, large apartments, factories, etc.

The Ideal-Avon A Heating Outfit, first illustrated in the previous edition of the FITTER, has proved so satisfactory to all its users, and so adaptable to the Trade, that we now have enlarged its line to include not only home heating outfits but also garage and hot water supply outfits. The Ideal Gas-Avon A, burning either natural or artificial gas, here shown for the first time, is likewise made in outfits for home heating, garage and hot water supply.

The Ideal-Avon Valve, made in our own factory, under most thorough inspection and testing methods, is the most perfect radiator air valve that has ever been put on the market. We forecast its rapid adoption as the standard air valve for all its heating systems.

Numerous other Specialties and Heating materials are listed, but space preventing their enumeration here we can only ask our friends and patrons to look this new IDEAL FITTER over for cover to cover. Such reading will be well worth while. We do not by any means feel that we have reached perfection, and therefore shall continue to search for better things, to the end that the Heating Industry may be advanced to a higher plane.

The persistent advertising and promotional campaigns being carried on by the Company for many years create popular demand and good will for the products of this Company. The architects and public prefer and specify them in such huge quantities every year that they are accepted everywhere as standard. Consequently the Trade make quick sales and share in the prestige of these successful products.

Cordially,

AMERICAN RADIATOR COMPANY

April 1, 1932



Pierce Plant
Buffalo, N. Y.



Detroit Plant
Detroit, Mich.



Litchfield Plant
Litchfield, Ill.



Buffalo Plant
Buffalo, N. Y.



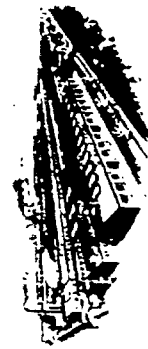
Springfield Plant
Springfield, Ohio



Trussville Plant
Trussville, Pa.



Bond Plant
Buffalo, N. Y.



Michigan Plant
Detroit, Mich.



Birmingham Plant
Birmingham, Ala.



Kansas City Plant
Kansas City, Mo.



Houston Plant
Rockford, Ill.



Institute of Thermal Research
Buffalo, N.Y.

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To Architects, Engineers, and Trade:

We present herein new ratings of Ideal Arco Boilers, which reflect the actual capacities they develop. This schedule credits each Boiler with its actual rating, whereas formerly ratings of Arco Boilers have been less than their actual capacities and were based on arbitrary fuel charges for the purpose of supplying uniformly spaced ratings.

Under average chimney conditions, Arco Boilers have fuel depths as great as can be used to advantage, both with respect to efficiency and quick steaming. Any greater fuel depth would be detrimental.

We present herein standardized ratings of Ideal Arco Boilers made in conformity with the rating formula of the American Society of Heating and Ventilating Engineers published in Volume 25 of the Proceedings of 1919 on page 147. This Society has for years endeavored to bring about a uniform method of determining heating boiler ratings.

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In accordance with this method, the rating of any heating boiler is based on the pounds of coal burned from one fuel charge, multiplied by the pounds of water evaporated by one pound of coal burned; which gives the number of pounds of steam produced. This result is then multiplied by four, which is the number of square feet of radiator surface required to condense one pound of steam per hour. This total divided by the number of hours the boiler is to run without attention, gives the boiler's continuous rating for this number of hours.

The application of this formula to Arco Boiler ratings increases the ratings of some and decreases the ratings of others.

The revised ratings have been determined from actual tests using anthracite coal, are strictly reliable and accurate for that fuel, giving the maximum capacity of the boilers tested with fire surfaces *clean*, and not diminished in efficiency by the accumulation of soot.

In selecting the size boiler for use in connection with any heating system, due consideration should be given all conditions surrounding the particular installation for which boiler is being selected. It is important, in determining correct boiler capacities for given loads, that ample safety factors of reserve capacity be provided in accordance with the principles set forth on pages 85, 249, 250 and 251 of this "Ideal Fitter" catalogue.

We have proved the correctness of these ratings. Their adoption is a direct step in advance

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for our industry and the public, which owe to the American Society of Heating & Ventilating Engineers due appreciation for this important contribution to standardization.

Arco Boilers

We present below details of assemblage of all Arco Boilers and examples indicating methods of establishing ratings.

Number 3 Series

There has been added to the Arco line of boilers the Number 3 Series consisting of

Base

Crown-sheet-Firepot Section, and

Dome

This Series of Arco Boilers, based on an eight-hour firing period, has an evaporative power of 8.0 pounds. They are well adapted for installations where the chimney draft is poor or where draft conditions are such that a boiler with long flue travel would reduce the draft available. Such reduced draft would lower the rate of combustion and result in causing soot deposits on the flue surfaces, which condition would materially reduce the boiler heating power.

This assemblage provides a crown-sheet which is an integral part of the firepot section, and as a result of this type of construction, makes this series of boiler comparable to similar types of boilers, with an assemblage consisting of

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Base

Firepot Section (without crown-sheet)

Single Section, and

Dome

Such boilers do not provide a crown-sheet in the firepot section.

Number 4 Series

This Series of Arco Boilers, based on an eight-hour firing period, has an evaporative power of 8.5 pounds. The assemblage remains as heretofore, consisting of

Base

Crown-sheet-Firepot Section

Single Section, and

Dome

They are comparable to similar boilers with an assemblage consisting of

Base

Firepot Section (without crown-sheet)

2 Single Sections, and

Dome

For good combustion this series of boilers requires a slightly better draft than the Number 3 Series.

Number 5 Series

This Series of Arco Boilers, based on an eight-hour firing period, has an evaporative power of 9.0 pounds. The assemblage remains as heretofore, consisting of

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Base

Crownsheet-Firepot Section

Double Section, and

Dome

The double section, being equal in heating surface to 2 single sections, makes this series of Arco Boilers comparable to similar boilers with an assemblage consisting of

Base

Firepot Section (without crownsheet)

3 Single Sections, and

Dome

For good combustion this series of boilers requires a slightly better draft than the Number 4 Series.

Number 6 Series

This Series of Arco Boilers, based on an eight-hour firing period, has an evaporative power of 9.4 pounds. The assemblage remains as heretofore, consisting of

Base

Crownsheet-Firepot Section

Double Section

Single Section, and

Dome

This No. 6 Series of Arco Boilers is comparable to similar boilers with an assemblage consisting of

16

Base

Firepot Section (without crownsheet)

4 Single Sections, and

Dome

Due to the long fire travel, this series of boilers should be provided with a tight chimney flue of proper dimensions to provide sufficient draft for good combustion, and when so provided a very high efficiency can be obtained.

Chimney Flues

One of the most important factors in connection with a heating installation is the flue to which the boiler is connected. To a large extent the capacity of the boiler depends on the size and height of the flue. If the flue cannot develop sufficient draft intensity to burn the necessary amount of coal to develop boiler rating, the result will be the same as if a boiler of insufficient capacity were installed. When flue is already built, a boiler of the proper size should be selected that is best suited for the draft available. In other words, for the reasons given, the boiler should be fitted to the chimney. Under certain conditions, it is highly unsatisfactory to attempt to fit a poor chimney to a good boiler.

For all information regarding size of Chimney Flues, refer to pages 247 and 248.

Method of Determining Rating

When the evaporative power and the available fuel of a boiler are known, and the rating of that

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boiler is based on the American Society of Heating & Ventilating Engineer's Standard Rating Formula, it is a simple problem to determine the boiler's continuous hourly rating as shown by the following examples:

Example 1:

3-22-S Ideal Arco Boiler

Eight-hour Rating

Evaporative Power 8.0 lbs.

Fuel Available.....	134 lbs.
Evaporative Power.....	8 0 "
Total Steam from one Fuel Charge.....	1072 "

134 pounds (Fuel available) Multiplied by 8.0 (Evaporative Power) equals 1072 (Total steam produced from one fuel charge) Multiplied by 4 (the number of sq. ft. of Standard Column Radiation necessary to condense one pound of steam) equals 4288. Divided by 8 (the hours boiler is to run without attention) equals 535 sq. ft. Boiler Rating.

Example 2:

3-22-S Ideal Arco Boiler

Ten-hour Rating

Evaporative Power 8.0 lbs.

134x8.0x4	equals 430 Sq. Ft. Boiler Rating
10	

18

Example 3:

3-22-S Ideal Arco Boiler

Twelve-hour Rating

Evaporative Power 8.0 lbs.

134x8.0x4	equals 355 Sq. Ft. Boiler Rating
12	

The Number Three, Four, Five and Six Series, Arco Boilers of the same diameter grate, contain the same amount of Fuel Available, as follows:

Diameter Firepot Inches.	19	20	22	23	25	28	31	34
Fuel Available, lbs.....	96	112	131	152	178	228	283	344

When the firing period is less than eight hours, Ideal Arco Boilers will develop ratings considerably in excess of those shown under "8-Hour Ratings" when operating under ideal conditions.

Selecting Boilers for Soft Coal

The selection of boiler sizes for soft coal depends entirely upon the grade of fuel to be used. If a good grade of soft coal is used the catalogue rating of Ideal Boilers can be developed and boiler sizes can be determined on this basis, but this does not provide for a boiler of sufficient capacity when low grade coal is used.

The evaporative power of soft coal ranges from 3.8 pounds to about 11 pounds of evaporation

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per pound of coal burned, depending on the quality of the coal and the boiler efficiency.

Effect of B. t. u. Value of Coal

If in a boiler capable of developing 65 per cent efficiency we burn soft coal containing 7500 B.t.u., we would only evaporate 5 pounds of water, whereas, with this same boiler burning soft coal containing 13,000 B.t.u., the rate of evaporation would be 8.7 pounds per pound of coal burned. Therefore, when burning the low grade fuel containing 7500 B.t.u., the boiler should be at least 75 per cent larger than for the good grade of fuel, to develop the same boiler rating, not allowing for a lower rate of combustion, which is the case when burning the low grade fuel as compared to the rate when a good grade of fuel is used.

From this it is clearly evident that much larger boilers must be selected for low grade fuels with low evaporative power than would be required if a good grade of fuel were used.

Example: If in an installation we have 100 square feet of equivalent column radiation (steam) and the size boiler is to be selected for burning coal containing 9000 B.t.u. per pound, first determine the proper rating based on hard coal (6700), then add the percentages as shown (45 per cent) based on the B.t.u. value of the coal to be used (which is 9000), which would require a boiler rated at 970 sq. ft.

The average B.t.u. of anthracite is 12,000 and the average B.t.u. of a good grade of soft coal is 13,000. Hence, about the same quantities must be burned to develop ratings.

B.t.u. content of coal	Percentage to be added
12000	10
11000	20
10000	30
9000	45
8000	65
7000	85

Method of Rating All Ideal Boilers

All Ideal Boilers, using anthracite coal as a fuel, are rated in accordance with the rating formula of the American Society of Heating and Ventilating Engineers as outlined on pages 12 and 13 of this Ideal Fitter. Accordingly the procedure followed for determining the rating of any Ideal Boiler is exactly the same as that fully explained for Ideal Arco Boilers on pages 18 and 19. For example:

2-A-7 Ideal Type "A" Heat Machine Eight-hour Rating

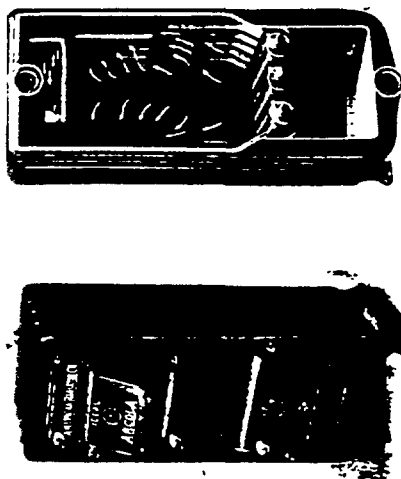
Fuel available, 358 lbs., multiplied by the evaporative power, 9.5, equals total steam from one fuel charge, 3400 lbs. Dividing this total steam by 8 and multiplying the result by 4 gives the eight-hour rating, 1700 sq. ft. which is the catalog rating of the number 2-A-7 Ideal Type "A" Heat Machine.

Testing of Ideal Boilers

All Ideal Boilers are made in conformity with the A. S. M. E. Boiler code, which specifies a maximum allowable working pressure of 15 pounds per square inch for steam and 30 pounds per square inch for hot water heating.

Ideal-ARCOLA Radiator-Boiler

(Pat'd January 18, 1921, Other Patents Pending)



To meet the popular demand for a complete hot water heating outfit for small homes, stores, flats, etc., Ideal ARCOLAS are sold as outfits or "packages", consisting of Boiler, American Radiators, Expansion Tank, etc. as below. Ideal-ARCOLA Radiator-Boilers are also sold separately.

Ideal-ARCOLA Heating Outfits

Outfit (Outfits consist of Ideal-ARCOLA Radiator-Boiler, American Radiators, Expansion Tank, Drain Valve and Vent Fitting below.)

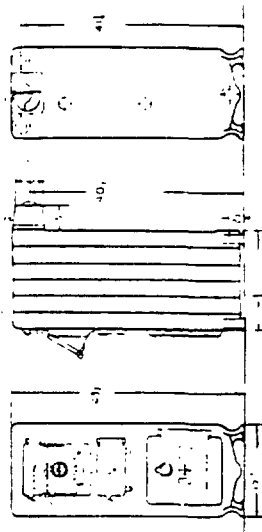
Outfit Number	Consists of No. 1 Ideal-ARCOLA with	75 Sq. Ft. of Radiation
1-PA-75	1-PA-100	100
1-PA-100	1-PA-125	125
1-PA-125	1-PA-150	150
1-PA-150	1-PA-175	175
2-PA-200	1-PA-200	200
2-PA-225	1-PA-225	225
3-PA-250	1-PA-250	250
3-PA-275	1-PA-275	275
3-PA-300	1-PA-300	300
3-PA-325	1-PA-325	325
4-PA-350	1-PA-350	350
4-PA-375	1-PA-375	375
5-PA-400	1-PA-400	400
5-PA-425	1-PA-425	425
5-PA-450	1-PA-450	450

See current trade discount sheet for shipping weights and list prices. Radiation will be made up in any number of radiators desired. Any additional quantity of radiation will be furnished at extra charge. No radiator valves or air valves are necessary. For Price List of Boiler parts see page 200.

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Ideal-ARCOLA Radiator-Boiler

(Pat'd January 18, 1921, Other Patents Pending)



Dimensions and Ratings

Number of Boiler	Number of Sections	Radiator Square Feet (See Note)	Fuel Capacity Pounds	Length Inches	Radiating Surface of Area sq. ft.
No. 0	3	135	40	9	40
No. 1	4	200	60	12	45
No. 2	5	300	80	15	50
No. 3	6	400	100	18	55
No. 4	7	500	120	21	60
No. 5	8	600	140	24	65

See Current Trade Discount Sheets for list prices and shipping weights.

Ideal-ARCOLAS are shipped complete in case.

Oval smoke pipe connection will take 6 in. diameter smoke pipe.

Flow pipe tapping, 2 inches, (one tapping plugged).

Return pipe tapping, 2 inches.

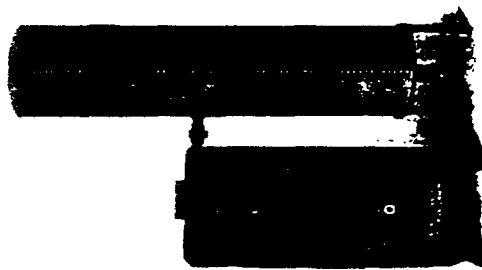
Two openings to take 1 in. pipe are provided in rear section for domestic hot water coil or bungelow Taco, (see page 171).

* In figuring the square feet of radiation required for the room in which the Ideal-ARCOLA Boiler stands, allow for the heat given off by the Ideal-ARCOLA, the expansion tank and piping, which combined have an average heating value as given in table.

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Ideal-ARCOLA Hot Water Supply Outfit

Pat'd January 18, 1921. Other patents pending.



No. O-52 Outfit

Number of Outfit		Tank Capacity Gals.	
O-52 Black	1	52	100
A-100 Black	1	100	52
O-52 Gals.	1	52	100
A-100 Gals.	1	100	52

See Current Trade Discount Sheet for list prices and supply weights.

The Ideal-ARCOLA Hot Water Supply Outfit furnishes, day or night, plenty of hot water at an automatic all-around temperature for the bath, toilet, kitchen or the laundry.

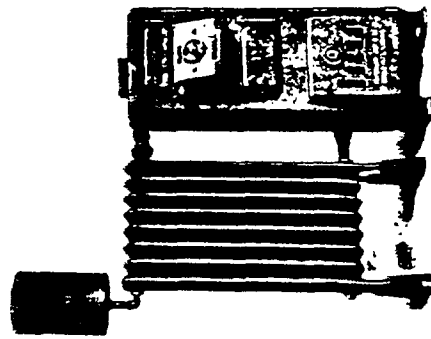
The Ideal-ARCOLA Hot Water Supply Outfit is complete with block or galvanized iron tank—made extra heavy and tested to 200 lbs. water pressure. Pipe and fittings, all cast and ready to be screwed together, are also furnished. May be installed in a few hours at a minimum expense.

The temperature regulator, supplied with the outfit, serves triple duty: it automatically keeps the water between 110 and 116 degrees. The amount of care and coal required is practically negligible.

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Ideal-ARCOLA Garage Heating Outfit

Pat'd January 18, 1921. Other Patents Pending.



No. O-40 Outfit

Number of Outfit		Tank Capacity Gals.	
O-40	1	40	100
O-52	1	52	100

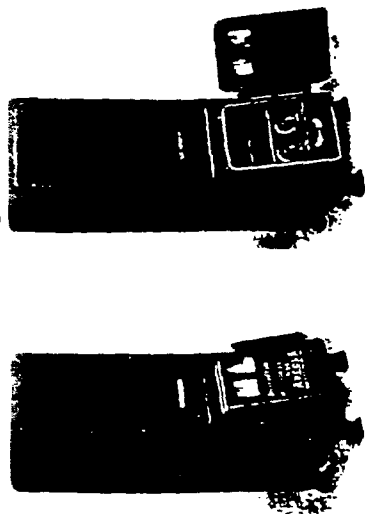
See Current Trade Discount Sheet for list prices and supply weights.

Just as the Ideal-ARCOLA is revolutionizing the warming of small houses and stores, so the company is revolutionizing the heating of garages. The Ideal-ARCOLA Garage Heating Outfit is a complete outfit without reach of their kind of automobiles.

The Ideal-ARCOLA Garage Heating Outfit is a complete outfit with pipe and fittings, all cast and ready to be screwed together. No wall supports are needed; the outfit is supported on feet and furnished. An automatic regulator controls the electric lamp, thus maintaining a steady temperature, day and night. Running water is not required; the same water is used for heating and for other purposes.

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Ideal Gas ARCOLA (Patent Pending)



The Ideal Gas ARCOLA is a small, gas-burning, hot water boiler, compact, pleasing in appearance and economical to operate. Like its companion, the coal-burning Ideal-ARCOLA, the Ideal Gas ARCOLA is sold in Outfit or "pat" type form, consisting of boiler, ARCOLA Radiators, Expansion Tank, etc., as below. Ideal Gas ARCOLAS are also sold separately.

Ideal Gas ARCOLA Heating Outfits

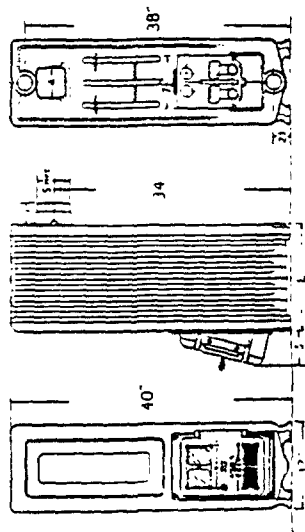
Outfit Number	Outfits consist of Ideal-Arcola Gas Boiler, Regular 18 inch high AMERICAN Peerless, 3 Column Radiators as listed below, Expansion Tank, Drain Valve and Vent Fitting
1-GA-100	Consists of No. 1 Ideal-Arcola with 75 Sq. Ft. of Radiation
1-GA-125	100
1-GA-150	125
2-GA-175	175
2-GA-200	200
2-GA-225	225
3-GA-250	250
3-GA-275	275
3-GA-300	300
4-GA-325	325
4-GA-350	350
4-GA-375	375
5-GA-400	400
5-GA-425	425
6-GA-450	450

See Current Trade Discount Sheet for list price and shipping weights.

Important Notice: Specify whether for Artificial or Natural Gas.

Radiation will be made up in any number of radiators desired. Any additional quantity of radiation will be furnished at extra charge. No radiator valves or air valves are necessary. For Price List of boiler parts page 200.

Ideal Gas ARCOLA (Patent Pending)



Dimensions and Ratings

No. of Boiler	No. of Water Pipes	No. of Radiating Burners	Size of Gas Supply Pipe, Ins.	Artic. Dim. Total, Inches	Dimension, "L", Inches	Radiating Surface of ARCOLA Sq. Ft.
0	1	135	1 1/2	1 1/2	9	22
1	4	300	2	2 1/2	12	25
2	5	300	2 1/2	3 1/2	15	28
3	6	375	3	4 1/2	18	31
4	7	425	3 1/2	5 1/2	21	34
5	8	525	4	6 1/2	24	37

See Current Trade Discount Sheet for list prices and shipping weights.

Important Notice: Specify whether for Artificial or Natural Gas.

Ideal Gas ARCOLAS are shipped complete in outfit.

Such, Pipe connection, 5 in. b.

Flow pipe tapping, 2 inches.

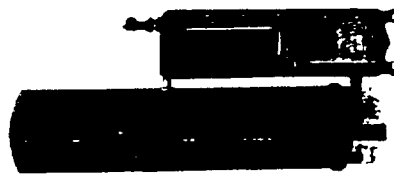
Return pipe tapping, 2 in. b.

Two openings to take 1 in. pipe are provided in rear of boiler for above hot water coil.

*In figuring the square feet of radiation required for the room in which the Ideal Gas ARCOLA stands, allow for the heat given off by the Ideal Gas ARCOLA expansion tank and piping, which combined have an average heating value as given in table.

Ideal Gas ARCOLA Hot Water Supply Outfit

Patent Pending



Number of Outfit

0 Gas-52 Black	52
1 Gas-100 Black	100
0 Gas-52 Galv.	52
1 Gas-100 Galv.	100

Tank Capacity

0 Gas-52	52
1 Gas-100	100

See Current Trade Discount Sheet for list prices and shipping weights.

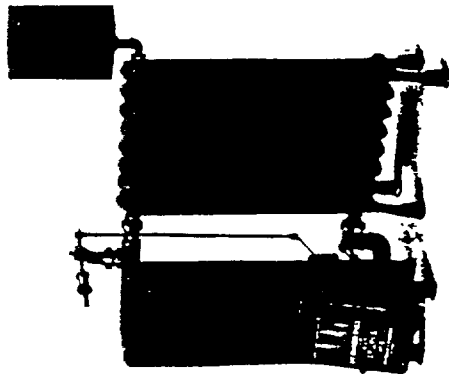
The Ideal Gas ARCOLA Hot Water Supply Outfit furnishes day or night, plenty of hot water at an automatic day and night temperature, for the bath, toilet, kitchen or the laundry.

The Ideal Gas ARCOLA Hot Water Supply Outfit comes complete with black or galvanized iron tank—made extra heavy and tested to 200 lbs. water pressure. Pipe and fittings, all cut ready to be screwed together, are also furnished with the outfit. Filled in a few hours at a minimum expense, the outfit will give years of comfort and undisturbed service.

The temperature regulator supplied with the outfit keeps gas by automatically keeping the water at any desired point between 100 and 220 degrees. The most economical gas water heating outfit obtainable.

Ideal Gas ARCOLA Garage Heating Outfit

Patented January 18, 1921; other patents pending



Number of Outfit

0 Gas-40	40
0 Gas-75	75

Garage Capacity

One car	40
Two car	75

See Current Trade Discount Sheet for list prices and shipping weights.

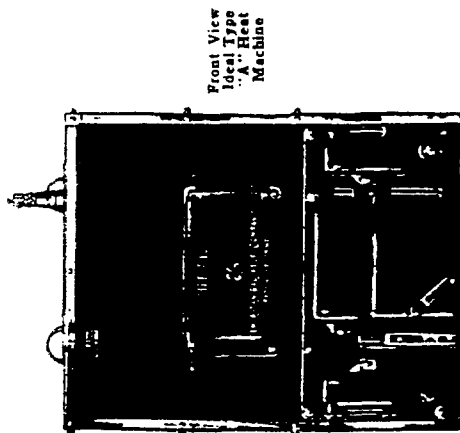
Specify whether for Artificial or Natural Gas

The Ideal Gas ARCOLA Garage Heating Outfit furnishes an Ideal method for heating the small garage. Burning gas—either artificial or natural—there is absolutely no labor needed to keep the garage at a temperature which insures easy starting of the car on cold mornings and complete freedom from danger of a frozen radiator.

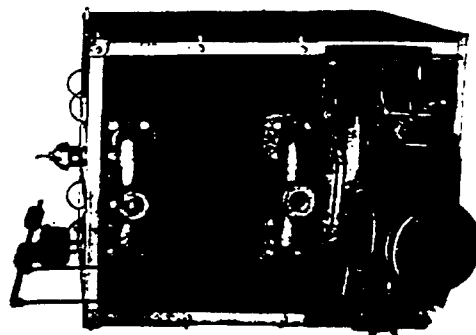
The Ideal ARCOLA Garage Heating Outfit is complete, with pipe and fittings, all threaded and ready for quick setting-up in the garage. No wall supports are needed, the radiator standing on pedestals furnished. An automatic regulator controls the gas supply, thus maintaining a steady temperature, day and night. Running water is not required—the same water is made to circulate over and over

IDEAL Type "A" Heat Machines

(Pat'd July 20, 1910; Other Patents Pending)



Front View
Ideal Type
"A" Heat
Machine



Rear View
Ideal Type
"A" Heat
Machine

For Price List of Boiler Parts, see pages 202 and 203.
Trimmings, see pages 36 and 201.

IDEAL Type "A" Heat Machines

Boiler No.	B-Hour Rating Sq. Ft.	No. Tubes	Total Length Inches	Grate Area Sq. Ft.	Height Water Jacket Inches	Outlet No. and Size	Safety Valve No. and Size
1-A-4	450	4	22	1.9	35	1-4	1-2
1-A-5	600	5	27 1/2	2.5	35	1-4	1-2
1-A-6	750	6	33	3.1	35	1-4	1-2
1-A-7	900	7	38 1/2	3.7	35	1-4	1-2

Water

Boiler No.	B-Hour Rating Sq. Ft.	No. Tubes	Total Length Inches	Grate Area Sq. Ft.	Height Water Jacket Inches	Outlet No. and Size	Safety Valve No. and Size
1-A-40	750	4	22	1.9	35	1-4	2-4
1-A-50	1000	5	27 1/2	2.5	35	1-4	2-4
1-A-60	1250	6	33	3.1	35	1-4	2-4
1-A-70	1500	7	38 1/2	3.7	35	1-4	2-4

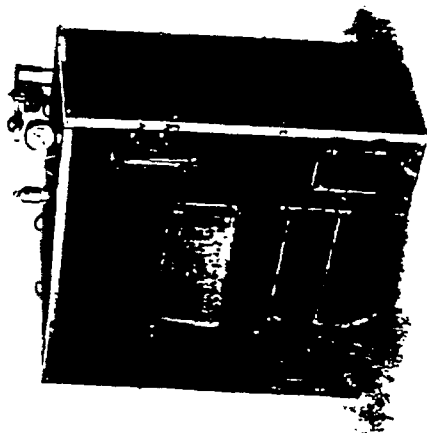
For list price, see Current Trade Discount Sheet.
*Safety Valve sizes accord with A. S. M. E. boiler code.
Factors determining boiler capacities (derived from actual tests)
Number of Boiler—Steam or Water
Fuel available, lbs.
Evaporative power, lbs.
Total steam from one fuel charge, lbs.
Chimney area (sq. ft.)
Chimney height, ft.
*For additional chimney flue sizes, see page 36.
For Smoke Pipe and other dimensions, see page 37.
For good chimney construction and its influence on boiler selection, see pages 215 and 216.
Height of boiler, 46 1/2 inches
Width of boiler, 46 inches
For selection of proper size boiler, see pages 210-251.
We do not recommend the burning of soft coal in the 1 Series Type "A" Boilers.

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 8, 10, OR 12 HOURS

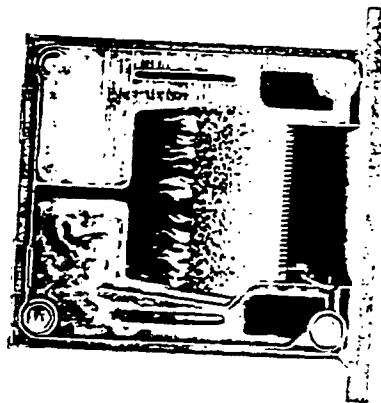
TIME	Steam Rating				Water Rating			
	4 Sec.	5 Sec.	6 Sec.	7 Sec.	4 Sec.	5 Sec.	6 Sec.	7 Sec.
8 Hours	450	450	600	750	750	1000	1250	1500
10 Hours	360	360	480	600	600	800	1000	1200
12 Hours	300	300	400	500	500	665	835	1000

IDEAL Type "A" Heat Machines

(Pat'd July 26, 1910, other Patents Pending)



No. 2-A-5 Steam Boiler



Interior of No. 2-A-5 Steam Boiler

For Price List of Boiler parts, pages 202 and 203
Trimming: pages 36 and 37.

IDEAL Type "A" Heat Machines

Steam

Boiler No.	8 Hour Rating of Sq Ft.	No. of Tubes	Total Length of Tubes, Inches	Grate Area, Sq Ft.	Height of Water, Inches	Depth of Water, Inches	Width of Water, Inches	Safety Valve Size, Inches
2-A-5	1100	5	27 1/2	4	15	1.5	1-2 1/2	1 1/2
2-A-6	1400	6	33	5	43	1.5	1-2 1/2	1 1/2
2-A-7	1700	7	38 1/2	6	43	1.5	1-2 1/2	1 1/2
2-A-8	2000	8	44	7	43	1.5	1-2 1/2	1 1/2
2-A-9	2300	9	49 1/2	8	13	1.5	1-2 1/2	1 1/2

Water

Boiler No.	8 Hour Rating of Sq Ft.	No. of Tubes	Total Length of Tubes, Inches	Grate Area, Sq Ft.	Height of Water, Inches	Depth of Water, Inches	Width of Water, Inches	Safety Valve Size, Inches
2-A-50	1800	5	27 1/2	4	15	1.5	2-5	2-5
2-A-60	2300	6	33	5	43	1.5	2-5	2-5
2-A-70	2800	7	38 1/2	6	43	1.5	2-5	2-5
2-A-80	3300	8	44	7	43	1.5	2-5	2-5
2-A-90	3800	9	49 1/2	8	13	1.5	2-5	2-5

For list price, see Current Trade Discount Sheet.

*Safety Valve sizes accord with A. S. M. E. boiler code.

Factors determining boiler capacities (derived from actual tests)

Number of Boiler—Steam or Water 5 6 7 8 9
 Fuel available, lbs. 412 295 358 421 485
 Evaporative power, lbs. 9 5 9 5 9 5 9 5
 Total steam from one boiler, lbs. 2204 2602 4000 1000 1607
 Chimney area as a scale of ft. sq. in. 141 168 168 168 168
 Chimney height, ft. 15 15 15 15 15

*For additional chimneys, floor sizes, see page 36

For Smoke Pipe and other dimensions, see page 37.

For good chimney construction and its influence on boiler selection, see pages 235 and 236

Height of boiler, 55 1/2 inches. Width of boiler, 50 1/2 inches.

For selection of proper size boiler, see pages 249-251

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 8, 10, OR 12 HOURS

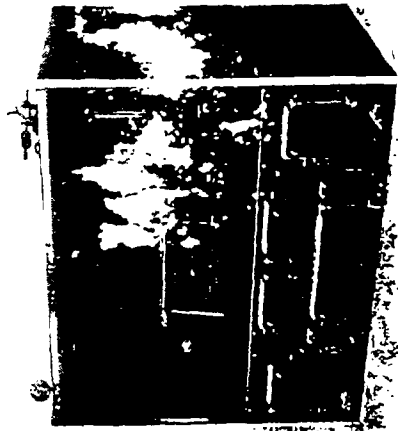
TIME	Steam Rating				
	5 Sec.	6 Sec.	7 Sec.	8 Sec.	9 Sec.
8 Hours	1100	1100	1700	2000	2300
10 Hours	880	1120	1360	1600	1840
12 Hours	735	935	1135	1335	1535

Water Rating

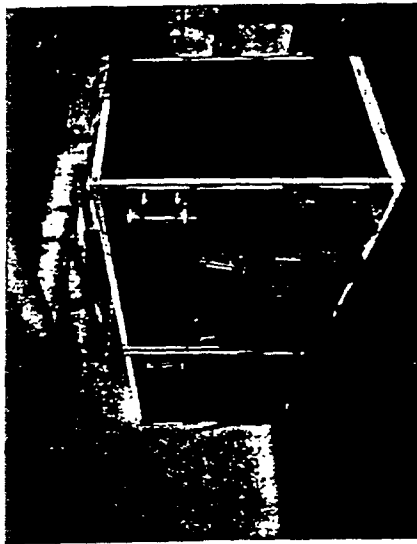
TIME	5 Sec.	6 Sec.	7 Sec.	8 Sec.	9 Sec.
8 Hours	1800	2300	2800	3300	3800
10 Hours	1440	1840	2240	2640	3040
12 Hours	1200	1515	1865	2200	2515

IDEAL Type "A" Heat Machines

(Patented July 2, 1919. Other Patents Pending)



IDEAL Type "A" Sectional Boiler
Front view, series No. 3, Steam



Battery of IDEAL Type "A" Heat Machines
For Price List of Boiler parts see pages 202 and 203.
Trimings, see pages 36 and 201.

IDEAL Type "A" Heat Machines

Steam

Boiler No.	Hour Rating By F. L. Hoar	No. of Sec.	Total Length Feet	Grate Area Sq. Ft.	Water Line Length Feet	Boiler No. and Size	Safety Valve Size Inches
3 A-5	2400	5	38	8	40	1-8 1-5	1-2 1/2
3 A-6	3200	6	46	10	49	1-8 1-5	1-3
3 A-7	3900	7	54	12	49	1-8 1-5	1-3
3 A-8	4500	8	62	14	49	1-8 1-5	2-2 1/2
3 A-9	5200	9	70	16	49	1-8 1-5	2-2 1/2
3 A-10	5800	10	78	18	49	1-8 1-5	1-3 1/2
3 A-11	6500	11	86	20	49	1-8 1-5	1-3 1/2

Water

Boiler No.	Hour Rating By F. L. Hoar	No. of Sec.	Total Length Feet	Grate Area Sq. Ft.	Water Line Length Feet	Boiler No. and Size	Safety Valve Size Inches
3 A-50	11000	5	38	8	40	1-8 2-8	2-8
3 A-60	5500	6	46	10	49	1-8 2-8	2-8
3 A-70	6600	7	54	12	49	1-8 2-8	2-8
3 A-80	7700	8	62	14	49	1-8 2-8	2-8
3 A-90	8800	9	70	16	49	1-8 2-8	2-8
3 A-100	9900	10	78	18	49	1-8 2-8	2-8
3 A-110	11000	11	86	20	49	1-8 2-8	2-8

For list price, see Current Trade Discount Sheet.

*Safety Valve sizes accord with A. S. M. E. boiler code.

Factors determining boiler capacities (derived from actual tests)

Number of Boiler—Steam or Water

Fuel available, lbs.

Evaporative power, lbs.

Total steam from one fuel charge, lbs.

Chimney height, ft.

Number of Boiler—Steam or Water

Fuel available, lbs.

Evaporative power, lbs.

Total steam from one fuel charge, lbs.

Chimney area (sea level), sq. ft.

Chimney height, ft.

*For additional chimney flue size, see page 36.

For Smoke Pipe and other dimensions, see pages 37

For good chimney construction and its influence on boiler selection, see pages 235 and 236.

Height of boiler, 61 inches. Width of boiler, 26 1/2 inches.

For selection of proper size boiler, see pages 19-24.

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 8, 10, OR 12 HOURS

Steam Rating

TIME	5 Sec.	6 Sec.	7 Sec.	8 Sec.	9 Sec.	10 Sec.	11 Sec.
8 Hours	2600	3250	3900	4550	5200	5850	6500
10 Hours	2080	2600	3120	3640	4160	4680	5200
12 Hours	1735	2170	2600	3035	3470	3900	4335

Water Rating

TIME	5 Sec.	6 Sec.	7 Sec.	8 Sec.	9 Sec.	10 Sec.	11 Sec.
8 Hours	4100	5500	6900	8300	9700	11100	12500
10 Hours	3520	4400	5280	6160	7040	7920	8800
12 Hours	2935	3670	4400	5135	5870	6600	7340

IDEAL Type "A" Heat Machines

Regular Boiler Equipment

Supplied with all Type "A" Steam Boilers

No. 1—IDEAL METALLIC JACKET—Consisting of heavy black-japanned sheet-iron covers with thick asbestos air-cell insulation, including heavy nickel-plated keys for readily applying to boiler.

No. 2—AUTOMATIC REGULATOR—Consisting of No. 805 Arco Steam Regulator, including lever, counterweight, and rods—positive connection to draft door and damper.

No. 3—WATER COLUMNS—10-inch glass with heavy brass— $\frac{1}{2}$ inch gauge cocks and guards— $\frac{1}{8}$ inch pet cock.

No. 4—TIGHT COCKS— $\frac{3}{8}$ inch brass.

No. 5—IDEAL SAFETY GATE—Improved type— $4\frac{1}{2}$ inch face with Bourdon spring and special water seal plug—clear and accurate graduation for vapor and low pressure.

No. 6—DRAW-OFF COCKS—Two of solid brass construction.

No. 7—FIRING TOOLS—Poker, hoe with handle, wire flue brush.

Supplied with all Type "A" Water Boilers

No. 1—IDEAL METALLIC JACKET—Same as No. 1 above.

No. 2—DAMPER CONTROL—Consisting of bracket, hand-wheel with screw, lever, and adjustable rods—positive connection to draft door and damper.

No. 3—DRAW-OFF COCKS—Same as No. 6 above.

No. 4—FIRING TOOLS—Same as No. 7 above.

For Price List of Trimmings and Boiler parts see page 201-203.

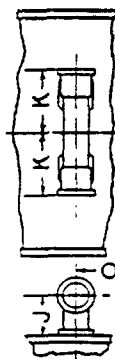
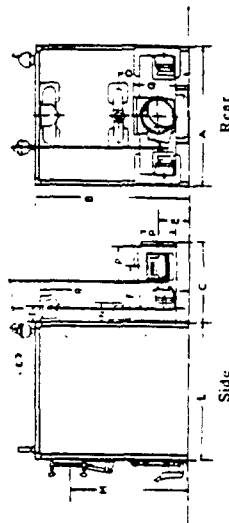
Chimney Sizes Recommended for Type "A" Boilers

Number of Boilers	HEIGHT OF CHIMNEY IN FEET				
	30	35	40	45	50
1-A-4 or 40	8x12	8x12	8x12	8x12	8x12
1-A-5 or 50	8x12	8x12	8x12	8x12	8x12
1-A-6 or 60	12x12	12x12	12x12	12x12	12x12
1-A-7 or 70	12x12	12x12	12x12	12x12	12x12
2-A-5 or 50	12x12	12x12	12x12	12x12	12x12
2-A-6 or 60	12x12	12x12	12x12	12x12	12x12
2-A-7 or 70	12x12	12x12	12x12	12x12	12x12
2-A-8 or 80	16x16	16x16	16x16	16x16	16x16
2-A-9 or 90	16x16	16x16	16x16	16x16	16x16
3-A-5 or 50	16x16	16x16	16x16	16x16	16x16
3-A-6 or 60	16x16	16x16	16x16	16x16	16x16
3-A-7 or 70	20x20	20x20	20x20	20x20	20x20
3-A-8 or 80	20x20	20x20	20x20	20x20	20x20
3-A-9 or 90	20x20	20x20	20x20	20x20	20x20
3-A-10 or 100	20x20	20x20	20x20	20x20	20x20
3-A-11 or 110	20x20	20x20	20x20	20x20	20x20

Above chimney flue sizes are based on sea level conditions—add 2% to area for each 500 feet elevation above sea level. See pages 247, 248 for standard sizes of tile and brick chimney flues.

IDEAL Type "A" Heat Machines

Measurements for Steam or Water



RETURN HEADER FOR WATER BOILERS

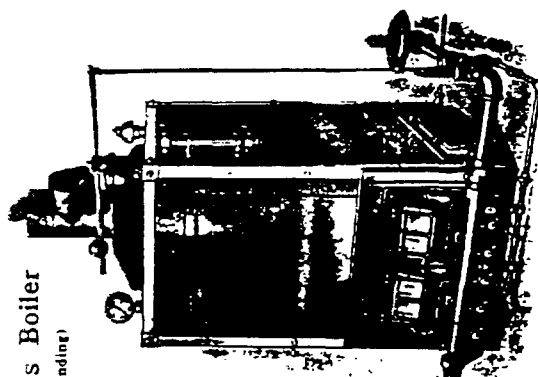
Dimension	Type 1-A		Type 2-A		Type 3-A	
	Steam Inches	Water Inches	Steam Inches	Water Inches	Steam Inches	Water Inches
A	36	47	51	56	77	77
B	47	23 $\frac{1}{2}$	56	29 $\frac{1}{2}$	63	63
C	23 $\frac{1}{2}$	11 $\frac{1}{2}$	29 $\frac{1}{2}$	11	41	41
D	11 $\frac{1}{2}$	12 $\frac{1}{2}$	11	13	13	13
E	12 $\frac{1}{2}$	17 $\frac{1}{2}$	21	21	29 $\frac{1}{2}$	29 $\frac{1}{2}$
F	17 $\frac{1}{2}$	17 $\frac{1}{2}$	19 $\frac{1}{2}$	19 $\frac{1}{2}$	21 $\frac{1}{2}$	21 $\frac{1}{2}$
G	35	6 $\frac{1}{2}$	11	7	40	40
H	6 $\frac{1}{2}$	21 $\frac{1}{2}$	7	26	10	29
I	21 $\frac{1}{2}$	9	13	13	18	18
J	44 $\frac{1}{2}$	11 $\frac{1}{2}$	54	54	61 $\frac{1}{2}$	61 $\frac{1}{2}$
K	5	5	5 $\frac{1}{2}$	5 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$
L	10 $\frac{1}{2}$	10 $\frac{1}{2}$	12 $\frac{1}{2}$	12 $\frac{1}{2}$	14	14

*See pages 31, 33 and 35

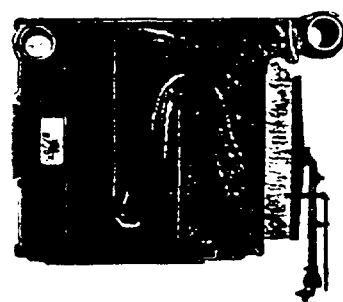
Fire Door Dimensions: Size 1-A, 14 $\frac{1}{2}$ x9 inches; 2-A, 18x10 inches; 3-A, 22x10 inches

IDEAL Gas Boiler

(Patent Pending)



Front View
IDEAL
Gas Boiler



Interior View
IDEAL
Gas Boiler

For Price List of Boiler parts see page 204
For Trimmings see pages 40 and 201

IDEAL Gas Boilers

Natural Gas

Rating—Sq. Ft.				*Steam Safety Valve Size Inches
Steam		Water		
No. of Boiler	Rating Sq. Ft.	No. of Boiler	Rating Sq. Ft.	
2 G-3	500	2 G-30	800	1½
2 G-4	750	2 G-40	1200	1½
2 G-5	1000	2 G-50	1600	1½
2 G-6	1250	2 G-60	2000	2
2 G-7	1500	2 G-70	2400	2
2 G-8	1750	2 G-80	2800	2
2 G-9	2000	2 G-90	3200	2
2 G-10	2250	2 G-100	3600	2½
2 G-11	2500	2 G-110	4000	2½

For list prices, see Current Trade Discount Sheets.
*Safety Valve Sizes accord with A. S. M. E. Boiler Code.
Above ratings are based upon a NATURAL Gas
Pressure of 3 ounces maintained at burner manifold and
a heat value of 1100 B. t. u's per cubic foot of gas.
For gas pressures and heat values other than above
specified, boiler ratings will be furnished.

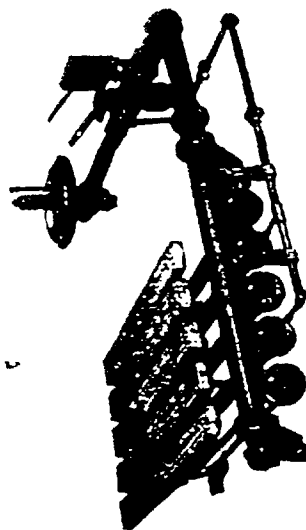
Artificial Gas

Rating—Sq. Ft.				*Steam Safety Valve Size Inches
Steam		Water		
No. of Boiler	Rating Sq. Ft.	No. of Boiler	Rating Sq. Ft.	
2 G-3	400	2 G-30	650	1
2 G-4	600	2 G-40	975	1 1/4
2 G-5	800	2 G-50	1300	1 1/2
2 G-6	1000	2 G-60	1625	1 3/4
2 G-7	1200	2 G-70	1950	2
2 G-8	1400	2 G-80	2275	2
2 G-9	1600	2 G-90	2600	2
2 G-10	1800	2 G-100	2925	2
2 G-11	2000	2 G-110	3250	2 1/2

For list prices, see Current Trade Discount Sheets.
*Safety Valve Sizes accord with A. S. M. E. Boiler Code.
Above ratings are based upon an ARTIFICIAL Gas
Pressure of 2 1/2 inches maintained at burner manifold and
a heat value of 600 B. t. u's per cubic foot of gas.
For gas pressures and heat values other than above
specified, boiler ratings will be furnished.

IDEAL Gas Boiler

(Patent Pending)



Burner Assembly

Regular Boiler Equipment

Supplied with All Hot and Cold Boilers

Steam Boiler

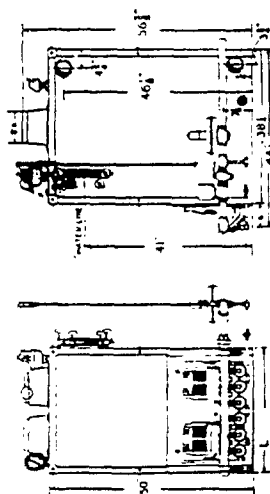
Gas Pressure Governor—Gas Shut-Off Cock, with instruction plate—Snap Gas Valve—Auto Steam Damper Regulator, with lever, weight and connecting rods—Pilot Light Gas Cock—Water Gauge—Tri-Cocks—Ideal Steam Gauge—Draw-Off Cock—Inlet Metallic Jacket—Automatic Draft Regulator—Inlet P. P. Valve

Water Boiler

Gas Pressure Governor—Gas Shut-Off Cock, with instruction plate—Snap Gas Valve—Auto Water Damper Regulator, with lever, weight and connecting rods—Pilot Light Gas Cock—Draw-Off Cock—Inlet Metallic Jacket—Automatic Draft Regulator—Inlet Altitude Gauge—Ideal Hot Water Thermometer.

IDEAL Gas Boilers

(Patent Pending)



Dimensions for Water Boiler Same as for Steam

Natural Gas

Number of Boiler	Length, Inches	Size of Gas Pipe, Inches	Cap. of Gas Water, Cu. Ft. Per Hr.	Number of Burners	Number of Pilots	No. and Size of Smoke Pipes, Inches	Return, Inches
2-G. 3 or 30	16	1	200	2	1	1-6	8 x 8
2-G. 4 or 40	20	1 1/4	300	3	1	1-6	8 x 8
2-G. 5 or 50	24	1 1/2	400	4	2	1-8	8 x 8
2-G. 6 or 60	28	1 3/4	500	5	2	1-8	8 x 8
2-G. 7 or 70	32	2	600	6	3	2-8	8 x 12
2-G. 8 or 80	36	2 1/4	750	7	3	2-8	8 x 12
2-G. 9 or 90	40	2 1/2	900	8	4	2-8	8 x 12
2-G. 10 or 100	44	2 3/4	1050	9	4	2-8	12 x 12
2-G. 11 or 110	48	3	1200	10	5	2-8	12 x 12

Artificial Gas

Number of Boiler	Length, Inches	Size of Gas Pipe, Inches	Cap. of Gas Water, Cu. Ft. Per Hr.	Number of Burners	Number of Pilots	No. and Size of Smoke Pipes, Inches	Return, Inches
2-G. 3 or 30	16	1 1/4	300	2	1	1-6	8 x 8
2-G. 4 or 40	20	1 1/2	450	3	1	1-8	8 x 8
2-G. 5 or 50	24	1 3/4	600	4	2	1-8	8 x 8
2-G. 6 or 60	28	2	750	5	2	2-8	8 x 12
2-G. 7 or 70	32	2 1/4	900	6	3	2-8	8 x 12
2-G. 8 or 80	36	2 1/2	1050	7	3	2-8	8 x 12
2-G. 9 or 90	40	2 3/4	1200	8	4	2-8	12 x 12
2-G. 10 or 100	44	3	1350	9	4	2-8	12 x 12
2-G. 11 or 110	48	3 1/4	1500	10	5	2-8	12 x 12

Natural or Artificial Gas

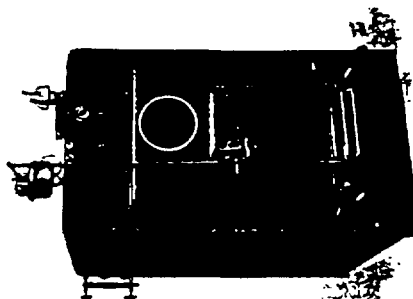
Size of Supply Tappings—Two, 4 inches. Size of Return Tappings—Two, 4 inches.
Height inclusive of trimmings but exclusive of Automatic Draft Regulator, which is about 1 foot higher and makes the total height of boiler only 50 inches. Height of water-line only 11 inches.

IDEAL 29-inch Water Tube Boilers

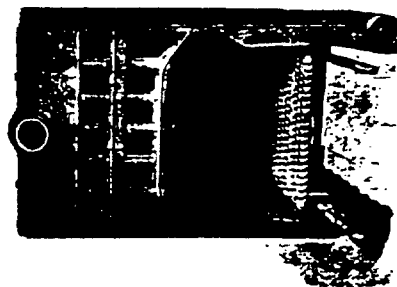
For all Fuels

Patented May 9, 1905, Feb. 12, 1918, other Patents Pending

Rear View
IDEAL 29-inch
Water Tube
Boiler



Interior View
IDEAL 29-inch
Water Tube
Boiler



Rating conditions, see opposite and page 85.
For price list of parts, see page 205.
Arrangement of sections, page 231 and grades page 234.

IDEAL 29-inch Water Tube Boilers (Furnished With or Without Ideal Smoke Preventing Device)

Steam

Without Ideal Smoke Preventing Device	With Ideal Smoke Preventing Device	Boiler with or without Ideal Smoke Preventing Device				
		No. of Boiler	Rating Sq. Ft.	No. of Flues	No. of Flues	*Safety Valve Size Inches
W-29-T-5	See Note	1	1000	5	1-5	2
W-29-T-6	See Note	1	1500	6	1-5	2
W-29-T-7	See Note	1	1800	7	1-5	2
W-29-T-8	See Note	1	2100	8	1-5	2
W-29-T-9	See Note	1	2400	9	1-5	2
W-29-T-10	See Note	1	2700	10	1-5	2
W-29-T-11	See Note	1	3000	11	1-5	2

Height of water line, 5'-0" inches

Water

Without Ideal Smoke Preventing Device	With Ideal Smoke Preventing Device	Boiler with or without Ideal Smoke Preventing Device				
		No. of Boiler	Rating Sq. Ft.	No. of Flues	No. of Flues	*Safety Valve Size Inches
W-29-T-5	See Note	1	1000	5	1-5	2
W-29-T-6	See Note	1	1500	6	1-5	2
W-29-T-7	See Note	1	1800	7	1-5	2
W-29-T-8	See Note	1	2100	8	1-5	2
W-29-T-9	See Note	1	2400	9	1-5	2
W-29-T-10	See Note	1	2700	10	1-5	2
W-29-T-11	See Note	1	3000	11	1-5	2

For list prices, see Current Trade Discount Sheet.
*Safety Valve sizes accord with A. S. M. E. boiler code.

Note: Where a steam boiler of less than 1800 sq. ft. and over 1200 sq. ft. is desired equipped with the Ideal Smoke Preventing Device, we recommend Ideal 29-inch Water Tube Boilers Nos. T-239, 10 or 11.

Factors determining boiler capacities (derived from actual tests):
Number of Boiler 29-T-5 29-T-6 29-T-7 29-T-8 29-T-9 29-T-10
Fuel available, lbs. 100 101 165 426 187 518
Evaporative power, lbs. 10 10 10 10 10 10

Total steam from one boiler, lbs. 2400 3040 3650 4260 4870 5480
Chimney area, sq. ft. 111 111 192 192 192 256
Chimney height, ft. 15 40 35 40 45 40

Additional chimneys, sizes: T-29-11, 16"x16"x10'.
For Smoke Pipe and other dimensions, see page 52.
For good chimney construction and its influence on boiler selection, see pages 235 and 236.

For selection of proper size boiler, see pages 249-251.
RATINGS DEVELOPED WHEN FUEL AVAILABLE IS
BURNED IN 8, 10, OR 12 HOURS

Steam Rating

TIME	5 Sec.	10 Sec.	15 Sec.	20 Sec.	25 Sec.	30 Sec.	35 Sec.	40 Sec.	45 Sec.	50 Sec.	55 Sec.	60 Sec.	65 Sec.	70 Sec.	75 Sec.	80 Sec.	85 Sec.	90 Sec.	95 Sec.	100 Sec.
8 hours	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800	5100	5400	5700	6000	6300	6600	6900
10 hours	960	1215	1440	1680	1920	2160	2400	2640	2880	3120	3360	3600	3840	4080	4320	4560	4800	5040	5280	5520
12 hours	800	1015	1215	1415	1615	1815	2015	2215	2415	2615	2815	3015	3215	3415	3615	3815	4015	4215	4415	4615

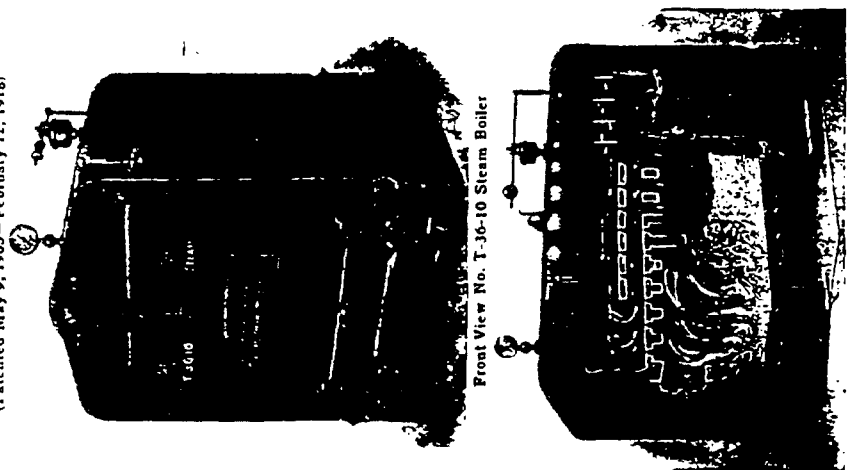
Water Rating

TIME	5 Sec.	10 Sec.	15 Sec.	20 Sec.	25 Sec.	30 Sec.	35 Sec.	40 Sec.	45 Sec.	50 Sec.	55 Sec.	60 Sec.	65 Sec.	70 Sec.	75 Sec.	80 Sec.	85 Sec.	90 Sec.	95 Sec.	100 Sec.
8 hours	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800	5100	5400	5700	6000	6300	6600	6900
10 hours	960	1215	1440	1680	1920	2160	2400	2640	2880	3120	3360	3600	3840	4080	4320	4560	4800	5040	5280	5520
12 hours	800	1015	1215	1415	1615	1815	2015	2215	2415	2615	2815	3015	3215	3415	3615	3815	4015	4215	4415	4615

Rating conditions, see opposite and page 85.
For price list of parts, see page 205.
Arrangement of sections, page 231 and grades page 234.

IDEAL 36-Inch Water Tube Boilers

For all Fuels
(Without Jacket)
(Patented May 9, 1905—February 12, 1918)



For Guarantee and Coverings see pages 85, 170
Regarding fuels see page 322.
Rating conditions see pages opposite and 85
For Free List of boiler parts, see page 208.
Arrangements of Sections, pages 231, 232, and Ginties, page 234.

IDEAL 36-inch Water Tube Boilers

(Furnished Without Ideal Metallic Jacket only).

Without Ideal Smoke Preventing Device	With Ideal Smoke Preventing Device	Boiler with or without Ideal Smoke Preventing Device				Safety Valve Rise, Inches
		No. of Boiler	Rating, Sq. Ft.	No. of Tubes	Inlets, No. and Rise	
S 16-T-5		1	1250	6	1 6	2 4
W 36-T-6		1	2200	7	1 6	2 4
S 16-T-7		1	2650	8	1 6	2 4
W 36-T-8		1	3100	10	1 6	2 4
S 16-T-9		1	3550	12	2 6	2 4
S 36-T-10		1	4000	13	2 6	2 4
S 36-T-11		1	4450	15	2 6	2 4
S 36-T-12		1	4900	16	2 6	2 4

Height of water line, 58 inches.

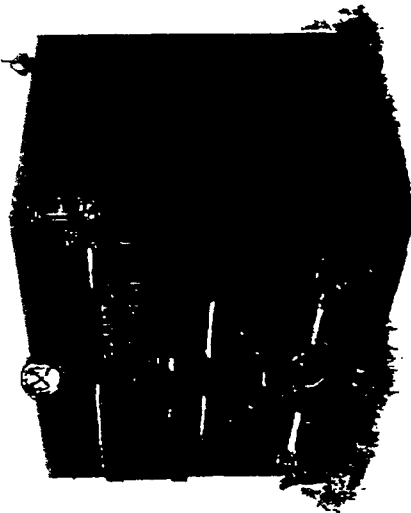
Water				Steam			
W 36-T-5	W 36-T-6	W 36-T-7	W 36-T-8	W 36-T-9	W 36-T-10	W 36-T-11	W 36-T-12
2875	3600	4125	4650	5175	5700	6225	6750
1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6
1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6
1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6
1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6
1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6
1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6
1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6
1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6

For list prices, see Current Trade Discount Sheet.
Safety Valve sizes according with A. S. M. E. boiler code.
Factors determining boiler capacities (derived from actual tests)
36-T-5 36-T-6 36-T-7 36-T-8
375 468 562 655
9.5 9.5 9.5 9.5
Fuel available, lbs.
Evaporative power, lbs.
Total steam from one fuel charge, lbs.
Chimney area (on level), sq. ft.
Chimney height, ft.
Number of boiler
Fuel available, lbs.
Evaporative power, lbs.
Total steam from one fuel charge, lbs.
Chimney area (on level), sq. ft.
Chimney height, ft.
For smoke pipe and other dimensions, see page 53.
For good design, see page 234.
For selection of proper size boiler, see pages 249-251.
Ratings developed when available fuel is burned in 8, 10, or 12 hours.

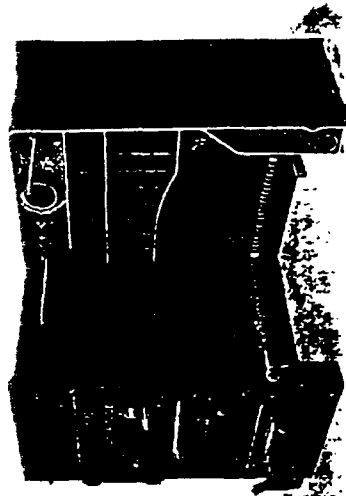
Steam Rating				Water Rating			
TIME	Sec. 16	Sec. 17	Sec. 18	Sec. 19	Sec. 20	Sec. 21	Sec. 22
8 hours	1750	2200	2650	3100	3550	4000	4450
10 hours	1125	1700	2115	2490	2845	3200	3560
12 hours	918	1360	1700	2075	2370	2665	2960
8 hours	1875	2400	2875	3350	3825	4300	4775
10 hours	1125	1700	2115	2490	2845	3200	3560
12 hours	918	1360	1700	2075	2370	2665	2960

IDEAL 79-Inch Water Tube Boiler

(Pat'd May 9, 1905-Feb. 12, 1918, other patents pending)



Front View of S-79-T-13 Boiler



Interior View of S-79-T-13 Boiler

For Price List of Parts see page 206. Jacket Parts page 207.
Arrangement of Sections see page 233.
Arrangement of Grates, see page 234.

IDEAL 79-inch Water Tube Boilers

(Furnished With or Without Ideal Metallic Jacket)

Without Ideal Smoke Preventing Device

Steam

Boiler No.	Rating, Sq. Ft.	No. of Sections	Total Length, Inches	Area, Sq. Ft.	Let's No. and Size	Ins. No. and Size	Safety Valve No. and Size
S-79-T-7	7000	7	48	22.96	1 10	1 4	1 4
S-79-T-8	8000	8	54	26.24	1 10	1 4	1 4 1/2
S-79-T-9	9000	9	60	29.52	1 10	1 4	1 3 1/2
S-79-T-10	10000	10	66	32.80	1 10	1 4	1 4 1/2
S-79-T-11	11000	11	72	36.08	1 10	1 4	1 4 1/2
S-79-T-12	12000	12	78	39.36	1 10	1 4	1 4 1/2
S-79-T-13	13000	13	84	42.64	1 10	1 4	2 4
S-79-T-14	14000	14	90	45.92	1 10	1 4	2 4
S-79-T-15	15000	15	96	49.20	1 10	1 4	3 3/8

Height of water line, 62 inches. Height of boiler, 81 1/2 inches.

Water

Boiler No.	Rating, Sq. Ft.	No. of Sections	Total Length, Inches	Area, Sq. Ft.	Let's No. and Size	Ins. No. and Size	Safety Valve No. and Size
W-79-T-7	11550	7	48	22.96	1 10	2 10	1 4
W-79-T-8	12000	8	54	26.24	1 10	2 10	1 4
W-79-T-9	12500	9	60	29.52	1 10	2 10	1 4
W-79-T-10	13000	10	66	32.80	1 10	2 10	1 4
W-79-T-11	13500	11	72	36.08	1 10	2 10	1 4
W-79-T-12	14000	12	78	39.36	1 10	2 10	1 4
W-79-T-13	14500	13	84	42.64	1 10	2 10	1 4
W-79-T-14	15000	14	90	45.92	1 10	2 10	1 4
W-79-T-15	15500	15	96	49.20	1 10	2 10	1 4

For list prices see Catalogue. For Discount Sheet

*Safety Valve sizes accord with A. S. M. E. boiler code.

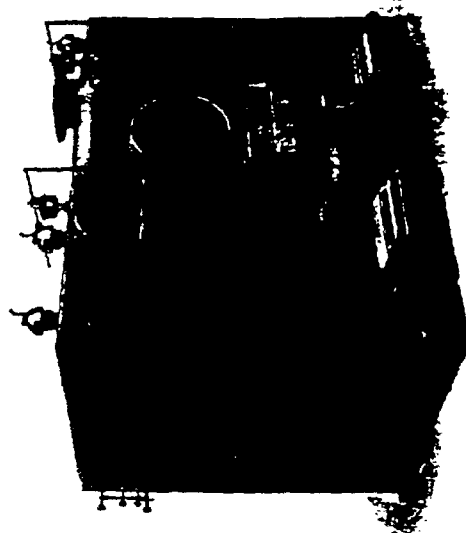
Factors Determining Boiler Capacities (based on actual tests)

Number of Sections in Boiler	7	8	9	10	11
Fuel available, lbs.	189	216	243	270	297
Evaporative Power, lbs.	9.25	9.25	9.25	9.25	9.25
Total Steam from one fuel charge, lbs.	1750	2000	2250	2500	2750
Chimney Area (each side), sq. in.	180	480	576	576	672
Chimney height, ft.	65	70	70	70	75
Number of Sections in Boiler	12	13	14	15	
Fuel available, lbs.	124	151	178	106	
Evaporative power, lbs.	9.25	9.25	9.25	9.25	
Total steam from one fuel charge, lbs.	1000	1250	1500	1750	
Chimney area (each side), sq. in.	672	784	784	854	
Chimney height, ft.	75	80	80	85	

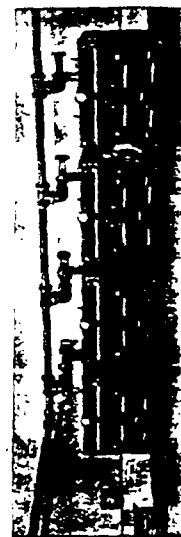
For Smoke Pipe dimensions and assemblies, see page 54.
For good chimney construction, and its influence on boiler selection, see pages 235 and 236.
For selection of proper size boiler see pages 249-251.

IDEAL 79-Inch Water Tube Boilers

(Pat'd May 9, 1905 - Feb 12, 1918, Other Patents Pending)



Rear View of T 79-13 Boiler



Typical Battery Installation

For Price List of Parts, see page 206 Jacket, page 207.
Arrangement of Grates, see page 214

IDEAL 79-inch Water Tube Boilers

(Furnished With or Without Ideal Metallic Jacket)
With Ideal Smoke Preventing Device

Boiler Number	Rating Sq. Ft.	No. of Tubes	Total Length Inches		Grate Area Sq. Ft.	Out. Jets No. and Size	In. Jets No. and Size	Safety Valves No. and Size
			Sec.	1.				
T 79-9	9000	9	60	29.52	1.10	1.4	1.3	1.3
T 79-10	10000	10	66	32.80	1.10	1.4	1.4	1.3
T 79-11	11000	11	72	36.08	1.10	1.4	1.4	1.3
T 79-12	12000	12	78	39.36	1.10	1.4	1.4	1.3
T 79-13	13000	13	84	42.64	1.10	1.4	1.4	1.3
T 79-14	14000	14	90	45.92	1.10	1.4	1.4	1.3
T 79-15	15000	15	96	49.20	1.10	1.4	1.4	1.3

Height of Water Line 66 inches. Height of boiler, 81 1/2 inches.

Water

Boiler Number	Rating Sq. Ft.	No. of Tubes	Total Length Inches	Grate Area Sq. Ft.	Out. Jets No. and Size	In. Jets No. and Size	Safety Valves No. and Size
T 79-90	14850	9	60	29.52	1.10	2.10	2.10
T 79-100	16500	10	66	32.80	1.10	2.10	2.10
T 79-110	18150	11	72	36.08	1.10	2.10	2.10
T 79-120	19800	12	78	39.36	1.10	2.10	2.10
T 79-130	21450	13	84	42.64	1.10	2.10	2.10
T 79-140	23100	14	90	45.92	1.10	2.10	2.10
T 79-150	24750	15	96	49.20	1.10	2.10	2.10

For List Price see Current Trade Discount Sheet.

*Safety Valve sizes accord with A. S. M. E. boiler code

Factors determining boiler capacities (derived from actual tests)

Number of Sections in Boiler	9	10	11	12
Fuel available, lbs.	244	270	297	324
Evaporative power, lbs.	9.25	9.25	9.25	9.25
Total steam from one boiler, lbs.	2250	2500	2750	3000
Chimney area for each boiler, sq. ft.	576	576	672	672
Chimney height, ft.	70	70	75	75

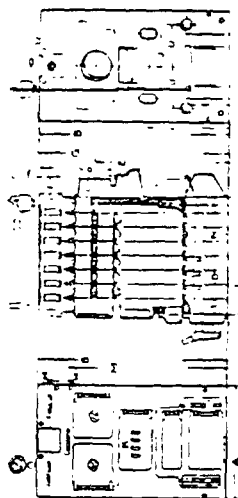
Number of Sections in Boiler

Number of Sections in Boiler	13	14	15
Fuel available, lbs.	351	378	406
Evaporative power, lbs.	9.25	9.25	9.25
Total steam from one boiler, lbs.	3250	3500	3750
Chimney area for each boiler, sq. ft.	672	784	784
Chimney height, ft.	80	80	85

For Smoke Pipe dimensions and assemblies, see page 54.
For Good chimney construction, and its influence on boiler selection, see pages 215 and 216.
For selection of proper size boiler, see pages 219, 251

IDEAL Water Tube Boilers

Dimensions
23 and 29-Inch Series



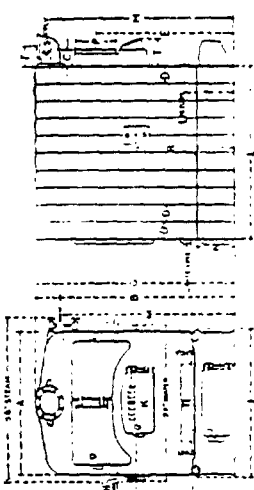
Dimensions	23" SERIES		29" SERIES	
	Steam	Water	Steam	Water
A	31 1/2"	31 1/2"	38 1/2"	38 1/2"
B	53 3/8"	50 3/8"	62"	59 3/8"
C	43 1/2"	43 1/2"	51 1/2"	51 1/2"
D	4"	4"	6"	6"
E	37 3/8"	37 3/8"	43 3/8"	43 3/8"
F	51 1/2"	51 1/2"	61 1/2"	61 1/2"
G	54 1/2"	51 1/2"	63"	60 3/8"
I	13 1/2"	13 1/2"	17 1/2"	17 1/2"
J	18 1/2"	18 1/2"	21 1/2"	21 1/2"
K	8 1/2" x 15"	8 1/2" x 15"	9" x 18"	9" x 18"
M	41 1/2"	41 1/2"	52 1/2"	52 1/2"
N	13"	13"	11"	11"
P	9"	9"	12"	12"
S	23 3/8"	23 3/8"	25 3/8"	25 3/8"
T	41 1/2"	41 1/2"	6"	6"
U	11 7/8"	11 7/8"	14 1/2"	14 1/2"
V			9"	9"

Number of Section
23-inch Series
Dimension "L," inches
29-inch Series
Dimension "L," inches

5	6	7	8	9	10	11
21	25	29	33	37	41	45
30	36	42	48	54	60	66

Ideal Water Tube Boilers

36-Inch Series



Measurements on 36-Inch Series (Steam or Water)

A - 50 inches	G - 64 inches	N - 54 inches
B - 60 inches	H - 64 inches	P - 12 inches
C - 15 1/2 inches	I - 12 1/2 inches	R - 14 inches
D - 6 inches	J - 52 inches	S - 19 inches
E - 53 inches	K - 60 inches	T - 10 inches
F - 6 1/2 inches (flange interchangeable front or back)	L - 52 inches	

The center to center distance between the two 1-inch return tapings on the back section is 11 inches.

Chimney Flue Sizes

When the Full Rated Capacity is Operating

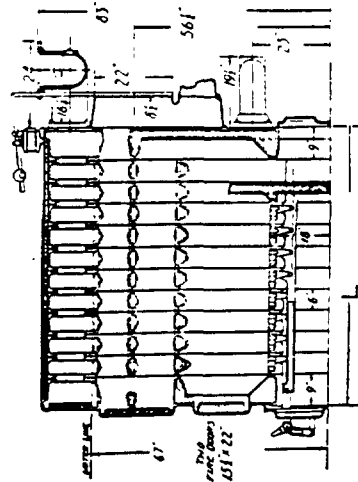
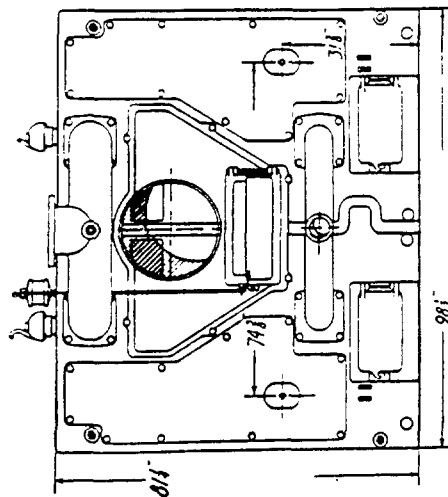
Number of Boiler	Number of Boilers in Battery or Connected to One Chimney			Number of Boilers in Battery or Connected to One Chimney		
	Dim. In.	Height Ft.	Area Sq. Ft.	Dim. In.	Height Ft.	Area Sq. Ft.
S or W 36-T-5	12 x 12	35	12 x 16	45	16 x 20	50
S or W 36-T-6	12 x 16	35	16 x 16	45	20 x 20	50
S or W 36-T-7	12 x 16	40	16 x 20	50	20 x 24	55
S or W 36-T-8	16 x 16	40	20 x 20	55	24 x 24	60
S or W 36-T-9	16 x 16	45	20 x 24	55	24 x 28	65
S or W 36-T-10	16 x 16	50	24 x 24	60	28 x 28	70
S or W 36-T-11	16 x 16	55	24 x 28	60	28 x 32	75
S or W 36-T-12	16 x 16	60	28 x 28	65	32 x 32	80

Number of Boiler	Number of Boilers in Battery or Connected to One Chimney			Number of Boilers in Battery or Connected to One Chimney		
	Dim. In.	Height Ft.	Area Sq. Ft.	Dim. In.	Height Ft.	Area Sq. Ft.
S or W 36-T-5	16 x 20	55	20 x 24	60	32 x 32	85
S or W 36-T-6	20 x 21	55	24 x 24	60	32 x 36	90
S or W 36-T-7	24 x 24	60	24 x 28	65	36 x 36	95
S or W 36-T-8	24 x 28	65	28 x 28	70	36 x 40	100
S or W 36-T-9	28 x 28	65	28 x 32	75	40 x 40	105
S or W 36-T-10	28 x 32	70	32 x 32	80	40 x 44	110
S or W 36-T-11	32 x 32	75	32 x 36	85	44 x 44	115
S or W 36-T-12	32 x 36	80	36 x 36	90	44 x 48	120

It should be clearly understood that the chimney sizes shown in this table are for a fair quality of free burning soft coal when the full rated capacity is in service.

IDEAL 79-inch Water Tube Boiler

Dimensions



L—7 sec.	8 sec.	9 sec.	10 sec.	11 sec.
43 ins.	54 ins.	60 ins.	66 ins.	72 ins.
L—13 sec.	13 sec.	11 sec.	15 sec.	
78 ins.	84 ins.	90 ins.	96 ins.	
				51

Ideal Water Tube Boiler Equipment

23, 29 and 79 Inch Series

Steam Boiler

Ideal Automatic Regulation: Consisting of Arco Steam Regulator including lever, counterweight rod, etc.

Ideal Steam Gauge: For low pressure and vapor systems. Water seal provided with each gauge.

Water Column Glass with heavy brass gauge cocks and guards— $\frac{1}{8}$ " pet. cock

Try-Cocks: Two, $\frac{3}{8}$ " of brass.

Firing Tools: Poker, hoe and wire-flue brush with handles. Jacket—Heavy black japanned steel jacket lined with high grade insulation.

Water Boiler

*Ideal Damper Control: Consisting of bracket, hand-wheel with screw, lever and rod, etc.

Firing Tools: Poker, hoe and wire-flue brush with handles. Jacket—Heavy black japanned steel jacket lined with high grade insulation.

*Arco Water Damper Regulator furnished with Ideal 79" Water Tube Boiler at no extra charge.

36-Inch Series

Steam Boiler

Ideal Automatic Regulation: Consisting of Arco Steam Regulator including lever, counterweight rod, etc.

Ideal Steam Gauge: For low pressure and vapor systems. Water seal provided with each gauge.

Water Column Glass with heavy brass gauge cocks and guards— $\frac{1}{8}$ " pet. cock.

Try-Cocks: Two, of brass.

Firing Tools: Poker, hoe and wire-flue brush with handles.

Water Boiler

Ideal Damper Control: Consisting of bracket, hand-wheel with screw, lever and rod, etc.

Firing Tools: Poker, hoe and wire-flue brush with handles.

Boiler Accessories Supplied at Extra Charge

Steam Boiler

Ideal Pop Safety Valves: For low pressure

Stock No. 971

Size List Price

1" \$ 6.00

2" 21.2

3" 37.50

4" 50.00

6" 80.00

8" 80.00

10" 80.00

12" 80.00

Water Boiler

Ideal Automatic Regulation: Consisting of Arco

Water Regulator including lever, counterweight, rod, etc.

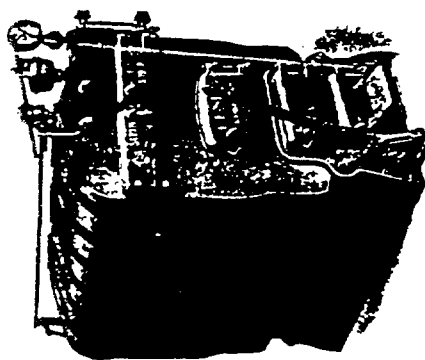
Ideal Altitude Gauge: 1 1/2" Dial

Ideal Hot Water Thermometer—straight

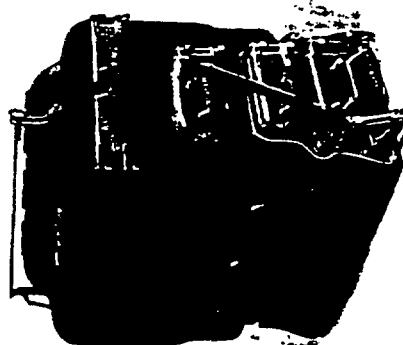
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IDEAL Sectional 19-inch Boilers

(Pat'd May 9, 1905)



No. S-10-7 Steam Boiler



No. W-10-7 Water Boiler

For Price List of Boiler Parts: Page 209. For Guarantee and Capacity Rating conditions: Page 85. For Arrangement of Section and Grate: Pages 15, 16. For Trimmings and Firing Tools: Pages 21, 22.

IDEAL Sectional 19-inch Boilers

Steam

Boiler No.	Hour Rating Sq. Ft.	Total Length, Sec. Ft.	Grate Area, Sq. Ft.	Height, In.	Out. Let-Off, No. and Size	Safety Valve, No. and Size, Inches
S 19-5	600	5	512	50	2 3/4	1 1/2
S 19-6	750	6	583	50	2 3/4	1 1/2
S 19-7	900	7	65	50	3 3/4	1 1/2

Water

W-19-5	1000	5	51 1/2	50	2 3/4	1 1/2
W-19-6	1250	6	58 3/4	50	2 3/4	1 1/2
W-19-7	1500	7	65	50	3 3/4	1 1/2

For list prices, see Current Trade Discount Sheet.
Safety Valve size accord with A. S. M. E. boiler code.

Factors determining boiler capacities (derived from actual tests)

Number of Boiler—Steam or Water	19-5	19-6	19-7
Fuel available, lbs.	141	177	212
Evaporative power, lbs.	8 5	8 5	8 5
Total steam from one foot grate, lbs.	1900	1505	1803
Chimney area (Gr. & H. ft. of m)	96	96	96
Chimney height, ft.	15	15	10
For Smoke Pipe and other dimensions, see pages 68 and 69.			
For good chimney construction and its influence on boiler selection, see pages 235 and 236.			
For selection of proper boiler, see pages 249-251.			

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 8, 10 OR 12 HOURS

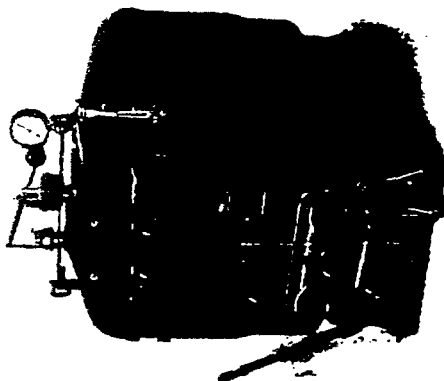
TIME	Steam Rating		
	5 Sec.	6 Sec.	7 Sec.
8 Hours	600	750	800
10 "	480	600	720
12 "	400	500	600

Water Rating

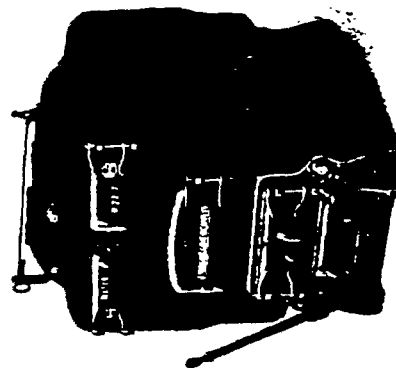
TIME	Water Rating		
	5 Sec.	6 Sec.	7 Sec.
8 Hours	1000	1250	1500
10 "	790	990	1190
12 "	660	825	990

IDEAL Sectional 22-inch Boilers

(Patented May 9, 1905)



No. S-22-7 Steam Boiler



No. W-22-5 Water Boiler
For Price List of Boiler parts: Page 209; Coverings, page 190.
For Connections and Conditions: Rating conditions, page 85.
For Dimensions and Details: Sectional drawings, page 85.
For Trimmings and Firing Tools: page 213, 214.

SR

IDEAL Sectional 22-inch Boilers

Steam

Boiler No.	Water Rating, sq. ft.	No. of Tubes	Total Length, inches	Grate Area, sq. ft.	Height, inches	Out-lets, No. and Size	Inlets, No. and Size	Safety Valve, Size, inches
S-22-5 800	5	53 1/2	4 08	4 08	46 1/2	53	2-4	4-4
S-22-6 1000	6	60 1/2	5 10	5 10	46 1/2	53	2-4	4-4
S-22-7 1200	7	67 1/2	6 12	6 12	46 1/2	53	3-4	6-4

Water

Boiler No.	Water Rating, sq. ft.	No. of Tubes	Total Length, inches	Grate Area, sq. ft.	Height, inches	Out-lets, No. and Size	Inlets, No. and Size	Safety Valve, Size, inches
W-22-5 1300	5	53 1/2	4 08	4 08	46 1/2	53	2-4	4-4
W-22-6 1650	6	60 1/2	5 10	5 10	46 1/2	53	2-4	4-4
W-22-7 2000	7	67 1/2	6 12	6 12	46 1/2	53	3-4	6-4

For list prices, see Current Trade Discount Sheet.

*Safety Valve, sizes accord with A. S. M. E. boiler code.

Factors determining boiler capacities (Derived from actual tests)

Number of Boiler	Steam or Water	22-5	22-6	22-7
Fuel available, lbs.	100	100	216	283
Evaporative power, lbs.	8 5	8 5	8 5	8 5
Total steam from one fuel charge	1607	2007	2407	
Chimney area (scale level), sq. in.	96	96	96	96
Chimney height, ft.	35	35	35	40

For Smoke Pipe and other dimensions, see pages 68 and 69.

For good chimney construction and its influence on boiler selection, see pages 215 and 216.

For scale of fuel prices, see page 213.

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 8, 10 OR 12 HOURS

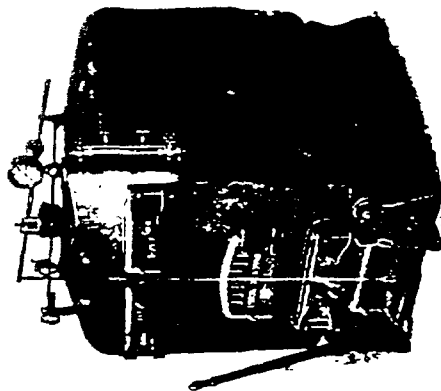
TIME	Steam Rating		
	5 Sec.	6 Sec.	7 Sec.
8 hours	800	1000	1200
10 hours	640	800	960
12 hours	535	665	800

TIME	Water Rating		
	5 Sec.	6 Sec.	7 Sec.
8 hours	1300	1650	2000
10 hours	1055	1320	1585
12 hours	880	1100	1320

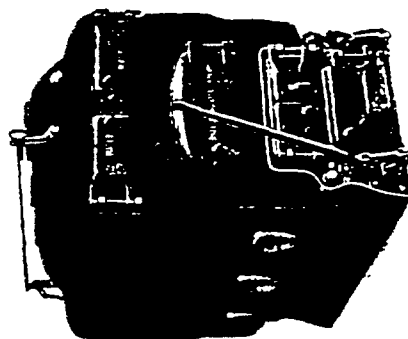
SR

IDEAL Sectional 25-inch Boilers

(Patented May 9, 1903)



No. S-25-7 Steam Boiler



No. W-25-7 Water Boiler

For Price List of Boiler parts, Page 299, Coverings, Page 190
For Guarantee and Coverings, Rating conditions, C. & G. Co., page 85
Arrangement of No. 10 and 12 Grates, page 215, 216
Thimblings and Trimmings, page 215, 216

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IDEAL Sectional 25-inch Boilers

Steam

Boiler No.	Steam Rating	Length, Inches	Grate Area, Sq. Ft.	Water Heating Surface, Sq. Ft.	Height, Feet	Ins. No. and Size	Safety Valve, No. and Size
S 25-5	1100	5	5.91	5.14	57.1	2 1/2	2
S 25-6	1350	6	6.64	6.80	57.1	2 1/2	2
S 25-7	1600	7	7.41	8.16	57.1	3 1/4	2
S 25-8	1850	8	8.21	9.52	57.1	4 1/4	2 1/2

Water

Boiler No.	Length, Inches	Grate Area, Sq. Ft.	Water Heating Surface, Sq. Ft.	Height, Feet	Ins. No. and Size	Safety Valve, No. and Size
W 25-5	1825	5	5.91	5.14	57.1	2 1/2
W 25-6	2225	6	6.64	6.80	57.1	2 1/2
W 25-7	2650	7	7.41	8.16	57.1	3 1/4
W 25-8	3050	8	8.21	9.52	57.1	4 1/4

For list prices, see Catalog, Trade Discount Sheet

*Safety Valve, see Catalog with A. S. M. E. Boiler Code

Factors determining boiler capacities (derived from actual tests)

Number of Boiler, 25-5	25-6	25-7	25-8
For available power, H.P.	250	318	377
Evaporative power, lbs.	85	85	85
Total steam from one fuel charge	2302	2704	3208
Chimney area, sq. ft., 40 in.	96	96	111
Chimney height, ft.	40	40	50
For Smoke Pipe or other dimensions, see page 68 and 69			
For good chimney construction and its influence on boiler selection, see pages 215, 216			

For selection, see page 199, 200

RATINGS DEVELOPED WHEN AVAILABLE FUELS BURNED IN 8, 10 OR 12 HOURS

Steam Rating

TIME	5 Sec.	6 Sec.	7 Sec.	8 Sec.
8 hours	1100	1350	1600	1850
10 hours	880	1080	1280	1480
12 hours	735	900	1070	1235

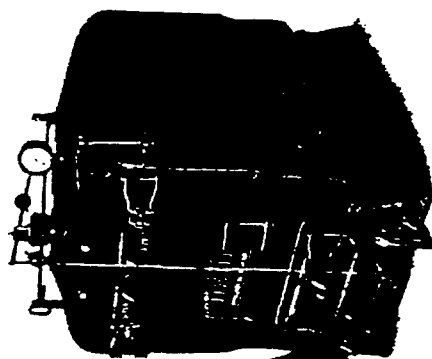
Water Rating

TIME	5 Sec.	6 Sec.	7 Sec.	8 Sec.
8 hours	1825	2225	2650	3050
10 hours	1450	1780	2110	2440
12 hours	1215	1485	1765	2040

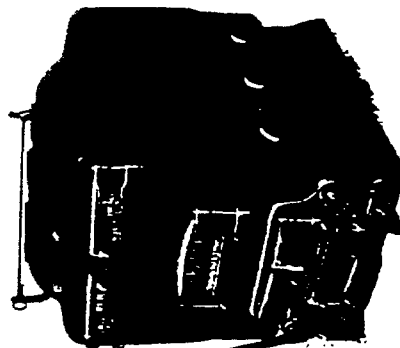
61

IDEAL Sectional 28-inch Boilers

(Pat'd May 9, 1905)



No. S-28-7 Steam Boiler



No. W-28-7 Water Boiler

For Price List of Boiler parts: page 299; Coverings: page 190
For Guarantee and Conditions: page 200; Conditions of Sale: page 85.
Arrangement of Stacks and Grates: page 246, 247.
Trimming and Firing Tools: page 248, 249.

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IDEAL Sectional 28-inch Boilers

Steam

Boiler No.	Number of Tubes	Total Length, Inches	Grate Area, Sq. Ft.	Height, Inches	Outlets, No. and Size	Safety Valve, No. and Size, Inches
S-28-5	1300	60	6.24	54	2 1/2	2
S-28-6	1625	68	7.80	54	2 1/2	2
S-28-7	1950	76	9.36	54	3 1/2	2 1/2
S-28-8	2275	84	10.92	54	3 1/2	2 1/2

Water

Boiler No.	Number of Tubes	Total Length, Inches	Grate Area, Sq. Ft.	Height, Inches	Outlets, No. and Size	Safety Valve, No. and Size, Inches
W-28-5	1500	60	6.24	60	2 1/2	1 1/2
W-28-6	1675	68	7.80	60	2 1/2	1 1/2
W-28-7	1900	76	9.36	60	3 1/2	1 1/2
W-28-8	2125	84	10.92	60	3 1/2	1 1/2

For List Prices see our "Trade Discount Sheet."

*Safety Valve sizes are with A. S. M. E. boiler code.

Factors determining boiler capacities obtained from actual tests.

Number of Boilers	Section of Water	8.5	8.6	8.7	28.8
Fuel available, lb.		299	331	408	523
Evaporative power, lb.		8.7	8.7	8.7	8.7
Total steam from boiler, lb.		602	655	690	1550
Chimney area, sq. ft.		141	141	192	192
Chimney height, ft.		40	40	50	60

For Smoke Pipe and other dimensions, see pages 68 and 69.

For good chimney construction and its influence on boiler efficiency, see pages 245 and 246.

For selection of proper size boiler, see page 249-54.

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 8, 10 OR 12 HOURS

Steam Rating

TIME	8 Hrs.			10 Hrs.			12 Hrs.		
	5 Sec.	16 Sec.	7 Sec.	5 Sec.	16 Sec.	7 Sec.	5 Sec.	16 Sec.	7 Sec.
8 Hours	1300	1625	1950	1300	1625	1950	1300	1625	1950
10 "	1010	1300	1560	1010	1300	1560	1010	1300	1560
12 "	865	1085	1300	865	1085	1300	865	1085	1300

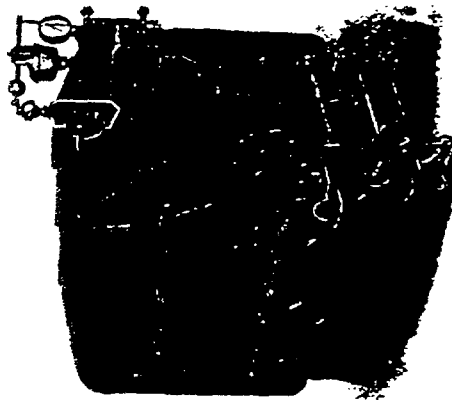
Water Rating

TIME	8 Hrs.			10 Hrs.			12 Hrs.		
	5 Sec.	16 Sec.	7 Sec.	5 Sec.	16 Sec.	7 Sec.	5 Sec.	16 Sec.	7 Sec.
8 Hours	2150	2675	3200	2150	2675	3200	2150	2675	3200
10 "	1715	2145	2575	1715	2145	2575	1715	2145	2575
12 "	1425	1790	2115	1425	1790	2115	1425	1790	2115

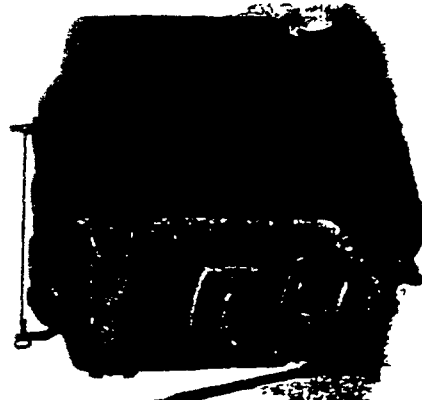
64

IDEAL Sectional 36-inch Boilers

(Pat'd May 9, 1905)



No. S-36-7 Steam Boiler



No. W-36-7 Water Boiler

For Price List of Boiler parts: page 209; Coverings, page 190.
For Guarantee and Coverings, Rating conditions, Colds, etc., page 85.
Arrangement of Sections and Grates, pages 215, 231.
Trimming and Firing Tools, pages 221, 221.

IDEAL Sectional 36-inch Boilers

Steam

Boiler No.	Hour Rating, lbs. per sq. ft.	No. of Tubes	Total Tube Length, ft.	Grate Area, sq. ft.	Height of Water Line, inches	Height of Smoke Stack, inches	Outlet No. and Size	Inlet No. and Size	Safety Valve, lbs. and Inches
S-36-5	2100	5	693 1/2	9 1/2	60 3/4	60 1/2	2-5	4-5	2 1/2
S-36-6	2625	6	787 1/2	11 1/2	60 3/4	60 1/2	2-5	4-5	2 1/2
S-36-7	3150	7	88	13 1/2	60 3/4	60 1/2	3-5	6-5	3
S-36-8	3675	8	97 1/2	15 1/2	60 3/4	60 1/2	3-5	6-5	3
S-36-9	4200	9	106 1/2	18 1/2	60 3/4	60 1/2	4-5	8-5	3

Water

Boiler No.	Hour Rating, lbs. per sq. ft.	No. of Tubes	Total Tube Length, ft.	Grate Area, sq. ft.	Height of Water Line, inches	Height of Smoke Stack, inches	Outlet No. and Size	Inlet No. and Size	Safety Valve, lbs. and Inches
W-36-5	3150	5	693 1/2	9 1/2	60 3/4	60 1/2	2-5	4-5	2 1/2
W-36-6	4325	6	787 1/2	11 1/2	60 3/4	60 1/2	2-5	4-5	2 1/2
W-36-7	5200	7	88	13 1/2	60 3/4	60 1/2	3-5	6-5	3
W-36-8	6050	8	97 1/2	15 1/2	60 3/4	60 1/2	3-5	6-5	3
W-36-9	6925	9	106 1/2	18 1/2	60 3/4	60 1/2	4-5	8-5	3

For list prices see Current Trade Discount Sheet.

*Safety Valve sizes accord with A. S. M. E. boiler code.

Factors determining boiler capacities (derived from actual tests)

Number of Boiler—Steam or Water	36-5	36-6	36-7	36-8	36-9
End available, lbs.	506	613	759	886	1013
Evaporative power, lbs.	8 3/8	8 3/8	8 3/8	8 3/8	8 3/8
Total steam from one fuel charge	4300	5250	6300	7350	8400
Chimney area (sq. ft.), sq. in.	238	288	350	410	470
Chimney height, ft.	40	40	40	40	40

For Smoke Pipe and other dimensions, see pages 68 and 69.

For good chimney construction, and its influence on boiler selection, see pages 215 and 216.

For selection of proper size boiler, see pages 219-251

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 8, 10 OR 12 HOURS

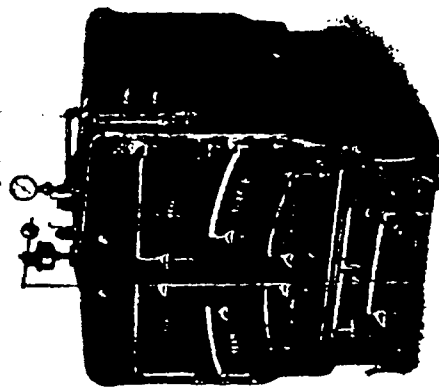
Steam Rating

TIME	5 Sec.	6 Sec.	7 Sec.	8 Sec.	9 Sec.
8 hours	2100	2625	3150	3675	4200
10 hours	1680	2100	2520	2940	3360
12 hours	1400	1750	2100	2450	2800

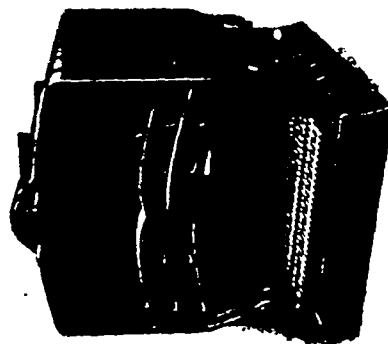
Water Rating

8 hours	3450	4325	5200	6050	6925
10 hours	2775	3465	4160	4850	5545
12 hours	2310	2890	3465	4040	4670

IDEAL Sectional 48-inch Boilers For All Fuels (Patented May 9, 1905)



No. T-48-8 Steam Boiler



No. W-48-8 Water Boiler Rear View with Back Section Removed
For Price List of Boiler parts, page 210. Coverings, page 190.
For Guarantee and Coverings, Rating conditions, Cols. etc., page 85.
Arrangements of Sections and Grates pages 236, 237.
Trimming and Firing Tools pages 223, 224.

ORIGINAL AS WITH SAME FUEL TRAVEL AS
HOT FIVE INCH AND 11
REGULAR 1924 UP W.T.
CENTER, OLD IDEAL 48-inch Boilers BUT NO
FUEL 0.51 3.11
OLD STYLE BUILT FOR AND
192.13
STEAMBOILER 176-3350R

Boiler without Ideal Smoke Preventing Device				Boiler with Ideal Smoke Preventing Device				Boiler with or with- out Ideal Smoke Preventing Device			
No. of Water	No. and Bore	Grate Area Sq. Ft.	No. of Boiler	No. and Bore	Grate Area Sq. Ft.	No. of Boiler	No. of Boiler	In- let No.	Out- let No.	In- let No.	Out- let No.
S. 18-6	1-3 1/2	18.00	T-48-6	1-3 1/2	18.00	T-48-6	2-0	2-0	2-0	2-0	2-0
S. 18-7	1-3 1/2	21.60	T-48-7	1-3 1/2	21.60	T-48-7	2-6	2-6	2-6	2-6	2-6
S. 18-8	2-3	25.20	T-48-8	2-3	25.20	T-48-8	3-6	3-6	3-6	3-6	3-6
S. 18-9	2-3	28.80	T-48-9	2-3	28.80	T-48-9	3-6	3-6	3-6	3-6	3-6
S. 18-10	2-3 1/2	32.40	T-48-10	2-3 1/2	32.40	T-48-10	4-0	4-0	4-0	4-0	4-0
			T-48-11	2-3 1/2	35.20	T-48-11	4-0	4-0	4-0	4-0	4-0
			T-48-12	2-3 1/2	38.40	T-48-12	4-0	4-0	4-0	4-0	4-0

Height of water line 72 inches. *Call 6-27 4-14-24 6 29 1/2*

Water				Steam			
No.	Grate Area Sq. Ft.	No.	Grate Area Sq. Ft.	No.	Grate Area Sq. Ft.	No.	Grate Area Sq. Ft.
W-48-6	18.00	T-48-60	18.00	8700	2-0	4-0	4-0
W-48-7	21.60	T-48-70	21.60	10375	2-6	4-0	4-0
W-48-8	25.20	T-48-80	25.20	12030	3-6	4-0	4-0
W-48-9	28.80	T-48-90	28.80	13725	3-6	4-0	4-0
W-48-10	32.40	T-48-100	32.40	15480	4-0	4-0	4-0
		T-48-110		17295	4-0	4-0	4-0
		T-48-120		18750	4-0	4-0	4-0

For list prices, see Current Trade Discount Sheet.
*Safety Valve sizes accord with A. S. M. E. boiler code.

Factors determining boiler capacities (derived from actual tests)

Number of Boiler—Steam and Water	48-6	48-7	48-8	48-9	48-10
Fuel available, lbs.	911	1112	1293	1423	1554
Evaporative power, lbs.	8.5	8.5	8.5	8.5	8.5
Total steam from one fuel charge, lbs.	7914	9452	10990	12520	14060
Chimney area (sea level), sq. m.	20x20	20x24	24x24	24x28	28x28
Chimney height, ft.	60	60	65	65	70
Chimney sizes—T-48-11 28"x12"x70' T-48-12—30"x10"x70'					

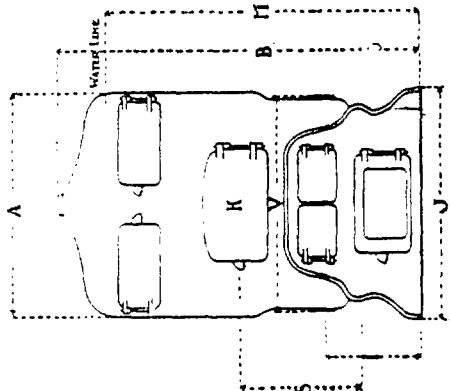
For Smoke Pipe and other dimensions, see pages 68 and 69.
For good chimney construction and its influence on boiler selection,
see pages 235 and 236.

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 6, 8 OR 10 HOURS

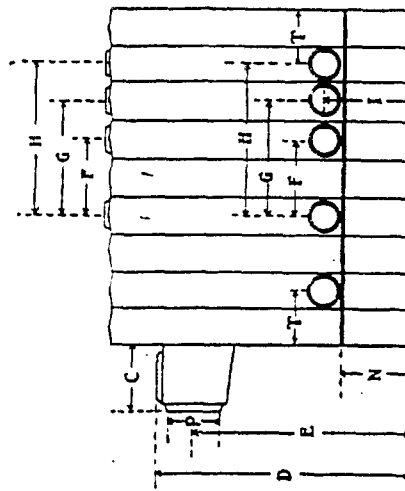
Steam Rating			
TIME	6 Sec.	8 Sec.	10 Sec.
6 hours	5375	6300	8350
8 hours	3960	4725	5500
10 hours	3165	3780	4395

Water Rating			
6 hours	8700	10375	12050
8 hours	6525	7760	9040
10 hours	5320	6275	7230

Sectional Boiler Measurements



Front View



Side View

For details of measurements see page 69.
Ideal Boilers are so designed that any base or section, whether round or square, may be taken through any door or opening which is not less than 2 feet 6 inches wide.
Arrangement of Sections and Grates pages 235, 237.

Sectional Boiler Measurements

Distances in inches on the outlines of Ideal Sectional Boiler, on page 58.

	19 in. Boilers		22 in. Boilers		25 in. Boilers	
	Water	Steam	Water	Steam	Water	Steam
A	31 1/2	32 1/2	35 1/2	36 1/2	40 1/2	41 1/2
B	50	53	53	53	57 1/2	57 1/2
C	15 1/2	15 1/2	15 1/2	15 1/2	17 1/2	17 1/2
D	45 1/2	45 1/2	47 1/2	47 1/2	53	53
E	37 1/2	37 1/2	40 1/2	40 1/2	44 1/2	44 1/2
F	13 1/2	13 1/2	14 1/2	14 1/2	15 1/2	15 1/2
G	19 1/2	19 1/2	21 1/2	21 1/2	23 1/2	23 1/2
H	26 1/2	26 1/2	28 1/2	28 1/2	30 1/2	30 1/2
I	16	16	16 1/2	16 1/2	17 1/2	17 1/2
J	26	26	29 1/2	29 1/2	34 1/2	34 1/2
K	18 1/2	18 1/2	18 1/2	18 1/2	19 1/2	19 1/2
L	43 1/2	43 1/2	46 1/2	46 1/2	51	51
M	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2
N	9	9	10 1/2	10 1/2	11 1/2	11 1/2
O	17 1/2	17 1/2	17 1/2	17 1/2	18 1/2	18 1/2
P	18 1/2	18 1/2	18 1/2	18 1/2	19 1/2	19 1/2
Q	29 1/2	29 1/2	33 1/2	33 1/2	39 1/2	39 1/2
R	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2
S	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2
T	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2
V	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2

	28 in. Boilers		36 in. Boilers		48 in. Boilers	
	Water	Steam	Water	Steam	Water	Steam
A	43 1/2	44 1/2	53 1/2	54 1/2	68	69
B	60 1/2	60 1/2	69 1/2	69 1/2	81 1/2	81 1/2
C	18 1/2	18 1/2	21 1/2	21 1/2	21 1/2	21 1/2
D	55 1/2	55 1/2	63 1/2	63 1/2	73 1/2	73 1/2
E	46 1/2	46 1/2	52 1/2	52 1/2	59 1/2	59 1/2
F	16	16	18 1/2	18 1/2	21 1/2	21 1/2
G	24	24	27 1/2	27 1/2	32 1/2	32 1/2
H	32	32	36 1/2	36 1/2	43	43
I	17 1/2	17 1/2	18 1/2	18 1/2	22 1/2	22 1/2
J	37 1/2	37 1/2	45 1/2	45 1/2	53 1/2	53 1/2
K	19 1/2	19 1/2	19 1/2	19 1/2	20 1/2	20 1/2
L	10	10	10 1/2	10 1/2	11 1/2	11 1/2
M	12	12	12 1/2	12 1/2	13 1/2	13 1/2
N	14 1/2	14 1/2	15 1/2	15 1/2	16 1/2	16 1/2
O	9 1/2	9 1/2	10 1/2	10 1/2	11 1/2	11 1/2
P	41 1/2	41 1/2	52 1/2	52 1/2	64 1/2	64 1/2
Q	41 1/2	41 1/2	52 1/2	52 1/2	64 1/2	64 1/2
R	41 1/2	41 1/2	52 1/2	52 1/2	64 1/2	64 1/2
S	41 1/2	41 1/2	52 1/2	52 1/2	64 1/2	64 1/2
T	41 1/2	41 1/2	52 1/2	52 1/2	64 1/2	64 1/2
V	41 1/2	41 1/2	52 1/2	52 1/2	64 1/2	64 1/2

*On 48-inch Boilers, center of outlets is located 10 1/2 inches to left of center line of boiler. Distance, center to center, between return inlets on back section, is 54 inches.

†Measured without Smoke-Hood Cover.

‡Measured with Smoke-Hood Cover on.

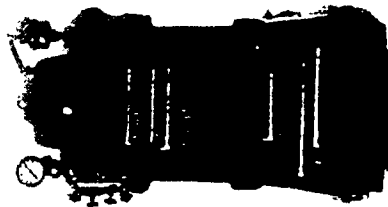
For Wood, Pred Door K in 19-inch Boilers is 10 1/2 inches; in 22-inch Boilers is 11 1/2 inches; in 25-inch Boilers is 13 1/2 inches; in 28-inch Boilers is 14 1/2 inches; in 36-inch Boilers is 15 1/2 inches; in 48-inch Boilers is 16 1/2 inches.

Do not bush the flow-pipe outlets of Steam Boilers; connect full size to the main, where velocity of steam exceeds 20 ft. per second under maximum conditions of load.

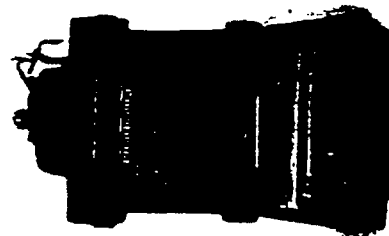
Arrangement of Sections and Grates, see pages 235-237.

IDEAL Arco Boilers

Number 3 Series
(Patented Feb. 12, 1918)



No. 3-23-S
Steam Boiler



No. 3-23-W
Water Boiler

When automatic damper control is desired, the ARCO Water Regulator (listed on page 168) can be inserted in a 2-inch opening provided regularly for the hand control post. Page 193 of "Ideal Fitter" shows proper method of installing the Regulator.

For Price List of Boiler Parts: Pages 212 to 215, Coverings, page 190.
For Guarantee and Coverings, Rating Conditions, Colla, etc., page 85.

IDEAL Arco Boilers

NUMBER 3 SERIES

ASSEMBLAGE: Base, Cornsheat-Firepot Section, and 2000
Responsive Power in Pounds 8.0

Boiler No.	8 Hour Rating Sq. Ft.	Nom. Diam. In.	Grate Area Sq. Ft.	Height Water Line Inches	Height (to top) Outlet Inches	Outlets No. and Size	Inlet Valve and Size	Safety Valve and Size
3-19 S	385	19	176	40 3/8	47 3/8	1-2 1/2	2-2 3/8	1
3-20 S	450	20	223	41 1/2	46 1/2	1-3	2-3	1
3-22 S	535	22	240	42 1/2	49 1/2	1-3	2-3	1-1/2
3-23 S	610	23	291	41 1/2	48 1/2	1-3	2-3	1-1/2
3-25 S	700	25	314	42 1/2	50 1/2	1-3 1/2	2-3 1/2	1-1/2
3-28 S	900	28	412	44	52 3/8	1-4	2-4	2
3-31 S	1125	31	490	45 1/2	54 3/8	1-4	2-4	2
3-34 S	1375	34	591	46 3/8	55 3/8	1-5	2-5	2

Water

Boiler No.	8 Hour Rating Sq. Ft.	Nom. Diam. In.	Grate Area Sq. Ft.	Height Water Line Inches	Height (to top) Outlet Inches	Outlets No. and Size	Inlet Valve and Size	Safety Valve and Size
3-10 W	635	19	176	41 1/2	47 3/8	2-2 1/2	2-2 3/8	1
3-20 W	740	20	223	41	46 1/2	2-3	2-3	1
3-22 W	880	22	240	42 1/2	49 1/2	2-3	2-3	1
3-23 W	1000	23	291	41 1/2	48 1/2	2-3	2-3	1
3-25 W	1155	25	314	42 1/2	50 1/2	2-3 1/2	2-3 1/2	1
3-28 W	1485	28	412	44	52 3/8	2-4	2-4	1
3-31 W	1860	31	490	45 1/2	54 3/8	2-4	2-4	1
3-34 W	2270	34	591	46 3/8	55 3/8	2-5	2-5	1

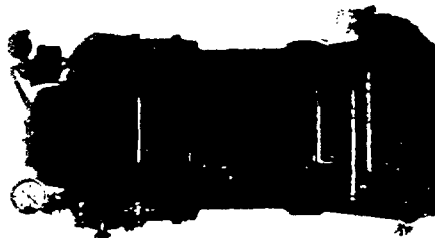
For list price, see Current Trade Discount Sheet.
Safety Valve size accord with A. S. M. E. boiler code.
Factors determining boiler capacities (derived from actual tests):
Number of Unit—Steam and Water 3-19 312 312 312 312
Fuel available, lbs. 800 800 800 800 800
Total steam from one fuel charge, lbs. 768 896 1072 1216
Chimney area (sea level), sq. in. 64 64 64 64 64
Chimney height, ft. 30 30 30 30 30
Number of Boiler—Steam and Water 3-25 3-28 3-31 3-34
Fuel available 178 228 283 312
Total steam from one fuel charge, lbs. 800 800 800 800
Chimney area (sea level), sq. in. 1425 1825 2264 2752
Chimney height, ft. 96 96 96 96 96
For good chimney construction and its influence on boiler selection, see pages 235 and 236.
For selection of proper size boiler, see pages 249, 251.
For selection of proper size chimney, see pages 249, 251.
RATINGS DEVELOPED WHEN AVAILABLE FUEL IS
BURNED IN 8, 10, OR 12 HOURS

TIME	19"	20"	22"	23"	25"	28"	31"	34"
8 Hours	385	450	535	610	700	900	1125	1375
10 "	310	360	430	490	560	720	900	1100
12 "	255	300	355	405	465	600	750	915

IDEAL Arco Boilers

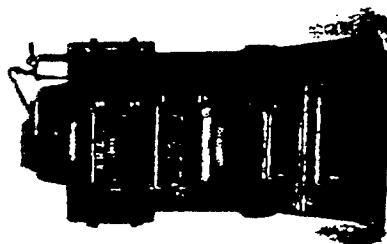
Number 4 Series

(Patented Feb. 12, 1918)



No. 4-20-S
Steam Boiler

No. 4-20-W
Water Boiler



Where automatic
control is desired,
the ARCO Water Regu-
lator fitted on page 168 can
be inserted in a 2-inch open-
ing provided regularly for
the hand control post.
Page 193 shows proper
method of installing the
Regulator.

For Price List of Boiler parts, pages 212-213, Coverings, page 190.
For Guarantee and Coverings, Rating conditions, Cuts, etc., page 85.

IDEAL Arco Boilers

NUMBER 4 SERIES

ASSEMBLAGE: Base, Crownsheet-Pilepot Section, Single Section
and Come

Evaporative Power in Pounds 8 5
Steam

Boiler No.	8-Hour Rating, Sq. Ft.	Non-Heating Area, Sq. Ft.	Height, Inches	Height, Feet	Height, Meters	Height, Centimeters	Height, Millimeters	Height, Micrometers
4-19-S	410	19	176	4.51	1.14	114	114	114
4-20-S	480	20	223	5.61	1.43	143	143	143
4-22-S	570	22	240	6.09	1.55	155	155	155
4-23-S	650	23	291	7.34	1.87	187	187	187
4-25-S	750	25	311	7.84	2.00	200	200	200
4-28-S	965	28	412	10.41	2.65	265	265	265
4-31-S	1200	31	490	12.40	3.16	316	316	316
4-31-S	1165	31	591	15.01	3.80	380	380	380

Water

Boiler No.	8-Hour Rating, Sq. Ft.	Non-Heating Area, Sq. Ft.	Height, Inches	Height, Feet	Height, Meters	Height, Centimeters	Height, Millimeters	Height, Micrometers
4-19-W	675	19	176	4.51	1.14	114	114	114
4-20-W	790	20	223	5.61	1.43	143	143	143
4-22-W	940	22	240	6.09	1.55	155	155	155
4-23-W	1065	23	291	7.34	1.87	187	187	187
4-25-W	1240	25	311	7.84	2.00	200	200	200
4-28-W	1590	28	412	10.41	2.65	265	265	265
4-31-W	1980	31	490	12.40	3.16	316	316	316
4-31-W	2115	31	591	15.01	3.80	380	380	380

For list price see Current Trade Discount Sheet.

*Safety Valve, series, according with A. S. M. E. boiler code.

Factor determining boiler capacities (to be used from actual tests)

Boiler No.	8-Hour Rating, Sq. Ft.	Non-Heating Area, Sq. Ft.	Height, Inches	Height, Feet	Height, Meters	Height, Centimeters	Height, Millimeters	Height, Micrometers
4-19	675	19	176	4.51	1.14	114	114	114
4-20	790	20	223	5.61	1.43	143	143	143
4-22	940	22	240	6.09	1.55	155	155	155
4-23	1065	23	291	7.34	1.87	187	187	187
4-25	1240	25	311	7.84	2.00	200	200	200
4-28	1590	28	412	10.41	2.65	265	265	265
4-31	1980	31	490	12.40	3.16	316	316	316
4-31	2115	31	591	15.01	3.80	380	380	380

For selection of proper size boiler, see pages 219-251.

For selection of proper size and height, see pages 12-21.

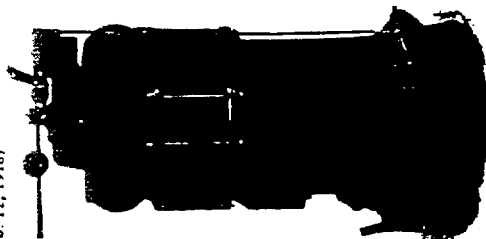
RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED
IN 8, 10, OR 12 HOURS

TIME	8 Hrs.	10 Hrs.	12 Hrs.	8 Hrs.	10 Hrs.	12 Hrs.	8 Hrs.	10 Hrs.	12 Hrs.
4-19	410	480	570	650	750	965	1200	1465	1930
4-20	480	570	650	750	965	1200	1465	1930	2415
4-22	570	650	750	965	1200	1465	1930	2415	3060
4-23	650	750	965	1200	1465	1930	2415	3060	3825
4-25	750	965	1200	1465	1930	2415	3060	3825	4785
4-28	965	1200	1465	1930	2415	3060	3825	4785	5985
4-31	1200	1465	1930	2415	3060	3825	4785	5985	7485
4-31	1165	1435	1885	2385	2985	3785	4735	5935	7435

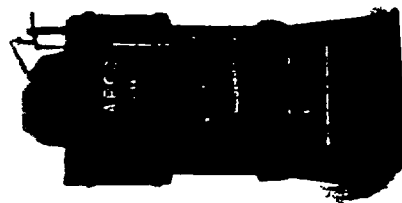
IDEAL Arco Boilers

Number 5 Series

(Patented Feb. 12, 1918)



No. 5-22-S
Steam Boiler



No. 5-22-W
Water Boiler

When automatic damper control is desired, the ARCO Water Regulator (listed on page 168) can be inserted in a 2" opening provided regularly for the hand control post. Page 193 shows a proper method of installing the Regulator.

For Price List of Boiler parts: pages 212-213; Coverings, page 190
For Guarantee and Coverings, Rating conditions, Cuts, etc., page 85

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IDEAL Arco Boilers

NUMBER 5 SERIES

ASSEMBLAGE: Base, Crown-Sheet-Firepot Section, Double Bottom and Dome
Evaporative Power in Pounds 9.0.

Boiler No.	8-Hour Rating, Sq. Ft.	Num. Grate Area, Sq. Ft.	Height Water Line, Inches	Height Outlet, Inches	Outlet No. and Size	Total No. Vents, Inches
5-19-S	430	19	1.76	57	1-2 1/2	2-2 1/2
5-20-S	500	20	2.23	50 1/2	1-3	2-3
5-22-S	600	22	2.40	51 1/2	1-3	2-3
5-23-S	685	23	2.91	51 3/8	1-3 1/2	2-3 1/2
5-25-S	800	25	3.14	52 1/2	1-4	2-4
5-28-S	1025	28	4.12	51 1/2	1-4	2-4
5-31-S	1275	31	4.90	56 1/4	1-5	2-5
5-34-S	1550	34	5.91	57 1/2	1-5	2-5

Water

5-19-W	710	19	1.76	50 3/8	2-2 1/2	2-2 1/2
5-20-W	825	20	2.23	50 1/8	2-3	2-3
5-22-W	900	22	2.40	52	2-3	2-3
5-23-W	1130	23	2.91	51 3/8	2-3	2-3
5-25-W	1320	25	3.14	53 1/2	2-3 1/2	2-3 1/2
5-28-W	1690	28	4.12	55 1/4	2-4	2-4
5-31-W	2100	31	4.90	58 1/2	2-4	2-4
5-34-W	2555	34	5.91	59 5/8	2-5	2-5

For list price, see (current) Trade Discount Sheet.
*Safety Valve sizes accord with A. S. M. E. boiler code.

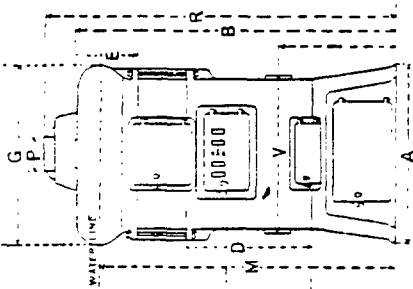
Factors determining boiler capacities (derived from actual tests.)
Number of Boiler—Steam and Water 5-19 5-20 5-22 5-23 5-25 5-28 5-31 5-34
Fuel available, lbs. 96 112 134 151 168 185 202 219
Evaporative power, lbs. 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0
Total steam from one fuel charge, lbs. 864 1008 1206 1368 1554 1740 1926 2112
Chimney area (sea level), sq. in. 64 64 64 64 64 64 64 64
Chimney height, ft. 35 35 35 35 35 35 35 35
Number of Boiler—Steam and Water 5-25 5-28 5-31 5-34
Fuel available lbs. 178 228 283 314
Evaporative power, lbs. 9.0 9.0 9.0 9.0
Total steam from one fuel charge, lbs. 1602 2052 2547 3096
Chimney area (sea level), sq. in. 90 144 144 144
Chimney height, ft. 40 40 40 40
For Smokestacks and other dimensions, see pages 249-251.
For selection of proper size boiler, see pages 249-251.
For selection of proper boiler assembly, see pages 12-21.

RATINGS DEVELOPED WHEN AVAILABLE FUEL IS BURNED IN 8, 10, OR 12 HOURS

TIME	Steam Rating				Water Rating			
	19"	20"	22"	23"	19"	20"	22"	23"
8 Hours	430	500	600	685	800	1025	1275	1550
10 "	345	400	480	550	610	810	1010	1250
12 "	290	315	400	455	515	685	850	1015
8 Hours	710	825	900	1130	1320	1690	2100	2555
10 "	570	660	700	910	1055	1350	1685	2045
12 "	480	555	600	750	885	1110	1405	1710

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IDEAL Arco Boiler Measurements

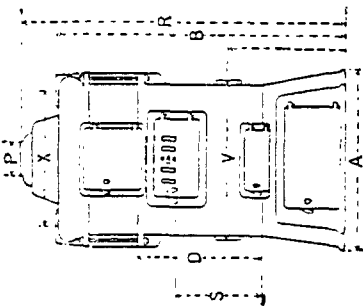


STEAM—Measurements are in inches

	A	D	E	G	H	I	M	P	R	S	V
3-19 S	27	21 1/2	11 1/2	26 1/2	47 1/2	16 1/2	10 1/2	8	55	15 1/2	24 1/2
3-20 S	28 1/2	23 1/2	11 1/2	28 1/2	49 1/2	16 1/2	10 1/2	8	53 1/2	16	25 1/2
3-22 S	30 1/2	25 1/2	11 1/2	30 1/2	51 1/2	16 1/2	10 1/2	9	51 1/2	16 1/2	27 1/2
3-23 S	31 1/2	26 1/2	12 1/2	31 1/2	53 1/2	16 1/2	10 1/2	9	50 1/2	17 1/2	28 1/2
3-25 S	33 1/2	28 1/2	12 1/2	33 1/2	55 1/2	16 1/2	10 1/2	9	48 1/2	18 1/2	30 1/2
3-28 S	36 1/2	31 1/2	13 1/2	36 1/2	58 1/2	16 1/2	10 1/2	9	46 1/2	19 1/2	32 1/2
3-31 S	39 1/2	34 1/2	13 1/2	39 1/2	61 1/2	16 1/2	10 1/2	9	44 1/2	20 1/2	34 1/2
3-34 S	42	37 1/2	14 1/2	42	64 1/2	16 1/2	10 1/2	9	42 1/2	21 1/2	36 1/2
4-19 S	27	23 1/2	11 1/2	26 1/2	47 1/2	16 1/2	10 1/2	8	55 1/2	15 1/2	24 1/2
4-20 S	28 1/2	24 1/2	11 1/2	28 1/2	49 1/2	16 1/2	10 1/2	8	53 1/2	16	25 1/2
4-22 S	30 1/2	26 1/2	11 1/2	30 1/2	51 1/2	16 1/2	10 1/2	9	51 1/2	16 1/2	27 1/2
4-25 S	31 1/2	27 1/2	12 1/2	31 1/2	53 1/2	16 1/2	10 1/2	9	50 1/2	17 1/2	28 1/2
4-28 S	33 1/2	29 1/2	12 1/2	33 1/2	55 1/2	16 1/2	10 1/2	9	48 1/2	18 1/2	30 1/2
4-31 S	35 1/2	31 1/2	13 1/2	35 1/2	58 1/2	16 1/2	10 1/2	9	46 1/2	19 1/2	32 1/2
4-34 S	37 1/2	33 1/2	13 1/2	37 1/2	61 1/2	16 1/2	10 1/2	9	44 1/2	20 1/2	34 1/2
5-19 S	27	23 1/2	11 1/2	26 1/2	47 1/2	16 1/2	10 1/2	8	55 1/2	15 1/2	24 1/2
5-20 S	28 1/2	24 1/2	11 1/2	28 1/2	49 1/2	16 1/2	10 1/2	8	53 1/2	16	25 1/2
5-22 S	30 1/2	26 1/2	11 1/2	30 1/2	51 1/2	16 1/2	10 1/2	9	51 1/2	16 1/2	27 1/2
5-23 S	31 1/2	27 1/2	12 1/2	31 1/2	53 1/2	16 1/2	10 1/2	9	50 1/2	17 1/2	28 1/2
5-25 S	33 1/2	29 1/2	12 1/2	33 1/2	55 1/2	16 1/2	10 1/2	9	48 1/2	18 1/2	30 1/2
5-28 S	36 1/2	31 1/2	13 1/2	36 1/2	58 1/2	16 1/2	10 1/2	9	46 1/2	19 1/2	32 1/2
5-31 S	39 1/2	34 1/2	13 1/2	39 1/2	61 1/2	16 1/2	10 1/2	9	44 1/2	20 1/2	34 1/2
5-34 S	42	37 1/2	14 1/2	42	64 1/2	16 1/2	10 1/2	9	42 1/2	21 1/2	36 1/2
6-19 S	27	23 1/2	11 1/2	26 1/2	47 1/2	16 1/2	10 1/2	8	55 1/2	15 1/2	24 1/2
6-20 S	28 1/2	24 1/2	11 1/2	28 1/2	49 1/2	16 1/2	10 1/2	8	53 1/2	16	25 1/2
6-22 S	30 1/2	26 1/2	11 1/2	30 1/2	51 1/2	16 1/2	10 1/2	9	51 1/2	16 1/2	27 1/2
6-23 S	31 1/2	27 1/2	12 1/2	31 1/2	53 1/2	16 1/2	10 1/2	9	50 1/2	17 1/2	28 1/2
6-25 S	33 1/2	29 1/2	12 1/2	33 1/2	55 1/2	16 1/2	10 1/2	9	48 1/2	18 1/2	30 1/2
6-28 S	36 1/2	31 1/2	13 1/2	36 1/2	58 1/2	16 1/2	10 1/2	9	46 1/2	19 1/2	32 1/2
6-31 S	39 1/2	34 1/2	13 1/2	39 1/2	61 1/2	16 1/2	10 1/2	9	44 1/2	20 1/2	34 1/2
6-34 S	42	37 1/2	14 1/2	42	64 1/2	16 1/2	10 1/2	9	42 1/2	21 1/2	36 1/2

Ideal Boilers are so designed that any section or base, whether round or square, may be taken through any door or opening which is not less than 2 feet 6 inches wide.

IDEAL Arco Boiler Measurements



WATER—Measurements are in inches

	A	B	D	I	P	R	S	V	X
3-19 W	27	11 1/2	21 1/2	16 1/2	8	48	15 1/2	24 1/2	19 1/2
3-20 W	28 1/2	12 1/2	22 1/2	17 1/2	9	47 1/2	16 1/2	25 1/2	20 1/2
3-22 W	30 1/2	13 1/2	24 1/2	18 1/2	9	46 1/2	17 1/2	26 1/2	21 1/2
3-23 W	31 1/2	14 1/2	25 1/2	19 1/2	10	45 1/2	18 1/2	27 1/2	22 1/2
3-25 W	33 1/2	15 1/2	27 1/2	20 1/2	10	44 1/2	19 1/2	28 1/2	23 1/2
3-28 W	36 1/2	16 1/2	29 1/2	21 1/2	11	43 1/2	20 1/2	29 1/2	24 1/2
3-31 W	39 1/2	17 1/2	31 1/2	22 1/2	11	42 1/2	21 1/2	30 1/2	25 1/2
3-34 W	42	18 1/2	33 1/2	23 1/2	11	41 1/2	22 1/2	31 1/2	26 1/2
4-19 W	27	11 1/2	21 1/2	16 1/2	8	48	15 1/2	24 1/2	19 1/2
4-20 W	28 1/2	12 1/2	22 1/2	17 1/2	9	47 1/2	16 1/2	25 1/2	20 1/2
4-22 W	30 1/2	13 1/2	24 1/2	18 1/2	9	46 1/2	17 1/2	26 1/2	21 1/2
4-23 W	31 1/2	14 1/2	25 1/2	19 1/2	10	45 1/2	18 1/2	27 1/2	22 1/2
4-25 W	33 1/2	15 1/2	27 1/2	20 1/2	10	44 1/2	19 1/2	28 1/2	23 1/2
4-28 W	36 1/2	16 1/2	29 1/2	21 1/2	11	43 1/2	20 1/2	29 1/2	24 1/2
4-31 W	39 1/2	17 1/2	31 1/2	22 1/2	11	42 1/2	21 1/2	30 1/2	25 1/2
4-34 W	42	18 1/2	33 1/2	23 1/2	11	41 1/2	22 1/2	31 1/2	26 1/2
5-19 W	27	11 1/2	21 1/2	16 1/2	8	48	15 1/2	24 1/2	19 1/2
5-20 W	28 1/2	12 1/2	22 1/2	17 1/2	9	47 1/2	16 1/2	25 1/2	20 1/2
5-22 W	30 1/2	13 1/2	24 1/2	18 1/2	9	46 1/2	17 1/2	26 1/2	21 1/2
5-23 W	31 1/2	14 1/2	25 1/2	19 1/2	10	45 1/2	18 1/2	27 1/2	22 1/2
5-25 W	33 1/2	15 1/2	27 1/2	20 1/2	10	44 1/2	19 1/2	28 1/2	23 1/2
5-28 W	36 1/2	16 1/2	29 1/2	21 1/2	11	43 1/2	20 1/2	29 1/2	24 1/2
5-31 W	39 1/2	17 1/2	31 1/2	22 1/2	11	42 1/2	21 1/2	30 1/2	25 1/2
5-34 W	42	18 1/2	33 1/2	23 1/2	11	41 1/2	22 1/2	31 1/2	26 1/2
6-19 W	27	11 1/2	21 1/2	16 1/2	8	48	15 1/2	24 1/2	19 1/2
6-20 W	28 1/2	12 1/2	22 1/2	17 1/2	9	47 1/2	16 1/2	25 1/2	20 1/2
6-22 W	30 1/2	13 1/2	24 1/2	18 1/2	9	46 1/2	17 1/2	26 1/2	21 1/2
6-23 W	31 1/2	14 1/2	25 1/2	19 1/2	10	45 1/2	18 1/2	27 1/2	22 1/2
6-25 W	33 1/2	15 1/2	27 1/2	20 1/2	10	44 1/2	19 1/2	28 1/2	23 1/2
6-28 W	36 1/2	16 1/2	29 1/2	21 1/2	11	43 1/2	20 1/2	29 1/2	24 1/2
6-31 W	39 1/2	17 1/2	31 1/2	22 1/2	11	42 1/2	21 1/2	30 1/2	25 1/2
6-34 W	42	18 1/2	33 1/2	23 1/2	11	41 1/2	22 1/2	31 1/2	26 1/2

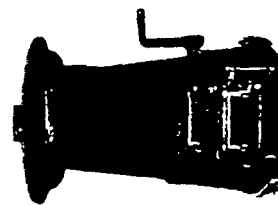
Ideal Boilers are so designed that any section or base, whether round or square, may be taken through any door or opening which is not less than 2 feet 6 inches wide.

IDEAL Hot Water Supply Boilers



No. 01 Ideal
Typical of Nos. 01 to 03

No. 09 Ideal
Typical of Nos. 04 to 08



No. 10 Ideal Arco

Showing how No. 02 Ideal may be connected to Range Boiler with ARCO Water Damper Regulator Control.

For Price List of Boiler parts see pages 216-219.

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IDEAL Hot Water Supply Boilers

Data and List Prices

No.	Grate Area Sq. Ft.	Non- metal Diam. Grate Inches	Style of Grate	Outlet and Inlets No. and Size, In.
01	56	10	Slide	1-1/2
02	93	10	"	1-1/2
03	111	10	"	1-1/2
04	192	12	Rocking	3-1/2
05	210	12	"	3-1/2
06	384	15	"	3-2
07	426	15	"	3-2
08	600	18	"	3-2
09	660	18	"	3-2
Arco 10	81	10	"	1-1/2
" 12	118	12	"	1-1/2
" 15	212	15	"	1-1/2

For prices see current Trade Discount Sheet

Capacities in gallons per hour and ratings in square feet of radiation, see pages 269 to 274

*Gallons per hour per .75 degree rise on 8 hour firing period, with hard coal.

†Equipped with Dorr sections, all others have fire pot section only, or, no intermediate sections used.

All the above Boilers have butterfly type damper and ash-pit door for automatic regulation.

When Hot Water Supply Boilers are subjected to some unusual pressure, as the case when tanks are connected direct to city pumping station, and the pressure is increased during times of conflagration or the like, it is recommended that the system be equipped with a Water-Pressure Relieving Valve and Relief Valve.

No fire tools are supplied with above Boilers.

In cases of unusually high city water pressure, or where the demand for hot water supply is very large, we recommend the use of Ideal Steam Boilers in connection with storage tank, as shown on page 84.

In following table is given corresponding old numbers.

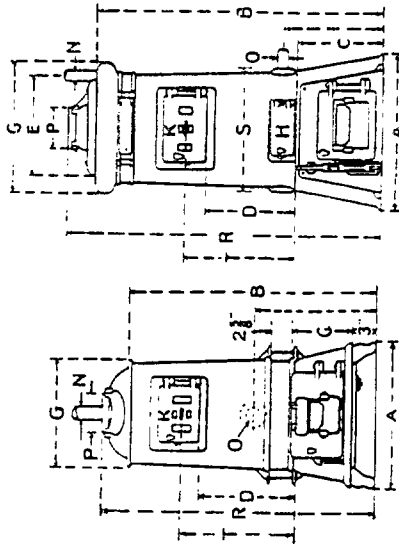
New No. 01 took place of old No. 09 Junior
New No. 02 took place of old No. 0 Junior
New No. 03 took place of old No. 101 Junior
New No. 04 took place of old No. 10 Junior and 121 Premier.
New No. 05 took place of old No. 12 Junior and 121 Premier.
New No. 06 took place of old No. 20 Junior and 151 Premier.
New No. 07 took place of old No. 22 Junior and 151 Premier.
New No. 08 took place of old No. 30 Junior and 181 Premier.
New No. 09 took place of old No. 32 Junior and 181 Premier.

For Price List of Boiler parts, see pages 216-219.

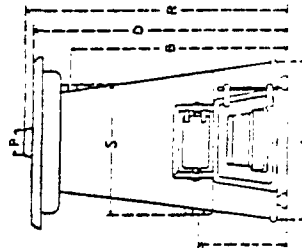
81

IDEAL Hot Water Supply Boilers

Dimensions
(See measurements, next page)



No. 02 Ideal
Same applies to Nos. 01 and 03
No. 09 Ideal
Same applies to Nos. 04, 05, 06,
07 and 08



Ideal Arco Nos. 10, 12, 15

For Price List of Boilers, parts, see page 216-219.

IDEAL Hot Water Supply Boilers

Dimensions (Inches)

Number of Boiler	Nominal Diameter of Grate	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
01	10	15 1/2	21 3/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
02	10	18	24 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
03	10	18	24 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
04	12	23 1/2	30 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
05	12	23 1/2	30 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
06	15	24 1/2	31 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
07	15	24 1/2	31 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
08	18	27 1/2	34 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
09	18	27 1/2	34 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2

Diameter of Pipe Collar "P" for Nos. 01, 02, 03 is 5 inches; for 04, 05, 06 is 6 inches, and for 08, 09 is 7 inches.

Boilers Nos. 01 to 03 inclusive will be regularly furnished with base bottom and legs, which on special order can be furnished for Nos. 04 to 09 Boilers. When this bottom and legs are used under Nos. 04 to 09, add 3 1/2 inches to B, I and R measurements.

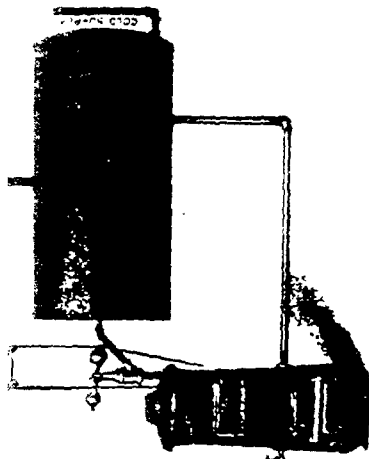
Ideal Arco Hot Water Supply Boilers

No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
10	16	21 1/2	26 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
12	16	21 1/2	26 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2
15	16	21 1/2	26 1/4	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2

See pages 269 to 273 inclusive for temperature ratings.

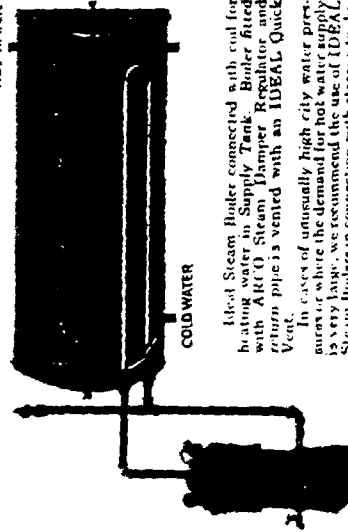
See page 467 for details.

IDEAL Hot Water Supply Boilers and Storage Tanks



IDEAL Hot Water Supply Boiler connected to large horizontal Tank and ARCO Water Regulator for controlling the temperature of the water. ARCO Water Regulator is recommended on all domestic supply boiler installations. The fire from running away and burning out, prevents the boiler from being damaged. A 3-inch Y fitting should be used in the supply from the boiler to the tank and the ARCO Regulator inserted therein, as shown in the illustration. (See pages 80, 168, 175 to 178, 261, 262 and 269 to 271)

HOT WATER



IDEAL Steam Boiler connected with cold water heating system. Boiler fitted with ARCO Steam Regulator and return pipe is vented with an IDEAL Quick Vent.

In cases of unusually high city water pressure or where the demand for hot water supply is very large, we recommend the use of IDEAL Steam Boilers in connection with storage tanks.

IDEAL Boilers and Water Supply Boilers

Method of Rating Ideal Boilers

IDEAL BOILERS are rated according to the formula recommended by the A. S. H. & V. E., published in Volume 25 of the Proceedings for 1919 on page 147.

The following is a simple explanation of this method of determining rating:

In computing the rating of any heating boiler, the pounds of coal burned from one fuel charge—multiplied by the pounds of water evaporated by one pound of coal burned—gives the pounds of steam produced which divided by the hours the boiler is desired to run without attention—gives the pounds of steam made each hour—this multiplied by four—which is the number of square feet of radiator surface required to condense one pound of steam per hour—gives the boiler's rating for the number of hours it operates without attention.

Fuel Basis for Ratings

The ratings are based on 49-1 grains of anthracite coal, since that fuel is more nearly uniform in its characteristics and heating effect.

When other types of fuel such as bituminous, coke, lignite, etc., are used, due consideration should be given to difference in calorific value, space occupied by a given weight of the fuel, and the character of the fuel which determine the amount of steam which can be secured proper combustion for a given output. See also pages 20 and 21, Selecting Boilers for Safe Coal.

For titles on hard and soft coal see pages 322 to 325.

Rating Conditions

The ratings which have been proved by exhaustive tests are based on the quantity of steam delivered at the boiler outlet under the following conditions:

One cubic foot of steam per hour at 2 lbs. gauge pressure.

One cubic foot of steam radiation condenses 1 lb. steam per hour, which is equivalent to the use of 112.6 B. T. U. per hour.

For WATER BOILERS: Ratings are based on a water temperature of 180° at the boiler and that 1 sq. ft. of water radiation uses 150 B. T. U. per hour.

For other than standard rating conditions, the actual condensing power of the radiating surface, e. g., Wall radiation, indirect, direct, indirect or vent, must be taken into consideration.

Domestic Water Heating

METHODS COMPARED: When a pipe coil or emission action is introduced into the system of an IDEAL Boiler, the water to be heated, as in the case of a water heater, should be provided—viz.: Based on temperature rise of 45 degrees F. per hour additional tax is imposed as follows:

STEAM BOILER—115 sq. ft. direct radiation per gallon of water heated.

WATER BOILER—215 sq. ft. direct radiation per gallon of water heated.

Due consideration being given to capacity of storage tank used.

Guarantee and Coverings

IDEAL Boilers are guaranteed only to the extent of furnishing new castings for any found defective in manufacture. On account of the varying conditions surrounding their installation, we do not guarantee our Boilers otherwise.

Both on account of increased efficiency and greater economy, we recommend that all Boilers be thoroughly protected by a substantial covering of asbestos. On page 199, tables will be found giving the amount of Asbestos Cement required to cover our IDEAL Boilers.

Radiator Data

The heights of the figures in the columns in line with the names of patterns of Radiators indicate the heights in which the various patterns are made. The figures which follow represent the amount of heating surface contained in each section.

Direct		Column Patterns									
Height, Inches		45	38	32	26	23	22	20	18		
Single-Column:											
Peerless, S and W		3	2 1/2	2	1 3/4			1 1/2			
Two-Column:											
Peerless, S and W		5	1	3 1/2	2 1/2	2 1/2		2			
Three-Column:											
Peerless, S and W		6	5	4 1/2	3 1/4		3		2 1/4		
Four-Column:											
Peerless, S or W		10	8	6 1/2	5		4		3		
Corto, height		38"	34 1/2"	31"	27"	23"		19 1/2"			
Corto, sq. ft. per section		4 1/2	1	3 1/2	3	2 1/2	2				

Direct—Flue and Window Patterns

Hgt., Inches	19 1/2	33 1/2	28	27 1/2	24	21 1/2	20	18	16	14
Peerless Flue										
Peerless Window, S or W	7	5 3/4	4 1/2		3 1/4					
Arco Window, S or W							5	4 1/2	3 3/4	3

*Peerless Wall Radiators

	Sq. Ft. per Sec.
Extra large section	9
Standard section	7
Small section	5

Indirect Radiators

Excelsior, Steam and Water	12
Perfection Pin, Standard Size, Steam or Water	10
Perfection Pin, Extra Large, Steam or Water	15
Cardinal, Steam or Water	15
Sterling, Steam or Water	20
Sanitary School Pin, Steam and Water	20

Vento Radiators

Ask for Special Price List of VENTO Radiators.

*Formerly Rococo.

Tappings of American Direct Radiators

Steam Radiators

One-Pipe Work Supply

Up to 24 square feet, inclusive	1 1/2 -inch
Above 24, up to 60 square feet	1 1/4 -inch
Above 60, up to 100 square feet	1 1/2 -inch
Above 100 square feet	2 -inch

Two-Pipe Work—Supply and Return

Up to 48 square feet, inclusive	1 x 3/4 -inch
Above 48, up to 96 square feet	1 1/4 x 1 -inch
Above 96 square feet	1 1/2 x 1 1/4 -inch

Water Radiators

Tapped for Supply and Return

Up to 40 square feet, inclusive	1 x 1 -inch
Above 40, up to 72 square feet	1 1/4 x 1 1/4 -inch
Above 72 square feet	1 1/2 x 1 1/2 -inch

Air Valve and Vapor Tappings

All air-valve tappings of Direct Radiators are regularly made 1/8-inch.

Vapor tappings, top and bottom opposite ends; supply 3/4-inch, return 1/2-inch.

Threads of Openings

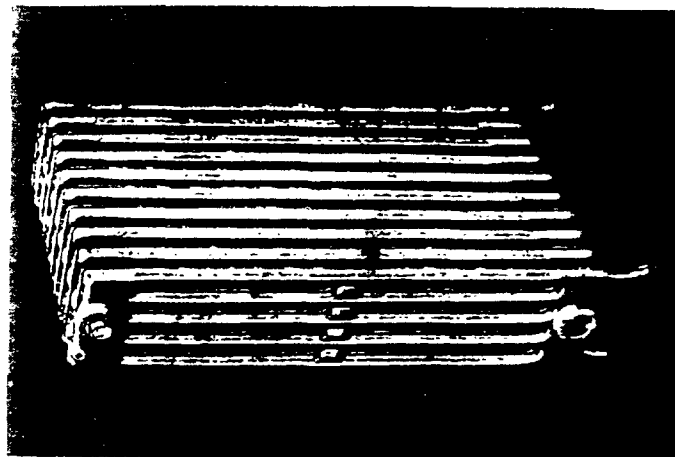
Unless otherwise ordered, all openings of Direct Radiators will have right-hand threads (except that of Wall Radiators where tapped 1 1/2-inch, in which case tapping at one end is right-hand and left-hand on other end).

Measurements

For distances between tappings and other measurements see pages 290 to 293.

(Pa'ed Sept. 4, 1917, Ma) 10, 1921, July 19, 1921)

For Steam and Water



Measurements and Tappings, see page 291

Corto Radiators For Steam and Water

No. of Stations	* Length 2 per Sec	HEIGHT, SURFACE - SQUARE, FEET				107-pm Height 2400, ft. per Sec.
		117-100 Height 450 ft. per Sec.	117-100 Height 450 ft. per Sec.	117-100 Height 450 ft. per Sec.	117-100 Height 450 ft. per Sec.	
2	4	9	7	6	5	5
3	6	13½	10½	9	7½	6
4	8	18	14	12	10	8
5	10	21½	17½	15	12½	10
6	12	27	21	18	15	12
7	14	31½	24½	21	17½	14
8	16	36	28	24	20	16
9	18	40½	31½	27	22½	18
10	20	45	35	30	25	20
11	22	49½	38½	33	27½	22
12	24	54	42	36	30	24
13	26	58½	45½	39	32½	26
14	28	63	49	42	35	28
15	30	67½	52½	45	37½	30
16	32	72	56	48	40	32
17	34	76½	59½	51	42½	34
18	36	81	63	54	45	36
19	38	85½	66½	57	47½	38
20	40	90	70	60	50	40
21	42	94½	73½	63	52½	42
22	44	99	77	66	55	44
23	46	103½	80½	69	57½	46
24	48	108	84	72	60	48
25	50	112½	87½	75	62½	50
26	52	117	91	78	65	52
27	54	121½	94½	81	67½	54
28	56	126	98	84	70	56
29	58	130½	101½	87	72½	58
30	60	135	105	90	75	60
31	62	139½	108½	93	77½	62
32	64	144	112	96	80	64

TAPPINGS: 1½ inches top and bottom and bushed for water; and 2 inches at bottom only and bushed for steam.

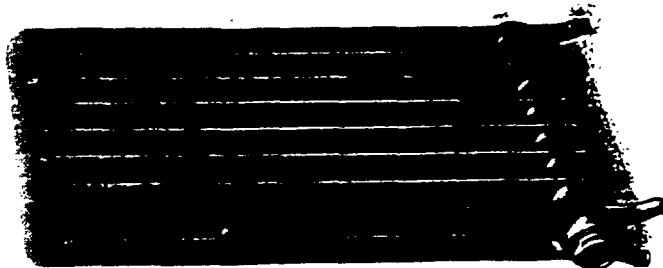
MEASUREMENTS: For center of tappets to floors, and between centers of upper and lower water tappets, exact heights and widths, etc., see page 291.

• Add $\frac{1}{2}$ inch to length for each bushing.

Corto Radiators are furnished, upon special order, with 6 inch legs, or legless.

Peerless Single Column Radiators

For Steam and Water



Each section is 4 1/2 inches wide. Width of legs, 5 1/2 inches.
These Radiators are made in special shapes as follows:

- Circular, for Steam and Water see pages 111 to 115
- Corner, for Steam and Water see pages 114, 296 to 297
- Curved, for Steam and Water see page 115
- Ventilating see pages 107 to 109
- Legs, Extra High for Steam and Water see page 120
- Single-Foot, Steam and Water see page 119
- Marble-Top Saddles, for Steam and Water see page 119
- Concealed Brackets for Steam and Water see pages 116 to 118

Peerless Single-Column Radiators

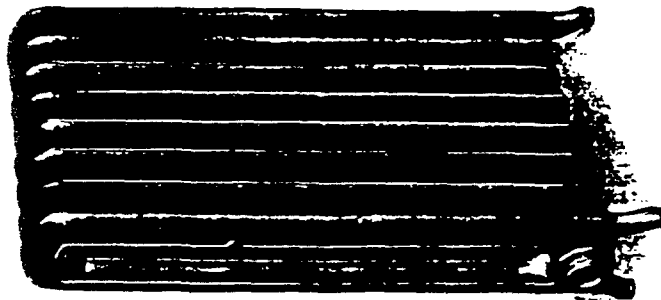
For Steam and Water

No. of Sections	Length of Section, ft. per Sec.	HEATING SURFACE—SQUARE FEET				
		38 in. Height, 3 sq. ft. per Sec.	42 in. Height, 4 sq. ft. per Sec.	46 in. Height, 5 sq. ft. per Sec.	50 in. Height, 6 sq. ft. per Sec.	54 in. Height, 7 sq. ft. per Sec.
2	5	6	5	4	3 1/2	3
3	7 1/2	9	7 1/2	6	5	4 1/2
4	10	12	10	8	6 2/3	5 1/2
5	12 1/2	15	12 1/2	10	8 2/3	7 1/2
6	15	18	15	12	10	9
7	17 1/2	21	17 1/2	14	11 2/3	10 1/2
8	20	24	20	16	13 1/3	12
9	22 1/2	27	22 1/2	18	15	13 1/2
10	25	30	25	20	16 2/3	15
11	27 1/2	33	27 1/2	22	18 1/3	16 1/2
12	30	36	30	24	20	18
13	32 1/2	39	32 1/2	26	21 2/3	19 1/2
14	35	42	35	28	23 1/3	21
15	37 1/2	45	37 1/2	30	25	22 1/2
16	40	48	40	32	26 2/3	24
17	42 1/2	51	42 1/2	34	28 1/3	25 1/2
18	45	54	45	36	30	27
19	47 1/2	57	47 1/2	38	31 2/3	28 1/2
20	50	60	50	40	33 1/3	30
21	52 1/2	63	52 1/2	42	35	31 1/2
22	55	66	55	44	36 2/3	33
23	57 1/2	69	57 1/2	46	38 1/3	34 1/2
24	60	72	60	48	40	36
25	62 1/2	75	62 1/2	50	41 2/3	37 1/2
26	65	78	65	52	43 1/3	39
27	67 1/2	81	67 1/2	54	45	40 1/2
28	70	84	70	56	46 2/3	42
29	72 1/2	87	72 1/2	58	48 1/3	43 1/2
30	75	90	75	60	50	45
31	77 1/2	93	77 1/2	62	51 2/3	46 1/2
32	80	96	80	64	53 1/3	48

TAPPINGS: Water—1 1/2 inches top and 2 inches bottom. Steam—2 inches at bottom only. Flushed as per list on page 87.
CONNECTIONS: Water—extra heavy 1 1/2 inch right and left threaded nipples at top and bottom. Steam—extra-heavy 2-inch right and left threaded nipples at bottom only.
LOW DRIP HUBS: One Pipe Steam—on supply leg-section Two Pipe Steam—on return leg-section.
MEASUREMENTS: For center of tappings to floors, and between centers of upper and lower water tappings, and between upper and lower concealed brackets, exact heights and widths, etc., see pages 296 to 297.
*Add 3/4 inch to length for each bushing.

Peerless Two-Column Radiators

For Steam and Water



Each section is 7 1/4 inches wide. Width of top, 8 1/2 inches.

These Radiators are made in special shapes as follows:

- Circular, for Steam and Water
- Corner, for Steam and Water
- Curved, for Steam and Water
- Ventilating
- Legs, Extra High, for Steam and Water
- Single Foot, Steam and Water
- Marble-Top Saddles, for Steam and Water
- Concealed Brackets, for Steam and Water

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Peerless Two-Column Radiators

For Steam and Water

No. of Sections	Length, 2 1/2 in. per Sec.	15 in. Height 15 1/2 in. per Sec.	18 in. Height 18 1/2 in. per Sec.	20 in. Height 20 1/2 in. per Sec.	22 in. Height 22 1/2 in. per Sec.	24 in. Height 24 1/2 in. per Sec.	26 in. Height 26 1/2 in. per Sec.	28 in. Height 28 1/2 in. per Sec.	30 in. Height 30 1/2 in. per Sec.	32 in. Height 32 1/2 in. per Sec.	34 in. Height 34 1/2 in. per Sec.	36 in. Height 36 1/2 in. per Sec.	38 in. Height 38 1/2 in. per Sec.	40 in. Height 40 1/2 in. per Sec.	42 in. Height 42 1/2 in. per Sec.	44 in. Height 44 1/2 in. per Sec.	46 in. Height 46 1/2 in. per Sec.	48 in. Height 48 1/2 in. per Sec.	50 in. Height 50 1/2 in. per Sec.	52 in. Height 52 1/2 in. per Sec.	54 in. Height 54 1/2 in. per Sec.	56 in. Height 56 1/2 in. per Sec.	58 in. Height 58 1/2 in. per Sec.	60 in. Height 60 1/2 in. per Sec.	62 in. Height 62 1/2 in. per Sec.	64 in. Height 64 1/2 in. per Sec.	
2	5	10	8	6 1/2	5 1/4	4 3/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8	1 1/4
3	7 1/2	15	12 1/2	10	8 1/2	7 1/4	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8
4	10	20	16 1/2	13 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8
5	12 1/2	25	20 1/2	16 1/2	13 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8	1 1/4
6	15	30	24	20	16 1/2	13 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4	1 1/8	1 1/4	1 1/8
7	17 1/2	35	28	23 1/2	18 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
8	20	40	32	26 1/2	21 1/2	16 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4	1 1/8	1 1/4
9	22 1/2	45	36	30	24	20	16 1/2	13 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4	1 1/8
10	25	50	40	33 1/2	26 1/2	21 1/2	16 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4	1 1/8
11	27 1/2	55	44	36 1/2	29 1/2	24 1/2	19 1/2	15 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4
12	30	60	48	40	32	26 1/2	21 1/2	16 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8	1 5/8	1 3/8	1 1/8	1 1/4
13	32 1/2	65	52	43 1/2	34 1/2	28 1/2	24 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
14	35	70	56	46 1/2	37 1/2	31 1/2	27 1/2	23 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
15	37 1/2	75	60	50	40	35	31 1/2	27 1/2	23 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
16	40	80	64	53 1/2	43 1/2	35 1/2	31 1/2	27 1/2	23 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
17	42 1/2	85	68	56 1/2	46 1/2	38 1/2	34 1/2	30 1/2	26 1/2	22 1/2	19 1/2	16 1/2	13 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8	1 7/8
18	45	90	72	60	50	40	37 1/2	33 1/2	29 1/2	25 1/2	21 1/2	18 1/2	15 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8	2 1/8
19	47 1/2	95	76	63 1/2	53 1/2	43 1/2	39 1/2	35 1/2	31 1/2	27 1/2	23 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
20	50	100	80	66 1/2	56 1/2	46 1/2	42 1/2	38 1/2	34 1/2	30 1/2	26 1/2	22 1/2	19 1/2	16 1/2	13 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8
21	52 1/2	105	84	70	60	50	40	37 1/2	33 1/2	29 1/2	25 1/2	21 1/2	18 1/2	15 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8	2 3/8
22	55	110	88	73 1/2	63 1/2	53 1/2	49 1/2	45 1/2	41 1/2	37 1/2	33 1/2	29 1/2	25 1/2	21 1/2	18 1/2	15 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8
23	57 1/2	115	92	76 1/2	66 1/2	56 1/2	52 1/2	48 1/2	44 1/2	40 1/2	36 1/2	32 1/2	28 1/2	24 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 1/2	2 1/2	2 1/2
24	60	120	96	80	70	60	50	40	37 1/2	33 1/2	29 1/2	25 1/2	21 1/2	18 1/2	15 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8	2 5/8
25	62 1/2	125	100	83 1/2	73 1/2	63 1/2	59 1/2	55 1/2	51 1/2	47 1/2	43 1/2	39 1/2	35 1/2	31 1/2	27 1/2	23 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2	4 1/2	3 1/2	2 1/2
26	65	130	104	86 1/2	76 1/2	66 1/2	62 1/2	58 1/2	54 1/2	50 1/2	46 1/2	42 1/2	38 1/2	34 1/2	30 1/2	26 1/2	22 1/2	19 1/2	16 1/2	13 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8
27	67 1/2	135	108	90	80	70	60	50	40	37 1/2	33 1/2	29 1/2	25 1/2	21 1/2	18 1/2	15 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8	2 7/8
28	70	140	112	93 1/2	83 1/2	73 1/2	69 1/2	65 1/2	61 1/2	57 1/2	53 1/2	49 1/2	45 1/2	41 1/2	37 1/2	33 1/2	29 1/2	25 1/2	21 1/2	18 1/2	15 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8
29	72 1/2	145	116	96 1/2	86 1/2	76 1/2	72 1/2	68 1/2	64 1/2	60 1/2	56 1/2	52 1/2	48 1/2	44 1/2	40 1/2	36 1/2	32 1/2	28 1/2	24 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2	6 1/2	5 1/2
30	75	150	120	100	90	80	70	60	50	40	37 1/2	33 1/2	29 1/2	25 1/2	21 1/2	18 1/2	15 1/2	12 1/2	10 1/2	8 1/2	6 1/8	5 1/4	4 3/8	4 1/8	3 7/8	3 5/8	3 1/8
31	77 1/2	155	124	103 1/2	93 1/2	83 1/2	79 1/2	75 1/2	71 1/2	67 1/2	63 1/2	59 1/2	55 1/2	51 1/2	47 1/2	43 1/2	39 1/2	35 1/2	31 1/2	27 1/2	23 1/2	20 1/2	17 1/2	14 1/2	11 1/2	9 1/2	7 1/2
32	80	160	128	106 1/2	96 1/2	86 1/2	82 1/2	78 1/2	74 1/2	70 1/2	66 1/2	62 1/2	58 1/2	54 1/2	50 1/2	46 1/2	42 1/2	38 1/2	34 1/2	30 1/2	26 1/2	22 1/2	19 1/2	16 1/2	13 1/2	10 1/2	8 1/2

TAPPINGS: Water, 1 1/2 inches top and 2 inches bottom. Steam, 2 inches at bottom only. Bushed as per list on page 87.

CONNECTIONS: Water—extra heavy 1 1/2 inch right and left threaded nipples at top and bottom. Steam—extra heavy 2-inch right and left threaded nipples at bottom.

LOW DRIP HUBS: One Pipe Steam on supply leg section. Two Pipe Steam on return leg section.

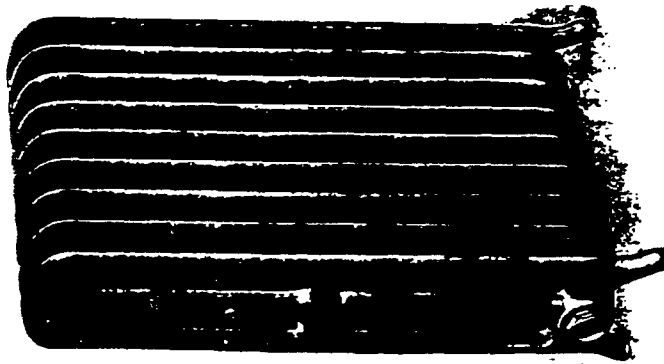
MEASUREMENTS: For center of Tappings to floors and between centers of upper and lower Water Tappings, and between upper and lower concealed brackets, exact heights, widths, etc., see pages 290 to 294.

*Add 1/2 inch to length for each bushing.

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Peerless Three-Column Radiators

For Steam and Water



Each section is 9 inches wide. Width of face, 10 inches.

These Radiators are made in special shapes as follows:
 Circular, for Steam and Water. See pages 111 to 113.
 Corner, for Steam and Water. See pages 114, 296 to 297.
 Curved, for Steam and Water. See page 115.
 Ventilating. See pages 107 to 109.
 Legs, Extra High, for Steam and Water. See page 120.
 Single Foot, Steam and Water. See page 119.
 Marble-Top Saddles, for Steam and Water. See page 119.
 Concealed Brackets, for Steam and Water. See pages 116 to 118.

Peerless Three-Column Radiators

For Steam and Water

No. of Sections	Heating Surface—Square Feet					
	Length of Section, 2 1/2 ft. (per Sec.)	45 in. Height (6 sq. ft. per Sec.)	48 in. Height (6 sq. ft. per Sec.)	51 in. Height (6 sq. ft. per Sec.)	54 in. Height (6 sq. ft. per Sec.)	57 in. Height (6 sq. ft. per Sec.)
2	5	12	10	9	7 1/2	6
3	7 1/2	18	15	13 1/2	11 1/2	9
4	10	24	20	18	15	12
5	12 1/2	30	25	22 1/2	18 1/2	15
6	15	36	30	27	22 1/2	18
7	17 1/2	42	35	31 1/2	26 1/2	21
8	20	48	40	36	30	24
9	22 1/2	54	45	40 1/2	33 1/2	27
10	25	60	50	45	37 1/2	30
11	27 1/2	66	55	49 1/2	41 1/2	33
12	30	72	60	54	45	36
13	32 1/2	78	65	58 1/2	48 1/2	39
14	35	84	70	63	52 1/2	42
15	37 1/2	90	75	67 1/2	56 1/2	45
16	40	96	80	72	60	48
17	42 1/2	102	85	76 1/2	63 1/2	51
18	45	108	90	81	67 1/2	54
19	47 1/2	114	95	85 1/2	71 1/2	57
20	50	120	100	90	75	60
21	52 1/2	126	105	94 1/2	78 1/2	63
22	55	132	110	99	82 1/2	66
23	57 1/2	138	115	103 1/2	86 1/2	69
24	60	144	120	108	90	72
25	62 1/2	150	125	112 1/2	93 1/2	75
26	65	156	130	117	97 1/2	78
27	67 1/2	162	135	121 1/2	101 1/2	81
28	70	168	140	126	105	84
29	72 1/2	174	145	130 1/2	108 1/2	87
30	75	180	150	135	112 1/2	90
31	77 1/2	186	155	139 1/2	116 1/2	93
32	80	192	160	144	120	96

TAPPINGS: Water, 1 1/2 inches top and 2 inches bottom. Steam, 2 inches at bottom only. Bunched as per list on page 87.
CONNECTIONS: Water—attach heavy 1 1/2 inch right and left threaded nipples at top and bottom. Steam—extra heavy 2 inch right and left threaded nipples at bottom only.
LOW DRIP HUBS: One Pipe Steam on supply leg-section. Two Pipe Steam on return leg-section.
MEASUREMENTS: For center of tappings to floors and between centers of upper and lower water tappings, and between upper and lower concealed brackets, cast heights and widths, etc., see page 299 to 291.
 *Add 1 1/2 inch to length for each borching.

Peerless Four-Column Radiators

For Steam or Water



Each section is 10 1/4 inches wide. Width of box, 11 1/4 inches.

These Radiators are not made in special shapes but can be equipped as follows:

- Single Foot, Section and Water
- Ventilating
- Legs, Extra High
- Marble-Top Saddles, for Steam and Water
- Concealed Brackets, for Steam and Water

see page 119

see pages 107 to 109

see page 120

see page 119

see pages 116 to 118

Peerless Four-Column Radiators

For Steam or Water

No. of Sections	Height, Section				Height, Full			
	45 in. Height, 10 sq. ft. per Sec.	48 in. Height, 12 sq. ft. per Sec.	54 in. Height, 18 sq. ft. per Sec.	60 in. Height, 24 sq. ft. per Sec.	45 in. Height, 10 sq. ft. per Sec.	48 in. Height, 12 sq. ft. per Sec.	54 in. Height, 18 sq. ft. per Sec.	60 in. Height, 24 sq. ft. per Sec.
2	6	16	13	10	6	16	13	10
3	9	21	19 1/2	15	9	21	19 1/2	15
4	12	26	26	20	12	26	26	20
5	15	30	32 1/2	25	15	30	32 1/2	25
6	18	36	39	30	18	36	39	30
7	21	42	45 1/2	35	21	42	45 1/2	35
8	24	48	52	40	24	48	52	40
9	27	54	58 1/2	45	27	54	58 1/2	45
10	30	60	65	50	30	60	65	50
11	33	66	71 1/2	55	33	66	71 1/2	55
12	36	72	78	60	36	72	78	60
13	39	78	84 1/2	65	39	78	84 1/2	65
14	42	84	91	70	42	84	91	70
15	45	90	97 1/2	75	45	90	97 1/2	75
16	48	96	104	80	48	96	104	80
17	51	102	110 1/2	85	51	102	110 1/2	85
18	54	108	117	90	54	108	117	90
19	57	114	123 1/2	95	57	114	123 1/2	95
20	60	120	130	100	60	120	130	100
21	63	126	136 1/2	105	63	126	136 1/2	105
22	66	132	143	110	66	132	143	110
23	69	138	149 1/2	115	69	138	149 1/2	115
24	72	144	156	120	72	144	156	120
25	75	150	162 1/2	125	75	150	162 1/2	125
26	78	156	169	130	78	156	169	130
27	81	162	175 1/2	135	81	162	175 1/2	135
28	84	168	182	140	84	168	182	140
29	87	174	188 1/2	145	87	174	188 1/2	145
30	90	180	195	150	90	180	195	150
31	93	186	201 1/2	155	93	186	201 1/2	155
32	96	192	208	160	96	192	208	160

TAPPINGS: 2 inches at top and bottom. Bushed as per list on page 87.

CONNECTIONS: Both Steam and Water extra heavy 2-inch right and left threaded nipples at top and bottom.

MEASUREMENTS: For center of tappings to floors, and between centers of upper and lower Water tappings, and between upper and lower concealed brackets, exact heights and widths, etc., see pages 290 to 293.

*Add 1/4 inch to length for each bushing.

Can be built up like all AMERICAN radiators to any desired height and can be made with any number of sections of greater number of sections. To get total heating surface, multiply the radiating surface of section (given under height) by the number of sections in the radiator.

Each section is 8½ inches wide. Width at legs 8½ inches.

TAPPINGS: 15½ inches and finished as per list on page 87, except that for steam one pipe the supply above 100 feet is 1½ inches.

CONNECTIONS: Extra heavy 15½ inch right and left threaded supplies at top and bottom.

MEASUREMENTS: For center of tappings to floors, and between centers of upper and lower water tappings, exact heights and widths, see pages 190 to 291. The bottom tapping of these radiators are on the floor.

The distance between the center of the upper tapping and the center of the lower tapping are as follows: 14 inches for 12 sections, 16 inches for 14 sections, 18 inches for 16 sections, 20 inches for 18 sections, 22 inches for 20 sections, 24 inches for 22 sections, 26 inches for 24 sections, 28 inches for 26 sections, 30 inches for 28 sections, 32 inches for 30 sections, 34 inches for 32 sections, 36 inches for 34 sections, 38 inches for 36 sections, 40 inches for 38 sections, 42 inches for 40 sections, 44 inches for 42 sections, 46 inches for 44 sections, 48 inches for 46 sections, 50 inches for 48 sections, 52 inches for 50 sections, 54 inches for 52 sections, 56 inches for 54 sections, 58 inches for 56 sections, 60 inches for 58 sections, 62 inches for 60 sections, 64 inches for 62 sections, 66 inches for 64 sections, 68 inches for 66 sections, 70 inches for 68 sections, 72 inches for 70 sections, 74 inches for 72 sections, 76 inches for 74 sections, 78 inches for 76 sections, 80 inches for 78 sections, 82 inches for 80 sections, 84 inches for 82 sections, 86 inches for 84 sections, 88 inches for 86 sections, 90 inches for 88 sections, 92 inches for 90 sections, 94 inches for 92 sections, 96 inches for 94 sections, 98 inches for 96 sections, 100 inches for 98 sections, 102 inches for 100 sections, 104 inches for 102 sections, 106 inches for 104 sections, 108 inches for 106 sections, 110 inches for 108 sections, 112 inches for 110 sections, 114 inches for 112 sections, 116 inches for 114 sections, 118 inches for 116 sections, 120 inches for 118 sections, 122 inches for 120 sections, 124 inches for 122 sections, 126 inches for 124 sections, 128 inches for 126 sections, 130 inches for 128 sections, 132 inches for 130 sections, 134 inches for 132 sections, 136 inches for 134 sections, 138 inches for 136 sections, 140 inches for 138 sections, 142 inches for 140 sections, 144 inches for 142 sections, 146 inches for 144 sections, 148 inches for 146 sections, 150 inches for 148 sections, 152 inches for 150 sections, 154 inches for 152 sections, 156 inches for 154 sections, 158 inches for 156 sections, 160 inches for 158 sections, 162 inches for 160 sections, 164 inches for 162 sections, 166 inches for 164 sections, 168 inches for 166 sections, 170 inches for 168 sections, 172 inches for 170 sections, 174 inches for 172 sections, 176 inches for 174 sections, 178 inches for 176 sections, 180 inches for 178 sections, 182 inches for 180 sections, 184 inches for 182 sections, 186 inches for 184 sections, 188 inches for 186 sections, 190 inches for 188 sections, 192 inches for 190 sections, 194 inches for 192 sections, 196 inches for 194 sections, 198 inches for 196 sections, 200 inches for 198 sections, 202 inches for 200 sections, 204 inches for 202 sections, 206 inches for 204 sections, 208 inches for 206 sections, 210 inches for 208 sections, 212 inches for 210 sections, 214 inches for 212 sections, 216 inches for 214 sections, 218 inches for 216 sections, 220 inches for 218 sections, 222 inches for 220 sections, 224 inches for 222 sections, 226 inches for 224 sections, 228 inches for 226 sections, 230 inches for 228 sections, 232 inches for 230 sections, 234 inches for 232 sections, 236 inches for 234 sections, 238 inches for 236 sections, 240 inches for 238 sections, 242 inches for 240 sections, 244 inches for 242 sections, 246 inches for 244 sections, 248 inches for 246 sections, 250 inches for 248 sections, 252 inches for 250 sections, 254 inches for 252 sections, 256 inches for 254 sections, 258 inches for 256 sections, 260 inches for 258 sections, 262 inches for 260 sections, 264 inches for 262 sections, 266 inches for 264 sections, 268 inches for 266 sections, 270 inches for 268 sections, 272 inches for 270 sections, 274 inches for 272 sections, 276 inches for 274 sections, 278 inches for 276 sections, 280 inches for 278 sections, 282 inches for 280 sections, 284 inches for 282 sections, 286 inches for 284 sections, 288 inches for 286 sections, 290 inches for 288 sections, 292 inches for 290 sections, 294 inches for 292 sections, 296 inches for 294 sections, 298 inches for 296 sections, 300 inches for 298 sections, 302 inches for 300 sections, 304 inches for 302 sections, 306 inches for 304 sections, 308 inches for 306 sections, 310 inches for 308 sections, 312 inches for 310 sections, 314 inches for 312 sections, 316 inches for 314 sections, 318 inches for 316 sections, 320 inches for 318 sections, 322 inches for 320 sections, 324 inches for 322 sections, 326 inches for 324 sections, 328 inches for 326 sections, 330 inches for 328 sections, 332 inches for 330 sections, 334 inches for 332 sections, 336 inches for 334 sections, 338 inches for 336 sections, 340 inches for 338 sections, 342 inches for 340 sections, 344 inches for 342 sections, 346 inches for 344 sections, 348 inches for 346 sections, 350 inches for 348 sections, 352 inches for 350 sections, 354 inches for 352 sections, 356 inches for 354 sections, 358 inches for 356 sections, 360 inches for 358 sections, 362 inches for 360 sections, 364 inches for 362 sections, 366 inches for 364 sections, 368 inches for 366 sections, 370 inches for 368 sections, 372 inches for 370 sections, 374 inches for 372 sections, 376 inches for 374 sections, 378 inches for 376 sections, 380 inches for 378 sections, 382 inches for 380 sections, 384 inches for 382 sections, 386 inches for 384 sections, 388 inches for 386 sections, 390 inches for 388 sections, 392 inches for 390 sections, 394 inches for 392 sections, 396 inches for 394 sections, 398 inches for 396 sections, 400 inches for 398 sections, 402 inches for 400 sections, 404 inches for 402 sections, 406 inches for 404 sections, 408 inches for 406 sections, 410 inches for 408 sections, 412 inches for 410 sections, 414 inches for 412 sections, 416 inches for 414 sections, 418 inches for 416 sections, 420 inches for 418 sections, 422 inches for 420 sections, 424 inches for 422 sections, 426 inches for 424 sections, 428 inches for 426 sections, 430 inches for 428 sections, 432 inches for 430 sections, 434 inches for 432 sections, 436 inches for 434 sections, 438 inches for 436 sections, 440 inches for 438 sections, 442 inches for 440 sections, 444 inches for 442 sections, 446 inches for 444 sections, 448 inches for 446 sections, 450 inches for 448 sections, 452 inches for 450 sections, 454 inches for 452 sections, 456 inches for 454 sections, 458 inches for 456 sections, 460 inches for 458 sections, 462 inches for 460 sections, 464 inches for 462 sections, 466 inches for 464 sections, 468 inches for 466 sections, 470 inches for 468 sections, 472 inches for 470 sections, 474 inches for 472 sections, 476 inches for 474 sections, 478 inches for 476 sections, 480 inches for 478 sections, 482 inches for 480 sections, 484 inches for 482 sections, 486 inches for 484 sections, 488 inches for 486 sections, 490 inches for 488 sections, 492 inches for 490 sections, 494 inches for 492 sections, 496 inches for 494 sections, 498 inches for 496 sections, 500 inches for 498 sections, 502 inches for 500 sections, 504 inches for 502 sections, 506 inches for 504 sections, 508 inches for 506 sections, 510 inches for 508 sections, 512 inches for 510 sections, 514 inches for 512 sections, 516 inches for 514 sections, 518 inches for 516 sections, 520 inches for 518 sections, 522 inches for 520 sections, 524 inches for 522 sections, 526 inches for 524 sections, 528 inches for 526 sections, 530 inches for 528 sections, 532 inches for 530 sections, 534 inches for 532 sections, 536 inches for 534 sections, 538 inches for 536 sections, 540 inches for 538 sections, 542 inches for 540 sections, 544 inches for 542 sections, 546 inches for 544 sections, 548 inches for 546 sections, 550 inches for 548 sections, 552 inches for 550 sections, 554 inches for 552 sections, 556 inches for 554 sections, 558 inches for 556 sections, 560 inches for 558 sections, 562 inches for 560 sections, 564 inches for 562 sections, 566 inches for 564 sections, 568 inches for 566 sections, 570 inches for 568 sections, 572 inches for 570 sections, 574 inches for 572 sections, 576 inches for 574 sections, 578 inches for 576 sections, 580 inches for 578 sections, 582 inches for 580 sections, 584 inches for 582 sections, 586 inches for 584 sections, 588 inches for 586 sections, 590 inches for 588 sections, 592 inches for 590 sections, 594 inches for 592 sections, 596 inches for 594 sections, 598 inches for 596 sections, 600 inches for 598 sections, 602 inches for 600 sections, 604 inches for 602 sections, 606 inches for 604 sections, 608 inches for 606 sections, 610 inches for 608 sections, 612 inches for 610 sections, 614 inches for 612 sections, 616 inches for 614 sections, 618 inches for 616 sections, 620 inches for 618 sections, 622 inches for 620 sections, 624 inches for 622 sections, 626 inches for 624 sections, 628 inches for 626 sections, 630 inches for 628 sections, 632 inches for 630 sections, 634 inches for 632 sections, 636 inches for 634 sections, 638 inches for 636 sections, 640 inches for 638 sections, 642 inches for 640 sections, 644 inches for 642 sections, 646 inches for 644 sections, 648 inches for 646 sections, 650 inches for 648 sections, 652 inches for 650 sections, 654 inches for 652 sections, 656 inches for 654 sections, 658 inches for 656 sections, 660 inches for 658 sections, 662 inches for 660 sections, 664 inches for 662 sections, 666 inches for 664 sections, 668 inches for 666 sections, 670 inches for 6

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Can be built up like all AMERICAN Radiators, in any size, with greater number of sections. To get total heating surface, multiply heating surface of section (given under height) by the number of sections in the radiator.

Each section is 12½ in. in its wide

TAPPINGS: 1¼ inches at top and 2 inches at bottom. Bushed as per list on page 87.

CONNECTIONS: Extra heavy 1½-inch right and left threaded nipples. It applies at 14-ton pressure.

FINISHES: Painted, galvanized, or enameled. Tappings to floors and between floors.

MEASUREMENTS: Height of radiators, from floor to top, and lower Water Tapping, exact heights and widths, see pages 90 to 291.

For Corbels, Window Radiators, in Curved shape, see page 133.

Corner, see pages 111, 196. Extra High Laps, see page 120, and Removable Laps for Marble Tops, see page 149.

♦Add ½ inch to length for each bushing.

Peerless Flue Radiators

For Steam Only



Each section is 8 1/4 inches wide. Width of legs 9 1/4 inches.

These radiators are not made in any special shape, such as curved, angle, etc.

Mounting Lugs, see page 119.

For dimensions, see page 293.

Peerless Flue Radiators

For Steam Only

No. of Sections	Length in ft. per Sec.	HEATING SURFACE - SQUARE FEET			
		30 1/2 in. Height 2 sq. ft. per Sec.	40 1/2 in. Height 3 1/2 sq. ft. per Sec.	47 1/2 in. Height 4 1/2 sq. ft. per Sec.	54 1/2 in. Height 5 1/2 sq. ft. per Sec.
2	6	11 1/2	15 1/2	19 1/2	23 1/2
3	9	17 1/4	23 1/4	29 1/4	35 1/4
4	12	23	31	39	47
5	15	28 1/2	38 1/2	48 1/2	58 1/2
6	18	34 1/2	46 1/2	58 1/2	69 1/2
7	21	40 1/2	54 1/2	68 1/2	80 1/2
8	24	46 1/2	62 1/2	78 1/2	90 1/2
9	27	52 1/2	70 1/2	88 1/2	100 1/2
10	30	58 1/2	78 1/2	98 1/2	110 1/2
11	33	64 1/2	86 1/2	108 1/2	120 1/2
12	36	70 1/2	94 1/2	118 1/2	130 1/2
13	39	76 1/2	102 1/2	128 1/2	140 1/2
14	42	82 1/2	110 1/2	138 1/2	150 1/2
15	45	88 1/2	118 1/2	148 1/2	160 1/2
16	48	94 1/2	126 1/2	158 1/2	170 1/2
17	51	100 1/2	134 1/2	168 1/2	180 1/2
18	54	106 1/2	142 1/2	178 1/2	190 1/2
19	57	112 1/2	150 1/2	188 1/2	200 1/2
20	60	118 1/2	158 1/2	198 1/2	210 1/2
21	63	124 1/2	166 1/2	208 1/2	220 1/2
22	66	130 1/2	174 1/2	218 1/2	230 1/2
23	69	136 1/2	182 1/2	228 1/2	240 1/2
24	72	142 1/2	190 1/2	238 1/2	250 1/2
25	75	148 1/2	198 1/2	248 1/2	260 1/2
26	78	154 1/2	206 1/2	258 1/2	270 1/2
27	81	160 1/2	214 1/2	268 1/2	280 1/2
28	84	166 1/2	222 1/2	278 1/2	290 1/2
29	87	172 1/2	230 1/2	288 1/2	300 1/2
30	90	178 1/2	238 1/2	298 1/2	310 1/2
31	93	184 1/2	246 1/2	308 1/2	320 1/2
32	96	190 1/2	254 1/2	318 1/2	330 1/2

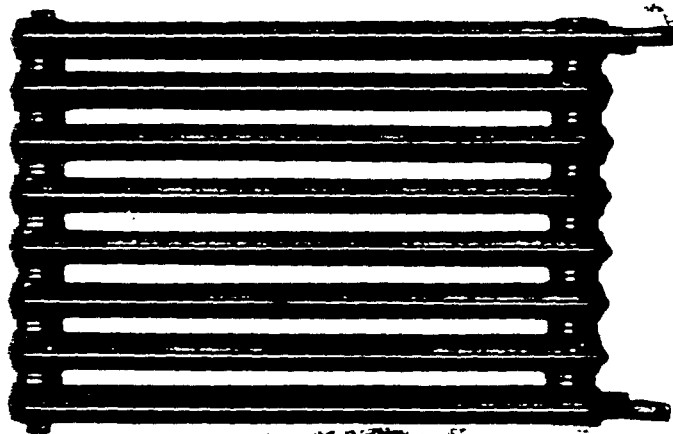
TAPINGS: 2 inches and larger as per list on page 87.

CONNECTIONS: Steam—with extra-heavy right and left threaded nipples at bottom only.

*Add 1/2 inch to length for each leg.

Peerless Hospital Radiators

For Steam or Water



Made specially for hospital institutions and all buildings where a Radiator having a large capacity, easily cleaned, supplies the need for a heating surface which is of the most economical of such institutions.

For dimensions of Peerless Hospital Radiators other than shown on opposite page, see dimensions of standard Peerless Radiators of same number of columns.

These Radiators are not made in special shapes but can be equipped as follows:

Less, Extra High
Concealed Brackets

See page 120
See pages 116 to 118

101

Peerless Hospital Radiators

For Steam or Water

One Column		HEATING SURFACE - SQUARE FEET				
No. of Sections	Length 3 in. per Sec.	16 in.	24 in.	32 in.	40 in.	
		Height 3 sq. ft. per Sec.	Height 4 1/2 sq. ft. per Sec.	Height 6 sq. ft. per Sec.	Height 8 sq. ft. per Sec.	
2	5 1/2	6	4	3 1/2	3	
3	8 1/2	9	7 1/2	5	4 1/2	
4	11 1/2	12	10	8	6 3/4	
5	14 1/2	15	12 1/2	10	8 1/2	

Two Column

No. of Sections	Length 3 in. per Sec.	HEATING SURFACE - SQUARE FEET				
		15 in. Height 8 sq. ft. per Sec.	18 in. Height 10 sq. ft. per Sec.	24 in. Height 13 1/2 sq. ft. per Sec.	20 in. Height 12 sq. ft. per Sec.	
2	5 1/2	10	8	6 1/2	4	
3	8 1/2	15	12	10	6	
4	11 1/2	20	16	13 1/2	8	
5	14 1/2	25	20	16 1/2	10	

Three Column

No. of Sec- tions	Length 4 in. per Sec.	HEATING SURFACE					SQUARE FEET				
		15 in. Height 6 sq. ft. per Sec.	18 in. Height 8 sq. ft. per Sec.	24 in. Height 13 1/2 sq. ft. per Sec.	20 in. Height 12 sq. ft. per Sec.	24 in. Height 13 1/2 sq. ft. per Sec.	20 in. Height 12 sq. ft. per Sec.				
2	5 1/2	12	10	9	7 1/2	6	4 1/2				
3	8 1/2	18	15	13 1/2	11 1/4	9	6 3/4				
4	11 1/2	24	20	18	15	12	9				
5	14 1/2	30	25	22 1/2	18 3/4	15	11 1/4				

Four Column

No. of Sec. time	Length ft. in per Sec.	HEATING SURFACE - SQUARE FEET				
		15 in. Height 10 sq. ft. per Sec.	18 in. Height 13 1/2 sq. ft. per Sec.	20 in. Height 16 sq. ft. per Sec.	22 in. Height 18 sq. ft. per Sec.	18 in. Height 15 sq. ft. per Sec.
2	6 1/2	20	16	13	10	8
3	10	30	24	19 1/2	15	12
4	13 1/2	40	32	26	20	16
5	17	50	40	32 1/2	25	20

* Add 1/2 inch to length for each barbing.
Sizes not limited to 5 sections, above table being illustrative only.

101

Peerless Flue Ventilating Radiators

For Steam Only



Each section is 8 1/4 inches wide. Width of legs 9 1/4 inches.

This pattern of Radiator is not made in any special or odd shape as the Box Bases can only be made in straight form.

See page 106 for illustration and data of the adjustable Box Bases.

In ordering please state whether Back or Bottom Inlet is required.

103

Peerless Flue Ventilating Radiators

For Steam Only

No. of Sections	Heating Surface, Square Feet			
	39 1/2 in. Height 7 sq. ft. per Sec.	31 1/2 in. Height 5 1/2 sq. ft. per Sec.	27 1/2 in. Height 4 1/2 sq. ft. per Sec.	21 1/2 in. Height 3 1/2 sq. ft. per Sec.
2	14	11 1/2	9	6 1/2
3	21	17 1/4	13 1/2	9 3/4
4	28	23	18	13
5	35	28 3/4	22 1/2	16 1/4
6	42	34 1/2	27	19 1/2
7	49	40 1/4	31 1/2	22 3/4
8	56	46	36	26
9	63	51 3/4	40 1/2	29 1/4
10	70	57 1/2	45	32 1/2
11	77	63 1/4	49 1/2	35 3/4
12	84	69	54	39
13	91	74 3/4	58 1/2	42 1/4
14	98	80 1/2	63	45 1/2
15	105	86 1/4	67 1/2	48 3/4
16	112	92 1/4	72	52
17	119	97 3/4	76 1/2	55 1/4
18	126	103 1/2	81	58 1/2
19	133	109 1/4	85 1/2	61 3/4
20	140	115	90	65
21	147	120 3/4	94 1/2	68 1/4
22	154	126 1/2	99	71 1/2
23	161	132 1/4	103 1/2	74 3/4
24	168	138	108	78
25	175	143 3/4	112 1/2	81 1/4

TAPPINGS: 2 inches and backed as per list on page 87.

CONNECTIONS: Steam with extra-heavy right and left threaded nipples at bottom only.

*Add 1/2 inch to length for each fitting.

105

Peerless Flue Box-Bases



Showing Rear Half of Box-Base and Dampers
Back Air-Inlet Closed

Outside measurements of flange or lip around back air-inlet of Box-Base, for attaching sheet-iron sleeve in pipe, are:

No.	Base Sec- tion	Floor to bottom opening	Inches	No.	Base Sec- tion	Floor to bottom opening	Inches
G-31	3	1	21 1/2	G-58	8	1	14 1/2
G-34	4	1	5 1/2	G-59	9	1	15 1/2
G-35	5	1	6 1/2	G-60	10	1	16 1/2
G-36	6	1	11 1/2	G-61	11	1	17 1/2
G-37	7	1	11 1/2	G-62	12	1	18 1/2



Box-Base, Showing Operation of Dampers
For Bottom Air-Inlet

Where air conduit is brought up through floor, under radiator, the opening in floor to be covered by dampers in Base should be:

No.	Base Section	Inches	No.	Base Section	Inches
H-53	3	21 1/2	H-58	8	14 1/2
H-54	4	5 1/2	H-59	9	15 1/2
H-55	5	6 1/2	H-60	10	16 1/2
H-56	6	11 1/2	H-61	11	17 1/2
H-57	7	11 1/2	H-62	12	18 1/2

NOTE.—12-Section Box-Base is to be used for Radiator of twelve sections, or any even number of sections larger. 11-Section Box-Base for Radiator of eleven sections, or any odd number of sections larger. In ordering Box-Bases to be placed in middle of long Radiators, note that, for instance, to cover six flues or middle sections requires an 8-Section Base, to cover seven flues or middle sections requires a 9-Section Base, etc.

Portable Ventilating Box-Bases

For Ventilating Radiators



Front View Above Base is a No. G-8-1, for a Peerless 3-Column
8-Section Radiator

These bases and corresponding front and back plates are actually made in eleven sizes for Peerless One, Two, Three and Four-Column Radiators, as listed on page 108. They fit under regular stock AMERICAN Radiators as turned in our warehouses. For illustration of Box-Base, see page 109.

To explain the application of these Bases. A No. G-13 Box-Base is to be used for AMERICAN Radiators of 14 sections, or any even number of sections larger. A No. G-15 Box-Base is to be used for AMERICAN Radiators of 15 sections, or any odd number of sections larger.

When ordering AMERICAN Box-Bases, always specify the Serial No. of the Base as given in the table on page 106, rather than to describe the number of middle sections the Base should fit under.

The two aprons, which are adjusted to the front and back of the Radiator, on top of the base, are held in place by bolts running through the center or corners of the apron. The aprons can readily be removed for cleaning.

Portable Ventilating Box-Bases

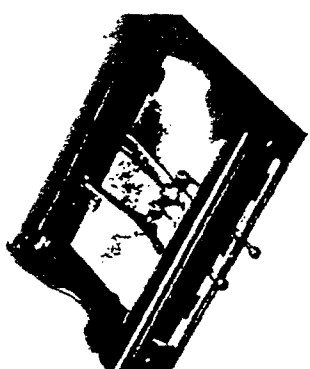
NOTE—Measurements are given in inches for bases with back opening, and for bottom opening. The data on back opening base represent outside measurements (to the flanges); the data on bottom opening base represent inside measurements (to the flanges). The data on the floor under the bases for the air inlet.

Single-Column Box-Bases						Two-Column Box-Bases					
No.	Back Op'g		Bottom Op'g		Length	No.	Back Op'g		Bottom Op'g		Length
	Width	Length	Width	Length			Width	Length	Width	Length	
G-5-1	21 1/2	5 1/2	H-5-1	1	5	G-5-2	21 1/2	5 1/2	H-5-2	31 1/2	5
G-6-1	21 1/2	7 1/2	H-6-1	3	7 1/2	G-6-2	21 1/2	7 1/2	H-6-2	31 1/2	7 1/2
G-7-1	21 1/2	10 1/2	H-7-1	3	10	G-7-2	21 1/2	10 1/2	H-7-2	31 1/2	10
G-8-1	21 1/2	12 1/2	H-8-1	3	12 1/2	G-8-2	21 1/2	12 1/2	H-8-2	31 1/2	12 1/2
G-9-1	21 1/2	15 1/2	H-9-1	3	15	G-9-2	21 1/2	15 1/2	H-9-2	31 1/2	15
G-10-1	21 1/2	17 1/2	H-10-1	3	17 1/2	G-10-2	21 1/2	17 1/2	H-10-2	31 1/2	17 1/2
G-11-1	21 1/2	20 1/2	H-11-1	3	20	G-11-2	21 1/2	20 1/2	H-11-2	31 1/2	20
G-12-1	21 1/2	22 1/2	H-12-1	3	22 1/2	G-12-2	21 1/2	22 1/2	H-12-2	31 1/2	22 1/2
G-13-1	21 1/2	25 1/2	H-13-1	3	25	G-13-2	21 1/2	25 1/2	H-13-2	31 1/2	25
G-14-1	21 1/2	27 1/2	H-14-1	3	27 1/2	G-14-2	21 1/2	27 1/2	H-14-2	31 1/2	27 1/2
G-15-1	21 1/2	30 1/2	H-15-1	3	30	G-15-2	21 1/2	30 1/2	H-15-2	31 1/2	30

Three-Column Box-Bases						Four-Column Box-Bases					
No.	Back Op'g		Bottom Op'g		Length	No.	Back Op'g		Bottom Op'g		Length
	Width	Length	Width	Length			Width	Length	Width	Length	
G-5-3	21 1/2	5 1/2	H-5-3	1 1/2	5	G-5-4	21 1/2	5 1/2	H-5-4	4	5 1/2
G-6-3	21 1/2	7 1/2	H-6-3	3 1/2	7 1/2	G-6-4	21 1/2	7 1/2	H-6-4	4	7 1/2
G-7-3	21 1/2	10 1/2	H-7-3	3 1/2	10	G-7-4	21 1/2	10 1/2	H-7-4	4	10 1/2
G-8-3	21 1/2	12 1/2	H-8-3	3 1/2	12 1/2	G-8-4	21 1/2	12 1/2	H-8-4	4	12 1/2
G-9-3	21 1/2	15 1/2	H-9-3	3 1/2	15	G-9-4	21 1/2	15 1/2	H-9-4	4	15 1/2
G-10-3	21 1/2	17 1/2	H-10-3	3 1/2	17 1/2	G-10-4	21 1/2	17 1/2	H-10-4	4	17 1/2
G-11-3	21 1/2	20 1/2	H-11-3	3 1/2	20	G-11-4	21 1/2	20 1/2	H-11-4	4	20 1/2
G-12-3	21 1/2	22 1/2	H-12-3	3 1/2	22 1/2	G-12-4	21 1/2	22 1/2	H-12-4	4	22 1/2
G-13-3	21 1/2	25 1/2	H-13-3	3 1/2	25	G-13-4	21 1/2	25 1/2	H-13-4	4	25 1/2
G-14-3	21 1/2	27 1/2	H-14-3	3 1/2	27 1/2	G-14-4	21 1/2	27 1/2	H-14-4	4	27 1/2
G-15-3	21 1/2	30 1/2	H-15-3	3 1/2	30	G-15-4	21 1/2	30 1/2	H-15-4	4	30 1/2

Distances from floor to bottom of back opening is 1 1/2 inch.
Order should state whether "Back Opening" or "Bottom Opening" is desired.

Portable Ventilating Box-Base For Ventilating Radiators

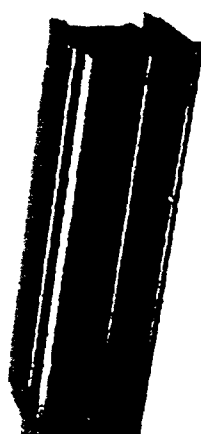


In this interchangeable base the dampers work with reversible action. When front damper is open, back damper is closed, and vice versa. When front damper is open, air is taken from the room; when rear damper is open, the air comes from outside. Front View—with Rear Wall Collar and Damper. Furnished with either an opening and damper in back (as shown) or in the floor, as desired.

Specify whether bases are desired with regular inlet collar in rear as above shown or for inlet to come through floor.

See list of sizes on page 108.

Wall Boxes

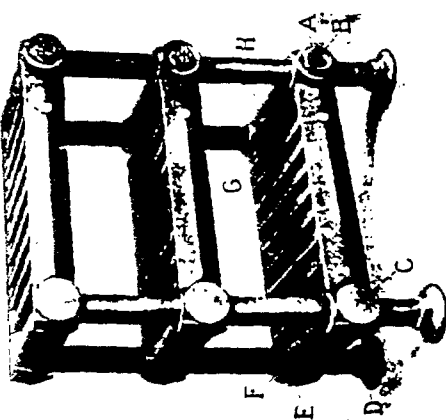


These are substantially constructed with heavy channel finish and their angle slats and inside brass wire screen render them storm and in-let proof. Made in two sizes. Large Box, exclusive of flange, 8x25 ins.; including rib or flange, 8 1/2 x 25 1/2 ins.; depth of box from front flange to rear, 4 inches. Collar at rear, 7 1/2 x 21 1/2 ins. Small Box, exclusive of flange, 5 1/2 x 17 1/2 ins.; including rib or flange, 5 3/4 x 18 ins.; depth of box from front flange to rear, 4 inches. Collar at rear, 4 1/2 x 17 1/2 ins. Bronze Wall Boxes: Made the same dimensions as Iron Wall Boxes, entirely of commercial red brass or bronze, including the deflecting plates and wire screen. Shipped in the rough unless otherwise ordered.

Peerless Pantry Radiators

(Formerly "Rococo")

For Steam or Water



This Radiator and Plate warmer combined is made up from Peerless Wall Sections (7-foot only) - for Steam or Water.

It is not only handy for kitchen pantries, but in extended constructions this warmer will be found most adaptable to the needs of hotel and restaurant kitchens wherein it is necessary to keep a large number of plates and other dishes warm and ready for service. It can be made up in various heights. It is shipped made up.

Sizes and Measurements

No.	Height Inches	Length Inches	Width Inches	Heating Surface Sq. Ft.
2	17	23	13 1/2	15.87
3	27	23	13 1/2	23 " "
4	37	23	13 1/2	31 " "
5	47	23	13 1/2	39 " "

Height, floor to bottom of lower section.

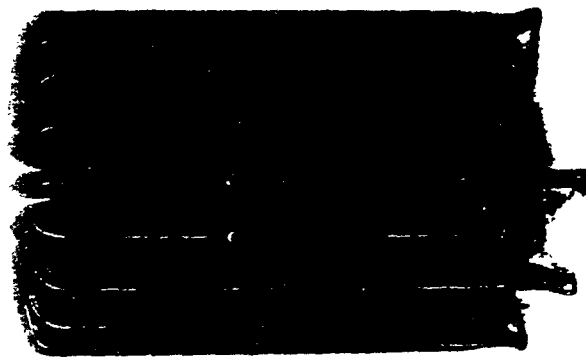
Distance from floor to center of tapping bottom section.

Width, inside of radiator.

TAPPINGS: Tapped regularly 1/2 inch, and located in center of radiator.

ing, state whether for Steam or Water, and what size tapping is required; also in specifying locations of tappings, note same by alphabetical designations shown in illustrations, and state what section is to be tapped. "H" and "F" are the regular tappings on each section, the others are special cast solid.

Circular Radiators



Peerless Two-Column Circular Radiator

Made in all heights of following patterns in steam and water:

Peerless One-Column
Peerless Two-Column
Peerless Three-Column

Radiators above listed are all made at Pierce and Detroit Plants except the twelve section, which is made at Detroit Plant, and one column which is made at Pierce Plant only.

All patterns of Circular Radiators made on special order only.

For measurements, see page 113

Circular Radiators

Notes on Construction

Circular Radiators are made in pattern and heights as listed on pages 94, 95, and 96.

TAPPINGS: Two- and three-column Radiators are tapped 2 inches and bushed as per list on page 87. Single-column cannot be tapped larger than 1½ inches. For one-pipe work this Radiator has two tappings for valves; for two-pipe work and for Water it has four tappings for valves—two supply in front and two return in back.

CONNECTIONS: Extra heavy right and left threaded nipples.

PUTTING TOGETHER: Circular Radiators are furnished in two pieces. When above Circular Radiators (for Steam only) are not intended to be placed around a column or post, they can, when specially ordered, be furnished all in one piece, having two connections for valves for two-pipe work. One-piece Circular Radiators are not supplied for one-pipe Steam, as the drainage would be unsatisfactory. Where Circular Radiators are used in connection with one-pipe system, each half of the circle should be connected as an independent Radiator. All Circular Water Radiators are made in two pieces.

SPACE FOR VALVES: In order to give more space for adjusting valves the sections of all Circular Steam and Water Radiators having supply and return openings are separated by an intermediate section without tapping boss, as shown in illustration.

REGULAR STOCK: Circular Radiators in Peerless 38-inch Two-Column Steam pattern only, are regularly carried in stock at Detroit Plant.

No.	Sections	Heating Surface Sq. Ft.	Sections	Heating Surface Sq. Ft.
1	12	48	28	112
2	16	64	32	128
3	20	80	36	144
4	24	96		

All other patterns made on special order only.

Distance from floor to center of either supply or return tapping is 4 inches.

Circular Radiators can be made to work as one Radiator single-pipe system, by use of flow and tee.

Circular Radiators

Peerless Single Column* - Steam and Water

No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs	No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs
16	20 1/4	8 3/4	10	38	26
18	22 1/4	10 1/4	42	30 1/2	27 1/2
20	23 3/8	11 5/8	44	40 7/8	28 3/8
22	25 1/8	13 1/8	46	42 3/8	30 3/8
24	26 1/2	14 1/2	48	43 3/4	31 3/4
26	28	16	50	45 1/4	33 1/4
28	29 1/4	17 3/8	52	46 3/8	34 3/8
30	30 7/8	18 7/8	54	48 1/8	36 1/8
32	32 1/4	20 1/4	56	49 1/2	37 1/2
34	33 1/4	21 1/4	58	51	39
36	35 3/8	23 3/8	60	52 1/2	40 5/8
38	36 3/4	24 3/4			

Peerless Two-Column - Steam and Water

112	20 7/8	22 3/8	38	39 5/8	21 3/8
16	23 3/4	5 3/4	41	41	23
18	25 1/4	7 1/4	42	42 1/2	24 1/2
20	26 5/8	8 5/8	44	43 7/8	25 5/8
22	28 1/8	10 1/8	46	45 3/8	27 3/8
24	29 1/2	11 1/2	48	46 3/4	28 3/4
26	31	13	50	48 1/4	30 1/4
28	32 3/8	14 3/8	52	49 5/8	31 5/8
30	33 3/8	15 3/8	54	51 1/4	33 3/8
32	35 1/4	17 1/4	56	52 1/2	34 1/2
34	36 3/4	18 3/4	58	54	36
36	38 1/4	20 1/4	60	55 1/2	37 1/2

Peerless Three-Column - Steam and Water

112	21	3	38	41 1/4	20 1/4
14	25 1/2	11 1/2	40	42 1/2	21 1/2
16	26 5/8	13 5/8	42	43 3/4	22 3/4
18	28	15 1/2	44	45	24
20	29 1/4	17 1/4	46	46 1/4	25 1/4
22	30 3/4	19 3/4	48	47 3/4	26 3/4
24	31 3/8	21 3/8	50	49	28
26	33 1/8	23 1/8	52	50 3/4	29 3/4
28	34 1/2	25 1/2	54	51 3/4	30 3/4
30	35 3/8	27 3/8	56	53 1/4	32
32	37 1/4	29 1/4	58	54 1/2	33 1/2
34	38 1/2	31 1/2	60	55 5/8	34 5/8
36	39 3/4	33 3/4			

*Made at Peoria Plant only.

†Made at Detroit Plant only.

Corner and 45° Angle Radiators



Corner Radiators are made in all heights of the following pattern:

Peerless Window, Steam or Water.
Peerless Flue, Steam and Water.
Peerless One, Two and Three Column, Steam and Water.

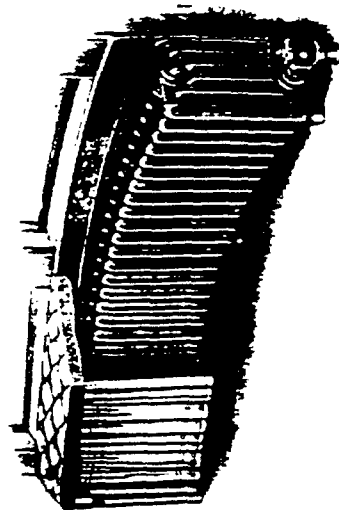
For instructions in ordering, see page 296.
For dimensions of Angle Radiators, made in all heights of the following patterns:

Peerless Window, Steam or Water.
Peerless One, Two and Three Column, Steam and Water.

For in turn them in ordering, see page 297.

Note: For Steam radiators who hand is to be a supply tapping Connected with right and left hand as to heavy threaded nipples.

Curved Radiators



Peerless Curved Window Radiator shown partially covered by a Window Seat

Curved Radiators are made for Steam and Water in all heights of patterns as follows:

Peerless Single Column Peerless Window (formerly

Peerless Two Column "Radiator")

Peerless Three Column

Note: Where Radiators are covered by seats, curtains, shields, etc., this fact is to be taken into account in estimating quantity of radiation required for proper service.

Note: In ordering Curved or Corner Radiators, specify the exact radius or angle of the bend, and within which the Radiator is to be placed. See page 296 or 297.

It is important that a heavy paper template showing exact size and radius of each Curved Radiator shall accompany the order.

Note: Makers also inform who hand of the curve (right or left-hand, when facing the Radiator) the supply is to be taken.

On all above Radiators, except Peerless Window, for one-pipe Steam work the supply leg is constructed with low drip hub, and for two-pipe Steam work the return-leg section is constructed with low drip hub.

Direct Radiators on Brackets

For Steam and Water



Peerless Single Column

Illustration above is to show how Radiator may be supported by Concealed Brackets. For description of Brackets and their special uses, see page 118.

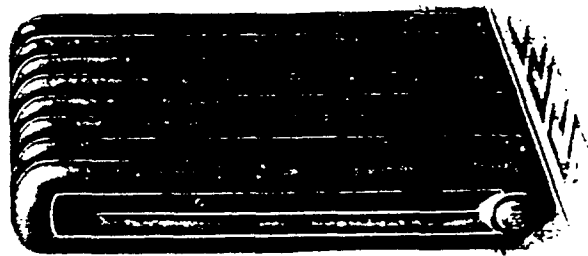
Peerless One, Two, Three and Four Column Radiators can be fitted with these Brackets on special orders. Radiators to be hung on Concealed Brackets are not equipped with low drip hub.

Orders for Radiators without legs must specify whether or not brackets are wanted, and if they are wanted, how many pairs.

116

Direct Radiators on Brackets

For Steam and Water



Peerless Two-Column

This type of Radiator is very desirable for use in narrow corridors, or in rooms where floor space is limited; specially advantageous for tile walls, or in basements above water line of Steam Boilers. Can be used for heating aspirating shafts in ventilating work, etc.

The same data, as regards heating surface, threading, nipple connection, and tapping, applies to these patterns as to Radiators having feet.

For additional data see page 118, and for measurements of brackets and of distances between upper and lower brackets, see pages 294 and 295.

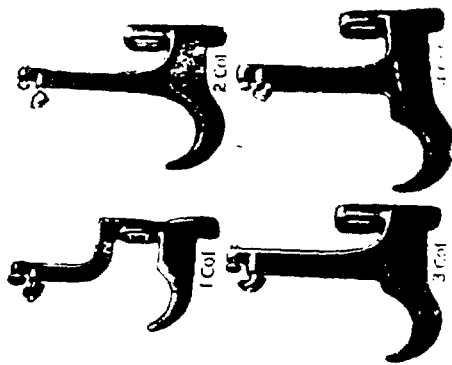
Note.—Radiators to be hung on Concealed Brackets are not equipped with low drip hub.

117

Peerless Radiator Bracket

Made of
Malleable Iron

Made for 1, 2, 3, and 4 column radiators for Water, Steam or Vapor Heating. Holds securely with only one stud bolt or lag screw with expansion bolt, thereby greatly reducing the cost of installation.



Bracket No.	Dist. from Wall	List Price
101	2"	\$1.25
102	3"	1.30
103	4"	1.40
104	5"	1.50
105	6"	1.60
106	7"	1.70
107	8"	1.80
108	9"	1.90
109	10"	2.00
110	11"	2.10
111	12"	2.20
112	13"	2.30
113	14"	2.40
114	15"	2.50
115	16"	2.60
116	17"	2.70
117	18"	2.80
118	19"	2.90
119	20"	3.00

Concealed Radiator Brackets

For supporting 1, 2, 3, and 4 column Direct Radiators of patterns made by us. Also made for supporting Condo Radiators. For application, see our line drawings and measurements on pages 294-5. A wall bracket is shown on the left and a ceiling bracket on the right. Ordinary radiators will support a Radiator of this pattern. When to be used, see our Top Brackets. See also whether for use on right, hand or left, and kitchen threaded nipple construction. See page 295 for the measurements.



Single Foot Radiator

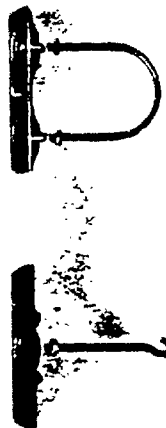


Radiators with front feet omitted and held in an upright position by a top bracket will be supplied by us, upon special order, in all heights of Peerless One, Two, Three, and Four-Column Radiators.

The legs are solid and can be finished with length of legs that will make the distance from floor to center of tapping 1, 2, 3, 4, 5, 6, 7, 8, or 9 inches.

For these Single Foot Radiators an additional charge will be made, prices quoted upon application.

SADDLES FOR MARBLE TOPS



Saddle for Steam Radiator Saddle for Hot Water Radiator

These Saddles fit Peerless One, Two, Three and Four-Column Radiators. They afford a rest or support upon which marble tops can be placed. Two of these saddles are usually sufficient for a radiator, but in the case of a Radiator of 15 sections or more, it is advisable to use three saddles, one in the center and one at each end.

LUGS FOR MARBLE TOPS



Removable lugs, as illustrated, are manufactured at Detroit. Plan to fit Peerless One, Two, Three and Four-Column Radiators. (Formerly "Rowley")

Extra-High Solid Legs



Extra-high solid legs as shown by illustration on this page, can be furnished on special order only for all heights of radiators, so that distances from floor to center of tapping will be 6 inches. Other distances up to 8 inches, if required, will be furnished on special order only, and at additional charge. Corbo Radiators can not be furnished with legs higher than 6 inches.

These Radiators with Extra High Solid Legs are tapped 2 inches and bushed according to list on page 87.

Note — In ordering Radiators having Extra-High Solid Legs, always give distance required from floor to the center of what is to be the supply tapping of Radiator.

Radiators supplied with Extra-High Solid Legs are not equipped with low drip hubs.

120

Radiator Pedestals



Pedestals to fit under legs of all styles and heights of any of our Direct Radiators can be furnished in the following heights: 1½, 1, 1½, 2, 2½, 3, 3½, 4, 4½ and 5 inches. Made at Pierce Plant.

Radiator Foot-ups

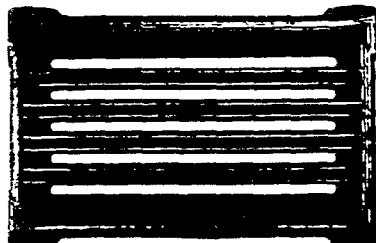


View of a new Radiator "Foot-up," showing its application to a low Radiator, and illustrating the method of taking up a carpet without changing anything but one of the Foot-ups at a time. The advantages of these little conveniences are as follows: Very neat in appearance; easily adjusted; save time and money; do away with Radiator boards; save cutting carpet or displacing the Radiator to take up the carpet. These Foot-ups set the Radiator up from floor 1½ inches. List Prices: Two pieces to a set; plain, 25 cents per set; nickel-plated, 40 cents per set. Made at Pierce Plant.

121

Peerless Wall Radiators (Formerly "Rococo")

Peerless Wall Radiators should always be assembled with bars vertical to secure greatest heating efficiency. The 7- and 9-foot Sections are, therefore, made in two Styles. Nos. 7-A and 9-A have bars running crosswise of the Section and are regularly tapped for connecting end to end as illustrated. Nos. 7-B and 9-B have bars running lengthwise of the Section and are regularly tapped for connecting side by side as illustrated.



No. 7-B



No. 9-B

No. 5 A is made with bars running crosswise of the Section only and is regularly tapped for connecting end to end.

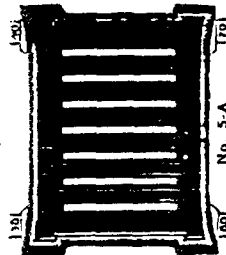
On special order, the No. 5 A, 7-A and 9-A sections can be furnished withappings at 30, 40, 70, and 80 as illustrated.

For Ratings and Measurements of Sections, see pages 124 and 308.

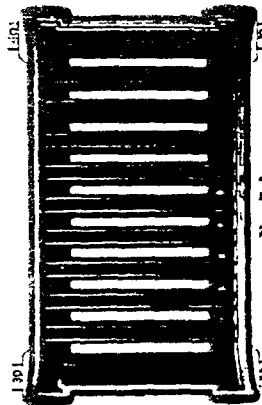
For additional Measurements and Methods of Assembling, see pages 209 to 306 inclusive.

For Tappings, Connections, Directions for Ordering, and Shipping Conditions, see page 298.

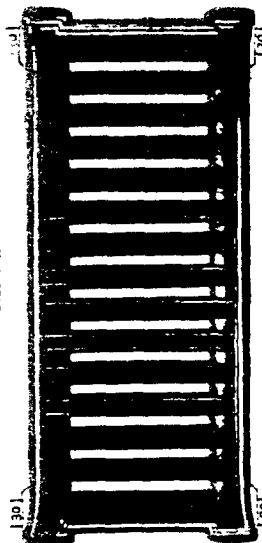
Peerless Wall Radiators - Continued (Formerly "Rococo")



No. 5-A



No. 7-A



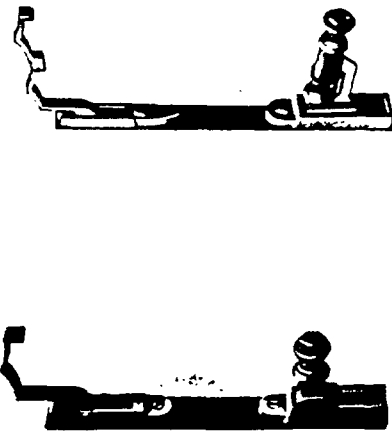
No. 9-A

Rating and Measurement of Sections				
Section Number	Height Inches	Length or Width Inches	Thickness (with Bracket) Inches	Heating Surface Sq. Ft.
5 A	11 1/2	16 1/2	3 1/2	5
7 A	11 1/2	21 1/2	3 1/2	7
9 A	11 1/2	29 1/2	3 1/2	9

For Ratings and Measurements of Sections, see page 298. See page 308 for Heating Surface in length of section.

Arco Adjustable Wall Brackets

(Patented July 3, 1916; March 16, 1919)



Single spool bracket for double row of radiators

Made for all runs of wall radiators in factories, warehouses, theatres, railroad stations and other buildings, garages, schools, churches and residences.

By use of these brackets, which permit vertical adjustment of 2 inches, the fitter can adjust for "pitch" after they have been attached to the wall. The brackets set the outer face of the radiator 13 1/2 inches from the wall.

The spools on the bottom bracket allow a free horizontal movement of the radiators, thus taking care of any difference in "roughing in" measurements, and afford free-play for expansion and contraction. The V shape formed by the divided spool fits the edges of Peerless Wall sections, thus keeping them securely in place.

The malleable iron finger of the top bracket is set at its highest point and then screwed down to the radiator, merely guiding it and keeping it from tipping forward.

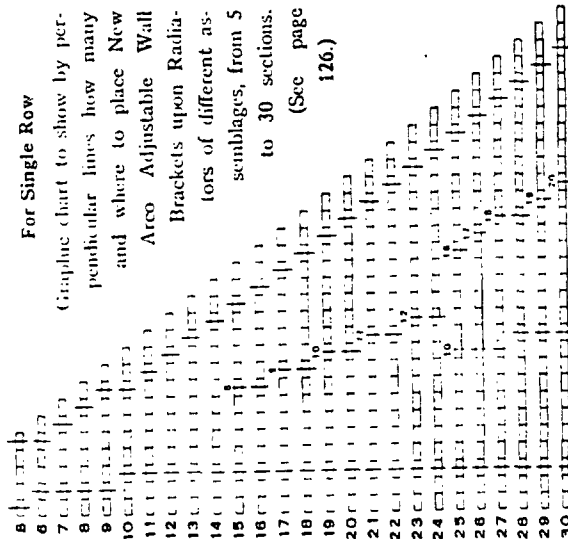
On SPECIAL ORDER we furnish the Arco Brackets with two spools (see above) to carry two runs of radiation separated for "A" section about 1 1/4 inch, and for "B" section 1 1/2 inch.

For application of new Arco Adjustable Wall Brackets to Peerless Wall Radiators, see page 126. See page 125 for chart showing number and location of Brackets on assemblies.

When ordering state whether for use with 5, 7, or 9 square foot sections and whether of "A" or "B" pattern, giving figure number of assembly. See pages 299 to 306. See page 126 for detail measurements.

New Arco Adjustable Wall Brackets

For Single Row
Graphic chart to show by perpendicular lines how many and where to place New Arco Adjustable Wall Brackets upon Radiators of different assemblies, from 5 to 30 sections. (See page 126.)



For Double Row of Radiation

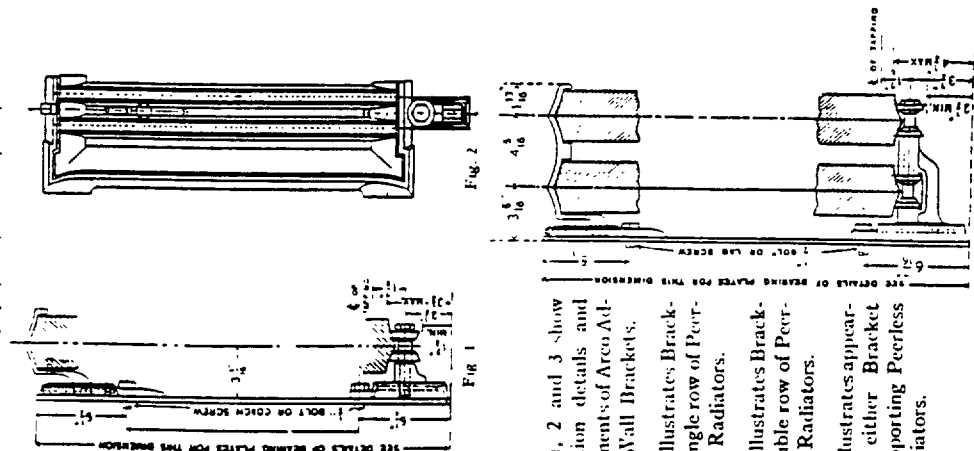
The following table gives the number of double spool Arco adjustable brackets required to support properly two rows of "B" Sections Peerless Wall Radiators:

Number of Double Sections	Number of Brackets
5 to 8	2
9 to 11	3
15 to 24	5
25 to 32	7
33 to 45	8

See Measurements of Brackets, page 126.

Arco Adjustable Wall Brackets

(Patented July 5, 1910; March 18, 1913)



Figs. 1, 2 and 3 show construction details and measurements of Arco Adjustable Wall Brackets.

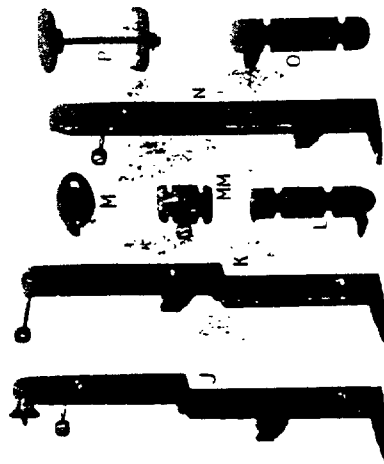
Fig. 1 illustrates Bracket for a single row of Peerless Wall Radiators.

Fig. 3 illustrates Bracket for double row of Peerless Wall Radiators.

Fig. 2 illustrates appearance of either Bracket when supporting Peerless Wall Radiators.

126

Wall Radiator Brackets



Brackets "J": To fit over a 9 1/4 inch high baseboard or skirting, and for supporting Wall Radiators Nos. 7-B and 9-B. With each "J" Bracket we furnish one 1/4 inch stove bolt and one button.

Height from floor to center of lowest tapping (Supply or return):

1 Bracket	9 1/4 inches
2 Bracket	7 1/4 inches
3 Bracket	5 1/4 inches

Brackets "K": To fit over baseboard or skirting, and for supporting Wall Radiators Nos. 5-A, 7-A, and 9-A. With each "K" Bracket we furnish one 1/4 inch stove bolt and one button. Height from floor to center of lowest tapping (Supply or return):

K-1 Bracket (will fit over 1 1/2 inch high baseboard)	16 inches
K-2 Bracket	14 inches
K-3 Bracket	12 inches
K-4 Bracket	10 inches
K-5 Bracket	8 inches
K-6 Bracket	6 inches

Brackets "L," "O," "MM," and "M": Screwed to wall, baseboard or wainscoting. "L" and "O" brackets are bottom supports for all sizes of Wall Radiators. "M" and "MM" brackets are top end supports. In place are not. One "MM" bracket is furnished with each "L," "O," and "M" bracket. Brackets are abitted for use with each "L" or "O" Bracket. Bracket for two wood screws—not furnished by us. With each "MM" Bracket we furnish one 1/4 inch stove bolt and one button.

Bracket "N": Is a straight right angle Bracket, without offset, for supporting all sizes of Wall Radiators, height from floor to center of end tapping losses, 5 1/2 inches. With each "N" Bracket we furnish one 1/4 inch stove bolt and one button.

Ceiling Bracket "P": Made of cast plate, 3 1/2 inches diameter and screwed to ceiling joists by four screws—not furnished by us. The bolt furnished gives a distance of 3 1/2 inches to 5 inches from bottom of Radiator to ceiling. Other length bolts can be furnished on special order.

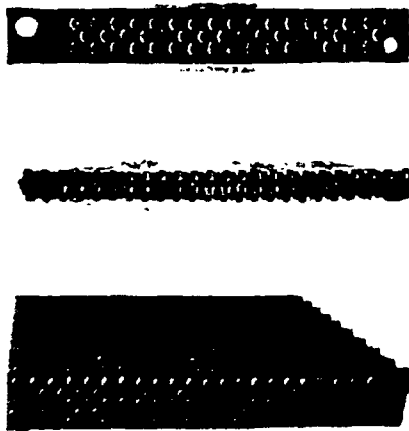
Note.—In ordering buttons and stove bolts separately, state for which bracket, because of different lengths of bolts.

127

14344

Vento Cast-Iron Heaters

For Fan or Blower Work



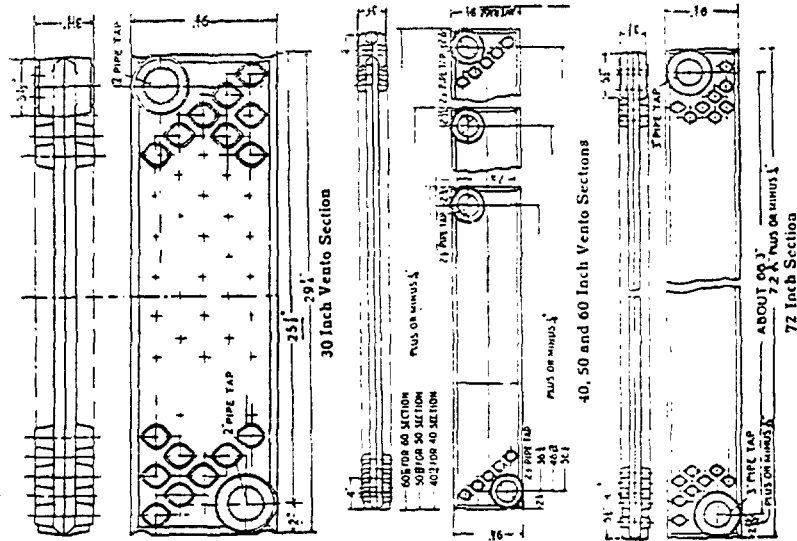
Regular Section Cross Section Narrow Section

Front View of Ten-Section Stack
Sections are easily handled and transported and may be carried through doors or windows of any building, and can then be assembled in compact, complete heaters. The equivalent pipe coil stacks are cumbersome and difficult to handle and transport.
All details given in special catalogs.

Vento Cast-Iron Heaters—Steam or Water

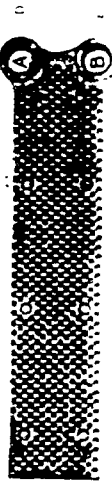
NARROW SECTIONS	Sq. Ft. per Section	Height	Width
40 inch	7.5	41 1/2	6 1/2
50 inch	9.5	50 1/2	8 1/2
60 inch	11	60 1/2	10 1/2
REGULAR SECTIONS	Sq. Ft. per Section	Height	Width
40 inch	8.0	41 1/2	9 1/2
50 inch	10.75	50 1/2	11 1/2
60 inch	13.5	60 1/2	13 1/2
72 inch	16.0	72 1/2	16 1/2

Please ask for special and complete catalog: "Engineers Data on Vento Heaters."



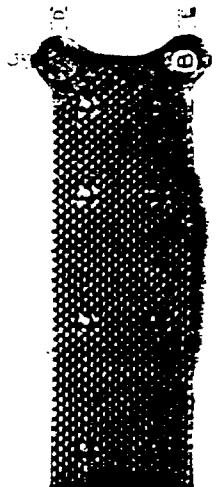
Perfection Pin Indirect Radiator

For Steam and Water Threaded Nipple Connections



"Standard" Size, Water End Section

MEASUREMENTS: Heating surface, 10 square feet. Length, 46 1/2 inches. Height, 11 1/2 inches at connecting point, 9 1/2 inches. Width in stack, 2 1/2 inches. On Special Order we furnish nipples to make this radiator connect to regular sections in stacks, 3, 4, 5, 6, 7, 8, 9, or 10 feet.



"Extra Large" Size, Steam End Section

MEASUREMENTS: Heating surface, 15 square feet. Length, 46 1/2 inches. Height, 11 1/2 inches at connecting point, 14 inches. Width in stack, 3 1/2 inches. On Special Order we furnish nipples to make this radiator connect to regular sections in stacks, 3, 4, 5, 6, 7, 8, 9, or 10 feet.

Both Sizes

CONSTRUCTION: Both "Standard" and "Extra Large" sections are made in distinctive patterns for Steam and Water. The Water patterns have two connections or passageways.

TAPPINGS: 2 inches right and left on water side, left and right on other side. Unless otherwise ordered the made tappings in both sizes will be right hand Air Valve Tap, 1/2 inch.

SPECIAL TAPPINGS: If other than regular tappings ("A" and "B") are desired, we can furnish them. If the radiator is to be used for steam, we can furnish it with 1/2 inch right and left tappings 1 1/2 inches or smaller, at "A" and "B". On the Extra Large section, we can furnish 1 1/2 inch or smaller at "B", 1 inch or smaller at "A", and 1/2 inch on the steam connection.

CONNECTIONS: Extra heavy 2-inch right and left threaded nipples with hexagonal nut in center.

SHIPMENTS: Water sections shipped as ordered, assembled in stacks of 5 or 6 sections; steam sections shipped as ordered, assembled and are therefore shipped knocked down. Sufficient nipples are shipped for assembly.

See page 309 for Free Air and Drain Between Centers.

Perfection Pin Indirect Radiators

For Steam or Water Flange and Bolt Connections



"Standard" Size Steam End Section

MEASUREMENTS: Standard Size—Heating surface, 10 square feet. Length, 46 1/2 inches. Height, 11 1/2 inches at connecting point, 11 1/2 inches. Width in stack, 2 1/2 inches.



"Extra Large" Size Steam End Section

MEASUREMENTS: Extra Large Size—Heating surface, 15 square feet. Length, 36 1/2 inches. Height, 11 1/2 inches at connecting point, 15 1/2 inches. Width in stack, 3 1/2 inches.

Both Sizes

CONSTRUCTION: Made in one type for either steam or water—with right and left hand connections.

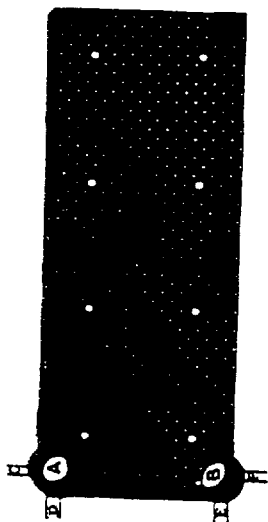
TAPPINGS: 2 inches right hand threads, unless otherwise ordered. Air Valve Tap, 1/2 inch.

SPECIAL TAPPINGS: If other than regular tappings ("A" and "B") are desired, we can furnish them. If the radiator is to be used for steam, we can furnish it with 1/2 inch right and left tappings 1 1/2 inches or smaller, at "A" and "B". On the Extra Large section, we can furnish 1 1/2 inch or smaller at "B", 1 inch or smaller at "A", and 1/2 inch on the steam connection.

SHIPMENTS: Always separately, cannot be shipped assembled. Sufficient bolts are sent to second flange.

See page 309 for Free Air and Drain Between Centers.

Sanitary School Pin Indirect Radiators For Steam and Water



Section for Water

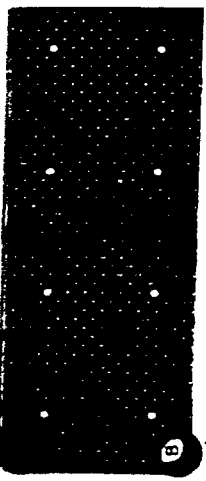
CONSTRUCTION: These sections are made in distinctive patterns for Steam and Water. The Steam patterns have one connection with the water supply. The Water pattern has two connections or passages for steam.

MEASUREMENTS: Heating surface, 20 square feet. Length with regular tapping, 36 1/4 inches; height at connecting point with regular tapping, 15 1/4 inches; width with special tapping at "C" or "P" 15 1/2 inches. Width with section in stack, 4 inches. On Special Order, we furnish nipples to make distances center to center in stack 3 1/2, 4 1/2, or 4 5/8 inches.

TAPPINGS: 2 inches, right-hand on supply end; left-hand on return end. Unless otherwise ordered the nipple tappings of bushings will be right-hand. Air Valve Tap—3/8 inch.

CONNECTIONS: Extra-heavy 2-inch right and left threaded nipple with hexagon nut at center.

SHIPMENTS: Steam sections always separate; Water sections separate in stacks. Sufficient nipples are sent to assemble.



Section for Steam

NOTE, Special Tappings: If other than regular tappings ("A" and "B" on water section and "B" only on steam section) are desired, we can furnish special tappings 2 inches or smaller, at "C", "D", "E", and "F", and also at "A" on the steam section.

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Excelsior Indirect Radiators For Steam and Water



Water End Section

MEASUREMENTS: Heating surface, 12 square feet. Length, Steam section, 36 inches; Water, 36 3/4 inches. Height, 8 inches. Width in stack, 3 5/8 inches; on Special Order we can furnish nipples to make distances from center to center of sections in stack—3 7/8, 4 1/8, or 4 3/8 inches.

TAPPINGS: 1 1/2 inches right threaded on supply; left threaded on return. If smaller opening is required for Steam use a 1 1/2-inch nipple and reducing ell, instead of bushing—to avoid interfering with diaphragm opening. We do not furnish any bushings. Air Valve Tap—3/8 inch. The supply pipe should be attached to the right-hand side of stack, and return pipe to the left-hand side.

SPECIAL TAPPINGS: If other tappings than regular are required we can furnish at "A", "B", "C", "D", or "U", 1 1/2 inches or smaller.

CONNECTIONS: Extra-heavy 1 1/2-inch right and left threaded nipples, with hexagon nut in center.

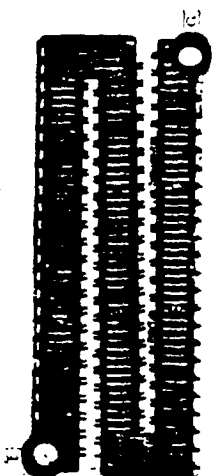
SHIPMENTS: Separate sections, unless ordered in stacks of five or six sections. Sufficient nipples are sent to assemble.

See page 309 for Free Areas and Distances between Centers.

See page 310 for Directions for Setting, and other Data.

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Sterling Indirect Radiators For Water Only



MEASUREMENTS: Heating surface 29 1/2 inches long. Length 36 1/4 inches. Height 15 1/2 inches. Width 15 1/2 inches in stack, 2 1/2 inches. On **Special Order** we furnish extra long nipples to make connections between sections. **TAPPINGS:** 2 inches right threaded, left threaded, or return—unless otherwise ordered. When back set down, the tapping inside the flashing is right hand, unless otherwise ordered. **Air Valve Tap—3/4 inch.**

SPECIAL TAPPINGS: If desired, we can furnish special tappings at 1/2, 3/4, 1, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/4, 2 1/2, 3, 3 1/4, 3 1/2, 4, 4 1/4, 4 1/2, 5, 5 1/4, 5 1/2, 6, 6 1/4, 6 1/2, 7, 7 1/4, 7 1/2, 8, 8 1/4, 8 1/2, 9, 9 1/4, 9 1/2, 10, 10 1/4, 10 1/2, 11, 11 1/4, 11 1/2, 12, 12 1/4, 12 1/2, 13, 13 1/4, 13 1/2, 14, 14 1/4, 14 1/2, 15, 15 1/4, 15 1/2, 16, 16 1/4, 16 1/2, 17, 17 1/4, 17 1/2, 18, 18 1/4, 18 1/2, 19, 19 1/4, 19 1/2, 20, 20 1/4, 20 1/2, 21, 21 1/4, 21 1/2, 22, 22 1/4, 22 1/2, 23, 23 1/4, 23 1/2, 24, 24 1/4, 24 1/2, 25, 25 1/4, 25 1/2, 26, 26 1/4, 26 1/2, 27, 27 1/4, 27 1/2, 28, 28 1/4, 28 1/2, 29, 29 1/4, 29 1/2, 30, 30 1/4, 30 1/2, 31, 31 1/4, 31 1/2, 32, 32 1/4, 32 1/2, 33, 33 1/4, 33 1/2, 34, 34 1/4, 34 1/2, 35, 35 1/4, 35 1/2, 36, 36 1/4, 36 1/2, 37, 37 1/4, 37 1/2, 38, 38 1/4, 38 1/2, 39, 39 1/4, 39 1/2, 40, 40 1/4, 40 1/2, 41, 41 1/4, 41 1/2, 42, 42 1/4, 42 1/2, 43, 43 1/4, 43 1/2, 44, 44 1/4, 44 1/2, 45, 45 1/4, 45 1/2, 46, 46 1/4, 46 1/2, 47, 47 1/4, 47 1/2, 48, 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Radiator Wrenches



Direct Radiator Wrench

These steel wrenches are made especially for assembling or disassembling direct Radiators connected with right- and left-hand threaded nipples. They are made in two sizes—for 1½-inch and 2-inch nipples and in three lengths—1-foot, 2-foot, and 4-foot (carried in stock at all Plants and Warehouses).



Indirect Radiator Wrench

These drop-forged steel wrenches are made especially for assembling Indirect Radiators connected with right- and left-hand threaded nipples having hexagon nut at center. Made in two sizes for 1½- and 2-inch nipple openings. Carried in stock at Springfield and Standard Plants.



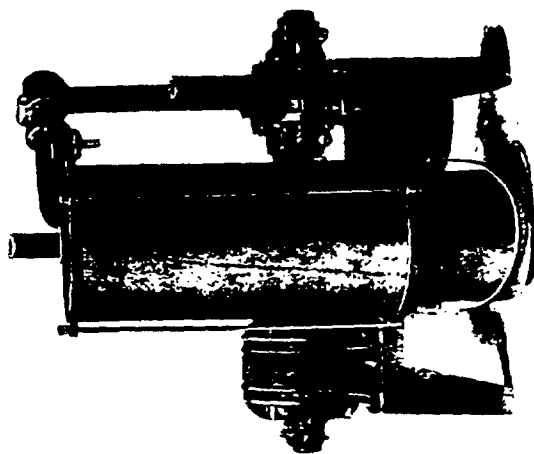
Vento Nipple Wrench

For Vento Sections this wrench will be found most practical. Made of drop-forged steel for right- and left-hand threaded nipples having a hexagon nut at center. In ordering state whether for 2½ or 3 inch nipple. Carried in stock at Springfield Plant.

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Arco Wand Vacuum Cleaners

(Pat'd Mar. 9, 1907 - Feb. 18, 1913 - Mar. 17, 1914 - Sept. 1, 1914)



This cut illustrates type Nos. 341 and 361 Arco Wand with electric motor direct drive

Number	Capacity	Motor H. P.	Equipment* Included	List Price
341	1 sweep	1 1/2	No. 3	\$240.00
361	1 sweep	1 1/2	No. 4	350.00

*Includes direct current, 110 or 220 volts or alternating current, single phase, 60 cycles, 110 or 220 volts.

Added net charge for motors of other specifications upon application.

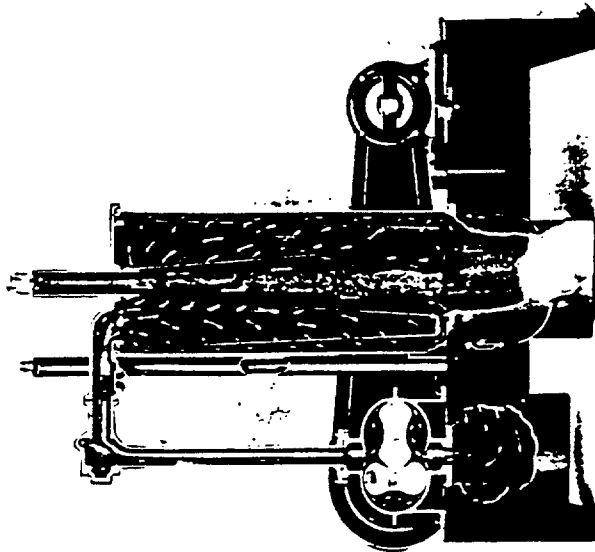
*Illustrated and listed on page 111.

Number	Dimensions			Shipping Weight, Lbs.
	Length inches	Width inches	Height inches	
341	36	21	41	410
361	41	23	50	600

112

Arco Wand Vacuum Cleaners

(Pat'd Mar. 9, 1907—Feb. 18, 1913—Mar. 17, 1914—Sept. 1, 1914)



This cut illustrates type Nos. 481 and 692 Arco Wand with electric motor, belt drive, and shows interior construction of all machines

Number	Capacity	Motor H. P.	Equipment* Included	List Price
481	1 Sweeper	2	No. 5	\$ 597.00
692	2 "	3	No. 6	1200.00

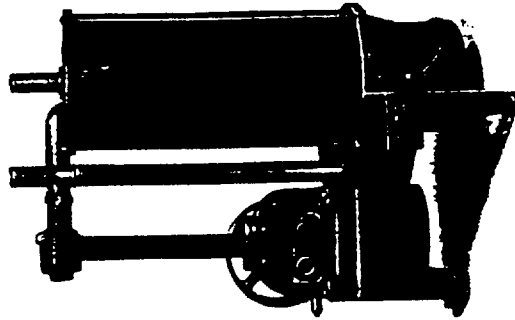
*Includes direct current, 110 or 220 volts or alternating current, single phase, 60 cycles, 110 or 220 volts or two or three phase 60, 50, 40, 30 or 25 cycles, 110 or 220 volts.
 †Added net charge for motors of other specifications upon application.
 *Illustrated and listed on page 141.

Number	Dimensions			Shipping Weight, Lbs.
	Length, Inches	Width, Inches	Height, Inches	
481	58	24	54	1050
692	72	29	72	2000

118

Arco Wand Vacuum Cleaners

(Pat'd Mar. 9, 1907—Feb. 18, 1913—Mar. 17, 1914—Sept. 1, 1914)



This cut illustrates type Nos. 34, 36, and 48 Arco Wand machines without motor.

Number	Capacity	Engine H. P. Recommended	Equipment* Included	List Price
34	1 Sweeper	1	No. 3	\$150.00
36	1 "	2	No. 4	200.00
48	2 "	3	No. 5	300.00

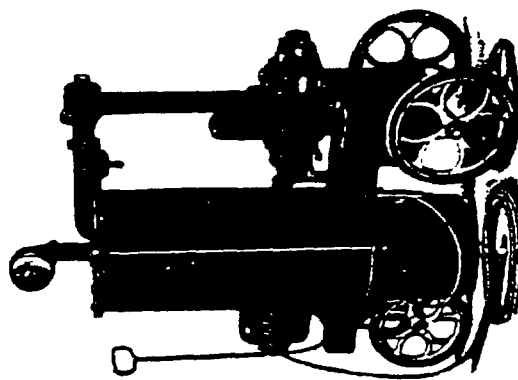
Pump pulleys: Nos. 34 and 36 machines are equipped with pump pulley 10-inch diameter by 2-inch face. We can furnish pulleys 8-inch, 6-inch, and 4-inch diameter by 2½-inch face if specified.
 No. 48 machine is equipped with pump pulley 12-inch diameter by 2½-inch face. We can furnish pulleys for this machine 10-inch, 8-inch, 6-inch, and 4-inch diameter by 3½-inch face if specified.
 Method of belting up machine and table to determine size and speed of pulleys illustrated on page 314.
 *Illustrated and listed on page 141.

Number	Dimensions			Shipping Weight, Lbs.
	Length, Ins.	Width, Ins.	Height, Ins.	
34	29	20	41	340
36	32	22	50	490
48	35	25	54	700

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Arco Wand Vacuum Cleaners

(Pat'd Mar. 9, 1907—Feb. 18, 1913—
Mar. 17, 1914—Sept. 1, 1914)



This cut illustrates type Nos. 341-T, 361-T Arco Wand mounted
on truck with rubber tire wheels
481-T same as above except Belt Drive and steel tire wheels

Number	Capacity	Motor H. P.	Equipment* Included	List Price
341-T	1 sweeper	1 1/2	No. 30-T	\$315.00
361-T	1 "	1 1/2	No. 30-T	\$355.00
481-T	1 "	2	No. 50-T	\$500.00

*Includes direct current, 110 or 220 volts or alternating current,
single phase, 60 cycle, 110 or 220 volts.
Added net charge for motors of other specifications upon appli-
cation. *Listed on page 111

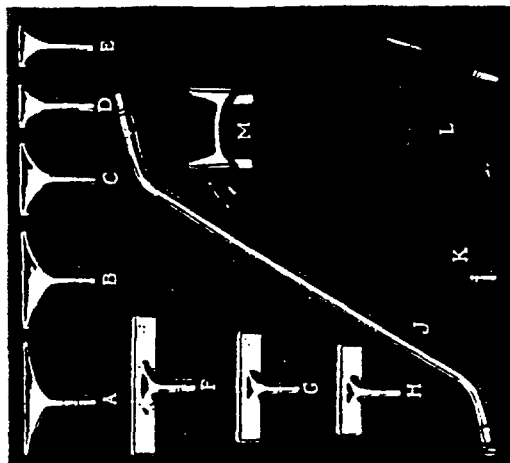
Number	Dimensions			Shipping Weight Lbs.
	Length In.	Width In.	Height In.	
341-T	37	24	48	500
361-T	47	26	55	680
481-T	57	28	62	1100

Truck machines include electric cable as follows:
341-T, 25 feet; 361-T and 481-T, 50 feet.

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Regular Tool Equipments

(Pat'd May 13, 1913)



No. 3 Equipment, furnished with
Machines Nos. 34, 341.

J—1 Wand (Handle)
K—1 Tuft Cleaner
D—1 4-inch Renovator
A—1 12-inch Renovator
P—1 15-inch Felted Sweeper
M—1 Hose Bracket
L—2 25-foot lengths 1 1/4-inch
Hose and Couplings

No. 5 Equipment, furnished with
Machines Nos. 48, 481

J—1 Wand (Handle)
K—1 Tuft Cleaner
D—1 4-inch Renovator
A—1 12-inch Renovator
P—1 15-inch Felted Sweeper
M—1 Hose Bracket
L—2 25-foot lengths 1 1/4-inch
Hose and Couplings

No. 4 Equipment, furnished with
Machines Nos. 36, 361

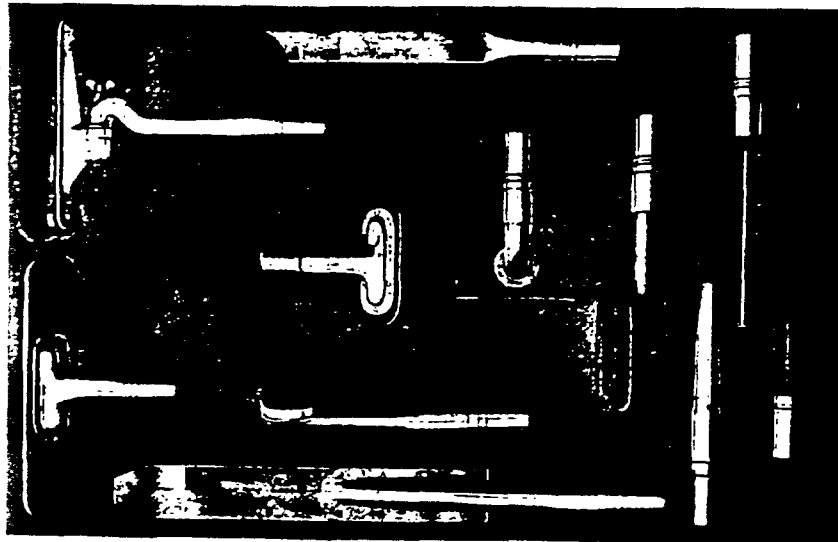
J—1 Wand (Handle)
K—1 Tuft Cleaner
E—1 4-inch Renovator
B—1 10-inch Renovator
G—1 12-inch Felted Sweeper
M—1 Hose Bracket
L—2 25-foot lengths 1-inch Hose
and Couplings.

No. 6 Equipment, furnished with
Machine No. 692

J—2 Wands (Handles)
K—2 Tuft Cleaners
D—2 4-inch Renovators (Ad-
justable Section Type)
A—2 12-inch Renovators (Ad-
justable Section Type)
F—2 15-inch Felted Sweepers
M—2 Hose Brackets
L—4 25-foot lengths 1 1/4-inch
Hose and Couplings.

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Special Tools



O — Gulper Tool
 P — 5-inch Hand Brush
 R — Metal Blowing Tool
 S — Floor Brush
 S — Duster
 T — Angle 15-Inch Floor Tool
 U — Underneath Radiator Tool
 V — 2 1/2-inch Hand Brush
 W — 6-inch Hand Brush
 X — Radiator Tool
 Y — Round 8-inch Floor Tool

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Truck Machine Equipments

No. 30-T, furnished with No. 411-F and 161-T machine, consists of the following:

- 1 Wand (Handle) 1 1/4 inch hose size
 - 1 Tuft Cleaner 1 1/4 inch hose size
 - 1 4-inch Renovator 1 1/4 inch hose size
 - 1 10-inch Renovator 1 1/4 inch hose size
 - 1 25 foot length 1 1/4 inch Hose with Coupling
- No. 50-T, furnished with No. 481-F, consists of the following:
- 1 Wand (Handle) 1 1/4 inch hose size
 - 1 Tuft Cleaner 1 1/4 inch hose size
 - 1 4-inch Renovator (A, S, T) 1 1/4 inch hose size
 - 1 12-inch Renovator (A, S, T) 1 1/4 inch hose size
 - 1 12 inch Floor Brush 1 1/4 inch hose size
 - 1 35 foot length 1 1/4 inch Hose with Coupling

Extra Equipment Prices on Tools and Parts

Name of Tool	1 inch Hose Size Each	1 1/4 inch Hose Size Each
Blowing Tool, Round, Metal	\$2.35	\$2.90
Brush, 12-inch Floor (S)	5.45	7.85
Brush, 6-inch Hand (O)	5.45	7.85
Brush, 2 1/2-inch Hand (V)	6.15	8.55
Duster, Adjustable Back (F)	5.70	8.10
Felted Sweeper, 10 inch	4.90	7.30
Felted Sweeper, 12 inch	6.20	8.60
Felted Sweeper, 15 inch	6.20	8.60
Felted Sweeper, 18 inch	6.20	8.60
Fibre Round Tool, 8 inch (Z)	1.70	2.10
Fibre Round Tool, 15 inch (U)	3.80	4.20
Gulper Tool (O)	5.40	7.80
Observation Glass (Compl.)	8.15	10.55
Renovator, 4 inch A, S Type	3.10	3.50
Renovator, 7 inch	3.65	4.05
Renovator, 10 inch	4.20	4.60
Renovator, 12 inch	4.20	4.60
Renovator, 15 inch	4.20	4.60
Radiator Tool (V)	2.65	3.05
Radiator Tool (Underneath) (V)	7.30	7.70
Tuft Cleaner	1.20	1.60
Tuft Cleaner, Fibre End only	5.10	5.50
Wand (Handle) No. 3	5.40	7.80
Wand (Handle) length 5 feet	5.40	7.80
Wood Face Sweeper, 12-inch	4.00	4.40
Wood Face Sweeper, 15-inch	4.00	4.40
Wood Face Sweeper, 18-inch	4.00	4.40

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14352

Extra Equipment

Prices on Tools and Parts—Continued

Hose with Coupling

Length, Feet	1 inch Each	1 1/4 inch Each	1 1/2 inch Each
5	\$ 1.90		
10	3.80		
15	5.70		
20	7.60	\$11.30	\$12.90
25	9.50		
30	11.40	17.30	19.40
35	13.30		
40	15.20	23.30	25.90
45	17.10		
50	19.00	29.30	31.90
Hose without Coupling, per foot			
Hose Bracket		1.00	.65
Hose Coupling Complete		2.30	3.15
Hose Coupling, Female End		1.70	2.35
Hose Coupling, Male End		.60	.30

Steel Hose with Couplings

Length, Feet	1 inch Each	1 1/4 inch Each
25	\$19.15	\$22.50
50	36.65	42.50
Hose without Rubber End and Ends, Rubber	70	80
	1.40	1.70

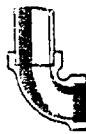
Inlet Couplings

WALL OR FLOOR PATTERN	WITH LOCK AND KEY
Hose Size 1 in. 1 1/4 in. 1 1/2 in.	Hose Size 1 in. 1 1/4 in. 1 1/2 in.
Inlet Coupling Bushings (11) 1 1/4 in. 1 in. hose size .25	Inlet Coupling Bushings (11) 1 1/4 in. 1 in. hose size .25
Inlet Coupling Bushings (12) 1 1/2 in. 1 1/4 in. hose size .35	Inlet Coupling Bushings (12) 1 1/2 in. 1 1/4 in. hose size .35
Inlet Coupling Fitting Sleeve, Cast Iron (for exposed piping), for 1 1/2, 2, or 2 1/2 inch pipe openings, Hose size 1, 1 1/4 or 1 1/2 inch	
Inlet Coupling Spacing Collars, Brass (for concealed piping), Hose size 1, 1 1/4, or 1 1/2 inch	
Length 1 1/4 inch	\$0.50
Length 1 1/2 inch	.55
Length 1 3/4 inch	.65
Length 2 inch	.75
Inlet Coupling Wrench (11) 1 in. with 1/4 inch adjustment of Inlet Couplings, Hose size 1, 1 1/4, or 1 1/2 inch	.30

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Drainage Fittings, Cast Iron

See page 335. Use Drainage Fittings on all piping. The inside diameter of these fittings through the body is the same as the inside diameter of pipe (see illustration). The fittings should be free from all fins, burrs, or rough places.

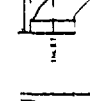
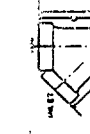


No. 1001

No. 1003

No. 1005

No. 1007



No. 1011

No. 1013

No. 1015

No. 1017

Dimensions and List Prices

No.	Description	Size Inches	Dimensions, Inches			Price
		A	B	C		
*1001	90° Long Turn Elbows	1 1/2	3 1/2	3 1/2	\$0.35	
		2	4 1/2	4 1/2	.45	
		3	5 1/2	5 1/2	.60	
		4	6 1/2	6 1/2	.75	
		5	7 1/2	7 1/2	.90	
		6	8 1/2	8 1/2	1.05	
		8	10 1/2	10 1/2	1.20	
		10	12 1/2	12 1/2	1.40	
		12	14 1/2	14 1/2	1.60	
		14	16 1/2	16 1/2	1.80	
		16	18 1/2	18 1/2	2.00	
		18	20 1/2	20 1/2	2.20	
		20	22 1/2	22 1/2	2.40	
		24	26 1/2	26 1/2	2.80	
		28	30 1/2	30 1/2	3.20	
		30	32 1/2	32 1/2	3.40	
		36	38 1/2	38 1/2	4.00	
		42	44 1/2	44 1/2	4.60	
		48	50 1/2	50 1/2	5.20	
		54	56 1/2	56 1/2	5.80	
		60	62 1/2	62 1/2	6.40	
		72	74 1/2	74 1/2	7.60	
		84	86 1/2	86 1/2	8.80	
		96	98 1/2	98 1/2	10.00	
		108	110 1/2	110 1/2	11.20	
		120	122 1/2	122 1/2	12.40	
		144	146 1/2	146 1/2	14.80	
		168	170 1/2	170 1/2	17.20	
		192	194 1/2	194 1/2	19.60	
		216	218 1/2	218 1/2	22.00	
		240	242 1/2	242 1/2	24.40	
		264	266 1/2	266 1/2	26.80	
		288	290 1/2	290 1/2	29.20	
		312	314 1/2	314 1/2	31.60	
		336	338 1/2	338 1/2	34.00	
		360	362 1/2	362 1/2	36.40	
		384	386 1/2	386 1/2	38.80	
		408	410 1/2	410 1/2	41.20	
		432	434 1/2	434 1/2	43.60	
		456	458 1/2	458 1/2	46.00	
		480	482 1/2	482 1/2	48.40	
		504	506 1/2	506 1/2	50.80	
		528	530 1/2	530 1/2	53.20	
		552	554 1/2	554 1/2	55.60	
		576	578 1/2	578 1/2	58.00	
		600	602 1/2	602 1/2	60.40	
		624	626 1/2	626 1/2	62.80	
		648	650 1/2	650 1/2	65.20	
		672	674 1/2	674 1/2	67.60	
		696	698 1/2	698 1/2	70.00	
		720	722 1/2	722 1/2	72.40	
		744	746 1/2	746 1/2	74.80	
		768	770 1/2	770 1/2	77.20	
		792	794 1/2	794 1/2	79.60	
		816	818 1/2	818 1/2	82.00	
		840	842 1/2	842 1/2	84.40	
		864	866 1/2	866 1/2	86.80	
		888	890 1/2	890 1/2	89.20	
		912	914 1/2	914 1/2	91.60	
		936	938 1/2	938 1/2	94.00	
		960	962 1/2	962 1/2	96.40	
		984	986 1/2	986 1/2	98.80	
		1008	1010 1/2	1010 1/2	101.20	
		1032	1034 1/2	1034 1/2	103.60	
		1056	1058 1/2	1058 1/2	106.00	
		1080	1082 1/2	1082 1/2	108.40	
		1104	1106 1/2	1106 1/2	110.80	
		1128	1130 1/2	1130 1/2	113.20	
		1152	1154 1/2	1154 1/2	115.60	
		1176	1178 1/2	1178 1/2	118.00	
		1200	1202 1/2	1202 1/2	120.40	
		1224	1226 1/2	1226 1/2	122.80	
		1248	1250 1/2	1250 1/2	125.20	
		1272	1274 1/2	1274 1/2	127.60	
		1296	1298 1/2	1298 1/2	130.00	
		1320	1322 1/2	1322 1/2	132.40	
		1344	1346 1/2	1346 1/2	134.80	
		1368	1370 1/2	1370 1/2	137.20	
		1392	1394 1/2	1394 1/2	139.60	
		1416	1418 1/2	1418 1/2	142.00	
		1440	1442 1/2	1442 1/2	144.40	
		1464	1466 1/2	1466 1/2	146.80	
		1488	1490 1/2	1490 1/2	149.20	
		1512	1514 1/2	1514 1/2	151.60	
		1536	1538 1/2	1538 1/2	154.00	
		1560	1562 1/2	1562 1/2	156.40	
		1584	1586 1/2	1586 1/2	158.80	
		1608	1610 1/2	1610 1/2	161.20	
		1632	1634 1/2	1634 1/2	163.60	
		1656	1658 1/2	1658 1/2	166.00	
		1680	1682 1/2	1682 1/2	168.40	
		1704	1706 1/2	1706 1/2	170.80	
		1728	1730 1/2	1730 1/2	173.20	
		1752	1754 1/2	1754 1/2	175.60	
		1776	1778 1/2	1778 1/2	178.00	
		1800	1802 1/2	1802 1/2	180.40	
		1824	1826 1/2	1826 1/2	182.80	
		1848	1850 1/2	1850 1/2	185.20	
		1872	1874 1/2	1874 1/2	187.60	
		1896	1898 1/2	1898 1/2	190.00	
		1920	1922 1/2	1922 1/2	192.40	
		1944	1946 1/2	1946 1/2	194.80	
		1968	1970 1/2	1970 1/2	197.20	
		1992	1994 1/2	1994 1/2	199.60	
		2016	2018 1/2	2018 1/2	202.00	
		2040	2042 1/2	2042 1/2	204.40	
		2064	2066 1/2	2066 1/2	206.80	
		2088	2090 1/2	2090 1/2	209.20	
		2112	2114 1/2	2114 1/2	211.60	
		2136	2138 1/2	2138 1/2	214.00	
		2160	2162 1/2	2162 1/2	216.40	
		2184	2186 1/2	2186 1/2	218.80	
		2208	2210 1/2	2210 1/2	221.20	
		2232	2234 1/2	2234 1/2	223.60	
		2256	2258 1/2	2258 1/2	226.00	
		2280	2282 1/2	2282 1/2	228.40	
		2304	2306 1/2	2306 1/2	230.80	
		2328	2330 1/2	2330 1/2	233.20	
		2352	2354 1/2	2354 1/2	235.60	
		2376	2378 1/2	2378 1/2	238.00	
		2400	2402 1/2	2402 1/2	240.40	
		2424	2426 1/2	2426 1/2	242.80	
		2448	2450 1/2	2450 1/2	245.20	
		2472	2474 1/2	2474 1/2	247.60	
		2496	2498 1/2	2498 1/2	249.60	
		2520	2522 1/2	2522 1/2	252.00	
		2544	2546 1/2	2546 1/2	254.40	
		2568	2570 1/2	2570 1/2	256.80	
		2592	2594 1/2	2594 1/2	259.20	
		2616	2618 1/2	2618 1/2	261.60	
		2640	2642 1/2	2642 1/2	264.00	
		2664	2666 1/2	2666 1/2	266.40	
		2688	2690 1/2	2690 1/2	268.80	
		2712	2714 1/2	2714 1/2	271.20	
		2736	2738 1/2	2738 1/2	273.60	
		2760	2762 1/2	2762 1/2	276.00	
		2784	2786 1/2	2786 1/2	278.40	
		2808	2810 1/2	2810 1/2	280.80	
		2832	2834 1/2	2834 1/2	283.20	
		2856	2858 1/2	2858 1/2	285.60	
		2880	2882 1/2	2882 1/2	288.00	
		2904	2906 1/2	2906 1/2	290.40	
		2928	2930 1/2	2930 1/2	292.80	
		2952	2954 1/2	2954 1/2	295.20	
		2976	2978 1/2	2978 1/2	297.60	
		3000	3002 1/2	3002 1/2	300.00	
		3024	3026 1/2	3026 1/2	302.40	
		3048	3050 1/2	3050 1/2	304.80	
		3072	3074 1/2	3074 1/2	307.20	
		3096	3098 1/2	3098 1/2	309.60	
		3120	3122 1/2	3122 1/2	312.00	
		3144	3146 1/2	3146 1/2	314.40	
		3168	3170 1/2	3170 1/2	316.80	
		3192	3194 1/2	3194 1/2	319.20	
		3216	3218 1/2	3218 1/2	321.60	
		3240	3242 1/2	3242 1/2	324.00	
		3264	3266 1/2	3266 1/2	326.40	
		3288	3290 1/2	3290 1/2	328.80	
		3312	3314 1/2	3314 1/2	331.20	
		3336	3338 1/2	3338 1/2	333.60	
		3360	3362 1/2	3362 1/2	336.00	
		3384	3386 1/2	3386 1/2	338.40	
		3408	3410 1/2	3410 1/2	340.80	
		3432	3434 1/2	3434 1/2	343.20	
		3456	3458 1/2	3458 1/2	345.60	
		3480	3482 1/2	3482 1/2	348.00	
		3504	3506 1/2	3506 1/2	350.40	
		3528	3530 1/2	3530 1/2	352.80	
		3552	3554 1/2	3554 1/2	355.20	
		3576	3578 1/2	3578 1/2	357.60	
		3600	3602 1/2	3602 1/2	360.00	
		3624	3626 1/2	3626 1/2	362.40	
		3648	3650 1/2	3650 1/2	364.80	
		3672	3674 1/2	3674 1/2	367.20	
		3696	3698 1/2	3698 1/2	369.60	
		3720	3722 1/2	3722 1/2	372.00	
		3744	3746 1/2	3746 1/2	374.40	
		3768	3770 1/2	3770 1/2	376.80	
		3792	3794 1/2	3794 1/2	379.20	
		3816	3818 1/2	3818 1/2	381.60	
		3840	3842 1/2	3842 1/2	384.00	
		3864	3866 1/2	3866 1/2	386.40	
		3888	3890 1/2	3890 1/2	388.80	
		3912	3914 1/2	3914 1/2	391.20	
		3936	3938 1/2	3938 1/2	393.60	
		3960	3962 1/2	3962 1/2	396.00	
		3984	3986 1/2	3986 1/2	398.40	
		4008	4010 1/2	4010 1/2	400.80	
		4032	4034 1/2	4034 1/2	403.20	
		4056	4058 1/2	4058 1/2	405.60	
		4080	4082 1/2	4082 1/2	408.00	
		4104	4106 1/2	4106 1/2	410.40	
		4128	4130 1/2	4130 1/2	412.80	
		4152	4154 1/2	4154 1/2	415.20	
		4176	4178 1/2	4178 1/2	417.60	
		4200	4202 1/2	4202 1/2	420.00	
		4224	4226 1/2	4226 1/2	422.40	
		4248	4250 1/2	4250 1/2	424.80	
		4272	4274 1/2	4274 1/2	427.20	
		4296	4298 1/2	4298 1/2	429.60	
		4320	4322 1/2	4322 1/2	432.00	
		4344	4346 1/2	4346 1/2	434.40	
		4368	4370 1/2	4370 1/2	436.80	
		4392	4394 1/2	4394 1/2	439.20	
		4416	4418 1/2	4418 1/2	441.60	
		4440	4442 1/2	4442 1/2	444.00	
		4464	4466 1/2	4466 1/2	446.40	
		4488	4490 1/2	4490 1/2	448.80	
		4512	4514 1/2	4514 1/2	451.20	
		4536	4538 1/2	4538 1/2	453.60	
		4560	4562 1/2	4562 1/2	456.00	
		4584	4586 1/2	4586 1/2	458.40	
		4608	4610 1/2	4610 1/2	460.80	
		4632	4634 1/2	4634 1/2	463.20	
		4656	4658 1/2	4658 1/2	465.60	
		4680	4682 1/2	4682 1/2	468.00	
		4704	4706 1/2	4706 1/2	470.40	
		4728	4730 1/2	4730 1/2	472.80	
		4752				

Hose and Piping

Maximum Length and Sizes

Machine Numbers	Hose		Piping	
	Maximum Lengths Feet	Size Inches	Maximum Lengths Feet	Size Inches
341 and 346	1 35	1	100	1 1/2
361 and 366	1 75	1 1/2	200	1 1/2
481 and 486	1 100	1 1/2	350	2
692	2 100	1 1/2	1150	2

Exhaust line should be same size as Cleaner main.

Maximum length of hose measured from machine to the most remote inlet coupling regardless of the number of mains and risers used.

For either of the following combinations can be used - 120 feet of 3-inch main connected to any 2 1/2-inch riser not exceeding 80 feet in height, or 120 feet of 3-inch main connected to any 2 1/2-inch riser not exceeding 160 feet in height.

Stationary Type

Nos. 341 and 346 Arco Wand Vacuum Cleaners - Single-Sweeper Machines. Suitable for cleaning cottages, houses, small apartments, etc.

Nos. 361 and 366 Arco Wand Vacuum Cleaners - Single-Sweeper Machines. Suitable for cleaning medium size buildings, larger residences, apartments, etc.

Nos. 481 and 486 Arco Wand Vacuum Cleaners - Single-Sweeper Machines. Suitable for large residences and buildings, schools, churches, libraries, banks, factories, etc.

No. 692 Arco Wand Vacuum Cleaners - Two-Sweeper Machines. Suitable for very large buildings, schools, libraries, stores, office buildings, factories, etc., where there is a large amount of floor space to be cleaned in a specified time, necessitating two operators working, instead of one as with Single-Sweeper Machine.

Truck Type

No. 341-T Arco Wand Vacuum Cleaners. Suitable for use in office buildings, hotels, apartment buildings, stores, banks, libraries, hospitals, laboratories, telephone exchanges and garages.

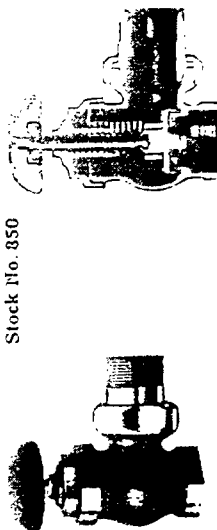
No. 361-T Arco Wand Vacuum Cleaner. Suitable for buildings as above, where greater capacity is required to meet peculiar conditions in the removal of large and frequent accumulations of dirt.

No. 481-T Arco Wand Vacuum Cleaner. Suitable for use in factories and manufacturing buildings, having large floor areas.

IDEAL Packless Radiator Valves

(Patents Pending)

Stock No. 850



For Low Pressure Steam or Water Heating

A Radiator Valve that will not leak steam, water or air around the stem. No packing. All metal. No expense of up-keep. Insurance against damage.

Radiator Valves should be designed for radiator surroundings. Unlike engine room valves, they should be finely finished, symmetrical in design, and should require no repacking to prevent leaks. Ideal Packless Radiator Valves - our new design - have been developed especially for radiator use. Symmetrical in appearance, easy to operate, and with ample area within for the free flow of steam and water. No packing of any kind is used. A metallic bellows allows the raising and lowering of the stem, but provides a flexible metal wall between the interior and exterior, thus making it steam, water or air tight at all times. The Ideal Packless Radiator Valve prevents damage to floors, walls, ceilings, and drapes. There is no "packing" to wear out and cause leaks around the stem. Saves the maintenance cost of repacking other types. Inexpensive insurance against damage to buildings. Turns so easily that it can be opened or closed with the finger tips. Equipped with new cool grip handle, hard rubber finish, which will not crack, break, or become loose. Especially adapted to vacuum heating.

List Prices

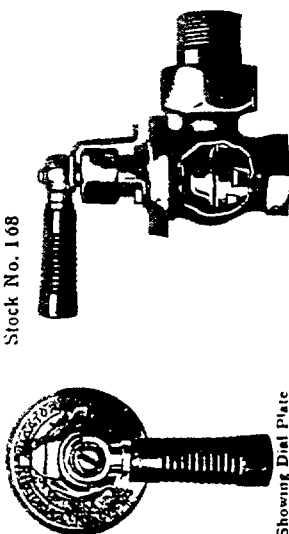
With Union, Jenkins Disc, Rough Body, plated all over. Threaded right hand both openings.

Size	1/2 in.	3/4 in.	1 in.	1 1/4 in.	1 1/2 in.	2 in.
No. 850 Angle	\$5.50	\$5.50	\$6.75	\$7.75	\$9.50	\$13.75
" 851 R. H.	6.00	6.00	7.25	8.50	10.50	15.00
" 852 L. H.	6.00	6.00	7.25	8.50	10.50	15.00
" 860 Globe	5.50	5.50	6.75	7.75	9.50	13.75

On special order a circulating hole will be drilled for hot water heating. Can be furnished with iron wheel handle. Lock and shield type can be furnished at extra charge, see page 153. See page 194 for roughing-in dimensions. See page 196 for correct specification form.

Detroit Multiport Valve

Improved Type For Vapor Heating
Stock No. 168



Showing Dial Plate
and Lever Handle

The improved Detroit Multiport Valve is of the double adjustment, graduated type for Vapor Heating only. It is fitted with Composition Disc which insures a tight shut-off when the valve is closed on either vacuum heating or steam pressures up to 15 lbs.

This disc holder makes a close working fit in the calibration shell. Turning the handle "to open" raises the disc from the seat and allows steam to pass through the port openings in the calibration shell. A partial turning of the handle causes the disc holder to uncover only a portion of the port openings, thus allowing the owner to regulate the amount of steam permitted to flow into the radiator. The shape and arrangement of the ports allow small valve openings when the handle is only slightly turned.

The adjustment to limit the maximum port opening is secured by setting the stop in the proper position on the dial plate which restricts the swing of the handle and the consequent lift of the disc. This construction provides for accurate balancing of the system. The stop is adjusted by loosening the lock nut and turning the stop to the desired position.

List Prices

Finished, rough body, nickel-plated all over, rubber handle. Round wood mahogany finish handle can be furnished on special order. Threaded right hand both openings.

Size	1 1/2 in.	2 in.	2 1/2 in.	3 in.
No. 168, Angle	\$1 25	\$1 50	\$5 50	\$7 25

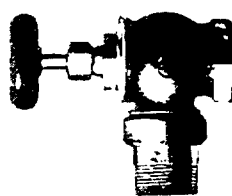
See page 194 for roughing-in dimensions.

See page 196 for correct specification form.

Screw-Stem Steam Radiator Valves

These steam valves—both angle and corner—are machined carefully and subjected to rigid inspection before leaving the factory. The metal is well distributed; threads carefully cut.

Rough body and polished trimmings plated all over. Other finishes on special order. No. 92 (not carried in stock) threaded right hand on side, right hand on bottom.



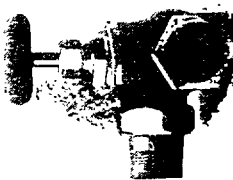
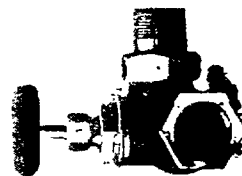
Nos. 72 and 62 with Union
Threaded, Right-Hand
Both openings

Price List

Stock No.	Size	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20
72	Disc with Union	\$2 40	\$2 85	\$3 05	\$3 55	\$4 05	\$4 55	\$5 05	\$5 55	\$6 05	\$6 55	\$7 05	\$7 55	\$8 05	\$8 55	\$9 05
62	Disc with Union	3 15	3 80	4 15	4 75	5 10	5 75	6 10	6 75	7 10	7 75	8 10	8 75	9 10	9 75	10 10
72	Disc without Union	2 10	2 85	3 05	3 55	4 05	4 55	5 05	5 55	6 05	6 55	7 05	7 55	8 05	8 55	9 05

Screw-Stem Steam Corner Valves

Off-set Pattern



No. 32—Right-Hand Valve
Threaded, Right-Hand
Both openings

No. 37—Left-Hand Valve
Threaded, Right-Hand
Both openings

Price List with Composition Disc

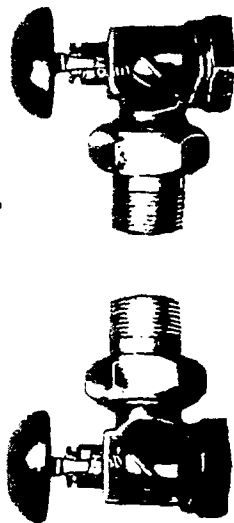
Stock No.	Size	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20
32	With Union R. H.	\$3 45	\$4 20	\$5 25	\$7 05	\$8 95	\$10 85	\$12 75	\$14 65	\$16 55	\$18 45	\$20 35	\$22 25	\$24 15	\$26 05	\$27 95
37	With Union L. H.	3 45	4 20	5 25	7 05	8 95	10 85	12 75	14 65	16 55	18 45	20 35	22 25	24 15	26 05	27 95
42	Without Union R. H.	3 15	3 80	4 15	4 75	5 10	5 75	6 10	6 75	7 10	7 75	8 10	8 75	9 10	9 75	10 10
47	Without Union L. H.	3 15	3 80	4 15	4 75	5 10	5 75	6 10	6 75	7 10	7 75	8 10	8 75	9 10	9 75	10 10

Rough body and polished trimmings plated all over. Other finishes on special order. Nos. 42 and 47 (not carried in stock) threaded right hand on side, right hand on bottom.

NOTE—See page 194 for roughing-in measurements.

Improved Q. O. Water Radiator Valves Self Cleaning Type

Patent Pending



Valve Open

Valve Closed

No. 101 A with union. Threaded right-hand both openings.

This valve is designed to overcome the sticking, due to corrosion and scale, frequently encountered in hot water valves of the shell type. As indicated in the cut, it operates on the principle of a swinging plate, set at a 45° angle which opens or closes the valve with a half turn of the handle.

The narrow edge of the plate presents a small area of contact with the body so that corrosion is easily broken away. The sharp edge of the plate acts as a scraper to clean the interior of the body of all dirt and deposit.

The interior plate, set at an angle of 45°, is also concave, which provides a passage through the valve of a true elbow shape. This greatly reduces the frictional resistance to the flow as compared to other hot water valves—a feature of great importance in hot water heating.

It is equipped with a new non-breaking composition handle which has a permanent black hard-rubber finish. This material insures a "cool grip" at all times. An indicator on the handle shows at a glance whether the valve is "on" or "off." The packing box is of an approved type, using the well-known "gland" principle.

Can be furnished with adjustable stop to regulate circulation—stock No. 101

Price List

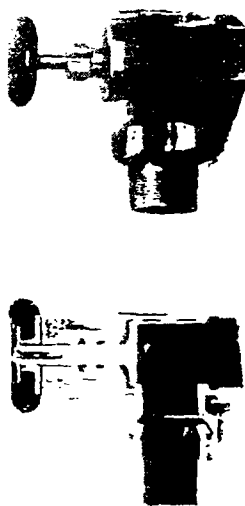
Stock No.	Size, inches	1/4	3/8	1	1 1/4	1 1/2	2
101-A	With union	\$2.40	\$2.85	\$3.65	\$5.05	\$7.10	\$10.85

Rough body plated all over.

See page 191 for roughing-in measurements.

150

Q-O Bonnetless Water Radiator Valves



No. 101 with Union

Threaded, Right-Hand Both Openings

Price List

Stock No.	Size, inches	1/4	3/8	1	1 1/4	1 1/2	2
101	With Union	\$1.40	\$1.85	\$2.65	\$3.05	\$4.10	\$5.05
111	Without Union	\$1.65	\$2.10	\$3.00	\$3.40	\$4.50	\$5.45

Rough body and polished trimmings, plated all over. Other finishes on special order. No. 111 first carried in stock threaded right-hand on side, right-hand on bottom.

Union Elbows for Water Radiators



No. 132

Both Threads Right-Hand

Price List

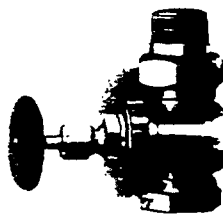
Stock No.	Size, inches	1/4	3/8	1	1 1/4	1 1/2	2
132		\$1.75	\$2.00	\$2.50	\$3.00	\$4.00	\$5.00

Rough body and polished trimmings, plated all over. Other finishes on special order.

NOTE—See page 191 for roughing-in measurements.

151

Straightway Q.-O. Water Radiator Valves



No 161 with Union
Threaded, Right-Hand Both Openings

No. 161 with Union Threaded, Right-Hand Both Openings

The valve can be fully opened or closed for one-quarter turn of the valve. It must be remembered that the content of water will move in the direction indicated by the arrows on its side.

Price List

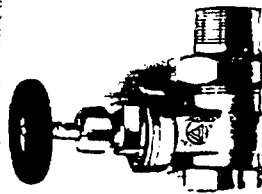
Size	Size, Inches	Y	1	1 1/2	2
116	With Union	\$2.95	\$3.65	\$5.05	\$10.10
121	With or Union	1.95	2.65	3.50	7.05

Rough body and pipe 1 1/2 in. diameter. Other fittings as shown. All fittings are made of steel. The old right-hand end.

W. W. Brass Gate Valves

Stock No. 373

Double Gate, Screened with Carbon



Price List.	Rough Body	Plated all over
100 375		

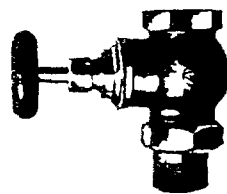
Size, inches	1	2	3	4	5	6	7	8	9	10	11	12
Price, each	65	84	28	55	10	56	60	59	60	51	2	80
Extra for Lock and Shield	Add to List Values											
No. 311	65	40	80	1	60	1	60	1	20	1	20	1

See page 191 for rough opening requirements.

See page 194 for requirements for comments

Screw-Stem Brass Globe Valves

Stock No. 189

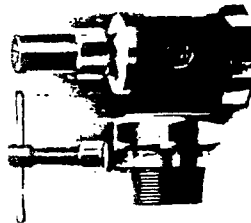


Threaded, Right-Hand Both Openings, Rough Body---
Plated all over.

Price List, with Union, Jenkins Disc, Wood Wheel

Size	1 m	3 m	1 m	1 1/2 m	1 1/2 m	2 m
No. 189	\$3 15	\$3 80	\$1 75	\$6 40	\$8 10	\$13 10

Lock and Shield for Radiator Valves



All stems of Radiator Valves can be furnished, on special order only, with Lock and Shroud. Keys not furnished unless ordered extra. See special list for No. 371 Gate Valves, page 152.

Keys for Detail Values, extra, each, net
Keys for Full or Packed Value, extra, each, net
Note. — When ordering specify number and size of Value, adding

NOTE.—When ordering specify number and size of Valve, adding the words "Lock and Shield".

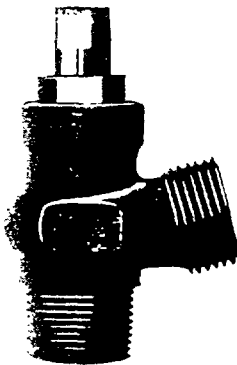
Gate Valves.—One key for $\frac{1}{2}$ inch and $\frac{3}{4}$ inch; one for 1-inch to 2-inch.

Norr—See page 194 for coughing in measurements.

NOTE—See page 194 for computing in measurements.

IDEAL Draw Off Cock

Stock No. 170



Especially designed for a boiler drain valve. Is equipped with a stuffing box which prevents leak on the floor when boiler is being drained. Made of brass throughout—brass seat. Boiler connection $\frac{3}{4}$ " Iron Pipe size. Outlet, $\frac{1}{4}$ " Standard hose thread. Brass finish. List Price \$1.75

Ideal Pop Safety Valves

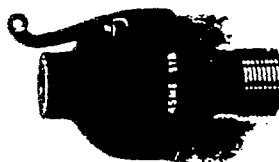
Low Pressure, Baked Enamel Finish

Stock No. 971

These valves are especially designed for house heating boilers. Regularly set to relieve at 15 lbs. Non-adjustable. Complies with A. S. M. E. standard.

On special order at extra charge can be set to relieve at any pressure from 5 lbs. to 25 lbs. Factory shipment only.

Can also be furnished on special order at extra charge with nickel plated finish.



Vapor Pop Safety Valves

For Vapor Heating. Stock No. 961

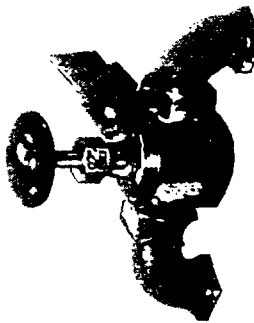
Can be set to relieve at $1\frac{1}{2}$ lbs. or 3 lbs. Order should specify desired relieving pressure.

Price List				
Size, inches	1	1½	2	2½
Stock Nos. 971 and 961, each	\$6.00	\$6.75	\$8.11	\$10.26
	\$10.37	\$12.26	\$15.00	\$18.00

151

Ideal Unique Water Radiator Valve

Stock No. 380



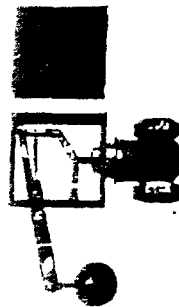
This Valve provides an interchangeable flow and return connection at one end only of the Hot-Water Radiator. Saves labor, elbow, run, and fittings. Saves the cutting of ports, and extra cutting and boring of floors. Permits location of the Radiator in restricted floor space, where it could not go if connected at both ends.

List Prices
Size, in. lbs.
1½ in. 11½ lbs. \$1.15
2 in. 15 lbs. \$1.25
2½ in. 17½ lbs. \$1.35
3 in. 20 lbs. \$1.45

Arco Snap-Acting Gas Valve

(Patents pending)

Stock No. 791



(Showing Housing Removed)

A Control Valve for Use with Thermostats and with Pressure and Temperature Regulators—Natural or Artificial Gas.

The Arco Snap-Acting Gas Valve prevents back-fire. By means of a spring, the valve is kept open and closed. It is actuated by a single snap action of the lever. It is used in a second connection with any type of regulator providing an up and down movement. Made of brass with renewable leather seats, screwed ends, complete with lever and weight.

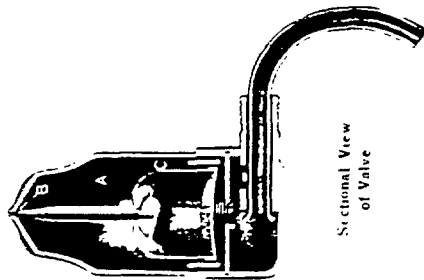
List Prices				
Size, inches	1	1½	2	2½
List	\$14.00	\$16.00	\$18.00	\$21.00
Weight, boxed	5 lbs.	6 lbs.	6½ lbs.	7 lbs.
Height from center of run	7 in.	7 in.	7 in.	7 in.
Valve length end to end	4½ in.	5½ in.	5½ in.	7 in.

155

Ideal Airid Siphon Valve

(Patent Pending)
Stock No. 500

For Venting Low Pressure Steam Radiators



The Ideal Airid Siphon Valve has been developed after many years of experience, exhaustive study and research. The "Airid Valve" represents the greatest forward step in venting steam radiators which has taken place in many years. This invention has made possible a simplified construction which produces the best air valve ever produced at a price that is low.

The perfect design of the Ideal Airid Siphon Valve has come through study of areas and free passages. Under flooded radiator conditions the valve vents without leak because the large separating chamber "A" allows separation of the air and water. The seat at "B" requires no guide for the pin, thus eliminating the water pocket around the seat which causes spluttering and leaking. By increasing the area "C" between the float and shell to proper proportions, it was discovered that the valve would siphon or drain perfectly without a by-pass from the stem to the air space at the top of the shell.

Attention has been paid to the effect of dirt, scale, or corrosion on the operation of the valve. The wide areas and absence of a "pin pocket" have reduced to a minimum the opportunity for dirt to interfere with the work of the valve. It is washed down and out through the free area around the float.

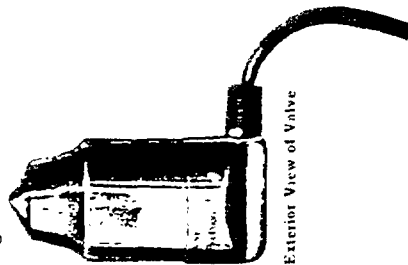
For details of operation, weight, list price, etc., see next page.

156

Ideal Airid Siphon Valve

(Patent Pending)
Stock No. 500

For Venting Low Pressure Steam Radiators



The valve operates thermostatically by the expansion of a volatile liquid contained within the float forcing outward the diaphragm which forms the bottom of the float, raising the pin and instantly closing the valve. A slight cooling relieves the internal pressure, and causes the diaphragm to contract, which opens the valve.

Should the valve flood, the float instantly closes, but when the water falls away in the radiator the siphon draws the water in the valve back to the radiator, thus leaving it free to vent every pocket of air.

The Ideal Airid Siphon Valve will vent the largest radiator quickly without steam or water leak, insuring every loop steam hot. It is non-adjustable and made entirely of metal. Tenants cannot tamper with it. It is of pleasing design, highly polished and in our own polished. Made complete in our own factories under our own inspection and to A. Guaranteed for five years.

Packed six in a box. Orders for one gross shipped in cartons containing 24 boxes of six each. Weight of box of six, 1 1/2 lbs. Weight of carton of twelve dozen, 38 lbs. The ideal connection 1/4 inch pipe size. Stock No. 500. List price \$2.00.

See page 196 for correct specification form.

157



Ideal Airid Siphon Valve attached to radiator showing siphon

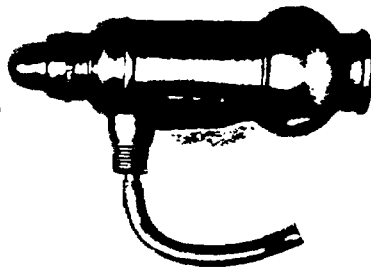
14359

Norwall Siphon Air Valve

(Pat'd Apr. 19, 1904—June 21, 1904—June 29, 1907)

Stock No. 561

Non-Adjustable



The Norwall Siphon Air Valve is non-adjustable and cannot be tampered with. All metal, no perishable parts. A sealed metal float is contained in the inner or float chamber, which is connected to an outer or air chamber by a small hole at the bottom. Water of condensation is retained in the bottom of the valve.

When steam reaches the valve the air in the outer chamber expands, forcing the water into the inner chamber raising the float and closing the valve; when the valve cools this air contracts, drawing the water from the float chamber into the air chamber. The float then drops and opens the valve. This action is instantaneous.

On "water-logged" radiators the valve closes tight against the escape of water, but the instant the water in the radiator falls away, the siphon automatically discharges the surplus water in the valve back into the radiator, thus opening the valve and allowing the radiator to vent.

Should dirt interfere with the perfect operation of the valve, the bottom cap is so fitted that it can be easily removed and the valve cleaned, making it as good as new.

This valve can be furnished equipped with "Government Holder" to prevent it from being removed from the radiator by hand. This requires an extra 1/4" tapping in radiator directly below regular air valve tapping, 3/4" centers. Price on application. Weight packed 3 3/4 lbs. per doz.

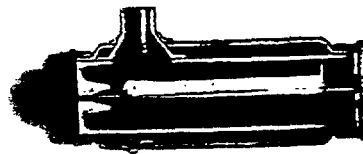
Stock No. 561, List Price, each, \$2.50

158

Allen Automatic Air Valve

Stock No. 560

(Patented January 29, 1907)



The Allen Automatic Air Valve operates on the air expansion principle; is non-adjustable, all metal, quickly responsive to air pockets, and easily cleaned if necessary. This valve meets the demand for a sensitive automatic air valve, where no siphon is desired.

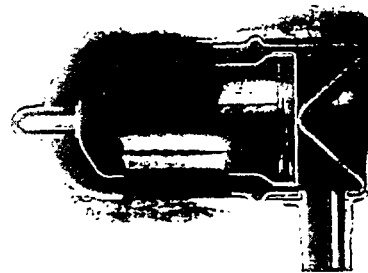
List Price

Stock No. 560, each \$1.80
(Weight packed 2 lbs. per doz.)

Arco Automatic Air Valve

Non-Adjustable

Stock No. 490



The Arco Automatic Air Valve is made entirely of brass, eliminating the objectionable rubber expansion port common to most valves of adjustable type.

In the shell of the valve is a sealed metal float with a flexible bottom. This float is partially filled, under vacuum, with a heat-sensitive liquid. When cold the valve is open, freely venting the Radiator of accumulated air. When steam reaches the valve the vaporizing of the float liquid expands the flexible bottom in the float, and closes the valve. When the valve cools the flexible bottom contracts, thus opening the valve. Weight, packed, 2 lbs. per dozen.

List Price each, \$1.50

159

14360

Ideal Air Line Valve

Patent Pending

Stock No. 816

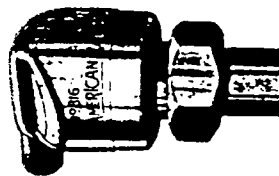
For venting steam radiators where drip line, air line or vacuum air line is used.

The IDEAL Air Line Valve operates on the same general principle as our IDEAL Aird Valve. It is always open to the passage of air but closes tight when steam reaches it. Should water reach the valve, it remains open for passage of the water to the drip line. It insures a hot radiator but keeps the air line cold. Non-adjustable—cannot be "tampered" with—made entirely of metal, sensitive in operation.

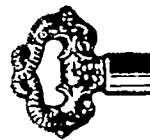
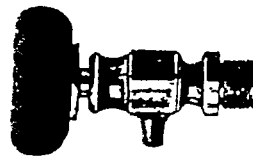
When steam reaches the valve it vaporizes a volatile liquid contained within the thermostatic member, creating a gas pressure and expanding outward the diaphragms which form the top and bottom of the member. This forces the pin to the seat closing the valve. When the valve cools the vapor condenses, relieving the pressure which opens the valve. It is either wide open or closed tight. Made in our own factories under our own inspection and test.

Nickel plated $\frac{1}{4}$ " radiator connection; $\frac{1}{2}$ " female union on outlet. Packed 6 in a box. Weight of six, 2 lbs. List \$3.50

See page 196 for Correct Specification form.



Compression Air Valves



List Prices

Stock No. 520—Wood Wheel, nickel plated, wt. pld. 1 1/2 lbs. doz. \$4.00
 Stock No. 521—Key, nickel plated, wt. pld. 1 1/2 lbs. doz. 3.00
 Two keys regularly furnished with each dozen
 Extra Keys, 5 cents each, net.

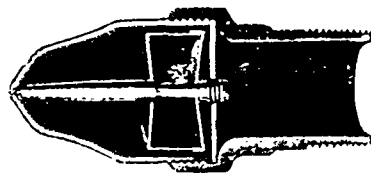
160

IDEAL Quick Vent

Patent Pending

Stock No. 815

For venting mains, long runs of pipe, indirect sizes, drop mers, etc., where a large amount of air must be expelled quickly. Will benefit all low pressure steam jobs by venting entire piping system and thereby heating radiators quicker under less pressure. Operates by volatile liquid contained within expandable member which has diaphragm at top and bottom giving full movement of stem. No adjustment. All metal. Very sensitive. Will last indefinitely. Does not close against water. Venting port $\frac{1}{2}$ -inch diameter. Valve connection $\frac{1}{4}$ -inch pipe thread. Polished brass finish. Weight, packed, 1 1/2 pound each.



No. 815 Quick Vent. List Price each..... \$3.00

See page 196 for correct specification form.

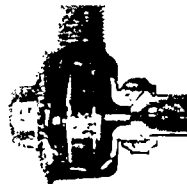
IDEAL Vento Vent

Patent Pending

Stock No. 817

For Use on Vento Heaters and Blast Cells

This valve is designed particularly for relieving air from Vento heaters (low pressure only). It has a large venting port— $\frac{1}{2}$ -inch diameter. Operates by volatile liquid contained within expandable member of wide diameter with diaphragm at top and bottom. No adjustment. All metal. Does not close against water. Connection to heater $\frac{1}{2}$ -inch pipe size. Outlet fitted with $\frac{1}{2}$ -inch female union for air line. Can be set in any position. Body, black enamel, nickel trimmings. Weight, packed, 1 1/2 pound each.

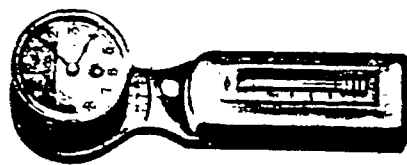


No. 817 Vento Vent. List Price each..... \$4.00

See page 196 for correct specification form.

161

Arco Temperature Regulator



8-Day Clock Automatic Thermostat

This Regulator with its various combinations of thermostat and motor represents the latest development of automatic draft control. The heating contractor will find many distinctive features which make the Arco Temperature Regulator attractive and useful to the home owner, and easy to install.

Models of Arco Temperature Regulators

There are three models of Thermostats and three models of motors.

- Plain Thermostat
- One-Day Clock Thermostat
- Eight-Day Clock Automatic Thermostat
- Gravity Motor
- Spring Motor
- Electric Non-Wind Motor

Any thermostat can be used with any motor, nine different complete regulators are obtainable. See page 165 for details. Thermostats differ only in the clock construction. The same accurate thermostat blade is used in all. The same high grade material and workmanship are found in each type of motor. An attractive display board complete with regulator connected to draft and clock dampers for practical demonstration can be furnished. A great aid in making sales. Price on application.

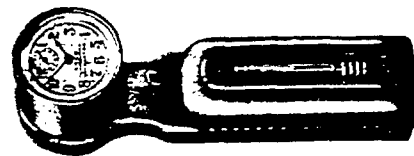
Arco Eight-Day Automatic Thermostat

This is the popular model. It performs its functions entirely independent of any attention or adjustment. The clock feature automatically lowers the temperature at night at any time desired and automatically raises it to 70 degrees in the morning at any hour desired. During the day the Thermostat maintains accurately any temperature between 55 degrees and 85 degrees and it can be used independent of clock by simply pulling out the button. Winding the clock once a week is all the attention required. Clock is wound from the front - an exclusive feature of much importance. Regularly furnished in dark antique finish. For list prices see page 165.

163

Arco Temperature Regulator

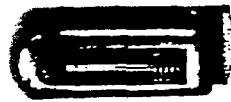
Arco One-day Clock Thermostat



One-Day Clock Thermostat

The model is equipped with a one-day clock which automatically sets the temperature indicator up in the morning at any pre-determined time. With the thermostat it is necessary to wind the clock once every 24 hours and set the indicator back each evening before retiring. It can be operated independently of the clock if desired. Temperature range 55° to 85°. Dark antique finish.

Arco Plain Model Thermostat



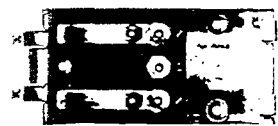
This model is like the others except that it has no clock. It is used for various purposes where clock control is unnecessary, maintaining the temperature at what you desire the indicator is set. The temperature range is from 55° to 85°. Dark antique finish. Thermostat

Special Features

All Arco Thermostats are equipped with a wall plate which is interchangeable with all models. The greatly simplified attachment of thermostat to wall and wire connections. Arco thermostats have a patented adjusting feature, by means of which correct adjustment can be made when necessary, without altering the distance between the contact points. The thermostat blade is extra long and extremely accurate. All thermostats are carefully tested and correctly adjusted before shipment.

For list prices see page 165.

164



Interchangeable Wall Plate Formed with Thermostat Arco Thermostat

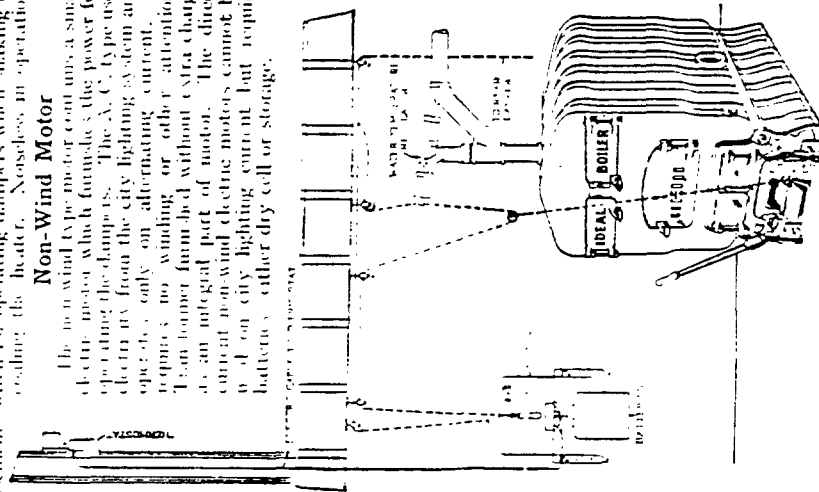
14362

Arco Temperature Regulator Motors

The power to operate the dampers of the heater is supplied by the Arco Motor which is strong and well made. It has ample power to lift the heaviest dampers or to operate steam for pressure. Moisture, dirt and rust proof all bronze bearings and gears. Provided with built-in switch for operating dampers when shaking or cooling the heater. Noiseless in operation.

Non-Wind Motor

The non-wind type motor contains a small electric motor which furnishes the power for operating the dampers. The A. C. type uses electricity from the city lighting system and operates only on alternating current. It requires no winding or other attention. The motor is furnished without extra charge as an integral part of motor. The direct current non-wind electric motors cannot be used on city lighting current but require batteries or other dry cell or storage.



Typical installation of an Arco Temperature Regulator. Shows method of installation for Steam Boilers and Hot Water Boilers equipped with Damper Regulator. Complete instructions with each Regulator showing connections to all types of heater.

161

Arco Temperature Regulator

Spring Motor

The spring motor will give 60 to 75 operations on one winding. Indicator shows whether winding is necessary.

Gravity Motor

The gravity motor is similar to the spring motor except that the power is supplied by a 10 lb. weight. This motor requires winding more often than the spring motor. Gravity motors require no dry cells. Motors require no attention. Motor is furnished without extra charge as an integral part of motor. The direct current non-wind electric motors cannot be used on city lighting current but require batteries or other dry cell or storage.

Non-Wind Motor

Contains electric power motor and requires no winding. A. C. motor (equipped with transformer) should be used where city lighting current is employed. D. C. motor requires dry cells or storage battery. Cannot be used on city current.

Arco Spring Motor

List Prices

With A. C. Non-Wind Motor 23 lbs.	With D. C. Non-Wind Motor 23 lbs.	With Spring Motor 21 lbs.	With Gravity Motor Shipping Wt. With
No. 1 List	No. 1 List	No. 1 List	No. 1 List
Eight Day Clock Automatic Thermostat	Eight Day Clock Automatic Thermostat	Eight Day Clock Automatic Thermostat	Eight Day Clock Automatic Thermostat
715 | \$90.00 | 728 | \$90.00 | 722 | \$65.00 | 719 | \$58.00	715 | \$90.00 | 728 | \$90.00 | 722 | \$65.00 | 719 | \$58.00	715 | \$90.00 | 728 | \$90.00 | 722 | \$65.00 | 719 | \$58.00	715 | \$90.00 | 728 | \$90.00 | 722 | \$65.00 | 719 | \$58.00
One Day Clock Automatic Thermostat	One Day Clock Automatic Thermostat	One Day Clock Automatic Thermostat	One Day Clock Automatic Thermostat
724 | \$77.00 | 727 | \$67.00 | 721 | \$52.00 | 718 | \$45.00	724 | \$77.00 | 727 | \$67.00 | 721 | \$52.00 | 718 | \$45.00	724 | \$77.00 | 727 | \$67.00 | 721 | \$52.00 | 718 | \$45.00	724 | \$77.00 | 727 | \$67.00 | 721 | \$52.00 | 718 | \$45.00
Plain Model Thermostat	Plain Model Thermostat	Plain Model Thermostat	Plain Model Thermostat
724 | \$20.00 | 726 | \$20.00 | 720 | \$15.00 | 717 | \$8.00	724 | \$20.00 | 726 | \$20.00 | 720 | \$15.00 | 717 | \$8.00	724 | \$20.00 | 726 | \$20.00 | 720 | \$15.00 | 717 | \$8.00	724 | \$20.00 | 726 | \$20.00 | 720 | \$15.00 | 717 | \$8.00

Order for A. C. units should specify voltage and cycle of current. Extra charge where current is other than 110 volts, 60 cycle. Low Voltage Transformer, Stock No. 730 for use in place of batteries with Spring and Gravity Motors. At time of installation, contractor will supply dry cells for each Regulator, thus insuring batteries of full capacity for each Regulator. See page 196 for correct specification form and for special booklet.

List Prices Special Balanced Check Dampers

With Saddles—No. 911

6 in. Saddle, 6 in. Rim \$2.60 9 in. Saddle, 8 in. Rim \$3.40

7 in. Saddle, 6 in. Rim 2.80 10 in. Saddle, 10 in. Rim 3.80

8 in. Saddle, 8 in. Rim 3.40 12 in. Saddle, 10 in. Rim 3.80

6 in. Without Saddles, No. 912

8 in. Without Saddles, No. 912

10 in. Without Saddles, No. 912

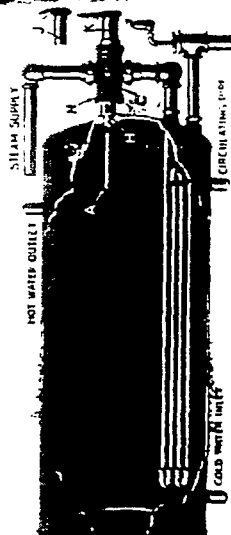
12 in. Without Saddles, No. 912

Arco Tank Regulator

Patent Pending

Stock No. 825

For automatic regulation of the temperature of water
or other liquids heated by steam
For steam pressure up to 25 lbs.



Arco Tank Regulator. Direct connected type

For use in hotels, schools, office buildings, hospitals, apartment buildings, factories, public institutions.

This regulator has been designed under an entirely new principle of volatile gas expansion. See next page for details of operation. This new principle allows the use of a single seated valve, which eliminates the leak through the valve so common with double seated valves. It also allows the regulator to be placed in any position. It is sensitive, accurate and positive in operation. The valve has no stuffing box, and does not leak steam around the stem. It will not bind in operation, hence insures close regulation.

The Arco Tank Regulator is small and compact. No moving parts are exposed, but are enclosed in a cast iron housing finished in baked enamel. Interior parts are of brass with renewable seat and disc of phosphor bronze - the best metal obtainable for valve seats. The bellows used in this construction is made from our own design, of the purest of brass, and from built-up discs. The Regulator and bellows are made complete in our own factories under our own inspection and test.

Particular attention is directed to the novel method of grouping the sizes. Improvements in design have made possible the use of the same size for several sizes. For example, Size A Regulator is used for 1/2", 3/4", 1", 1 1/4" and 1 1/2" pipe connections. It is threaded 1" and sets of bushings are furnished for 3/4", 1" and 1 1/4", so that this one regulator can be used for the three sizes of pipe. This feature results in a saving to the contractor, as the pipe sizes are changed and to dealers by allowing a complete stock to be carried with the least investment.

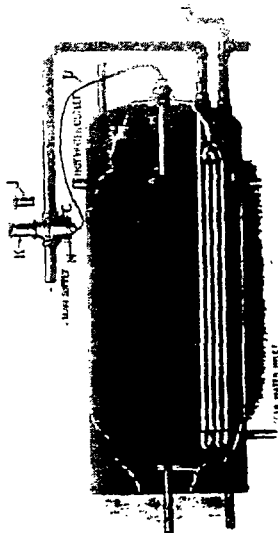
For List Prices, see next page

166

Arco Tank Regulator

(Patent Pending)

Stock No. 826



Both the flexible tube type and the direct connected type (see preceding page) operate on the same principle. The operating principle developed by the expansion of gas (air is used for close regulation. An increase in temperature of the liquid being regulated causes the bulb "A" to increase in temperature and the air in the bulb expands, forcing the valve stem, which is connected to the bellows and the valve stem, at "C" which forces the valve to open. A slight cooling of the water causes a lessening of the pressure, which allows the compression spring (enclosed at "B") to close the valve. Adjustment for temperature is made at "K" by means of a key, turning to the right for higher temperature and to the left for lower temperature.

Temperature range regularly furnished 140° 180° Fahr. Special "mudlers" from tampering with the adjustment.

Temperature range supplied on special order. Both types for use on steam pressure up to 25 lbs.

In the direct connected type, Sizes C and D, (2" to 3") supplied in flexible tube type.

All sizes have iron body, brass interiors with bronze disc and seat. Sizes A and B have union at both ends. Sizes C and D have screwed ends. Flexible regulators C and D is regularly furnished 8 ft. long. Regulators with longer tubes can be supplied on special order.

See page 195 for roughing-in dimensions and size and length of ball.

List Prices

Furnished complete with adjusting key and bushings. Full details for installation with tank.

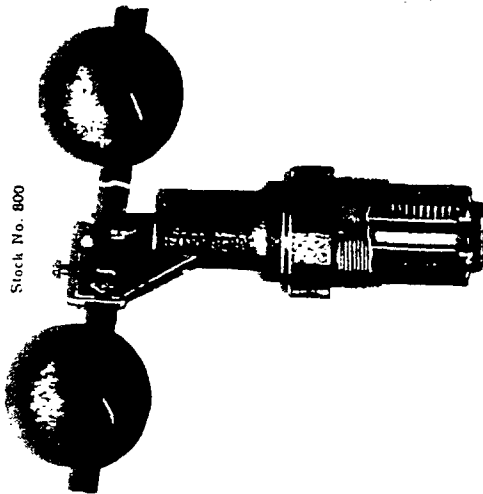
Stock No.	Size	For Pipe Connections	Type	Shipping Weights	List Price
825	A	1/2" to 1"	Direct connected with unions	20	50 00
825	B	1 1/4" to 1 1/2"	Direct connected with unions	25	60 00
826	C	2"	Flexible Tube screwed ends	50	80 00
826	D	2 1/2" to 3"	Flexible Tube screwed ends	60	90 00

167

Arco Water Regulator

For Damper Control on Hot Water Boilers

Stock No. 800



A damper Regulator designed by us for Hot Water Boilers which will control the draft by means of a constant water temperature at any degree between 140° and 240° Fahr. Damper control on Hot Water Boilers is as necessary as steam control on Steam Boilers. The Arco Water Regulator saves the inconvenience of attending the drafts, saves fuel by preventing over-heating, maintains a steady water temperature and saves the trouble of attending to the drafts. The Arco Water Regulator is made entirely of metal. Within the bulb is an expanded metal bellows, surrounded by which is a volatile liquid. As the water temperature in the system increases, the liquid vaporizes and the gas pressure generated thereby compresses the bellows and forces upward the thrust rod or stem which fills the level and thus the draft. As the water cools the gas pressure is relieved and the counterweight opens the drafts. There are no perishable parts for repair. The action is sensitive and accurate. Adjustment for temperature is obtained by changing the position of weights on the gas pressure.

The gas pressure is outside the bellows and the stem is attached to the bellows head at the bottom, similar to the construction of the Steam Regulator. This gives the bellows a long and long life. The head is formed as an integral part of the bellows thereby eliminating possibilities of leak at a soldered joint.

Made in our own factories, under our own inspection and test.

See page 193 for method of installation.

See page 197 for correct specification form.

Data, Dimensions and Price

Length of Bulb, 2 1/2 inches. Connection, 2" standard pipe thread. Trimmings consist of one 3/4-inch lever, two four-pound weights, 12 feet of chain, two ceiling pulleys, four "S" Hooks. Shipping weight 15 lbs.

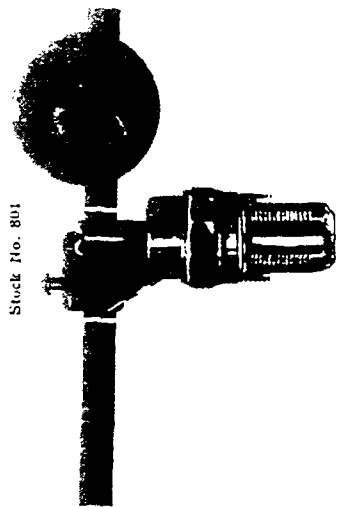
Stock No. 800 List Price \$10.00

168

Arco Junior Water Regulator

For Damper Control on Hot Water Supply Boilers

Stock No. 801



This Regulator is designed by us especially for Hot Water Supply Boilers. As the dampers are small and light, less power is required to operate them. The construction and operation are similar to that of the No. 800 Arco Water Regulator, described on page 168, but smaller in size. Damper control on Hot Water Supply Boilers is of vital importance, although it is frequently overlooked. Regulation saves fuel by preventing over-heating, saves attention to drafts and maintains constant water temperature. The Arco Junior Water Regulator prevents boiling, spattering, steaming water at the faucets and insures plenty of hot water as long as there is sufficient fire in the heater. It also prevents the annoyance and waste caused by the fire burning out and requiring relighting, which frequently occurs in Hot Water Supply Boilers due to the necessarily small fire pot. In localities where lime is present in the water, the Arco Junior Regulator prolongs the life of the heater by reducing to a minimum the lime deposit in the heater, since it prevents unnecessarily high water temperature at which most of the precipitation takes place.

Made in our own factories and under our own inspection and test.

See page 193 for typical installation.

See page 197 for correct specification form.

Data, Dimensions and Price

Length of bulb, 2 inches. Connection, 1 1/2-inch standard pipe thread. Temperature Range 140° to 180° Fahr. Trimmings furnished, one 3/4-inch lever, one 4-lb. weight, 6 feet of chain, two S Hooks. Shipping weight, 11 lbs.

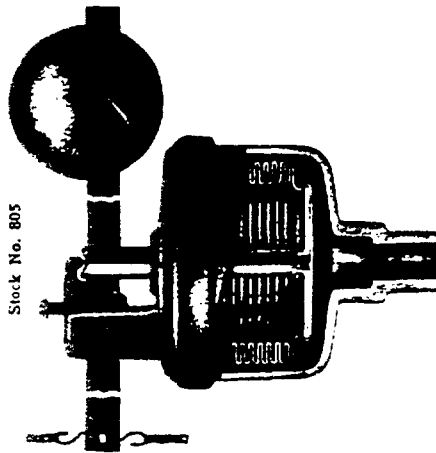
Stock No. 801 List Price \$16.00

169

Arco Steam Regulator

For Damper Control on Steam Heating Boilers

Stock No. 805



An all-metal pressure regulator for controlling dampers on steam-heating boilers. It is sensitive and accurate. The diaphragm is a metallic bellows of our own design and manufacture. The Regulator contains no rubber or other perishable material, thus saving the annoyance and expense of renewals so common with regulators using a rubber diaphragm.

Our design of this regulator is such that the steam pressure is on the outside of the bellows, with the stem or thrust rod extending down within the bellows where it is attached to the head at the bottom. These two prime features insure that the bellows expands or contracts evenly in all folds. There is no tendency for the bellows to tilt, and thus unduly stretch the metal on one side. This means long life and great sensitiveness. The head is formed as an integral part of the bellows, thereby eliminating possibilities of leak at a soldered joint.

For pressures up to 15 lbs.

Made in our own factories, under our own inspection and test.

See page 102 for method of installation.

Data, Dimensions and Price

Connection standard 1 inch male thread. Lever is 36 inches long. Weight, 1 lb. Shipped complete with 1 lever, 1 weight, 12 feet of chain, 2 ceiling pulleys, 4 S Hooks. Shipping weight, 16 lbs.

Stock No. 805. List Price \$16.00

170

Taco Water Heaters

For Heating Domestic Water with Steam, Vapor or Hot Water Boilers

Pat. December 20, 1921

Taco Water Heaters supply water for domestic use from the fire pot of the heating boiler. Save coal or gas and eliminate the second fire during winter months. No screwed joints exposed to the fire. Better and more efficient than a pipe coil.

Ar-Taco Heaters designed for Arco Boilers; Bungalow Taco Heaters for Arco Boilers.



Ar-Taco Heater

List Prices, Capacity and Dimensions

Size	Kind	Tank Capacity Gallons	Center to Center Inches	IRON		BRASS	
				Stock No.	List	Stock No.	List
	Bungalow	30	15 1/2	915	\$ 8.00	918	\$11.00
1	Ar-Taco	30	9	916	8.00	919	13.00
2	Ar-Taco	60	9	916	9.00	919	17.00
3	Ar-Taco	80	9	916	10.00	919	20.00

UNIVERSAL TACO WATER HEATERS

Pat. December 20, 1921

A fire pot heater designed to fit any steam or hot water boiler having corrod openings. Made of malleable iron; tested to 250 lbs. water pressure. Eliminates pipe connections in the fire pot. All pipe connections 1 inch

List Prices, Capacity and Dimensions

Stock No.	Tank Capacity Gallons	Center to Center Inches	Type of Boiler	Shipping Weight Pounds	List Price
603	30	1	Ideal Sect.	10	\$ 8.00
604	60	1	Ideal Sect.	14	13.00
605	30	6	Ideal Sect.	10	5.00
607	60	6	Ideal Sect.	14	13.00
609	30	9	Arco	10	9.00
610	60	9	Arco	11	14.00
615	60	15 1/2	Arco	10	8.00
616	60	15 1/2	Arco	11	13.00

NOTE: When fourth size is not shown for extra heat on boiler steam heaters, 1/2" square feet of radiation for each gallon of water heated. If hot water boiler, add 2 1/2" square feet of radiation for each gallon of water heated. See page 102 for correct specification form.

171

14366

Excelso Water Heater

Stock No. 740

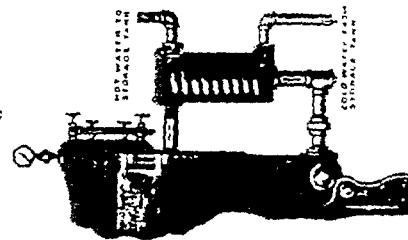
The Excelso Water Heater provides a method of heating water for domestic use that will give abundance of hot water at all times, require no attention from the owner, be inexpensive in operation and first cost, and take advantage of the fire in the heating boiler which must be burned seven or eight months of the year.

The Excelso method, a new combination of old and tried principles, is the most economical and satisfactory way to heat water for domestic service where a steam or vapor plant is used to heat the building. The Heater is connected externally to the boiler below the water line. The hot water from the heating boiler circulates through the heater around a copper coil through which passes the domestic water. The water in the heating boiler is always hot as long as there is

fire in the fire pot, hence hot water for domestic use will always be obtained whether the fire is banked or whether there is pressure in the system. This type of heater can never boil the water in the tank nor cause pounding in the pipes or scalding steam at the faucets. It does not affect combustion in the boiler, as the coil is not in contact with the coal. It simply has the effect of adding a small amount of radiation to the boiler.

For further description and prices see next page.

171



Excelso Water Heater—Continued

Stock No. 740

For heating domestic water from the steam or vapor heating boiler

Saves Coal or Gas

The Excelso Heater saves greatly in fuel as compared with the method of operating a second heater, either coal or gas, since during the greater portion of the year the second fire may be eliminated. A small hot water supply boiler is generally used for the water in the Excelso Heater, so that when one fire is extinguished the other may be started immediately. This means a saving in fuel and operating care since only one fire is kept throughout the whole year.

The Excelso Heater is extensively used in factories and large buildings of all kinds. It is particularly well adapted to take the place of a steam coil in a storage tank where live steam is available. Send for booklet showing many special applications.

Made of cast iron with removable copper coil, attached by ground joint connections. No packing. While the heater is not provided with tappings for the heater, the Excelso Rotary Hack Saw will cut openings of the correct size in a few minutes. All Excelso Water Heaters and Type A Steam Boilers are regularly supplied with tappings for Excelso Water Heaters.

See Page 197 for correct specific steam form.

Dimensions—List Prices—Capacities

	Shipped complete	extra	ready for use.	Stock No. 740
Size of Heater	11	12	13	15
Length, Inches	10 1/2	14	11 1/2	15
Diameter, Inches	5	5	6 1/2	6 1/2
Shell Openings	1 1/2	1 1/2	1 1/2	1 1/2
Weight, Pounds	12	23	31	39
Test Capacity, Gallons	40	45	60	90
List Price	\$10	\$10	\$50	\$60

Capacity figured at temperature rise 100 degrees in 3 hours. When Excelso Heaters are used allow extra load on boiler 1 1/2 square feet of radiation for each pound of water heated per hour.

Excelso Rotary Hack Saw

Makes a clean circular cut in iron to allow a steam coil to be cut in all kinds of work where tappings are required. Our stock is always on hand, it will cut through 1/2" of iron in a few minutes. Shipped complete with 1/2" of 1/4" of 1/4" for each size 1/2", 1/4", 1/4".

Stock No. 740 37 50 net each

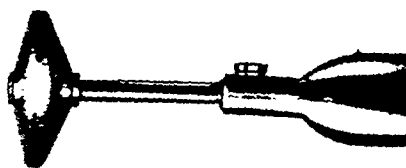
171

14367

Honeywell Heat Generator

For Hot Water Heating

These Generators are designed to quicken the circulation and widen the range of temperature in hot water heating plants by producing a slight pressure within the system. Contains no valves or other moving parts. The system is "sealed" by means of a column of mercury. Cannot stick or fail to relieve. Shipped complete with mercury.



List Prices, Each

Capacity Sq. Ft. of Radiation	Pounds of Mercury	Shipping Weight Pounds	Price
Style 4, No. 547	1	40	\$15.00
Style 2, No. 548	6	60	35.00
Style 3, No. 549	11	85	50.00
Style 4, No. 546	15	90	65.00

The Honeywell Tank in Basement Combination consists of a special Honeywell Heat Generator and a No. 800 Arco Water Regulator. For the use of this combination, the expansion tank can be located in the basement. The Arco Water Regulator is necessary for proper operation of this equipment.

List Prices

Including special generator and No. 800 Arco Regulator. For plant containing 2,500 square feet or less of radiation.

No. 774, Style 11, for one-story buildings \$18.00
No. 772, Style 12, for two-story buildings 52.00
No. 773, Style 13, for three-story buildings 56.00

Price on equipment for plants containing more than 2,500 square feet of radiation, or for buildings having more than three stories, furnished upon request.

Honeywell Aquastat

For use with any type of boiler, Arco Automatic Regulator to control water temperature. Temperature range 100° to 200° F. Delivery in 10 days from stock. List Price, \$20.00. Stock No. 729. Tapping weight 1 lbs.

Steel Storage Tanks

With or Without Coil



Important Information

All tanks listed on pages 177 and 178 can be furnished galvanized.

Orders for tanks with coils or in any way special, not subject to cancellation.

All tanks with coils provided with tapping for Arco Tank Regulator.

In ordering, state whether vertical or horizontal tanks are wanted. Unless otherwise ordered, horizontal tanks will be shipped with six openings.

Tanks without manholes are made with one concave and one convex head. Tanks with manholes have both heads convex.

Special Note

The quality of the material used and the method of construction make these tanks first class in every particular. When these tanks are to be subjected to sudden or unusual pressure, as in the case where tanks are connected direct to City Pumping Station and the pressure is increased during times of conflagration or the like, tanks of greater gauge or thickness of metal can be furnished or it is necessary that the system be equipped with Water Pressure Reducing Valve and Relief Valve.

Prices of special tanks furnished on application.

Black Steel Standard Storage Tanks

For Working Pressure Not Exceeding
65 lbs. per Sq. Inch

Stock No.	Size	Approximate Capacity Gallons	Approximate Weights	List Price
115	20 x 1	66	270	\$ 91.00
116	20 x 5	85	310	101.00
420	21 x 1	100	330	109.00
421	21 x 5	120	380	123.00
422	21 x 6	140	410	131.00
428	30 x 1	150	430	133.00
429	30 x 5	180	500	158.00
430	30 x 6	220	560	173.00
431	30 x 7	250	630	196.00
432	30 x 8	295	700	211.00
438	36 x 6	315	700	206.00
439	36 x 7	365	780	211.00
440	36 x 8	420	870	256.00
441	36 x 10	535	1030	391.00
444	42 x 6	430	890	276.00
445	42 x 7	500	980	310.00
446	42 x 8	575	1070	333.00
448	42 x 10	720	1250	375.00
449	42 x 12	865	1430	415.00
699	42 x 14	1000	1670	468.00

Hand holes, list price, \$8.00. Manholes in head, weight 100 pounds, list price, \$40.00; in shell, weight 200 pounds, list price, \$45.00. Extra openings, list price, 2 or 2½ inches, \$8.00; 3 or 3½ inches, \$9.00; 4 inches, \$10.00. Tanks under 21 inches in diameter cannot be furnished with manhole. Tank legs, per set of three, list price, \$3.00. Dimensions, 7½ inches floor to tank; 8½ inches over all.

Black Steel Extra-Heavy Storage Tanks

For Working Pressure Not Exceeding
100 lbs. per Sq. Inch

Stock No.	Size	Approximate Capacity Gallons	Approximate Weights	List Price
462	21 x 5	120	390	\$137.00
463	21 x 6	140	440	155.00
470	30 x 5	180	520	182.00
471	30 x 6	220	590	198.00
472	30 x 7	250	660	221.00
473	30 x 8	295	720	242.00
479	36 x 6	315	920	264.00
480	36 x 7	365	1030	300.00
481	36 x 8	420	1160	328.00
483	36 x 10	525	1380	385.00
486	42 x 6	430	1140	315.00
487	42 x 7	500	1260	390.00
488	42 x 8	575	1400	420.00
490	42 x 10	720	1660	480.00
691	42 x 12	865	1910	510.00
692	42 x 14	1000	2180	611.00
693	48 x 8	750	1690	510.00
694	48 x 10	940	1960	580.00
695	48 x 12	1130	2250	650.00
696	48 x 14	1300	2570	715.00
697	48 x 16	1500	2860	800.00
698	48 x 18	1700	3150	870.00

Hand holes, list price, \$8.00. Manholes in head, weight 100 pounds, list price, \$40.00; in shell, weight 200 pounds, list price, \$45.00. Extra openings, list price, 2 or 2½ inches, \$8.00; 3 or 3½ inches, \$9.00; 4 inches, \$10.00. Tanks under 21 inches in diameter cannot be furnished with manhole. Tank legs, per set of three, list price, \$3.00. Dimensions, 7½ inches floor to tank; 8½ inches over all.

Coils for Storage Tanks

We can, upon special order, supply tanks with return bend coils, at extra charge, as per list below. Size of coil must be determined by heating contractor, who alone is familiar with all the conditions surrounding installation. See pages 283 and 284 for method of heating.

List Prices of Standard Steam Coils Built in Tanks

These prices cover coil in horizontal tanks and include all return bend, black metal coil. Spiral coils furnished for vertical tanks. Price on application.

Size Tank	Size of Coil	Length of Coil in Feet	Price per Coil	Galvanized Coil
20" x 4'	1 Pipe 1 in	10	\$29.00	\$35.00
20" x 5'	1 Pipe 1 in	14	30.50	38.50
21" x 4'	1 Pipe 1 1/2 in	10	35.50	42.00
21" x 5'	1 Pipe 1 1/2 in	14	37.00	45.00
21" x 6'	1 Pipe 1 1/2 in	18	38.50	48.00
30" x 4'	1 Pipe 1 1/2 in	10	35.50	42.00
30" x 5'	1 Pipe 1 1/2 in	14	37.00	45.00
30" x 6'	1 Pipe 1 1/2 in	18	38.50	48.00
30" x 7'	1 Pipe 1 1/2 in	22	40.00	51.00
36" x 6'	1 Pipe 1 1/2 in	26	41.50	54.00
36" x 7'	1 Pipe 1 1/2 in	22	51.00	62.00
36" x 8'	1 Pipe 1 1/2 in	26	57.50	70.00
36" x 10'	1 Pipe 1 1/2 in	34	61.00	78.00
42" x 6'	1 Pipe 1 1/2 in	18	51.00	62.00
42" x 7'	1 Pipe 1 1/2 in	22	51.50	66.00
42" x 8'	1 Pipe 1 1/2 in	26	57.50	70.00
42" x 10'	1 Pipe 1 1/2 in	34	61.00	78.00
42" x 12'	1 Pipe 1 1/2 in	42	70.50	85.00
42" x 14'	1 Pipe 1 1/2 in	50	77.00	93.00

Coils made of bare cut copper, non pipe size can be furnished; also coils of greater or lesser length than shown above. Prices on application.

Approximate weights per foot: 1 inch, 1 pound; 1 1/2 inch, 1 1/2 pounds; 2 inch, 2 pounds; 3 inch, 3 pounds; 4 inch, 4 pounds; 5 inch, 5 pounds.

It is advisable to have a manhole in head of all tanks containing coils. This should be remembered when figuring.

Galvanized Expansion Tanks

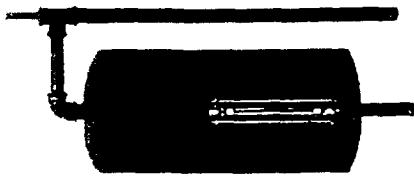
Stock No. 491

These tanks are made of steel, heavily galvanized, and are good for full rated capacity.

TAPPING: These tanks are tapped top and bottom for 1-inch overflow and expansion pipe, and on side for feed pipe.

Water Gauge Tappings 1/2 inch 13 1/2 inches between centers.

Water Gauge Stock No. 494
List price, \$1.75. Weight, packed, 1 1/4 lb.



List Prices for Tanks

Style	Size Inches	Nominal Capacity Gallons	Surface Feet of Radiation	Price of Tank	Weight of Tank Pounds
1	12 x 20	10	360	\$ 8.00	31
2	12 x 30	15	500	9.00	42
3	14 x 30	20	700	12.50	55
4	16 x 30	26	950	14.00	71
5	16 x 36	32	1,000	15.00	78
6	16 x 48	44	1,400	16.50	93

Ideal Expansion Tank Bracket

Stock No. 497

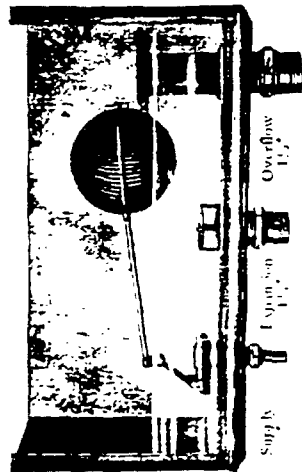
Tanks in all sizes of tanks, from 10 to 16 inches diameter. Labor-saving can be erected in two minutes. A substitute for the old fashioned shelf and at less expense. Weighs about 6 1/2 pounds and is shipped with screws packed under the slide plates.

List Price, each, complete, 1.75



Ideal Automatic Expansion Tanks

Stock No. 493



This Tank, made from being ornamental, is absolutely automatic in its operation, in using always that the system will be full of water. It is a great convenience to the floor owner. There is danger of freezing if the ordinary non-automatic tank is placed in the attic or some out-of-the-way closet. Besides, the expansion tank is often opposed to having an ornamental floor iron Expansion Tank placed in the bathroom or in a living room. The IDEAL Tank is made of hand-welded, built with sheet copper, and has golden oak finish. It does not require altitude gauge nor gauge glass and fitting. Recommended for use on jobs up to 1500 square feet capacity.

In its dimensions of 1 foot wide, 20 inches long, 9 inches high, 10 inches deep. Weight, crated, 10 lbs.

Roughing-in Measurements

27 inches from outside rear edge of tank to center of other overflow or expansion.

55 inches from center of supply to right side edge of tank.

33 inches from center of overflow to back edge of tank.

17 inches from center supply to left side edge of tank.

List Price

Including expansion and other couplings, and iron pipe thread, without cover.

Stock No. 493, roughed out in brass, golden oak, \$20.00

181

Arco Combination Steel Plates

For Floor or Ceiling



No. 707 N. P.
(Plan No. 706)

Made of heavy cold rolled steel. Nickled plates are coppered by fore nickling. Highly polished. Steel springs hold plate firmly to pipe. Can be cut by shears to fit irregular installations. Made in sizes 3 1/4 inch to 4 inch.



No. 709 N. P.
(Plan No. 708)

Made of cold rolled steel. Lighter than the No. 707 and has long, tapering fingers to hold the plate firmly in place. Can be cut by shears to fit irregular installations. Made in sizes 3 1/4 to 3 inches.

Price List

Size, inches	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3	3 1/4	4
Nos. 706, h. 709	15	16	17	18	19	20	21	22	23
Nos. 707, 709	15	16	17	18	19	20	21	22	23
Nickel, each	15	16	17	18	19	20	21	22	23
Weight (in. 11.2)	15	16	17	18	19	20	21	22	23
per doz. pk d	15	16	17	18	19	20	21	22	23
Nos. 706, 709	15	16	17	18	19	20	21	22	23
Weight (in. 11.2)	15	16	17	18	19	20	21	22	23
per doz. pk d	15	16	17	18	19	20	21	22	23
Nos. 706, 709	15	16	17	18	19	20	21	22	23

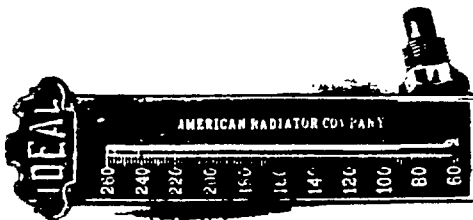
14371

Ideal Hot-Water Thermometers

Stock Nos. 540, 541



Straight



Angle

No Hot Water Boiler should be without an IDEAL Hot Water Thermometer.

The glass bulb of each instrument is immersed in a bath, protected by a thin tube, so there is little chance of injury.

Stem should be fully immersed in, or subject to a continuous circulation of the hot water, to secure accurate reading.

If thermometer does not face in right direction when screwed up tight, slightly loosen small screw which is found on one of the faces of the bezel and (without lifting) turn top of frame to desired position, after which tighten screw.

Each thermometer is put out carefully protected against damage in shipment. Customer's name on scale can be supplied. Thread on stem is 1/2 inch iron pipe size.

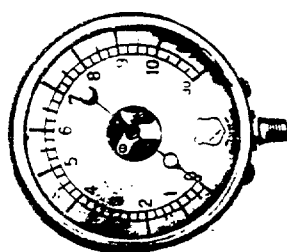
Stock No.	Hot Water Thermometer	Weight Packed	Price Each
540	Straight	1 1/4 lbs.	\$5.00
541	Angle (for use on riser, or circulating pump)	1 1/4 lbs.	6.00

182

Ideal Retard Steam Gauges

Stock No. 579

With Bourdon Spring



This gauge is especially designed for house heating low pressure boilers. It provides great width of scale between 0 and 100 lbs. with 1 1/2 lb. graduations, thus making easy and accurate reading of the low pressures carried on heating boilers. Will register up to 100 lbs. Accurate and positive.

Size 4 1/2 inches; steel case without back flange; hard rubber finish; silvered dial; without cock.

(Note.)

List Price, each \$12.00 Wt. 2 lbs. boxed.

Ideal Steam Gauges

Stock No. 577

4 1/2-inch steel case, silvered dial; without cock. Graduation 0 to 40 lbs. equally divided. List Price, \$8.00. 2 lbs. weight boxed. (Note.)

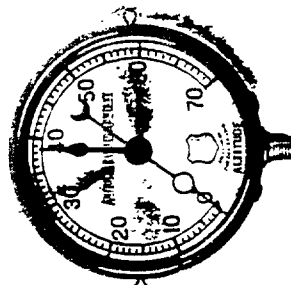
Ideal Altitude Gauges

Stock No. 578

Indicate accurately, at the boiler, the height of water in the system.

EXPLANATION: When the water is at its proper level in expansion tank, remove the ring and glass, and set the stationary red hand at the pressure indicated by the working hand; whenever the pressure falls below this point, water should be added. Size, 4 1/2 inches; steel case without back flange; no cock. Threaded 1/2-inch pipe connection. List Price, each, \$12.00. Wt. 2 lbs. boxed. (Note.)

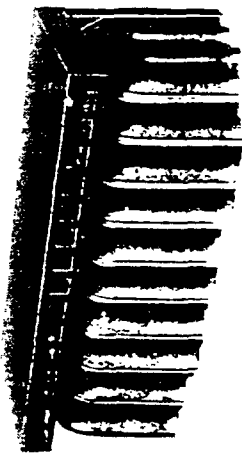
Note: All of above gauges can be furnished with customer's name on the dial if desired.



183

De Luxe All-Steel Radiator Covers

Stock No. 908



Air currents passing over radiator carry the dust and dirt always present in the air. If these currents are allowed to follow their usual course over radiators, this dust and dirt will eventually be deposited on walls, drapes and ceilings. The De Luxe Cover prevents this as it is so constructed with back shield and deflecting plate that the currents of air are deflected out into the room.

The cover is constructed from full furniture steel with a 2-inch flange on all four sides. To assist radiation, the front of the cover is opened in large squares, 1 1/8 inches diameter. The corners are electric and acetylene welded so the cover is one solid piece of heavy smooth steel. Covers are made to fit any type of floor or wall radiator. Will not interfere with pipe connections.

Covers are finished, according to specifications, to match the furniture or the wood trim of the room. The enamel wood finishes applied to the cover are smooth, beautifully grained and lasting. Mahogany, either light, dark or brown, and walnut are particularly attractive, as is French grey enamel, a soft toned finish that will harmonize well with any room done in neutral shades.

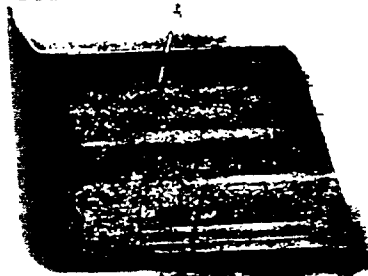
Use our special order blank to insure correct dimensions. We cannot be responsible for covers for which incorrect measurements are furnished. Orders for radiator covers not subject to cancellation.

For radiator 30 inches long or less. \$20 00
For each additional inch in length. 85

181

Ideal Radiator Shields

Stock No. 906



Can be readily fitted to Radiators of all varying constructions, the brackets can be quickly shifted to connect with any make of Radiator. They do not interfere with the operation of the Radiator valves or air valves, all being less than 2 inches wide. Brackets furnished with two cast iron top brackets (Part No. S-10), two adjustable hangers (each hanger consists of hook S-11, threaded plate S-12, knob S-13 and necessary bolts). Bottom hanger shield are used only for top shield proper distance from the Radiator. No hangers are furnished or necessary for bottom loops. No. 26 gauge material regularly furnished. As regularly made shield extends down to within 7 inches of the floor.

Regular Pattern

List Prices for Regular Pattern

Height of Radiator, Inches	26 or lower 5 Sec. or less	32 and 40 5 Sec. or less	44 and 48 5 Sec. or less
Shields from Black Sheets	\$6 00	\$6 40	\$6 80
Shields from Galvanized Sheets	7 25	7 60	8 00
Brass having Galvanized Iron Back	11 00	11 80	12 60
All Brass	16 00	16 00	16 00
Black painted or bronzed plain color	8 00	8 40	8 80
Galv. painted or bronzed plain color	9 20	9 60	10 00

Add \$4.00 to above List Prices for Black and Galvanized Vapor Panels.

Add \$12.00 to List for Brass Vapor Pan.

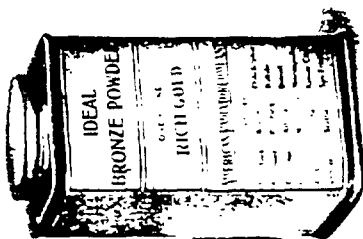
Shields painted to order or to match decorations at extra charge. In ordering indicate (1) whether single, two, three, four column or Window Radiator; (2) name and height of Radiator; (3) number and length of sections.

Orders not Subject to Cancellation

Vapor Pan Attachment (showing Pan Withdrawn)

185

Ideal Bronze, Liquids, and Primer



The use of a superior quality of bronze in the decorative treatment of Radiators adds greatly to the attractiveness of Radiator heating.

After many years of experiment and experience we offer a grade of bronze powder exactly suited to decorating Radiators. It lusters like burnished gold. The bronze is made for special requirements, and a single trial will prove the exceptional brilliancy and durability of the luster, and large amount of surface per pound it covers.

Bronze Powder is put up in six sizes, one containing one pound of Aluminum is also put up in one half pound cans. Gold Bronze (gale, rich, and deep), Stock No. 652. Copper Bronze, Stock No. 653. Aluminum Bronze, Stock No. 654. Green Bronze, Stock No. 655.

No. 656 Ideal Bronze Primer, sold in 1 lb. and 5 lb. cans. Weight in cans 8 pounds per case.

Directions for Use

BRONZE. Mix the bronze into an emulsion of water and oil. Apply with a brush or a spray gun. The bronze will be applied evenly with the brush. Cover surfaces of the radiator with one stroke of brush. Applying bronze when radiators are warm improves the luster.

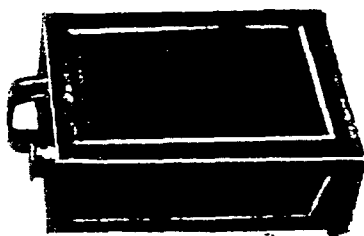
LIQUID. Keep the liquid in a closed tight jar. Do not use. Liquid left unworked a very short time becomes thick and becomes worthless. Do not get any bronze in hands, in eyes, or on the face. It will turn it green. Liquid if properly used, will not have to be thinned. Do not use a dirty mixing pot for bronze, and be that all dried up bronze is carefully removed before mixing fresh. One pound of bronze (except aluminum) will cover about 100 square feet of radiator. One pound of aluminum powder will cover about 600 square feet of radiator. One quart of liquid is required for each pound of bronze powder, except in the case of aluminum, for which the proportion is about one half pint of liquid to one pound of the powder.

Black Asphaltum

Stock No. 647

For the painting of boilers and risers, we offer a Black Asphaltum of great covering capacity and durability, put up in one gallon, half gallon, and quart cans, and in barrel.

First-class covering in every respect. Gives a perfect finish to all where the kind of varnish. Weight in cans 8½ lbs. per gallon.



Ideal Maroon Gloss Japan

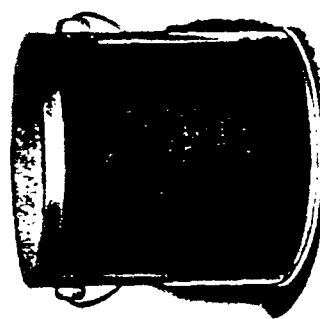
Stock No. 648

We also offer excellent quality of these goods in gallon, half gallon, and quart cans. This Japan has been thoroughly tested and proved to be first class in every regard. A good medium price radiator paint particularly well adapted for use in factories, public buildings, etc.

Directions for Use

This Maroon Gloss Japan settles in a very short time. Its covering capacity is such that it is not necessary to paint off and the pigment is covered with a putty knife, then gradually adding the liquid again. The more thoroughly the liquid is stirred the better will be the result. Thin with turpentine and apply with ordinary flat

bristle varnish brush. One coat is sufficient for Radiator work. No priming is required; has high gloss, quite equal to Enamel. Weight in cans 9½ lbs. per gallon.



Ideal Radiator Enamels

Stock No. 650



To demonstrate the beauty of this enamel, we have prepared a quantity of sample radiators, which are most effective in advertising for the product.

We invite attention to our line of Ideal Radiator Enamels and for sample radiators. The Enamels are made especially for radiator work, and we highly recommend them for covering quality and durability.

Popular colors available in half-gallon, and quart cans etc.

White,
Oak Brown,
Gobelin Green,

Ebony (or Black),
Maroon,
Terra Cotta,

Bronze Green,
Silver Gray,
Old Ivory

Gloss finish is required to apply except Ebony, which is regularly supplied in Flat finish. Flat finish in Ebony color is supplied only on special order.

Weight in cans: 1 1/2 pounds per gallon.

Directions for Use

Enamel (Light Shades)—Radiators should be painted with one coat of IDEAL Enamel Primer and two coats of enamel.

Enamels (Dark Shades)—Three coats of enamel should be used without a primer.

Stir enamel thoroughly and apply with an ordinary flat bristle paint brush. If the brush is not used, the enamel will not be applied evenly. Do not use a brush for radiators before applying or enamel will not set. Do not flood or brush heavily—two thin coats are far better than one thick. One gallon will cover about 250 square feet of surface. Enamel should be applied when radiator is cold and it should not be turned on for at least twenty-four hours after use.

Ideal Bronze and Enamel Primer

Stock No. 651

Our specially prepared Primer should be used for all results. It acts as a filler and furnishes a smooth surface upon which to apply the finishing coat. Supplied in same size cans as Enamel. Weight in cans 1 1/2 pounds per gallon. Primer will cover same amount of surface as enamel.

188

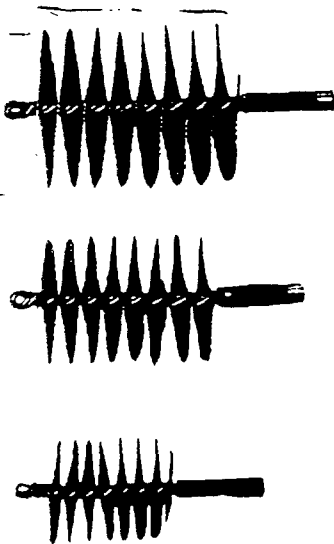
Ideal Bronze and Enamel Brushes

Stock No. 972



We are prepared to furnish best grade Fitch Brushes in sizes 1, 1 1/2, 2, 2 1/2, 3 inches.

Ideal Boiler Flue Brushes



No. 1
3 1/2 x 1 1/2 x 1/4"
For Alco Boilers

No. 2
6 x 2 1/2 x 1/4"
For National Boilers up to 98" Dia. 98" to 106" Water Tube Boilers

No. 3
10 x 2 1/2 x 1/4"
For 106" and 48" National Series Boilers

No. 5
10 x 2 1/2 x 1/4"
For 1 and 2 Series Type A Boilers

No. 6
6 x 2 1/2 x 1/4"
For 98" Water Tube Boilers

When ordering Flue Brushes, in all cases show on order size and style of Boiler for which they are intended.

List Prices: No. 1, \$0.60; No. 2, \$0.80; No. 3, \$1.00.
No. 5, \$0.60; No. 6, \$2.00

189

Ideal Asbestos Cement

Stock No. 402

IDEAL Asbestos should be applied to a warm surface in thin coats; the first coat should be left a rough surface and allowed to dry. Mix with water and apply with a trowel finishing with a wet brush. When dry, give a coat of paint, or when applying to a wall of this Asbestos half and half with Portland Cement, final coat should be about 1/4 inch thick, with a very hard finish.

Amount of Cement required to cover 100 sq. ft. of 1 1/2" thick.

Invincible Steam and Water		Sectional Steam and Water	
No. of Boiler	Lbs.	No. of Boiler	Lbs.
16	100	13	100
18	125	15	150
20	150	15	150
Arco Steam and Water			
No. of Boiler	Lbs.	No. of Boiler	Lbs.
4 19	125	19 6	280
5 19	150	19 7	320
6 19	175	22 5	275
4 20	125	22 6	325
5 20	150	25 5	375
6 20	175	25 6	350
4 22	200	25 7	400
5 22	225	25 8	450
6 22	250	28 5	500
5 23	275	28 6	575
6 23	300	28 7	650
4 25	325	28 8	725
5 25	350	36 5	575
6 25	375	36 6	650
4 28	400	36 7	725
5 28	425	36 8	800
6 28	450	36 9	875
4 31	475	38 6	850
5 31	500	38 7	950
6 31	525	38 8	1050
4 34	550	38 9	1150
5 34	575	38 10	1250
6 34	600	38 11	1350
		38 12	1500

Ideal Water Tube Boiler

36 5	575	36 10	950
36 6	600	36 11	1025
36 7	625	36 12	1100
36 8	650	36 13	1175
36 9	675	36 14	1250

On the left is shown a section of the boiler, and on the right is shown a section of the boiler, and on the right is shown a section of the boiler.

List Prices

Asbestos Cement, per bag of 100 pounds.

100

\$3.00

Ideal Spud Wrenches

These tools are most convenient for connecting up union

Radiator valves or

union elbows. Con-

nections can be

made up quicker,

tighter, and with-

out injuring the

union. Style 1 is

used hand-to, and

has an open hexa-

gon on end of han-

dle for adjusting

bolt nuts. Style 2

is used with a Still-

son wrench. Either

tool embraces 1 1/2,

1 1/4, 1, and 3/4

inch sizes. Made

of malleable iron.

List Prices, each: Style 1, \$0.75; Style 2, \$0.50.

Air-Cell Pipe Covering—Stock No. 398

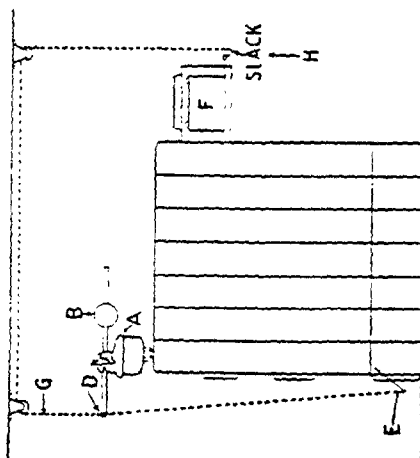


Formed by alternate layers of plain and corrugated (for ribbed) asbestos pipe, resulting in a strong, flexible covering. A good form of covering, giving full protection to the pipe. Applied in sections 3 feet long and cut lengthwise through the center. Neatly finished with canvas and lumps. Can furnish in 1/2, 1, and 1 1/2 inch thicknesses.

List Prices

Inside Diameter of Pipe, Inches	1/2	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	54	60
Price per Lineal Foot	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00
Inside Diameter of Pipe, Inches	1/2	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	54	60
Price per Lineal Foot	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00
Outside Diameter of Pipe, Inches	1/2	1	1 1/2	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	54	60
Price per Lineal Foot	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00

Adjusting ARCO Steam Damper Regulator



After Boiler is set up and under fire, raise whatever steam pressure it is desired to maintain, say 2 pounds.

When the gauge shows 2 pounds, adjust the weight "B" on the Regulator lever so that the chain connecting Tilt Draft Damper "E" and Check Draft Damper "F" is just taut, both dampers being closed. Then, when the front Draft "E" is open a little and Check Draft "F" closed, there will be a little slack in the chain as shown at the right, or vice versa. The slack naturally comes in stretch of chain along ceiling, but slack at "H" shows relative amount.

If any greater pressure is generated the Check Damper "F" will open and close the combination; the pressure will lower to 2 pounds; then the Check Damper will close. If the fire is clean, the pressure will gradually increase without opening the Tilt Draft "E"; and the Regulator will operate the Check Draft only until the grate becomes covered with ashes; then the pressure will drop below 2 pounds, and the Regulator will operate the Tilt Draft door on the ash pit.

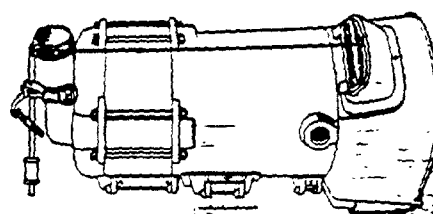
For best results chains should be connected so that draft "E" opens but slightly and check draft "F" opens wide.

The chains should never be disconnected from the doors; but any adjustment of pressures should be regulated by moving the weight "B" on the lever. From bottom "A" to end of lever "D" should never be more than 18 inches.

192

Installing ARCO Water Regulators

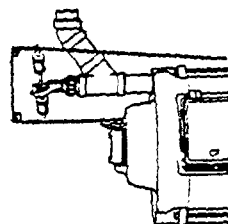
No. 800



Method of installing No. 800 Water Regulator on local ARCO Boilers with Control.

On Ideal Arco Boilers equipped with the Arco Damper Control, the Regulator is installed as shown in the sketch, by inserting in a 2-inch opening provided in the dome section of the boiler. It is connected to the damper by means of the lever and chain supplied with the Hand Control. Temperature adjustment is made by moving the weights on the lever bar. Two weights are supplied. If proper temperature is not obtained by using one weight, both may be used. A trial will indicate whether weights should be on opposite ends of lever or both on one end. On Type "A", Type "C" and Water Tube Boilers the Regulator is similarly installed in boiler opening provided.

On other type boilers a standard Y fitting (3 inches or larger) should be installed in one of the flow pipes and the Regulator inserted in the top opening by means of a bushing (to 2 inch) as shown. Connection should be made to dampers with chain and pulleys. Temperature adjustment is made by moving weights on lever. For high temperatures both weights may be placed on rear of lever. Complete directions sent with each Regulator.

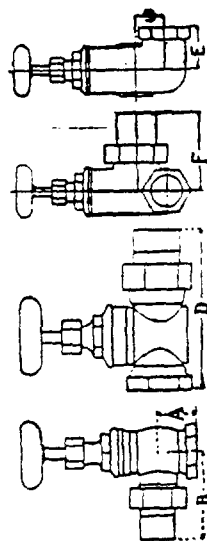


Method of installing No. 800 Regulator using chains and pulleys.

193

Measurements of Valves and Elbows

For Roughing-in Work



Size, Inches	1/2	3/4	1	1 1/4	1 1/2	2
Nos. 62-72-101A Valve	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 101 Valves	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 116 Valves	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 132 Elbows	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 189 Valves	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 168 Valves	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 373 Valves	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 32 and 37 Valves	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 850 Valves	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 851 and 852 Valve	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2
Nos. 860 Valves	A 11 11 3/4	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2
	B 12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2

Measurements of Ideal Unique

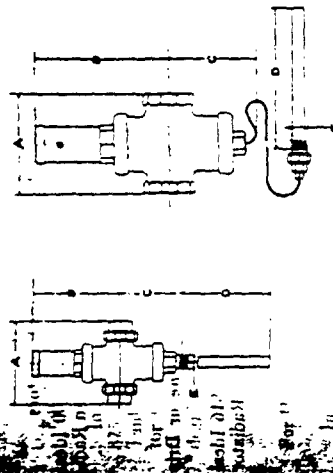
Radiator Valve No. 380

Size, inches	1/2	3/4	1	1 1/4	1 1/2	2
Center of body to end of spud	2 1/4"	2 3/4"	3 1/4"	3 3/4"	4 1/4"	4 3/4"
Inside dimensions of couplings to Radiator	1 1/4"	1 1/2"	1 3/4"	1 7/8"	2 1/8"	2 1/4"
Distance from center top opening of elbow to base bottom of elbow	1 1/4"	1 1/2"	1 3/4"	1 7/8"	2 1/8"	2 1/4"
Distance between centers of bottom elbow connections	5 1/2"	5 3/4"	6 1/4"	6 3/4"	7 1/4"	7 3/4"
Body diameter	1 1/4"	1 1/2"	1 3/4"	1 7/8"	2 1/8"	2 1/4"

Measurements of Arco Tank Regulator

Nos. 825 and 826

For Roughing-in work



Dimension in inches	A	B	C	D	E
For 1/2", 3/4", 1" pipe	1 1/4"	5 1/4"	4 3/4"	6 1/4"	1
For 1 1/4" and 1 1/2" pipe	8 1/4"	8 1/4"	6 1/4"	8 1/4"	1
For 2" pipe	8 1/4"	8 1/4"	6 1/4"	8 1/4"	1 1/4"
For 2 1/2" and 3" pipe	9 1/4"	12 1/4"	8 1/4"	15 1/4"	1 1/4"

How to Specify

For the convenience of Architects and Engineers, we are listing below the correct form for specifying Ideal Heating Specialties.

Ideal Packless Radiator Valves

Described on Page 147

For Steam Heating

Each Radiator shall be equipped with a No. 850 Ideal Packless Radiator Valve, manufactured by the American Radiator Company.

For Hot Water Heating

Each radiator shall be equipped with a No. 850 Ideal Packless Radiator Valve, drilled with circulating hole, manufactured by the American Radiator Company.

Detroit Multiport Vapor Valves

Described on Page 148

Fractional Valves for Vapor Heating

Each radiator shall be equipped with a No. 168 Detroit Improved Multiport Vapor Valve.

Ideal Airid Siphon Valves

Described on Pages 156 and 157

For Venting Low Pressure Steam Radiators

Each radiator shall be equipped with a No. 500 Ideal Airid Siphon Valve, manufactured by the American Radiator Company.

Ideal Air Line Valve

Described on Page 160

For Venting Steam Radiators Where Air Line or Drip Line is Used

Each radiator shall be equipped with a No. 816 Ideal Air Line Valve, manufactured by the American Radiator Company.

Ideal Quick Vent

Described on Page 161

For Venting Steam Mains and Risers

Install where shown on the plans on each steam main (if risers are to be vented insert the words "and riser") a No. 815 IDEAL Quick Vent, manufactured by the American Radiator Company.

Ideal Vento Vent

Described on Page 161

For Venting Vento Stacks and Blast Coils

Install on each Vento Stack (or Blast Coil) and connect to drain by $\frac{1}{2}$ " pipe, No. 817 IDEAL Vento Vents, manufactured by the American Radiator Company.

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How to Specify—Continued

Arco Temperature Regulator

Described on Pages 162 to 165

For Room Temperature Control

Install a No. — (specify number of model) ARCO Temperature Regulator with thermostat located in — room (specify room) and make proper connections to dampers of heater.

Water Regulator

Described on Pages 166 and 169

For Damper Control on Hot Water Heating Boilers

Install on the Hot Water Heating Boiler and properly connect to dampers, a No. 800 ARCO Water Regulator.

For Damper Control on Hot Water Supply Boilers for Domestic Water Supply

Install on the Hot Water Supply Boiler and properly connect to dampers, a No. 801 ARCO Junior Water Regulator.

Arco Tank Regulator

Described on Pages 166 and 167

For Temperature Control of Hot Water Storage Tanks Heated by Steam

Install on the hot water storage tank a No. — (No. 825 for sizes A and B; No. 826 for sizes C and D) ARCO Tank Regulator, manufactured by the American Radiator Company. The regulator to be of size — (specify size) and to have a temperature range of — degrees to degrees — (specify range desired.)

Excelso Water Heater

Described on Pages 172 and 173

For Heating Domestic Water Supply from Steam or Vapor Boiler

Install below the water line of the boiler and properly connect to the storage tank a No. — (specify size of heater) Excelso Water Heater.

Taco Water Heater

Described on Page 171

For Heating Domestic Water Supply from the Firepot of the Boiler

Install in the fire pot of the boiler a No. — (specify number) size — (specify size) — (specify Bungalow Taco or Ar-Taco, as needed), heater properly connected to storage tank.

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How to Order Boiler Parts

Improvements in the structural features of IDEAL Boilers are continually being made; therefore, to avoid delay and confusion or error in filling repair orders the following information (as far as possible) must be sent with the order:

FIRST—On all orders specify desired part by name or series, giving full name and number appearing on boiler, including the serial number and initial; also pattern number and letter appearing on the part ordered. The serial number of the boiler will be found on aluminum, or brass plate attached to fire door, or fire door frame. On later type boilers a series number is used which is cast on a plate with the number of the boiler and inserted in one of the doors. Where date of original purchase and name of dealer who purchased the boiler is known, this information is desired. If necessary, send sketch of part wanted.

SECOND—BASE AND GRATE PART ORDERS should also indicate for what style of Base (see pages 213-215, 243-246) the desired part is required; if a grate bar, state exact position in the set. When ordering a part of the shaking apparatus, mention to what other parts the desired casting is connected. When a Center Grate Bar only, for the Old Style Base (see page 245) is wanted advise whether the top of Grate Bar is flat, or if a lug about $\frac{1}{2}$ inch higher than the rest of the Bar is located at the end having Shaking Spindle.

THIRD—SECTIONS FOR SECTIONAL BOILERS are best ordered by giving the number of the section, commencing by counting the Front Section as "Number 1" the next to Front Section as "Number 2" etc. Advise whether or not section wanted is connected to the supply or return main of the heating system. Also in case the section is made in two halves like the 48', whether the right or left half is wanted.

FOURTH—SECTIONS FOR ROUND BOILERS should be specified as "Firepot," "First Section over Firepot," "Second Section over Firepot," etc., according to position in the boiler. When Section is connected by a center threaded nipple order should so advise. When for IDEAL PORTABLE WATER BOILER indicate whether Sections are held together by short bolts or long rods extending from the Firepot to the Top Section. When for IDEAL PORTABLE STEAM BOILER, whether the Boiler has a Cast Iron or a Galvanized Iron Jacket.

FIFTH—DOORS AND FRAMES: Advise just where located, in ordering Fire Doors or Fire Door Lintels, unless serial number of Boiler is given, the length and height of the door should appear on the order.

How to Order Boiler Parts

In ordering Boiler Repairs the following chart will be a helpful guide as to the information required to insure correct material being supplied:

1. What is Serial Number of Boiler? (See brass or aluminum plate attached to fire-door or fire-door frame). On later type boilers a series number is used and all information cast on inserted plate with boiler number should be given.
2. What is size and type of Boiler? (Give all letters and figures on front of boiler)
3. Is front or back Grate Bar wanted?
4. Is Right or Left Door wanted? (By right hand is always meant "right hand as you face boiler")
5. Counting Front Grate Bar as No. 1, which Grate Bar is wanted?
6. Is Right or Left Hand Grate Bar wanted? (By right hand is always meant "right hand as you face boiler")
7. Is Right or Left Hand Grate Connecting Bar wanted? (By right hand is always meant "right hand as you face boiler") (Grate Connecting Bar is the casting with lugs into which grate bars fit. Grate Connecting Arm is the casting without lugs.)
8. How many Grate Bars in Boiler?
9. Are Hinges and Catches Cast Solid on Front or on Detachable Frame?
10. What is Pattern Number of Casting?
11. Give Sketch and Measurements of Casting required?
12. Is Boiler 1895, 1896 or 1897 Pattern? (See base door for pattern year)
13. Is Door Solid? or Butterfly Type? (See outline cuts on pages 213-215, 218, 219, 243-246)
14. Counting Front as No. 1 Section, what is the Number of Section wanted? If made in halves, state if Right or Left.
15. Counting Firepot as No. 0 Section, is Intermediate Section required by you First, Second, or Third over the Firepot?
16. What Base is Boiler equipped with? (Indicate outline cuts on pages 213-215, 218, 219, 243-246)

Ideal Type "A" Sectional Boiler Parts
1-A, 2-A, and 3-A--List Prices

1-A, 2-A, and 3-A--List Prices

[illegible]

"File a Pattern & A Hunter should on his hand each only if signified on Page 200)

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Ideal Type "A" Sectional Boiler Parts

1-A, 2-A, and 3-A—List Prices—Continued

[illegible]

3

23-inch and 29-inch—List Prices

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IDEAL Water Tube Boilers

With and Without Ideal Smoke Preventing Device
36 Inch -- List Prices

15-, 19-, 22-, 25-, 28- and Now 36-Inch—List Prices

[illegible]

Sectional Boiler Parts

(With and Without IDEAL Smoke Preventing Device)
48-Inch—List Price

Name of Part	Without Smoke Preventing Device	With Smoke Preventing Device
Fire Door, R. or L.	\$ 4.75	\$ 4.75
Fire Door Lining, R. or L.	4.00	4.00
Fire Door Hinge, R. or L.	1.25	1.25
Upper C. O. Door, R. or L.	10.25	10.25
Upper C. O. Door, L. R. or L.	10.25	10.25
Lower C. O. Door, R. or L.	5.75	5.75
Lower C. O. Door, L. R. or L.	5.50	5.50
Clean Out Door Hinge	1.20	1.20
1-Section Base Panel	9.00	9.00
2-Section Base Panel	17.25	17.25
3-Section Base Panel	23.75	23.75
4-Section Base Panel	31.25	31.25
5-Section Base Panel	38.75	38.75
6-Section Base Panel	46.25	46.25
Base Front Frame	29.00	29.00
Base Back Panel, Lower Half Without Draft Opening	16.00	16.00
Base Back Panel, Upper Half	10.50	10.50
Bridge Front Panel	5.75	5.75
Slide Door, R. or L.	1.00	1.00
Slide Door Lining, R. or L.	3.25	3.25
Base Butterfly Door	4.25	4.25
R. H. Grate Conn. Arm, Short	3.50	3.50
R. H. Grate Conn. Arm, Long	4.00	4.00
R. H. Grate Conn. Arm, Extra Long	4.50	4.50
Link L. H. Grate Conn. Bar	3.75	3.75
Link L. H. Grate Conn. Bar	3.75	3.75
Link L. H. Grate Conn. Bar	3.75	3.75
Link R. H. Grate Conn. Bar	3.75	3.75
Link R. H. Grate Conn. Bar	3.75	3.75
Link R. H. Grate Conn. Bar	3.75	3.75
Grate Bar, R. or L.	3.75	3.75
Grate Bar, R. or L.	3.75	3.75
Grate Bar, R. or L.	3.75	3.75
Angle Lever	3.50	3.50
Shaker Handle	3.25	3.25
Smoke Hood	5.75	5.75
Smoke Hood, Damper and Hinge	8.00	8.00
Smoke Hood, Check Draft	1.25	1.25
Smoke Hood Door Weight	75.00	75.00
Smoke Hood Complete	1.00	1.00
Push Nipple Top, 6-inch	80.00	80.00
Push Nipple Bottom, 4-inch	113.75	113.75
Push Nipple, Center Front Section, 3-inch	122.00	122.00
Front Fire Section, Steam or Water	120.50	120.50
Open Center Section, Steam or Water	124.00	124.00
Closed Center Section, Steam or Water	124.50	124.50
Open Connecting Section, Steam or Water	123.25	123.25
Open Diving Flue Section, Steam or Water	131.25	131.25
Closed Diving Flue Section, Steam or Water	135.50	135.50
Open Bridge Wall Conn. Section, Steam or Water	132.50	132.50
Back Section, Steam or Water	23.50	23.50
R. H. Air Tube	10.00	10.00
Air Tube Support Plate		

*48" Boilers have right and left castings; prices are for each half.

Round Boiler Parts

For Standard Water Boilers*
List Prices

Name of Part	15"	17"	19"	22"	25"	28"	31"
Blowoff	59.75	72.50	81.75	111.25	125.50	157.50	188.75
Fire Door Frame	1.50	2.00	2.00	2.75	2.75	3.50	3.50
Fire Door Lining	1.20	1.40	1.40	1.60	1.60	2.00	2.00
Fire Door Slide	1.30	1.30	1.30	1.30	1.30	1.40	1.40
Chimney Door Frame	1.70	1.70	1.70	1.70	1.70	1.75	1.75
Chimney Door Lining	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Double Section	14.75	19.25	22.25	29.75	34.00	43.75	49.25
Water Dome	15.00	18.75	21.25	30.25	33.75	46.50	53.50
1-Sec. C. O. Dr. Frame	1.25	1.25	1.25	1.50	1.50	1.70	1.70
1-Sec. C. O. Dr. Lining	1.40	1.40	1.40	1.60	1.60	1.80	1.80
1-Sec. C. O. Dr. Frame	1.70	1.70	1.70	2.25	2.25	2.75	2.75
1-Sec. C. O. Dr. Lining	1.30	1.30	1.30	1.50	1.50	1.70	1.70
1-Sec. C. O. Dr. Frame	2.50	2.50	2.50	3.25	3.25	4.00	4.00
1-Sec. C. O. Dr. Lining	1.90	1.90	1.90	2.00	2.00	2.50	2.50
1-Sec. C. O. Dr. Frame	3.50	3.50	3.50	4.75	4.75	6.00	6.00
1-Sec. C. O. Dr. Lining	1.30	1.30	1.30	1.70	1.70	2.25	2.25
Smoke Hood, Bot. Pc.	1.40	1.40	1.40	1.60	1.60	2.00	2.00
Smoke Hood, Top Pc.	1.40	1.40	1.40	1.60	1.60	2.00	2.00
Damper, Bot. Door, 1"	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Check Draft Door	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Push Nipple	1.80	1.80	1.80	1.80	1.80	1.80	1.80

*For prices on Base and Grates see page 215.

For Lavincible Steam and Water Boilers

List Prices

Name of Part	16-in.	18-in.	20-in.
Base Castings	25.00	28.00	35.75
Base Front Frame	2.75	3.75	3.75
Base Door	1.60	1.60	1.90
Butterfly Door	1.00	1.00	1.00
Front Journal Plate	2.00	3.00	3.50
Center Grate Bar	2.05	2.75	3.25
Quishing Grate Bars	1.90	1.90	1.90
Grate Bar Gears	1.70	1.70	1.70
Shaker Handle	1.00	1.00	1.00
Prepail	60.50	69.00	80.25
Fire Door Frame	3.75	3.75	3.75
Fire Door Lining	1.00	1.00	1.00
Smokehood Collar	1.00	1.00	1.25
Smokehood Damper	40.00	40.00	40.00
Smokehood Chiv. 1 1/2"	30.00	45.00	51.50
Water Dome	31.00	45.00	51.50
2 1/4" Nipples	60.00	60.00	60.00

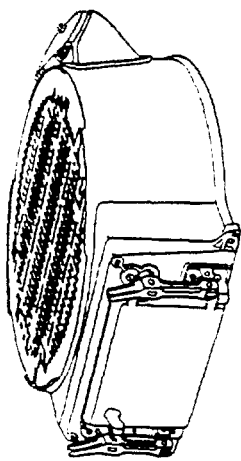
Note: Only one of each of the above parts is assembled in each boiler excepting the following: Two Grate Bars, Two Outside Grate Bars, Four Grate Wheels and Two Nipples.

Round Boiler Parts

Name of Part	19 in.	20 in.	22 in.	24 in.	26 in.	28 in.	30 in.	32 in.	34 in.
Fire Door Frame	3.60	3.80	4.00	4.20	4.40	4.60	4.80	5.00	5.20
Fire Door	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80
Fire Door Slide Damper	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05
Fire Door Lining	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05
Chimney Door Frame	1.25	1.35	1.45	1.55	1.65	1.75	1.85	1.95	2.05
Chimney Door	.70	.75	.80	.85	.90	.95	1.00	1.05	1.10
Chimney Door Lining	.60	.65	.70	.75	.80	.85	.90	.95	1.00
Single Section	24.25	25.25	26.25	27.25	28.25	29.25	30.25	31.25	32.25
Double Section	42.25	43.25	44.25	45.25	46.25	47.25	48.25	49.25	50.25
Water Dome	25.50	26.50	27.50	28.50	29.50	30.50	31.50	32.50	33.50
Narrow C. O. Door Frame	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00
Narrow C. O. Door	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80
Narrow C. O. Door Lining	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80
Medium C. O. Door Frame	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05
Medium C. O. Door	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05
Medium C. O. Door Lining	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05
Wide C. O. Door Frame	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05
Wide C. O. Door	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05
Wide C. O. Door Lining	2.25	2.35	2.45	2.55	2.65	2.75	2.85	2.95	3.05
Smoke Hood	5.00	5.20	5.40	5.60	5.80	6.00	6.20	6.40	6.60
Smoke Hood Bottom Piece	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80
Smoke Hood Cover	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80
Smoke Hood Frame	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80
Smoke Hood Damper	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30
Damper Slender, 5 in. W.	.50	.55	.60	.65	.70	.75	.80	.85	.90
Damper Lever	.50	.55	.60	.65	.70	.75	.80	.85	.90
Smoke Hood Clamp	.20	.22	.24	.26	.28	.30	.32	.34	.36
Link, Steam or Water	.10	.12	.14	.16	.18	.20	.22	.24	.26
1 H. Back Damper Rod	.10	.12	.14	.16	.18	.20	.22	.24	.26
1 H. Back Damper Rod	.10	.12	.14	.16	.18	.20	.22	.24	.26
Clevis	.20	.22	.24	.26	.28	.30	.32	.34	.36
Cone Neck	.20	.22	.24	.26	.28	.30	.32	.34	.36
Turnbuckle	.20	.22	.24	.26	.28	.30	.32	.34	.36
2 in. Special Plug, Water	.50	.55	.60	.65	.70	.75	.80	.85	.90
Regulator Bracket, Water	.40	.45	.50	.55	.60	.65	.70	.75	.80
Cold Water Cover	.20	.22	.24	.26	.28	.30	.32	.34	.36
Cold Water Bracket	.20	.22	.24	.26	.28	.30	.32	.34	.36
Ball Trap, Steam	.50	.55	.60	.65	.70	.75	.80	.85	.90
Hinge Lug, each	.20	.22	.24	.26	.28	.30	.32	.34	.36
Catch Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36
1 1/2 in. Plug	.20	.22	.24	.26	.28	.30	.32	.34	.36

For Base and Grate Parts, see 19, 20, 22, 24, 26, 28, 30, 32, 34 and 36.

Third Pattern Arco Base and Grate Parts



Arco Steam and Water Boilers since the latter part of 1915 have been equipped with the above pattern Arco Base. No changes in the construction of this Base were made except in location of draft inlet, and lift door later changed to butterfly type.

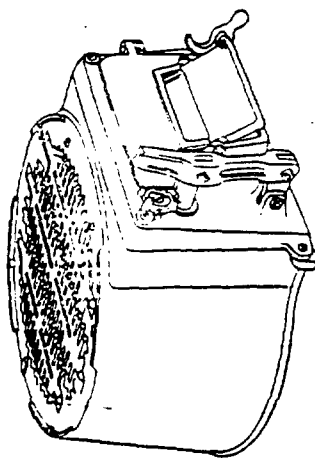
Grate Bars

15-, 17-, 19-, 20-, and 22-inch have three Bars: Front, Center, Back. Slakes on left side, front.
23-, 25-, 28-, 31-, and 34-inch have four Grate Bars: Front, Front-Center, Rear-Center, Back. The 23- and 25-inch Grates shake on left hand side in front. The 28-, 31- and 34-inch Grates shake in two halves in front.

List Prices—Arco Base and Grate Parts

	Nominal Diameter of Grate																					
	15 in.	17 in.	19 in.	20 in.	22 in.	23 in.	25 in.	28 in.	31 in.	34 in.	36 in.	38 in.	40 in.	42 in.	44 in.	46 in.	48 in.	50 in.	52 in.	54 in.	56 in.	58 in.
Base Front Frame	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear Frame	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Center Frame	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back Frame	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Frame	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Frame	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Frame	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Back-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Back-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Back-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Back-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Back-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Back-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Back-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Back-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Back-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Back-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back-Center Back-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Back-Center Back-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Back-Center Back-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Back-Center Back-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Back-Center Back-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Back-Center Back-Center Back-Center Back Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back-Center Back-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Front-Center Back-Center Back-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Rear-Center Back-Center Back-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Rear-Center Back-Center Back-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Back-Center Back-Center Back-Center Back-Center Back-Center	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10
Base Back-Center Back-Center Back-Center Back-Center Back-Center Lug	.20	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60	.62
Base Front-Center Back-Center Back-Center Back-Center Back-Center Back	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00											

Second Pattern Arco Base and Grate Parts



Arco Steam and Water Boilers (except Boilers made prior to the Spring of 1913) were equipped with the Second Pattern Arco Base until the latter part of 1915.

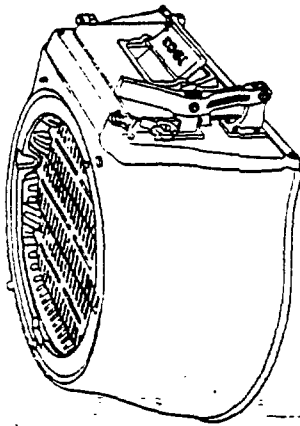
Grate Bars

15-, 17-, 19-, 20-, and 22-inch have three Bars: Front, Center, Back. Shakes on left side, front.
23-, 25-, 28-, 31-, and 34-inch have four Grate Bars: Front, Center, Back, Rear. The 23- and 25-inch Grates shake on left-hand side in front. The 28-, 31- and 34-inch Grates shake in two halves in front.

List Prices—Second Pattern Base and Grate Parts

Item	15 in.	17 in.	19 in.	20 in.	22 in.	23 in.	25 in.	28 in.	31 in.	34 in.
Base Casting	12.50	17.50	22.50	27.50	32.50	37.50	42.50	47.50	52.50	57.50
Base Front Frame	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Base Back Frame	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Base Butterfly Door	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Grate Ring	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Grate Ring Bracket	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Front Grate Bar	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Center Grate Bar	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Back Grate Bar	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Rear Grate Bar	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Angle Lever	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Angle Lever Catch	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Front Door	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Back Door	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Butterfly Door	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Handle	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Complete	12.50	17.50	22.50	27.50	32.50	37.50	42.50	47.50	52.50	57.50

First Pattern Arco Base and Grate Parts



Arco Steam and Water Boilers until the summer of 1913 (except Boilers made at Kansas City Plant) and Standard Water Boilers were equipped with the above pattern of Arco Base. No changes in the construction of this Base were made except in location of draft inlet.

Grate Bars

15-, 17-, 19- and 22-inch have three Bars: Front, Center, Back. Shakes on left-hand side, in front.
23-, 25-, 28-, 31- and 34-inch have four Grate Bars: Front, Center, Back, Rear. This Grate shakes on left-hand side in front.

List Prices—Arco Base and Grate Parts

Item	15 in.	17 in.	19 in.	22 in.	23 in.	25 in.	28 in.	31 in.	34 in.
Base Casting	12.50	17.50	22.50	27.50	32.50	37.50	42.50	47.50	52.50
Base Front Frame	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Base Back Frame	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Base Butterfly Door	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Grate Ring	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Grate Ring Bracket	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Front Grate Bar	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Center Grate Bar	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Back Grate Bar	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Rear Grate Bar	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Angle Lever	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Angle Lever Catch	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Front Door	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Back Door	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Butterfly Door	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Handle	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base Complete	12.50	17.50	22.50	27.50	32.50	37.50	42.50	47.50	52.50

New Hot Water Supply Boiler Parts For IDEAL Junior Hot Water Supply Boilers—List Prices

Name of Part	No. 01	No. 02	No. 03
Base Gating	85 15	87 00	87 00
Base Bottom	2 15	4 00	4 00
Base Front	2 15	4 00	4 00
Grate Center Slide	1 00	2 30	2 30
Grate Center Slide	1 00	2 30	2 30
Shaker Handle	1 00	2 30	2 30
Base Door	1 40	1 50	1 50
Shaker Door	1 40	1 50	1 50
Base Butterfly Door	2 25	3 00	3 00
Outside Combustion Ring	1 50	1 75	1 75
Inside Combustion Ring	1 50	1 75	1 75
Clinker Door Frame	1 50	1 75	1 75
Clinker Door Lining	1 50	1 75	1 75
Clinker Door Hinge or Catch Lug	1 50	1 75	1 75
Fire Door	1 50	1 75	1 75
Fire Door Lining	1 50	1 75	1 75
Fire Door Hinge or Catch Lug	1 50	1 75	1 75
Fire Door Damper	1 50	1 75	1 75
Smoke Hood	1 50	1 75	1 75
Check Draft Door	1 50	1 75	1 75
Fire Pot	1 50	1 75	1 75

Name of Part	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
Base	10 50	12 75	13 50	13 50	13 50	13 50
Base Bottom	1 75	1 90	2 10	2 10	2 10	2 10
Base Front	1 75	1 90	2 10	2 10	2 10	2 10
Grate Center Slide	1 40	1 60	1 80	1 80	1 80	1 80
Grate Center Slide	1 40	1 60	1 80	1 80	1 80	1 80
Shaker Handle	1 40	1 60	1 80	1 80	1 80	1 80
Base Door	1 40	1 60	1 80	1 80	1 80	1 80
Shaker Door	1 40	1 60	1 80	1 80	1 80	1 80
Base Butterfly Door	2 25	3 00	3 00	3 00	3 00	3 00
Outside Combustion Ring	1 50	1 75	1 75	1 75	1 75	1 75
Inside Combustion Ring	1 50	1 75	1 75	1 75	1 75	1 75
Clinker Door Frame	1 50	1 75	1 75	1 75	1 75	1 75
Clinker Door Lining	1 50	1 75	1 75	1 75	1 75	1 75
Clinker Door Hinge or Catch Lug	1 50	1 75	1 75	1 75	1 75	1 75
Fire Door	1 50	1 75	1 75	1 75	1 75	1 75
Fire Door Lining	1 50	1 75	1 75	1 75	1 75	1 75
Fire Door Hinge or Catch Lug	1 50	1 75	1 75	1 75	1 75	1 75
Fire Door Damper	1 50	1 75	1 75	1 75	1 75	1 75
Smoke Hood	1 50	1 75	1 75	1 75	1 75	1 75
Check Draft Door	1 50	1 75	1 75	1 75	1 75	1 75
Fire Pot	1 50	1 75	1 75	1 75	1 75	1 75

* Used only with 05, 07 and 09 Heaters. "A" used only with 04 Heaters; "B" with 05 Heaters; "C" with 06 Heaters; "D" with 07 Heaters; "E" with 08 Heaters; and "F" with 09 Heaters.
See page 217 for prices of Old Style Junior and Premier Heater Repairs.

Hot Water Supply Boiler Parts For IDEAL Junior Hot Water Supply Boilers—List Prices

Name of Part	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
Base Gating	85 15	87 00	87 00	87 00	87 00	87 00	87 00	87 00	87 00
Base Bottom	2 15	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00
Base Front	2 15	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00
Grate Center Slide	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Grate Center Slide	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Shaker Handle	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Base Door	1 40	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50
Shaker Door	1 40	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50
Base Butterfly Door	2 25	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 00
Outside Combustion Ring	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Inside Combustion Ring	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Frame	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Lining	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Hinge or Catch Lug	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Lining	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Hinge or Catch Lug	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Damper	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Smoke Hood	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Check Draft Door	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Pot	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75

* For prices on Use and Grades see page 218.

Hot Water Supply Boiler Parts For Premier Junior Hot Water Supply Boilers—List Prices

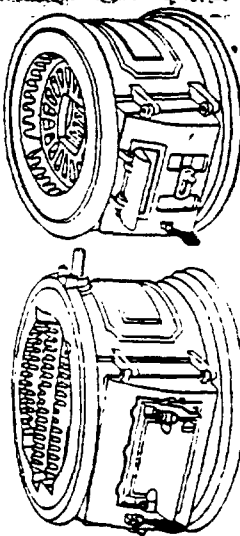
Name of Part	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
Base Gating	85 15	87 00	87 00	87 00	87 00	87 00	87 00	87 00	87 00
Base Bottom	2 15	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00
Base Front	2 15	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00
Grate Center Slide	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Grate Center Slide	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Shaker Handle	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Base Door	1 40	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50
Shaker Door	1 40	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50
Base Butterfly Door	2 25	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 00
Outside Combustion Ring	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Inside Combustion Ring	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Frame	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Lining	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Hinge or Catch Lug	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Lining	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Hinge or Catch Lug	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Damper	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Smoke Hood	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Check Draft Door	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Pot	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75

* For prices on Use and Grades see page 218.

Hot Water Supply Boiler Parts For ARCO Hot Water Supply Boilers—List Prices

Name of Part	No. 01	No. 02	No. 03	No. 04	No. 05	No. 06	No. 07	No. 08	No. 09
Base Gating	85 15	87 00	87 00	87 00	87 00	87 00	87 00	87 00	87 00
Base Bottom	2 15	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00
Base Front	2 15	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00
Grate Center Slide	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Grate Center Slide	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Shaker Handle	1 00	2 30	2 30	2 30	2 30	2 30	2 30	2 30	2 30
Base Door	1 40	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50
Shaker Door	1 40	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50
Base Butterfly Door	2 25	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 00
Outside Combustion Ring	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Inside Combustion Ring	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Frame	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Lining	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Clinker Door Hinge or Catch Lug	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Lining	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Hinge or Catch Lug	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Door Damper	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Smoke Hood	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Check Draft Door	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
Fire Pot	1 50	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75

First Pattern Junior Base and Grate Parts



Junior Rocking Grate

Junior Rocking Grate **Junior Draw-Center Grate**
The Grates supplied on all regular Junior Boilers made prior to March 25, 1897, were of the Junior Draw-Center pattern, still used on Grates of 10- and 12-inch diameter. All regular 15-inch Junior Boilers made after March 25, 1897 (Serial No. 514), and 18-inch Boilers made after March 27, 1897, were supplied with the present style of Junior Rocking pattern, consisting of three Bars.

Grate Bars

Ten-inch and 12-inch Grates have Draw-Center Bars.
This Grate shakes in front. (Note: The 10-inch Grates
used on No. 00 and the No. 0 Hot Water Supply Boilers
were made from different patterns.)

Fifteen-inch and 18-inch have Junior Rocking Grate with
Three Bars: Front, Center, Back. This Grate shakes all
the side of the Boiler.

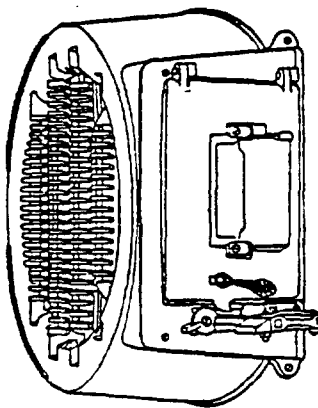
List Prices—Junior Base and Grato Parts

	10-in.	10-in.	12-in.	15-in.	18-in.
Base Coating	\$5.75	\$7.00			
Base (each)	30	30			
Base Panel	2.75	4.00	\$7.25	\$8.25	\$11.50
R. H. Base Panel				2.25	3.75
Journal Plate					
Closed Base Panel			1.00	2.50	3.00
Base Top Ring			3.25	7.75	9.00
Base Front Frame			1.60	2.25	3.50
Base Door	1.20	1.20	1.60	2.25	3.00
Base Slide					
Base Butterfly Door	.25	.50	1.00		
Shaker Door		50	50	50	50
Circular Slide Gate			60		
Front Gate Har.	1.40	1.75	1.00	1.10	1.50
Back Gate Har.			.70	1.10	1.50
Gate Connecting Bar				1.60	2.25
Shaker Handle				1.60	2.25
	40	40	50	50	1.00

Used on Old Sixty Six Single Bolster, Junior Base and Gate Panel

Used on Old Style Supply Boilers, Junior Base and Grate Purnell

First Pattern Premier Base and Grate



All Regular Premier Boilers made from the original patented design (not catalogued after 1908) were equipped with a built-in Base and Grate. Also based on regular design were the Portable Steam Boilers, April 9, 1901, to March 1, 1902, and all regular Boilers with Portable Water and Inwritable Base and W. B. Oil. June 17, 1901, to Mar. 1,

Specify Catalogue number. The 10-, 12-, 15-, and 18-inch sizes are used on Premier Junior Hot Water Supply Boilers.

Grate Bars—Style Used from 1903 to 1908

Grate Bars—Style Used from 1903 to 1908
 10-inch has Draw Center Grate. 12-inch has 2 Bars: Front, Back.
 15-, 16- and 21-inch have three Bars: Front, Center, Back. Shaker
 end-hand side in front.

24-, 28- and 32-inch Grates have four Bars: Front, Front-Center, Rear-Center, Back. Shaker on left-hand side in front.

Grate Bars—Older Styles—Prior to May and October, 1903

Grate Bars—Older Styles—Prior to May and October, 1903
 10-inch Premier Grate shaking from side used on No. 101 Boilers until April 31, 1903 (Serial A-5319). Draw Center Grate then adopted.
 12-inch Premier Grate shaking on side used on 12-inch Boilers until May 12, 1903 (Serial A-5419). Premier Grate shaking in front then adopted.

15-inch Junior Grate making on side used on 15-inch Premier Boilers until October 29, 1903 (Serial A-5125), when the above style Premier Grate was used until 1908, when the second was adopted.

Grate was used until 1908, when the second was adopted. The 18-inch Junior Grate shaking on the side was used on all 18-inch Junior Boilers until May 23, 1903 (Serial No. 5067), when the above Premier Grate was used until 1908, when second pattern was made.

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See page 241 for prices second pattern Premier Base and Grates.

List Price of Parts for Increasing Type "A", and Type "C", Steam or Water Boilers, One or More Sizes

From	To	5 or 50	6 or 60	7 or 70	8 or 80	9 or 90	10 or 100	11 or 110
1-A-4 or 40	1-A-5 or 50	\$171.50	\$265.00	\$364.00	\$463.75			
1-A-5 or 50	1-A-6 or 60		188.25	286.50	387.00			
1-A-6 or 60	1-A-7 or 70			209.50	310.25			
1-A-7 or 70	1-A-8 or 80				232.00			
2-A-5 or 50	2-A-6 or 60	277.50	414.50	571.25	\$703.25			
2-A-6 or 60	2-A-7 or 70		290.00	446.75	580.50			
2-A-7 or 70	2-A-8 or 80			320.75	457.25			
3-A-5 or 50	3-A-6 or 60	335.50	804.25	1,196.25	1,524.25			
3-A-6 or 60	3-A-7 or 70		564.25	901.00	1,225.75			
3-A-7 or 70	3-A-8 or 80			591.00	933.50			
3-A-8 or 80	3-A-9 or 90				630.25			
3-A-9 or 90	3-A-10 or 100							
1-C-4 or 40	1-C-5 or 50	180.25	274.25	377.25	466.75			
1-C-5 or 50	1-C-6 or 60		189.75	294.00	385.00			
1-C-6 or 60	1-C-7 or 70			220.75	311.75			
1-C-7 or 70	1-C-8 or 80				237.00			
1-C-8 or 80	1-C-9 or 90							
1-C-9 or 90								

List Price of Parts for Increasing IDEAL Water Tube Boilers, One or More Sizes

From	To	5 or 50	6 or 60	7 or 70	8 or 80	9 or 90	10 or 100	11 or 110	12 or 120	13 or 130	14 or 140
36-T-5 or 50	36-T-6 or 60	\$147.00	\$282.00	\$416.00	\$550.00	\$685.00	\$820.00	\$965.00			
36-T-6 or 60	36-T-7 or 70		147.00	280.00	420.00	565.00	710.00	855.00			
36-T-7 or 70	36-T-8 or 80			150.00	288.00	432.00	576.00	720.00			
36-T-8 or 80	36-T-9 or 90				148.00	300.00	444.00	588.00			
36-T-9 or 90	36-T-10 or 100					300.00	456.00	612.00			
36-T-10 or 100	36-T-11 or 110						300.00	456.00			
36-T-11 or 110	36-T-12 or 120										
36-T-12 or 120	36-T-13 or 130										
36-T-13 or 130	36-T-14 or 140										

List Prices do not include charge for Pop Safety Valve, which will be shipped by Plant where necessary, unless otherwise specified on order. Add price of Pop Safety Valve if larger valve is required.

Steam Boiler Trimmings—Parts

Trimmings for Invert Steam Boilers having the water column as a part of the section consist of the following:
 Steam Gauge—Ball Trap—Safety Valve—Water Gauge—
 Water Gauge Guards—Upper Water Gauge Cock—Lower
 Water Gauge Cock—2 Tri-cocks—Argo Regulator,
 complete with lever and weight—Jack Chain or Jointed
 Rod.

When water column is a separate casting, in addition to
 above trimmings include water column casting, pipe and
 fittings connecting water column to Boiler and pet cock.

Obsolete Steam Boilers, not furnished with Syphon
 and Regulator were furnished with rubber diaphragm
 Regulator.

List Prices

Ball Trap	\$0.50
Water Gauge Glass	.40
Water Gauge Guards, per set	.50
Water Gauge Upper Cock	1.75
Water Gauge Lower Cock	2.25
Compression Tri-Cock, 3/4-inch	1.25
Compression Tri-Cock, 1/2-inch	1.50
Pet Cock, 1/4-inch	.50
Pet Cock, 1/2-inch	.60
Diaphragm Rubber, 6 3/4 inches	.60
Diaphragm Rubber, 7 inches	.75
Diaphragm Trap	2.75
Diaphragm Bracket	.50
Diaphragm Plunger	.50
Diaphragm Lever	.60
Diaphragm Weight	.75
Pipe and Fittings, 48-inch Sectional Boilers	5.00
Pipe and Fittings, "60 Series," Smokeless Boilers	5.00
Pipe and Fittings, other Boilers	3.50
Water Column, Casting only, 48-in. Sectional Boilers	3.75
Water Column, Casting only, "60 Series," Smokeless Boilers	3.75
Water Column, Casting only, other Boilers	2.00
Water Column Trimmings Complete, Sectional Boilers (except 48-inch)	6.00
Water Column Trimmings Complete, 48-inch Sectional Boilers	7.00
Water Column Trimmings Complete, "60" "94" Series, Down Draft	7.00
Water Column Trimmings Complete, other Boilers	6.00

List Price of Parts for Increasing Sectional Boilers One or More Sizes

1 1/2 inch Boiler	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00
2 inch Boiler	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00	
3 inch Boiler	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00		
4 inch Boiler	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00			
5 inch Boiler	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00				
6 inch Boiler	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00					
7 inch Boiler	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00						
8 inch Boiler	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00							
9 inch Boiler	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00								
10 inch Boiler	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00									
11 inch Boiler	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00										
12 inch Boiler	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00											
13 inch Boiler	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00																								

Boiler Sundries Section Connecting Rods—List Prices

Size and Type of Boiler	Number of Sections											
	4	5	6	7	8	9	10	11	12			
Type 1-A, Steam or Water, Sectional.....	\$4.00	\$4.25	\$4.75	\$5.00	\$5.50	\$5.50						
Type 2-A, Steam or Water, Sectional.....		4.50	4.75	5.00	5.50	\$5.75						
Type 3-A, Steam or Water, Sectional.....		6.75	7.50	8.50	9.25	10.00	\$11.00	\$11.75				
Type "C", Steam or Water, Sectional.....	3.00	3.25	3.75	4.25	4.50	5.00	5.50					
Gas, Steam or Water, Sectional.....	2.50	2.75	2.75	3.00	3.00	3.25	3.25	3.50				
15-inch, Steam or Water, Sectional.....		3.00	3.25	3.50								
19-inch, Steam or Water, Sectional.....		3.00	3.25	3.50								
22-inch, Steam or Water, Sectional.....		3.25	3.50	3.75	4.00							
25-inch, Steam or Water, Sectional.....		3.50	3.75	4.00	4.25							
28-inch, Steam or Water, Sectional.....		4.00	4.25	4.50	4.75	5.00	5.25	5.50				
36-inch, Steam or Water, Sectional.....			5.25	5.50	5.75	6.00	6.25	6.75	7.00	7.50	8.00	\$9.00
48-inch, Steam or Water, Sectional.....	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25
21-inch, Steam or Water, Water Tube.....		3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00
29-inch, Steam or Water, Water Tube.....		3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00
36-inch, Steam or Water, Water Tube.....				8.00	8.75	9.75	10.50	11.50	12.00			
48-inch, Steam or Water, Water Tube.....			3.50	3.75	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00
34-inch, Steam or Water, Smokeless Downdraft.....			4.75	5.25	5.75	6.50	6.75	7.00	7.50	8.00	8.50	9.25
48-inch, Steam or Water, Smokeless Downdraft.....				6.00	6.50	7.25	7.50	8.00	8.50	9.00	9.50	10.00
60-inch, Steam or Water, Smokeless Downdraft.....					8.00	9.00	10.25	11.50	12.75	14.00		

*Add 75 cents for each additional Section above 12 Sections.

Arco Boilers				Arco Boilers			
Size of Boiler		4 Sects.	5 Sects.	Size of Boiler		4 Sects.	5 Sects.
19-inch, Steam or Water.....	\$2.75	\$3.00	\$3.25	25-inch, Steam or Water.....	\$2.75	\$3.00	\$3.25
20-inch, Steam or Water.....	2.75	3.00	3.25	28-inch, Steam or Water.....	2.75	3.00	3.25
22-inch, Steam or Water.....	2.75	3.00	3.25	31-inch, Steam or Water.....	2.75	3.00	3.25
23-inch, Steam or Water.....	2.75	3.00	3.25	34-inch, Steam or Water.....	2.75	3.00	3.25

IDEAL Boiler Fire Tools and Boiler Sundries (List Prices)

Boiler Types and Sizes	Flue Brushes	Handle	Poker	Scraper	Slice Bar	Hoe and Handle	Flue Brush Handle Jointed
1 "A" Type Sectional.....	No. 5	\$0.60			\$1.75	\$2.00	\$2.00
2 "A" Type Sectional.....	No. 5	60	\$1.85		2.00	2.75	2.75
3 "A" Type Sectional.....	No. 3	1.00	2.75		2.75	3.50	3.50
"C" Type Sectional.....	No. 1	60	2.25				2.25
36-inch Water Tube, with or without I. S. P. D.	No. 2	\$2.00	4.50		5.75	5.75	
15-inch Sectional.....	No. 2	80	1.85		1.85	1.85	
19-inch Sectional.....	No. 2	80	1.50		2.25	2.25	
22-inch Sectional.....	No. 2	80	1.50		2.25	2.25	
25-inch Sectional.....	No. 2	80	1.50		2.60	2.60	
28-inch Sectional.....	No. 2	80	1.85		3.00	3.00	
36-inch Sectional.....	No. 3	1.00	2.00		5.75	5.75	
48-inch Sectional, with or without I. S. P. D.	No. 3	1.00	3.00		7.25	7.25	
34-inch Series Down Draft.....	No. 2	80	1.85		3.00	3.00	
48-inch Series Down Draft.....	No. 3	1.00	2.25	\$1.75	5.75	5.75	
60-inch Series Down Draft.....	No. 3	1.00	3.00		7.25	7.25	
94-inch Series Down Draft.....	No. 3	1.00	3.00		7.25	7.25	
Arco.....	No. 1	60	1.10	1.10			

Boiler Putty

5-pound Can, each.....\$0.85 10-pound Can, each.....\$1.60

Blow-Off Cocks and Fusible Plugs

1½-inch Angle Blow-off Cock, each.....\$2.25 ¾-inch Fusible Plug (Heating Boiler Type).....\$1.00
 1-inch Fusible Plug (Massachusetts Standard).....\$2.25

IDEAL Type "C" Sectional Boiler Parts 4-, 5-, 6-, 7-, 8-, 9-, and 10-Section—List Prices

Name of Part	4 Sec.	5 Sec.	6 Sec.	7 Sec.	8 Sec.	9 Sec.	10 Sec.
End Section, Right or Left	\$111.25	\$111.25	\$111.25	\$111.25	\$111.25	\$111.25	\$111.25
Center Section	64.25	64.25	64.25	64.25	64.25	64.25	64.25
Front Leg Section	16.00	16.00	16.00	16.00	16.00	16.00	16.00
Front Frame	8.75	9.50	10.25	17.00	19.00	19.25	19.50
Front Door (1 for each Boiler)	3.75	6.25	9.50				
Front Door, R. H. (1 for each Boiler)				3.75	5.50	6.25	8.50
Front Door, L. H. (1 for each Boiler)				3.75	4.50	5.75	9.00
Front Door Hinge Plate	.70	.70	.70	.70	.70	.70	.70
Front Door Catch Plate	.30	.30	.30	.30	.30	.30	.30
Front Door Clamp Handle	.40	.40	.40	.40	.40	.40	.40
Drift Frame	1.10	1.10	1.10	1.50	1.50	1.50	1.50
Butterfly Draft Door, Outside Half	.70	.70	.70	1.00	1.00	1.00	1.00
Butterfly Draft Door, Inside Half	.30	.30	.30	.40	.40	.40	.40
Butterfly Draft Door Frame	.50	.50	.50	.70	.70	.70	.70
Magazine Door Frame	5.00	5.50	6.50	8.00	10.75	12.00	14.25
Magazine Door, Steam	2.00	2.25	2.75	2.25	2.50	2.00	2.25
Magazine Door, Water	1.90	2.50	3.00	1.60	2.25	1.25	1.60
Magazine Door Hinge (4-7-9-10 Boiler)	.40			.40		.40	.40
Magazine Door Hinge, R. or L. (5-6-8 Boiler)		.30	.30		.30		
Flue Cleanout Door	2.75	2.75	2.75	2.75	2.75	2.75	2.75
Flue Cleanout Door Frame	1.90	1.90	1.90	1.90	1.90	1.90	1.90
Flue Cleanout Door Hinge Plate	.30	.30	.30	.30	.30	.30	.30
Flue Cleanout Door Catch Plate	.30	.30	.30	.30	.30	.30	.30
Upper C. O. Cover Frame (4-5-6 in One Piece)	1.60	2.25	3.00	1.60	1.60	2.25	2.25
Upper C. O. Cover Frame (7-8-9-10 in Two Pieces)				1.60	2.25	2.25	3.00
Upper C. O. Cover Plate, Top Half	.50	.50	.50	.50	.50	.50	.50
Upper C. O. Cover Plate, Bottom Half	.30	.30	.30	.30	.30	.30	.30
Smoke Hood	13.25	13.25	13.25	13.25	13.25	13.25	13.25
Smoke Hood Damper	1.70	1.70	1.70	1.70	1.70	1.70	1.70

Smoke Hood Damper Bearing Bracket	1.30	1.30	1.30	1.30	1.30	1.30	1.30
Smoke Hood Damper Bearing Bracket	.30	.30	.30	.30	.30	.30	.30
Smoke Hood Damper Spindle	.30	.30	.30	.30	.30	.30	.30
Smoke Hood Damper Lever	.30	.30	.30	.30	.30	.30	.30
Smoke Hood Balance Weight	.30	.30	.30	.30	.30	.30	.30
Air Inlet Tube, Horizontal	5.50	6.50	9.00	12.00	13.00	15.00	15.75
Air Inlet Tube through Magazine	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Air Inlet Cover	.75	.75	.75	.75	.75	.75	.75
Auxiliary Air Inlet Damper Frame	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Auxiliary Air Inlet Damper	.30	.30	.30	.30	.30	.30	.30
Flange, Steam Return	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Flange, Steam and Water Flow and Water Return	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Blind Flange, Steam and Water	3.75	3.75	3.75	3.75	3.75	3.75	3.75
Cover for Pipe Opening, End Section	.30	.30	.30	.30	.30	.30	.30
Nipples, 6-inch	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Nipples, 4-inch	.80	.80	.80	.80	.80	.80	.80
Nipples, 2-inch	.60	.60	.60	.60	.60	.60	.60
JACKET PARTS							
Front Jacket	9.00	12.50	14.00	15.50	17.50	19.00	22.50
Back Jacket	21.75	28.00	31.50	33.50	44.75	49.00	51.75
Top Jacket	7.75	8.50	10.50	14.75	15.50	16.75	18.25
End Jacket, R. or L.	28.75	28.75	28.75	28.75	28.75	28.75	28.75
Top Jacket, C. O. Cover	3.50	5.00	6.25	7.75	8.50	10.50	12.00
Keys, Nickel Plated, Front Corners	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Keys, Nickel Plated, Back Corners	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Keys, Nickel Plated, Back Top	1.00	1.25	1.50	1.75	2.00	2.25	2.50
Keys, Nickel Plated, Front Top	1.00	1.25	1.50	1.75	2.00	2.25	2.50
Keys, Nickel Plated, Top Side, Rear Half	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Keys, Nickel Plated, Top Side, Front Half	.50	.50	.50	.50	.50	.50	.50
Front Corner Plate, Brass, Nickel Plated	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Back Corner Plate, Brass, Nickel Plated	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Top Plate, Brass, Nickel Plated	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Lock Nuts with Nickel Plated Brass Caps	.25	.25	.25	.25	.25	.25	.25
Angle Yokes	.20	.20	.20	.20	.20	.20	.20
Large Yokes	.20	.20	.20	.20	.20	.20	.20
Small Yokes	.15	.15	.15	.15	.15	.15	.15

Smokeless Down-Draft Boiler Parts

Steam and Water—List Prices

Name of Part	Brics
Fire Door, R. or L.	6 75
Fire Door Hinge Link	4 25
Fire Door Hinges, each	1 25
Fire Door Butterfly Door	1 70
Upper Front C. O. Door, R. or L.	9 75
Upper Front C. O. Door Lining	1 70
Upper Front C. O. Door Hinge	2 25
Chamber Door, R. or L.	1 70
Door Door, R. or L.	3 00
Door Door Lining	5 75
Base Front Frame	4 00
Base Front Door	1 20
Base Front Door Shade Bumper	3 75
Base Front Door Hinge	7 50
Base Back C. O. Door and Lining	18 75
Base Back Panel, Upper Half	23 50
Base Back Panel, Lower Half	41 25
Section Base Panel Extension	33 25
Section Base Panel Extension	31 00
Section Base Panel	32 00
Section Base Panel	18 40
Section Pen Coal Grate Bar	3 25
Section Solid Blant Grate	4 00
Blat L. H. Conn. Bar	5 25
Blat L. H. Conn. Bar	3 25
Blat R. H. Conn. Bar	3 25
Blat R. H. Conn. Bar, Rear Half	3 75
S. H. Front Half Conn. Arm, Short	4 50
E. H. Front Half Conn. Arm, Medium	5 00
E. H. Front Half Conn. Arm, Long	80
Angle Lever	2 50
Angle Lever Bracket and Link	1 10
Connecting Arm Catch	30
Smoker Handle	3 25
Smoke Hood	48 75
Smoke Hood Check Draft	7 50
Smoke Hood Weight	1 00
Smoke Hood Complete	56 25
Small Nipple Bolt, 3/4 inch	1 00
Small Nipple Bolt, 1/2 inch	80
Pump Nipple Front Section, 1-inch	90
Rear Grate Front Section	\$114 75
Rear Grate Front Plug Conn. Section	\$120 00
Full Grate Center Conn.	\$126 50
Full Grate Center Conn. Section	\$140 75
Front Bridgwall Section	\$142 75
Front Bridgwall Section	\$98 50
Front Par Section	\$122 50
Flat Section	2 50
Panel Front Cover Strip	2 25
Panel Front Cover Strip	1 10
Panel Back Cover Strip	1 10
Panel Back Cover Strip	2 50

*Right and left castings. Price given is for each half.

IDEAL Water Tube Boilers

Arrangement of Sections

(Without IDEAL Smoke Preventing Device)

A—Front Open Section
B—Front Open Center Section
C—Center Section
D—Center Connecting (return)
E—Rear Open Center Section
F—Back Section

STEAM
WATER

23" Series

S 23-T-5—A-C-C-C-H
S 23-T-6—A-C-C-C-H
S 23-T-7—A-C-C-C-C-H
S 23-T-8—A-C-C-C-C-C-H
S 23-T-9—A-C-C-C-C-C-C-H
S 23-T-10—A-C-C-C-C-C-C-C-H

"29" Series

S 29-T-5—A-C-C-C-H
S 29-T-6—A-C-C-C-C-H
S 29-T-7—A-C-C-C-C-C-H
S 29-T-8—A-C-C-C-C-C-C-H
S 29-T-9—A-C-C-C-C-C-C-C-H
S 29-T-10—A-C-C-C-C-C-C-C-C-H

"36" Series

S 36-T-5—A-B-C-G-H
S 36-T-6—A-B-C-C-G-H
S 36-T-7—A-B-C-C-C-G-H
S 36-T-8—A-B-C-C-C-C-G-H
S 36-T-9—A-B-B-C-C-C-G-H
S 36-T-10—A-B-B-C-C-C-C-G-H
S 36-T-11—A-B-B-C-C-C-C-C-G-H
S 36-T-12—A-B-B-B-C-C-C-C-C-G-H

STEAM
WATER

W 36-T-5—A-B-C-G-H
W 36-T-6—A-B-C-C-G-H
W 36-T-7—A-B-C-C-C-G-H
W 36-T-8—A-B-C-C-C-C-G-H
W 36-T-9—A-B-B-C-C-C-G-H
W 36-T-10—A-B-B-C-C-C-C-G-H
W 36-T-11—A-B-B-B-C-C-C-C-C-G-H
W 36-T-12—A-B-B-B-B-C-C-C-C-C-C-G-H

Smokeless Down-Draft Boiler Parts

94-Inch Steam and Water

Name of Part	List Price
Fire Door, R. or L.	6.35
Fire Door, Center	7.25
Fire Door Hinge Link Bracket, Upper	4.25
Fire Door Hinge Link Bracket, Lower	4.25
Butterfly Door in Fire Door, R. or L.	1.25
Upper Front C. O. Door, R. or L.	1.25
Upper Front C. O. Door, Center	1.25
Upper Front C. O. Door Hinges	12.25
Rear Sec. C. O. Door, R. L. or C.	1.25
Clunker Door, R. or L.	1.00
Slide Door, R. or L.	1.70
Base Front Door, R. or L.	1.50
Base Front Door Hinge	1.50
Base Back Panel, R. or L. Upper Half	1.50
Base Back Panel, R. or L. Lower Half	1.50
1 Section Base Center, Front Extension	1.50
1 Section Base Side, Extension R. or L.	1.50
5 Section Base Center	1.50
7 Section Base Center	1.50
2 Section Base Extension (12 inch)	1.50
2 Section Base Extension, Dead Grate	1.50
3 Section Base Extension, Dead Grate	1.50
Bottom Pea Coal Grate Bar	1.50
Bottom Solid Blank Grate	1.50
2 Link L. H. Grate Conn. Bar	1.50
3 Link L. H. Grate Conn. Bar	1.50
4 Link L. H. Grate Conn. Bar	1.50
2 Link R. H. Grate Conn. Bar	1.50
3 Link R. H. Grate Conn. Bar	1.50
R. H. Grate Conn. Arm, Short	1.50
R. H. Grate Conn. Arm, Medium	1.50
R. H. Grate Conn. Arm, Long	1.50
Angle Lever Bracket and Link	1.50
Shaker Handle	1.50
Smoke Hood	1.50
Upper Front Joint	1.50
Upper Back Joint	1.50
Water Door	1.50

For bearing...
The chains...
moving the weight...
to end of lever "D" should...

IDEAL Water Tube Boiler Parts

(With Ideal Smoke Preventing Device)

Arrangement of Sections

A—Front Section
B—Front Open Center Section
C—Center Section
D—Center Connecting Section
E—Center Air Tube Section
G—Rear Half Open Center Section
H—Back Open Section

NOTE: Air Tube is located between sections of Boiler, one-half in each, the name of which contains words "Air Tube".

STEAM

WATER

23" Series

T-23-9-A-C-C-C-C-E-E-C-H T-23-90-A-C-C-C-C-E-E-C-H
T-23-10-A-C-C-C-C-E-E-C-H T-23-100-A-C-C-C-C-E-E-C-H
T-23-11-A-C-C-C-C-E-E-C-H T-23-110-A-C-C-C-C-E-E-C-H

29" Series

T-29-7-A-C-C-C-E-E-H T-29-70-A-C-C-C-E-E-H
T-29-8-A-C-C-C-E-E-H T-29-80-A-C-C-C-E-E-H
T-29-9-A-C-C-C-E-E-C-H T-29-90-A-C-C-C-E-E-C-H
T-29-10-A-C-C-C-E-E-C-H T-29-100-A-C-C-C-E-E-C-H
T-29-11-A-C-C-C-E-E-C-H T-29-110-A-C-C-C-E-E-C-H

IDEAL 36" Water Tube Boiler

(With Smoke Preventing Device)

Arrangement of Sections

A—Front Section
B—Front Center Section
C—Center Section
D—Center Connecting Section
E—Center Cut-Out Section
G—Rear Center Section
H—Back Section

STEAM

T-36-8-A-B-C-C-E-E-G-G-H
T-36-9-A-B-C-C-E-E-G-G-H
T-36-10-A-B-C-C-E-E-G-G-H
T-36-11-A-B-C-C-E-E-G-G-H
T-36-12-A-B-B-C-C-E-E-G-G-H

WATER

T-36-80-A-B-C-C-E-E-G-G-H
T-36-90-A-B-B-C-E-E-G-G-H
T-36-100-A-B-B-C-E-E-G-G-H
T-36-110-A-B-B-C-E-E-G-G-H
T-36-120-A-B-B-C-E-E-G-G-H

Boiler Numbers in Effect Until 1924

IDEAL Water Tube Boiler Parts

79" Series

Arrangement of Sections

(Without Ideal Smoke Preventing Device.)

A—Front Section
C—Center Section
H—Back Section
H—Bridgeway Section

Boiler Number

Left or Right

STEAM

S-79-T-7-A-C-C-C-E-E-C-H
S-79-T-8-A-C-C-C-E-E-C-H
S-79-T-9-A-C-C-C-E-E-C-H
S-79-T-10-A-C-C-C-E-E-C-H
S-79-T-11-A-C-C-C-E-E-C-H
S-79-T-12-A-C-C-C-E-E-C-H
S-79-T-13-A-C-C-C-E-E-C-H
S-79-T-14-A-C-C-C-E-E-C-H
S-79-T-15-A-C-C-C-E-E-C-H

WATER

W-79-T-7-A-C-C-C-E-E-C-H
W-79-T-8-A-C-C-C-E-E-C-H
W-79-T-9-A-C-C-C-E-E-C-H
W-79-T-10-A-C-C-C-E-E-C-H
W-79-T-11-A-C-C-C-E-E-C-H
W-79-T-12-A-C-C-C-E-E-C-H
W-79-T-13-A-C-C-C-E-E-C-H
W-79-T-14-A-C-C-C-E-E-C-H
W-79-T-15-A-C-C-C-E-E-C-H

(With Ideal Smoke Preventing Device)

A—Front Section
C—Center Section
E—Center Air Tube Section
H—Back Section
H—Bridgeway Section

STEAM

Boiler
T-79-9-A-C-C-C-E-E-C-H
T-79-10-A-C-C-C-E-E-C-H
T-79-11-A-C-C-C-E-E-C-H
T-79-12-A-C-C-C-E-E-C-H
T-79-13-A-C-C-C-E-E-C-H
T-79-14-A-C-C-C-E-E-C-H
T-79-15-A-C-C-C-E-E-C-H

WATER

T-79-90-A-C-C-C-E-E-C-H
T-79-100-A-C-C-C-E-E-C-H
T-79-110-A-C-C-C-E-E-C-H
T-79-120-A-C-C-C-E-E-C-H
T-79-130-A-C-C-C-E-E-C-H
T-79-140-A-C-C-C-E-E-C-H
T-79-150-A-C-C-C-E-E-C-H

NOTE: In ordering new repair sections specify location from front and whether on right or left hand side.

Sectional Boiler Parts

Arrangement of Sections

10, 18, 27, 35, 38 and 38-inch Series

A—Front Section; B—Back Section; C—Closed Front Flue Connecting; D—Open Front Flue Connecting; E—Open Center; F—Closed Center; G—Open Center Connecting; H—Open Center Connecting; J—Rear Center Connecting; K—Closed Front Flue; M—Open Front Flue; N—Closed Connecting (applies only); P—Rear Center

STEAM	WATER
813-4-A-D-J-B	W 15-4-A-D-G-B
815-5-A-D-E-J-B	W 15-5-A-D-E-G-B
815-6-A-D-E-E-J-B	W 15-6-A-D-E-E-G-B
819-5-A-G-E-J-B	W 19-5-A-G-E-J-B
819-6-A-G-E-E-J-B	W 19-6-A-G-E-E-J-B
819-7-A-G-E-E-J-B	W 19-7-A-G-E-E-J-B
822-5-A-G-E-J-B	W 22-5-A-G-E-J-B
822-6-A-G-E-E-J-B	W 22-6-A-G-E-E-J-B
822-7-A-G-E-E-J-B	W 22-7-A-G-E-E-J-B
825-4-A-H-E-E-J-B	W 25-4-A-H-E-E-J-B
825-5-A-H-P-G-E-J-B	W 25-5-A-H-P-G-E-J-B
825-6-A-H-P-G-E-J-B	W 25-6-A-H-P-G-E-J-B
828-5-A-G-E-J-B	W 28-5-A-G-E-J-B
828-6-A-H-E-E-J-B	W 28-6-A-H-E-E-J-B
828-7-A-H-P-G-E-J-B	W 28-7-A-H-P-G-E-J-B
835-4-A-G-E-J-B	W 35-4-A-G-E-J-B
835-5-A-H-E-E-J-B	W 35-5-A-H-E-E-J-B
835-6-A-H-P-G-E-J-B	W 35-6-A-H-P-G-E-J-B
836-5-A-G-E-J-B	W 36-5-A-G-E-J-B
836-6-A-H-E-E-J-B	W 36-6-A-H-E-E-J-B
836-7-A-H-P-G-E-J-B	W 36-7-A-H-P-G-E-J-B
837-4-A-G-E-J-B	W 37-4-A-G-E-J-B
837-5-A-H-E-E-J-B	W 37-5-A-H-E-E-J-B
837-6-A-H-P-G-E-J-B	W 37-6-A-H-P-G-E-J-B

IDEAL Water-Tube Boilers

Arrangement of Grate

10, 18, 27, 35, 38 and 38-inch Series

Boiler Number	Without Ideal Smoke Preventing Device		With Ideal Smoke Preventing Device	
	L. H. Grate Bars	R. H. Grate Bars	L. H. Grate Bars	R. H. Grate Bars
Series 10	1	1	1	1
Series 18	2	2	2	2
Series 27	3	3	3	3
Series 35	4	4	4	4
Series 38	5	5	5	5
Series 38	6	6	6	6
Series 38	7	7	7	7
Series 38	8	8	8	8
Series 38	9	9	9	9
Series 38	10	10	10	10
Series 38	11	11	11	11
Series 38	12	12	12	12
Series 38	13	13	13	13
Series 38	14	14	14	14
Series 38	15	15	15	15
Series 38	16	16	16	16
Series 38	17	17	17	17
Series 38	18	18	18	18
Series 38	19	19	19	19
Series 38	20	20	20	20
Series 38	21	21	21	21
Series 38	22	22	22	22
Series 38	23	23	23	23
Series 38	24	24	24	24
Series 38	25	25	25	25
Series 38	26	26	26	26
Series 38	27	27	27	27
Series 38	28	28	28	28
Series 38	29	29	29	29
Series 38	30	30	30	30
Series 38	31	31	31	31
Series 38	32	32	32	32
Series 38	33	33	33	33
Series 38	34	34	34	34
Series 38	35	35	35	35
Series 38	36	36	36	36
Series 38	37	37	37	37
Series 38	38	38	38	38
Series 38	39	39	39	39
Series 38	40	40	40	40
Series 38	41	41	41	41
Series 38	42	42	42	42
Series 38	43	43	43	43
Series 38	44	44	44	44
Series 38	45	45	45	45
Series 38	46	46	46	46
Series 38	47	47	47	47
Series 38	48	48	48	48
Series 38	49	49	49	49
Series 38	50	50	50	50
Series 38	51	51	51	51
Series 38	52	52	52	52
Series 38	53	53	53	53
Series 38	54	54	54	54
Series 38	55	55	55	55
Series 38	56	56	56	56
Series 38	57	57	57	57
Series 38	58	58	58	58
Series 38	59	59	59	59
Series 38	60	60	60	60
Series 38	61	61	61	61
Series 38	62	62	62	62
Series 38	63	63	63	63
Series 38	64	64	64	64
Series 38	65	65	65	65
Series 38	66	66	66	66
Series 38	67	67	67	67
Series 38	68	68	68	68
Series 38	69	69	69	69
Series 38	70	70	70	70
Series 38	71	71	71	71
Series 38	72	72	72	72
Series 38	73	73	73	73
Series 38	74	74	74	74
Series 38	75	75	75	75
Series 38	76	76	76	76
Series 38	77	77	77	77
Series 38	78	78	78	78
Series 38	79	79	79	79
Series 38	80	80	80	80
Series 38	81	81	81	81
Series 38	82	82	82	82
Series 38	83	83	83	83
Series 38	84	84	84	84
Series 38	85	85	85	85
Series 38	86	86	86	86
Series 38	87	87	87	87
Series 38	88	88	88	88
Series 38	89	89	89	89
Series 38	90	90	90	90
Series 38	91	91	91	91
Series 38	92	92	92	92
Series 38	93	93	93	93
Series 38	94	94	94	94
Series 38	95	95	95	95
Series 38	96	96	96	96
Series 38	97	97	97	97
Series 38	98	98	98	98
Series 38	99	99	99	99
Series 38	100	100	100	100

11) Sectional Boiler Parts

Arrangement of Sections

A—Front Section; B—Back Section; C—Closed Front Flue Connecting; D—Open Front Flue Connecting; E—Open Center; F—Closed Center; G—Open Connecting; H—Closed Connecting; J—Rear Center Connecting; K—Closed Front Flue; L—Open Connecting (return only); N—Closed Connecting (supply only); P—Rear Center.

IDEAL Sectional 48-inch Boilers (Steam and Water)

(Without Ideal Smoke Preventing Device)

IDEAL 48-inch Boiler Sections are made in two parts.

	Right Side Sections	Left Side Sections
8-48-9	A-K-E-M-P-B	A-C-B-G-B-B
8-48-7	A-K-E-M-P-B	A-C-B-G-B-B
8-48-6	A-K-E-M-P-B	A-C-B-G-B-B
8-48-5	A-K-E-M-P-B	A-C-B-G-B-B
8-48-4	A-K-E-M-P-B	A-C-B-G-B-B
8-48-3	A-K-E-M-P-B	A-C-B-G-B-B
8-48-2	A-K-E-M-P-B	A-C-B-G-B-B
8-48-1	A-K-E-M-P-B	A-C-B-G-B-B
8-48-0	A-K-E-M-P-B	A-C-B-G-B-B

IDEAL Sectional 48-inch Boilers

(With Ideal Smoke Preventing Device)

A—Front Section; B—Back Section; C—Closed Front Flue Connecting; D—Open Front Flue Connecting; E—Open Center; F—Closed Center; G—Open Connecting (return only); H—Closed Connecting (return only); J—Rear Center Connecting; K—Closed Front Flue; L—Open Connecting (supply only); N—Closed Connecting (supply only); P—Rear Center.

	Right Side Sections	Left Side Sections
8-48-9	A-K-E-M-P-B	A-C-B-G-B-B
8-48-7	A-K-E-M-P-B	A-C-B-G-B-B
8-48-6	A-K-E-M-P-B	A-C-B-G-B-B
8-48-5	A-K-E-M-P-B	A-C-B-G-B-B
8-48-4	A-K-E-M-P-B	A-C-B-G-B-B
8-48-3	A-K-E-M-P-B	A-C-B-G-B-B
8-48-2	A-K-E-M-P-B	A-C-B-G-B-B
8-48-1	A-K-E-M-P-B	A-C-B-G-B-B
8-48-0	A-K-E-M-P-B	A-C-B-G-B-B

When used with Ideal Smoke Preventing Device, the following sections are required:

8-48-9: A-K-E-M-P-B, A-C-B-G-B-B

8-48-7: A-K-E-M-P-B, A-C-B-G-B-B

8-48-6: A-K-E-M-P-B, A-C-B-G-B-B

8-48-5: A-K-E-M-P-B, A-C-B-G-B-B

8-48-4: A-K-E-M-P-B, A-C-B-G-B-B

8-48-3: A-K-E-M-P-B, A-C-B-G-B-B

8-48-2: A-K-E-M-P-B, A-C-B-G-B-B

8-48-1: A-K-E-M-P-B, A-C-B-G-B-B

8-48-0: A-K-E-M-P-B, A-C-B-G-B-B

Sectional Boiler Parts

Arrangement of Grate Bars and Connectors

Sectional Boilers

Boiler No.	Grate Bars	Right Hand	Left Hand	Grate Bars	Right Hand	Left Hand	Boiler No.
8-48-9	4	4	4	4	4	4	8-48-9
8-48-7	4	4	4	4	4	4	8-48-7
8-48-6	4	4	4	4	4	4	8-48-6
8-48-5	4	4	4	4	4	4	8-48-5
8-48-4	4	4	4	4	4	4	8-48-4
8-48-3	4	4	4	4	4	4	8-48-3
8-48-2	4	4	4	4	4	4	8-48-2
8-48-1	4	4	4	4	4	4	8-48-1
8-48-0	4	4	4	4	4	4	8-48-0

Down Draft Boilers

Arrangement of Lower Grate Bars and Connecting Arms

Boiler No.	Grate Bars	Right Hand	Left Hand	Grate Bars	Right Hand	Left Hand	Boiler No.
8-48-9	4	4	4	4	4	4	8-48-9
8-48-7	4	4	4	4	4	4	8-48-7
8-48-6	4	4	4	4	4	4	8-48-6
8-48-5	4	4	4	4	4	4	8-48-5
8-48-4	4	4	4	4	4	4	8-48-4
8-48-3	4	4	4	4	4	4	8-48-3
8-48-2	4	4	4	4	4	4	8-48-2
8-48-1	4	4	4	4	4	4	8-48-1
8-48-0	4	4	4	4	4	4	8-48-0

Arrangement of Sections

"34" and "48" Series

[illegible]

"60" Series

Boiler Number	Right Side	Left Side
970-5 or W	R-M-T-S-U-W-Z	R-M-T-S-U-W-Z
980-5 or W	R-M-T-S-U-W-Z	R-M-T-S-U-W-Z
990-5 or W	R-M-T-S-U-W-Z	R-M-T-S-U-W-Z
1000-5 or W	R-M-T-S-U-W-Z	R-M-T-S-U-W-Z
1100-5 or W	R-M-T-S-U-W-Z	R-M-T-S-U-W-Z

In specifying repair sections for "60 Series" Down-Draft Boilers, order should state whether right-hand or left-hand is required, and whether for steam or water. "60 Series" Boilers are 10 1/2 inches in diameter. Supply Tappings on "60 Series" Boilers are 1/2 inch in diameter of center line of boiler.

"M" Series

Boiler Number	Right Side	Middle	Left Side
974-S or W	R-M-T-S-U-W-Z	R-Q-S-T-U-W-Z	R-M-T-S-U-W-Z
984-S or W	W-Z-T-T-T-S-U	R-Q-S-T-U	R-M-T-S-U-W-Z
994-S or W	W-Z-T-T-T-S-U	W-Q-Z-T-T-T-T	R-M-T-S-U-W-Z
9104-S or W	R-M-T-S-T-S-W	W-Q-Z-T-T-T-T	R-M-T-S-U-W-Z
9114-S or W	R-M-T-S-T-S-W	W-Q-Z-T-T-T-T	R-M-T-S-U-W-Z

In specifying repair sections for "94 Series" Down-Draft Boilers, order should state whether right-hand, left-hand, or middle section is required, also whether for steam or water.

Supply Tappings on "94 Series" Boilers are of the center line type, 27 1/4 inches each side of the center line of boiler.

Cast Special for Obsolete Boilers
8" x 18", 21", 24", 30" and 36-inch—List Price

Sectional Boiler Parts

Name of Part	18-in.	21-in.	24-in.	30-in.	36-in.	Old
Front Section, S	\$2.00	14.00	17.50	24.00	37.25	37.25
Front Section, W	102.50	172.25	160.75	216.00	340.25	340.25
Front Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Center Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Center Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Center Section, S	91.25	148.75	148.75	210.00	286.00	286.00
Center Section, W	91.25	148.75	148.75	210.00	286.00	286.00
Rear Conn. S	105.50	178.50	166.50	243.50	374.75	374.75
Rear Conn. W	94.75	163.25	150.25	222.00	371.00	351.00
Rear Section, S	122.00	161.50	150.00	207.75	313.00	313.00
Rear Section, W	113.25	147.75	135.25	198.75	292.75	292.75
Top, S	3.50	3.50	3.50	3.50	3.50	3.50
Top, W	3.50	3.50	3.50	3.50	3.50	3.50
Bottom, S	3.50	3.50	3.50	3.50	3.50	3.50
Bottom, W	3.50	3.50	3.50	3.50	3.50	3.50
Back Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Back Plug Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Back Section, S	105.50	178.50	166.50	243.50	374.75	374.75
Back Section, W	94.75	163.25	150.25	222.00	371.00	351.00
Back Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Back Plug Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Back Section, S	105.50	178.50	166.50	243.50	374.75	374.75
Back Section, W	94.75	163.25	150.25	222.00	371.00	351.00
Back Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Back Plug Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Back Section, S	105.50	178.50	166.50	243.50	374.75	374.75
Back Section, W	94.75	163.25	150.25	222.00	371.00	351.00
Back Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Back Plug Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Back Section, S	105.50	178.50	166.50	243.50	374.75	374.75
Back Section, W	94.75	163.25	150.25	222.00	371.00	351.00
Back Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Back Plug Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Back Section, S	105.50	178.50	166.50	243.50	374.75	374.75
Back Section, W	94.75	163.25	150.25	222.00	371.00	351.00
Back Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Back Plug Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Back Section, S	105.50	178.50	166.50	243.50	374.75	374.75
Back Section, W	94.75	163.25	150.25	222.00	371.00	351.00
Back Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Back Plug Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Back Section, S	105.50	178.50	166.50	243.50	374.75	374.75
Back Section, W	94.75	163.25	150.25	222.00	371.00	351.00
Back Plug Conn. S	98.50	168.00	172.00	212.00	330.00	330.00
Back Plug Conn. W	99.25	169.50	167.50	209.25	318.75	318.75
Back Section, S	105.50	178.50	166.50	243.50	374.75	374.

er This one has two Clinken Doors

Round Boiler Parts

Carl Special for Absolute Boilers

Cost Special for Native Borden

Premier Steam and Water—2nd Pattern (1908).•

For Flue Pattern Premier Steam and Water Boilers, 1900 to 1908

List Price

Name of Part	15 In.	18 In.	21 In.	24 In.	27 In.	30 In.	33 In.	36 In.
Steeple	\$310	\$319	\$327	\$336	\$345	\$354	\$363	\$374
Fire Door Frame	4 75	4 75	5 50	5 50	5 50	5 50	6 00	6 00
Fire Door Lin.	2 75	3 00	3 25	3 50	3 75	4 00	4 25	4 50
Fire Door Slide	1 75	1 90	2 30	2 50	2 75	3 00	3 25	3 50
Door Lin.	50	60	60	60	60	60	60	60
Damper								
Linker Door Frame	2 75	2 75	2 25	2 25	3 25	3 25	3 25	3 25
Linker Door Lin.	90	90	1 25	1 25	1 60	1 60	1 60	1 60
Linker Door Slide	60	60	70	70	90	90	90	90
Lean-Out Door Frame	2 25	2 50	3 25	3 75	4 25	4 25	6 25	6 25
Lean-Out Door Lin.	1 40	1 50	2 00	2 00	2 50	2 50	2 50	2 50
Lean-Out Panel	1 70	2 00	2 50	2 50	3 25	3 25	4 50	5 75
Lean-Out Section							83 25	104 00
Lean-Out Section Lin.	22 00	11 00	30 75	37 00	43 25	44 00	46 75	108 75
Lean-Out Section Slide	22 75	31 25	38 75	55 50	64 00	67 25	70 75	107 25
Lean Dome	59 00	70 00	86 75	105 75	133 25	175 50	197 25	231 50
Lean Dome Lin.	35 25	42 50	53 50	63 75	87 75	100 50	134 25	
Smoke Hood, Top								
Smoke Hood, Top Lin.	3 25	3 25	5 50	5 50	6 50	6 50	8 50	8 50
Smoke Hood, Bottom	4 50	4 50	5 50	5 50	7 25	7 25	8 00	8 00
Smoke Hood, Bottom Lin.	1 30	1 30	1 75	1 75	2 00	2 25	2 75	2 75
Damper								
Smoke Id. Check								
Drift Door	90	90	1 20	1 20	1 70	1 70	1 75	1 75
Drift Door Lin.	10 00	10 00	14 00	14 00	18 50	20 25	22 50	22 50
Wing Lin.	4 90	4 90	5 40	5 40	6 25	6 25	7 25	7 25
Wing Lin. Lin.								
Lean Nipple								
Lean Nipple Lin.	4 90	1 00	1 00	1 00	1 00	1 10	1 20	1 20

*For Name and Grade Data see page 243

**For Old Style Invincible Steam and Water Boilers Made
Prior to 1908***

What Do I Do?

Name of Part	19 in.	21 in.	23 in.	30 in.	36 in.
Fire Box	\$126.00	\$156.50	\$188.75	\$222.25	\$277.25
First Section over Firebox	101.50	101.50	130.75	193.50	217.50
Upper Intermediate Section	71.50	92.75	117.75	166.50	217.50
Lower Intermediate Section	111.00	126.75	187.00	243.00	332.25
Blow Dome	64.50	81.75	114.75	161.75	204.75
Water Dome	6.00	6.00	6.00	6.00	6.00
First Door Frame	3.00	3.00	3.25	3.50	4.00
First Door Slide Damper	1.00	1.00	1.00	1.00	1.00
Second Door Frame	1.25	1.25	2.00	2.25	2.25
Third Door Frame	1.25	1.25	2.00	2.25	2.25
Water Out Door	1.25	1.25	2.00	2.25	2.25
Smoke Hood	5.75	5.75	9.00	9.00	9.00
Smoke Hood Check Draft	1.10	1.10	1.60	1.60	2.25
Smoke Hood Cover	4.00	4.00	4.00	4.00	4.00
Push Nipple	5" .80 4"	900 4"	900 4"	1.00 6"	1.00 6"

paper prices on Base and Citicorp pages 219, 241, 245 and 246

Hot Water Supply Boiler Parts

Hot Water Supply Boilers

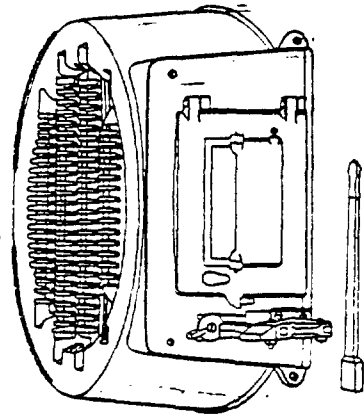
List Prices

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— (M)

Second Pattern Premier Base and Grates

(Cut Special for Obsolete Boilers)



All regular Premier Boilers made from the second pattern grate early part of 1908 and Arco Boilers made at Kansas City Plant (prior to the Summer of 1913) were equipped with above type of Grates. No changes have been made in its adoption.

Grate Bars

14 1/2, 18- and 21-inch have three Bars: Front, Center and Back. Shakes in front on left-hand side.
19 1/4- and 27-inch have four Bars: Front, Front-Center, Rear-Center and Back. Shakes in front on left-hand side.
31- and 34-inch have five Bars: Front, Front-Center, Center, Rear-Center, and Back. Shakes in two halves in front.

List Prices—Second Pattern Premier Base and Grates

Grate	15-in.	18-in.	21-in.	24-in.	27-in.	31-in.	34-in.
Base	\$19.75	\$46.00	\$59.75	\$68.75	\$75.75	\$91.00	\$110.00
Back Casting	7.00	7.00	6.75	8.25	9.75	11.75	11.75
Front Frame	3.50	3.50	4.00	4.00	4.00	4.50	4.50
Back Door	1.30	1.30	1.70	1.70	2.00	2.00	2.00
Front Butterfly Door	2.50	3.25	5.75	5.75	6.50	7.25	8.25
Front Grate Bar	3.25	5.00	7.25	7.25	9.00	11.00	12.25
Back Grate Bar	2.50	3.25	5.75	5.75	6.50	7.25	8.25
Connecting Arm	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Shake Lever	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shake Handle	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Base Complete	60.50	72.00	100.25	114.50	130.50	172.75	194.50

See page 219 for prices on first pattern Premier Base and Grates.

Round Boiler Parts

(Cut Special for Obsolete Boilers)

List Prices

Name of Part	19-in.	21-in.	25-in.	30-in.	36-in.
Piercing	\$126.00	\$156.00	\$222.00	\$257.75	\$317.75
First Section Over Firepot	80.00	101.50	130.25	193.50	237.50
Other Intermediate Sections	72.25	91.50	113.50	164.25	202.25
Steam Dome	111.00	136.75	187.00	243.00	303.25
Fire Door Frame	11.25	12.00	15.00	15.00	18.25
Fire Door	2.25	2.25	3.00	3.00	4.25
Fire Door Wheel Damper	1.20	1.20	2.00	2.00	3.25
Fire Door Lining	1.20	1.20	2.00	2.00	3.25
2-Section Jacket, Front Frame	16.25	17.25	21.25	23.50	30.00
3-Section Jacket, Front Frame	16.25	17.25	21.25	23.50	30.00
4-Section Jacket, Front Frame	16.25	17.25	21.25	23.50	30.00
1-Section Jacket, Front Frame	16.25	17.25	21.25	23.50	30.00
Lower Jacket, Front Frame	16.25	17.25	21.25	23.50	30.00
Narrow C. O. Door Frame	5.25	5.50	6.50	6.50	7.00
Wide C. O. Door	1.10	1.10	1.30	1.30	1.60
Wide C. O. Door Frame	9.50	9.50	11.50	12.25	14.50
Bottom Panels, each	5.50	6.75	7.25	9.75	10.25
Bottom Panels C. O. Door, each	1.10	1.10	1.10	1.10	1.10
Lower Wide Panels, each	5.00	6.00	10.25	12.50	15.50
Center Narrow Panels, each	2.75	3.25	4.25	4.75	5.75
Center Wide Panels, each	5.25	5.25	8.00	9.75	12.75
Top Wide Panels, each	5.25	6.50	8.50	11.00	12.50
Domestic Top Flue Strips, each	1.40	1.40	1.70	1.50	2.25
Domestic Side Flue Strips, each	1.40	1.40	1.70	1.50	2.25
Direct Draft Damper	1.60	1.75	2.25	3.00	4.25
Smoke Hood C. O. Covers, each	4.50	4.50	9.00	11.75	19.00
Smoke Hood Cover Lining, each	1.40	1.40	1.40	1.40	1.40

* For prices on Base and Grates see pages 219, 244, 245 and 246.
† Four to each Smoke Hood.
In ordering parts indicate whether boiler has galvanized or cast iron jacket.

For Portable Water Boilers*

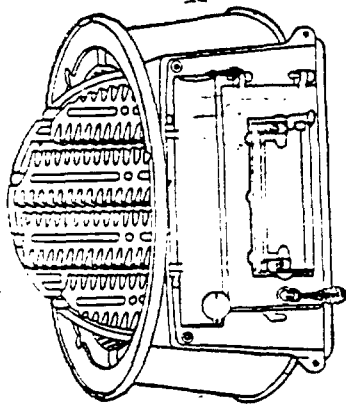
List Prices

Name of Part	19-in.	21-in.	25-in.	30-in.	36-in.
Piercing	\$123.00	\$150.00	\$201.00	\$237.25	\$275.25
First Section Over Firepot	60.25	76.25	99.25	142.75	180.25
Other Intermediate Sections	54.25	69.25	88.25	116.00	147.25
Water Dome	94.25	119.25	164.25	213.00	264.25
Fire Door Frame	9.00	9.00	11.00	11.00	14.00
Fire Door	3.00	3.00	3.50	3.50	4.00
Fire Door Wheel Damper	1.70	1.70	2.50	2.50	3.25
Fire Door Lining	1.70	1.70	2.50	2.50	3.25
Clean Out Door Frame	1.90	1.90	2.00	2.25	2.25
Clean Out Door	5.25	5.25	9.00	9.00	11.75
Smoke Hood	1.10	1.10	1.60	1.60	2.25
Smoke Hood Check Draft Door	1.10	1.10	1.60	1.60	2.25
Smoke Hood Covers	1.10	1.10	1.60	1.60	2.25
Push Supply	1.10	1.10	1.60	1.60	2.25

* For prices on Base and Grates see pages 219, 244, 245 and 246.
In ordering parts indicate whether long or short connecting rods are used.

Perfection Base and Grate Parts

Cast Special for Obsolete Boilers



Perfection Grates were used on all regular Portable Water and Locomotive Steam and Water Boilers from June, 1897, to June 17, 1901. After March 1, 1902, all Portable and Locomotive Boilers were again fitted with the Perfection Base.

Grate Bars

16- and 19-inch have three Grate Bars: 1 Left-Hand with shank, 1 Center, 1 Right-Hand without shank. This Grate shakes on left-hand side in front.
21- and 23-inch have four Grate Bars: 1 Left-Hand with shank, 1 Center, 1 Right-Hand without shank. This Grate shakes on left-hand side in front.
27- 30- and 36-inch have four Grate Bars: 1 Left-Hand with shank, 2 Center, 1 Right-Hand with shank. This Grate shakes in two halves in front.

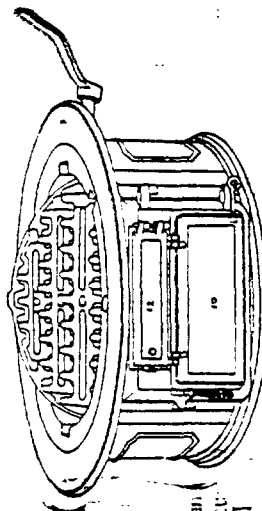
List Prices—Perfection Base and Grate Parts

Num. Diam. of Grate	16 in.	19 in.	21 in.	23 in.	27 in.	30 in.	36 in.
Base Casting Plate	141.75	148.00	158.25	162.00	169.75	170.75	176.25
Base Corner Plate							2.50
Base Top Ring (Wide)							45.00
Base Top Ring (Narrow)							31.50
Base Ring	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Base Door	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Base Butterfly Door	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Right Hand Grate Bar	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Right Hand Shaker Grate Bar							7.25
Left Hand Shaker Grate Bar							7.25
Center Grate Bar	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Grate Conn. Bar, each	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Shaker Hook Cover							9.25
Base Front Frame							10.75
Base Front Extension							1.90
Shaker Handle, Short, Wt.	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Shaker Handle, Long, Sim.	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Base Complete	21.00	23.00	25.00	27.00	31.50	33.00	37.50
Base Comp. Portable Sim.	21.00	23.00	25.00	27.00	31.50	33.00	37.50

*Wide Top Ring used on Portable Steam Boilers.

Old Style Base and Grate Parts

Cast Special for Obsolete Boilers



The Old-Style Pattern of Grate was used on all Portable Boilers until the Fall of 1896, at which time the Center-Grate Bar of the 19-, 25-, 30- and 36-inch size was changed somewhat. This type of Grate was discontinued in June, 1897.

Grate Bars

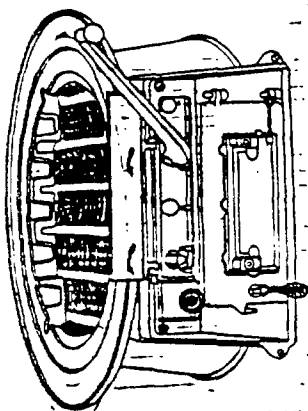
The Old-Style Grate shakes at the side of the Boiler. It consists of the following Bars: Two Outside Bars, two next to Center Bars, one Center Bar with spindle.
19-, 25- and 30-inch have five Bars: Two Outside Bars, two next to Center Bars, one Center Bar with spindle.
36-inch have seven Bars: Two Outside Bars, two next to Outside Bars, two next to Center Bars, one Center Bar with spindle.

List Prices—Old-Style Base and Grate

Num. Diam. of Grate	16 in.	19 in.	21 in.	23 in.	27 in.	30 in.	36 in.
Base Bottom Plate	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Base Bottom Ring	13.50	13.50	13.50	13.50	13.50	13.50	13.50
Base Bottom Plate	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Base R. H. Panel	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Base L. H. Panel	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Base Panel Corner Plate							1.50
Base Top Ring (Water)	13.50	13.50	13.50	13.50	13.50	13.50	13.50
Base Top Ring (Steam)	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Base Ring	11.75	11.75	11.75	11.75	11.75	11.75	11.75
Base Door	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Base Butterfly Door	7.50	7.50	7.50	7.50	7.50	7.50	7.50
Base Draft Door	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Base Outside Grate Bar	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Base Inside Grate Bar	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Base Center Grate Bar	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Base Connecting Bar	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Base Spindle (Water)	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Base Spindle (Steam)	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Base Spindle Handle	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Base Spindle Journal Plate	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Base Handle	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Triangular Grate and Base Parts

Cast Special for Obsolete Boilers



Triangular Grates were used on all required Portable Steam Boilers from June, 1897 to January 16, 1898 (Serial M. 1 to M. 1342).

Grate Bars

19-inch has three Grate Bars: All of same length.
21-inch has four Grate Bars: Two long and two short.

35-inch has five Grate Bars: Three long and two short.
36-inch has six Grate Bars: Four long and two short.

List Prices—Triangular Grate and Base Parts

Item	16 in	18 in	21 in	25 in	30 in	34 in	36 in
Blue Castles	\$13.75	\$14.50	\$15.25	\$16.00	\$16.75	\$17.50	\$18.25
Blue Front Extension	2.00	2.50	3.00	3.50	4.00	4.50	5.00
Blue Front Frame	3.00	3.50	4.00	4.50	5.00	5.50	6.00
Blue Door	3.00	3.50	4.00	4.50	5.00	5.50	6.00
Blue Chimney Door	3.00	3.50	4.00	4.50	5.00	5.50	6.00
Blue Boiler Door	3.00	3.50	4.00	4.50	5.00	5.50	6.00
Blue Top	9.00	12.25	15.50	18.75	22.00	25.25	28.50
Blue Ring	2.00	2.50	3.00	3.50	4.00	4.50	5.00
Blue Wide Base Top Ring	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Long or Center Grate Bar	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Next to Center Grate Bar	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Next to Outside Grate Bar	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Short or Outside Bar	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Grate Bar Hanger	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Grate Bar Journal	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Plate	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Grate Bar Center	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Grate Bar Corner	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Grate Bar Extension	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Grate Bar Socket	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Grate Bar Handle	5.00	5.50	6.00	6.50	7.00	7.50	8.00
Blue Grate Bar Compensator	5.00	5.50	6.00	6.50	7.00	7.50	8.00

Important to Observe in Ordering

- As stated on page 198 and 199, orders are accepted, made promptly when the following detailed information is furnished to the order:
- Name of sketch or part.
- Pattern number call on part.
- Position of Grate Bar.
- Name of purchaser who originally purchased the Boiler.

Notes on Chimney Flues

The value of the flue depends on area and velocity. Velocity alone is no proof of good draft—there must be sufficient area to carry the gases. The chimney-top should run above the highest part of the roof and should not be less in height than shown in table.

The chimney should be so located with reference to any higher buildings nearby that wind-currents will not form eddies and force the air downward in the shaft. A shifting cowl, which will always turn the outlet away from the adverse currents, will promote better draft.

The flue should run as nearly straight as possible from the base to the top outlet. The outlet must not be capped so that its area is less than the area of the flue. The flue should have no other openings into it but the Boiler smoke pipe. Sharp bends and offsets in the flue will often reduce the area and choke the draft. The flue must be free of any feature which prevents full area for the passage of smoke, etc.

If the flue is made of tile the joints must be well cemented, or all space between the tile and brick-work filled in tightly. There must be no open crevices into the flue where the sections meet—otherwise the draft is checked.

If the flue is made of brick, the stack should have outside walls at least eight inches thick to insure safety. The inside joints should be well latched; each course should be well bedded and free from surplus mortar at the joints.

If there is a soot-pocket in the flue below the smoke pipe opening, the clean-out door should always be tightly closed. If this soot-pocket has other openings in it—from fire-places or other connections—these openings check the draft and prevent best heating results from the Boiler.

Measuring All Demands on a Boiler

In estimating the size of the Boiler required, the square feet of surface on all mains and risers used on the job should be considered in connection with the radiators to be installed. This additional surface should be carefully computed and considered with reference to the amount of steam it condenses, or its cooling effect on water.

If radiation other than the direct form is used, the Boiler capacity must be increased in proportion as those surfaces may condense steam or cool the water more rapidly than direct radiation.

Let us illustrate the demands made on a large steam boiler where a considerable area on the piping makes it more impressive. (It has been the common practice to assume that the extra tax imposed on the boiler, due to piping installed, is about 25% of the amount of radiation in all cases—this, however, is not correct.) This percentage will in some instances fairly represent the tax imposed, but on small heating installations it is a well-known fact that the actual amount of piping necessary will in all cases be from 40 to 50% of the amount of radiation installed, as expressed in terms of equivalent Column radiation, whereas on larger jobs the percentage will be from 30 to 35% and will decrease proportionately to about 25% for jobs with 4000 square feet or over of Steam and 6500 square feet or over of Hot Water Radiation.

Take for example, a case calling for one of our Ideal Steam Boilers. Their capacities are rated on the basis of 2 pounds gauge pressure (219 degrees Fahrenheit) at the boiler and 1 pound of steam condensed per hour to each 4 feet of condensing surface standing in air at 70 degrees.

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Notes on Chimney Flues—Continued

The smoke pipe should not extend into the flue beyond the inside surface of the flue, otherwise the end of the pipe cuts down the area of the flue.

The joints, where the smoke pipe fits the smoke-hood of the Boiler, or where the pipe enters the chimney, should be made tight with boiler putty or asbestos cement.

In the following table are shown commercial sizes of tile and unlined brick chimney flues referred to on the pages on Boilers, giving detail data relating to Ratings, etc., under item G.

It will be noted that the actual and commercial sizes do not agree: Flues laid up in brick work give a larger area than would be indicated by the commercial sizes; on the other hand, the dimensions of the tile linings are the outside dimensions so that the actual area of a tile is less than would be indicated by the commercial size.

Table

Commercial Size	Actual Inside Area in Square Inches	
	Tile	Unlined Brick
7 x 7	33	72
8 x 8	52	110
8½ x 8½	80	169
8 x 12	126	221
8½ x 13	169	289
12 x 12	240	365
13 x 13		430
12 x 16		530
13 x 18		640
16 x 16		880
18 x 18		
20 x 20		
24 x 24		
24 x 24		
24 x 24		
24 x 24		

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Measuring All Demands on a Boiler —Continued

Ideal Water Boilers are rated with water at a temperature of 180 degrees F. leaving the Boiler, and radiation standing in air at 70 degrees. Like all heating boilers their ratings are figured in terms of direct radiation.

As Ideal Steam Boilers are rated on so definite a standard it only requires a knowledge of how many pounds of steam will be required per hour to select accurately a Boiler which cannot fail to produce the heating effect required, with proper conditions of fuel and draft. For example, suppose a steam heating job presents the following demands:

	Radiation Piping at Surface Measure- ments	Multiplic to Convert to Equivalent Column Radiation	Equivalent Column Radiation
Direct radiation stand- ing in air at 70 de- grees.	2,600	1	2,600
Indirect radiation	1,300	1.7	2,210
Mains, branches and risers standing in air at 60 degrees	800	1.5	1,200
Total square feet of radiating surface	4,700		
Total equivalent column radiation			6,010

By this it will be seen that while there is a total of 4,700 square feet of radiating surface—of which 800 square feet is piping surface—exposed to air at varying degrees of temperature yet because of the increased condensing effect to which portions of the surface are subjected, the demand for steam is so increased that for the ample cited the actual demand on the boiler would be equal to 6,010 square feet of radiation under standard conditions, not allowing for other conditions of load, such as morning peak load, etc.

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Measuring All Demands on a Boiler —Continued

To provide for this extra tax, a boiler should be selected with a rated capacity of from 15 to 20 per cent greater than the actual connected load, as expressed in terms of equivalent Column radiation which would give us a boiler rated at 7,325 square feet (T-48-8.) This illustrates the advantage of knowing the total surface the job presents in radiation and piping; and just how much steam is required to do the work. Selection is thus lifted from hazard or guesswork.

Note:—Indirect radiation—the rate of condensation depends upon temperature of air entering the stack, area, velocity, etc., and is here assumed for example to be 70% more than direct radiation.

Uncovered mains, branches and risers—the rate of condensation from these surfaces would be much diminished by a good pipe covering, depending upon the character of the material used. (See page 191.)

A fair and dependable percentage of the plus Equivalent Column Radiation (Radiation only), plus Equivalent Column Radiation to take care of piping load and morning peak load in selecting boiler capacity may be figured as follows: "Piping standing in air at 60 degrees."

Equivalent Column Radiation Load (Radiation only)

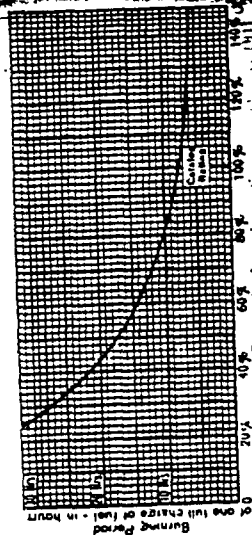
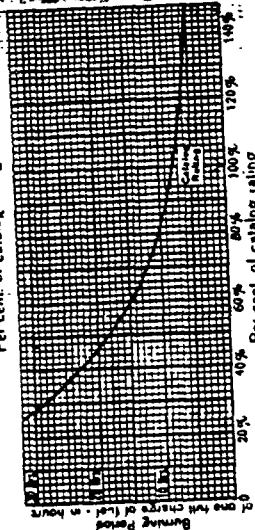
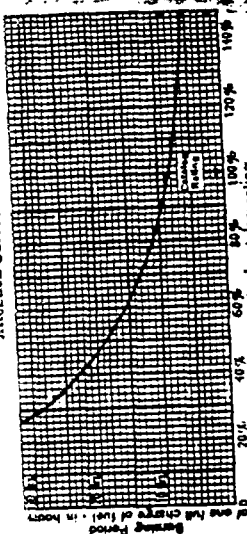
100 to 300	feet plus 70 to 75%
300 to 450	feet plus 65 to 70%
450 to 700	feet plus 60 to 65%
700 to 1250	feet plus 55 to 60%
1250 to 4000	feet plus 50 to 55%
4000 to 10000	and over plus 50%

The foregoing percentages provide for the additional tax of piping plus the morning peak load.

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IDEAL Type "A" Heat Machines

Attention Curves

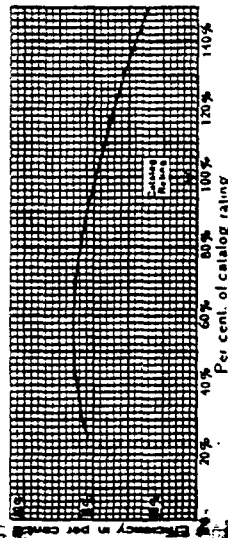
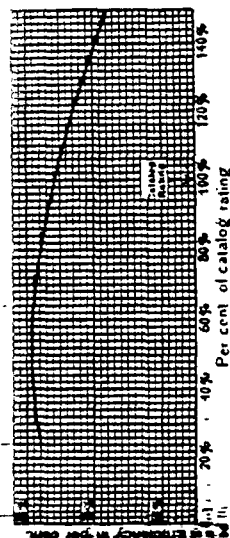
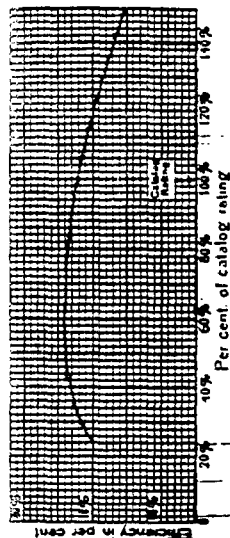


The test charts on page 253 show that the Type "A" Boiler can carry its full load or catalog rating for 8 hours during the coldest weather period (which constitutes only 140 days of the heating season). Whereas, during the average of 140 days of more moderate weather (which constitutes 82 per cent of the entire heating season) due to the lessened demand for heat, the higher efficiency of the boiler will run without reaching on one full fuel charge from 10 to 30 or more hours, depending upon the daily capricious weather fluctuations.

From the dependable ratings of the IDEAL Type "A" Boiler, the owner may select much higher size or capacity of boiler as will run out attention for 10, or 12, or 16 hours or more, during the extreme cold weather period.

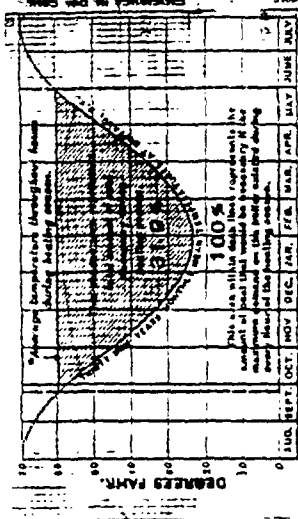
IDEAL Type "A" Heat Machines

Efficiency Curves



The heating season is approximately 100 days of moderate winter weather, 80 days of cold weather, 40 days of very cold or high windy weather. The test charts on page 252 show that at the high rate of burning, the Type "A" Boiler will easily carry its full load, as per catalog rating, at a very high efficiency during the other 180 days of average winter weather (82 per cent of the entire heating season) when only a low rate of combustion is required, the Type "A" Boiler shows a full higher efficiency. Ordinary types of boilers show much less efficiency during this long period, many of them showing below 60 per cent efficiency. We believe that in comparison with any other type of boiler now on the market these test charts show IDEAL Type "A" Boiler to yield the highest percentage of heat obtained over so long a period, per ton of coal burned.

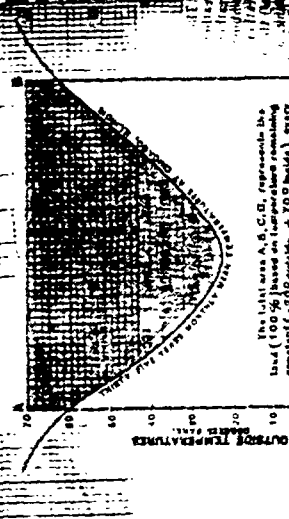
Actual vs. Theoretical Season's Fuel Demand



It is generally believed and is probably true that if the prospective purchaser is told that 500 square feet of radiation will require 100 pounds of coal per hour to keep the radiation steadily filled with steam, he will multiply the 10 pounds by 5,000 hours (the average length of the northern heating season), showing a consumption of thirty-five tons of coal. Whereas the maximum hourly demand is no indication of the season's normal demand because the entire quantity of radiation is not used every hour. Periods of low demand occur during the season for a total of nearly 700 hours, during the entire heating season. The maximum hourly demand indicates thirty-five tons of coal, while good practice demonstrates that the consumption will be about ten to twelve tons.

In other words, the coal required for a heating season is about one-third the quantity that would be used if all radiation were constant use every hour of the day and night.

Charts show the normal demands at Buffalo and Chicago.



The left axis A, B, C, D, represents the base (100, 50, 20, 10, 5, 2, 1, 0.5, 0.25, 0.125, 0.0625, 0.03125, 0.015625, 0.0078125, 0.00390625, 0.001953125, 0.0009765625, 0.00048828125, 0.000244140625, 0.0001220703125, 0.00006103515625, 0.000030517578125, 0.0000152587890625, 0.00000762939453125, 0.000003814697265625, 0.0000019073486328125, 0.00000095367431640625, 0.000000476837158203125, 0.0000002384185791015625, 0.00000011920928955078125, 0.000000059604644775390625, 0.0000000298023223876953125, 0.00000001490116119384765625, 0.000000007450580596923828125, 0.0000000037252902984619140625, 0.00000000186264514923095703125, 0.000000000931322574615478515625, 0.0000000004656612873077392578125, 0.00000000023283064365386962890625, 0.000000000116415321826934814453125, 0.0000000000582076609134674072265625, 0.00000000002910383045673370361328125, 0.000000000014551915228366851806640625, 0.0000000000072759576141834259033203125, 0.00000000000363797880709171295166015625, 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Velocity of Winds in U. S.

Average hourly velocity of the wind at selected stations of the United States Weather Bureau, also the highest velocity ever reported for a period of five minutes.

Stations	Average Hourly Velocity	Highest Velocity Reported	Stations	Average Hourly Velocity	Highest Velocity Reported
Abilene, Texas	11	66	Loansworth, Kan. I.	11	66
Albany, N. Y.	6	70	Louisville, Ky.	7	60
Albany, Mich.	9	72	Lynchburg, Va.	4	50
Albany, Ga.	9	66	Memphis, Tenn.	5	74
Bismarck, N. D.	8	54	Montgomery, Ala.	6	75
Boise, Idaho	4	55	Nashville, Tenn.	7	64
Boston, Mass.	11	90	New York City, N. Y.	9	94
Buffalo, N. Y.	5	35	North Platte, Neb.	8	64
Charlotte, N. C.	6	80	Omaha, Neb.	8	60
Chicago, Ill.	7	73	Palestine, Texas	10	81
Cincinnati, Ohio	7	73	Philadelphia, Pa.	5	61
Cleveland, Ohio	7	73	Pittsburgh, Pa.	5	61
Custer, Mont.	7	73	Portland, Me.	7	75
Denver, Colo.	7	73	Red Bluff, Cal.	11	75
Detroit, Mich.	11	75	Rochester, N. Y.	11	75
Dodge City, Kan.	11	75	St. Louis, Mo.	11	75
Dubuque, Iowa	7	73	St. Paul, Minn.	7	73
El Paso, Texas	7	73	St. Vincent, Minn.	7	73
Evansville, Ind.	7	73	Salt Lake City, Utah	7	73
Galveston, Texas	10	84	San Diego, Cal.	7	73
Havre, Mont.	11	75	San Francisco, Cal.	10	84
Huron, S. D.	10	84	Santa Fe, N. M.	10	84
Indianapolis, Ind.	10	84	Savannah, Ga.	7	73
Jacksonville, Fla.	10	84	St. Paul, Minn.	7	73
Keokuk, Iowa	8	60	Union City, N. C.	7	73
Knoxville, Tenn.	5	34	Wilmington, N. C.	7	73

* Anemometer new away at a velocity of 34 miles per hour, September, 1900. † Stations discontinued.

Standard Table Showing Velocity and Force of Winds

Description	Miles per Hour	Feet per Minute	Test per Second	Force per Square Foot
Perceptible	1	88	1.47	0.0003
Just perceptible	2	176	2.93	0.0006
Gentle breeze	3	264	4.41	0.0009
Pleasant breeze	4	352	5.88	0.0012
Brisk wind	5	440	7.35	0.0015
High wind	10	880	14.70	0.0030
Very high wind	15	1,320	22.05	0.0045
Storm	20	1,760	29.33	0.0060
Great storm	30	2,640	44.10	0.0090
Hurricane	40	3,520	58.80	0.0120
	45	3,960	66.00	0.0135
	50	4,400	73.33	0.0150
	60	5,280	88.00	0.0180
	70	6,160	102.67	0.0210
	80	7,040	117.33	0.0240
	100	8,800	146.67	0.0300

Climatic Temperatures

Lowest and Average Degrees in the U. S.
*October 1st to May 1st. All stated in Fahrenheit
(Compiled from U. S. Weather Bureau Records)

State	City	Lowest	Average	State	City	Lowest	Average
Ala.	Mobile	-1	57.7	Neb.	North Platte	-35	34.6
Ark.	Flagstaff	-21	34.8	Nev.	Carson City	-22	33.9
Cal.	San Diego	-12	52.0	N. H.	Concord	-35	33.1
Col.	Denver	-29	38.4	N. J.	Atlantic City	-7	41.6
Conn.	Grand Jct.	-16	39.2	N. Y.	Saratoga Lake	-35	34.1
Del.	Dover	-19	36.3	N. M.	New York City	-6	40.1
Fla.	Miami	-1	73.7	N. C.	Hatteras	-13	38.0
Ga.	Atlanta	-8	51.4	N. D.	Devil's Lake	-51	18.9
Idaho	Boise	-28	39.6	Ohio	Toledo	-16	36.8
Ill.	Chicago	-23	35.9	Okla.	Oklahoma City	-17	47.1
Ind.	Indianapolis	-25	40.4	Ore.	Baker City	-20	34.1
Iowa	Des Moines	-15	44.1	Pa.	Pittsburgh	-20	40.8
Kan.	Topeka	-15	44.1	R. I.	Providence	-9	37.5
La.	New Orleans	-7	60.5	S. C.	Charleston	-7	56.9
Maine	Bangor	-26	37.6	S. D.	Columbia	-43	25.9
Maryland	Baltimore	-13	37.2	Tenn.	Knoxville	-16	47.0
Mass.	Boston	-22	31.1	Tex.	Corpus Christi	-9	50.7
Mich.	Detroit	-24	35.3	Utah	Salt Lake City	-20	39.7
Minnesota	Minneapolis	-33	28.4	Vt.	Northfield	-32	27.8
Miss.	Jackson	-24	35.3	Wash.	Lynchburg	-5	45.2
Mo.	St. Louis	-16	39.2	W. Va.	Parkersburg	-27	41.9
Mont.	Helena	-42	30.9	Wis.	La Crosse	-43	31.2
Neb.	Lincoln	-29	35.8	Wyo.	Cheyenne	-38	33.7
Nev.	Carson City	-22	33.9		Lander	-36	29.0

Table of Altitudes and Boiling Point of Water

Locality	Elevation Above Sea Level, ft.	Boiling Point of Pure Water, deg. F.	Gauge Press. to give 212 deg. F. lbs. and oz.	Temp. of Steam at 2 lbs. Gauge Press., deg. F.	Normal Baro- metric Pressure inches of Mercury	Normal Atmos- pheric Pressure in lb. lbs.
Atlanta, Ga.	1,000	210.0	9	216	28.8	14.10
Buffalo, N. Y.	600	210.8	5	217	29.3	14.48
Butte, Mont.	5,700	201.12	14	209	24.14	11.86
Carson, Nev.	4,660	203.02	6	210	25.12	12.31
Chattanooga, Tenn.	674	210.6	6	217	29.25	14.34
Cheyenne, Wyo.	6,000	200.53	3	208	23.86	11.71
Chicago, Ill.	600	210.8	5	217	29.33	14.40
Cincinnati, O.	500	211.0	4	217	29.44	14.44
Cleveland, O.	642	210.7	7	217	29.28	14.30
Colorado Springs, Col.	5,982	200.53	3	208	23.88	11.71
Dallas, Tex.	425	211.1	1	217	29.52	14.58
Denver, Colo.	5,279	201.92	11	209	24.53	12.04
Detroit, Mich.	600	210.8	5	217	29.33	14.40
Helena, Mont.	4,000	204.32	1	211	28.95	14.24
Knoxville, Tenn.	933	210.1	3	217	29.34	14.40
Leadville, Colo.	10,190	192.94	12	201	20.34	9.90
Leadville, Mont.	3,200	205.81	8	213	26.55	13.00
Missoula, Tenn.	450	211.1	1	217	29.50	14.48
Nashville, Tenn.	430	211.1	1	217	29.50	14.48
Ogden, Utah	4,300	203.72	7	211	27.47	12.81
Pike's Peak, Colo.	14,108	185.96	19	196	17.52	8.68
Provo, Utah	4,512	203.32	6	211	27.56	12.84
Pueblo, Colo.	4,660	203.02	6	210	27.51	12.79
Rochester, N. Y.	531	210.9	5	217	29.41	14.31
St. Cloud, Minn.	1,070	210.0	9	216	28.86	14.11
St. Louis, Mo.	450	211.1	1	217	29.50	14.48
St. Paul, Minn.	750	210.5	5	217	29.16	14.21
Salt Lake City, Ut.	4,300	203.72	7	211	27.47	12.81
San Antonio, Tex.	675	210.6	6	217	29.24	14.30
Saranac Lake, N. Y.	1,574	208.9	9	215	28.25	13.61
Spokane, Wash.	1,900	208.31	11	215	27.90	13.31

*To give a temperature equal to 2 lbs. pressure at level (the basis on which Boilers are rated) add 2 lbs. to figures given in third column.

NOTE.—The above table, by Mr. C. B. Thompson, shows the necessity of taking into account the locality of installation in estimating amount of radiation, size of Boiler, etc.

Cleaning Steam Boilers

Accumulations of oil, grease, or grit in a new or clean boiler to foam, prevents generation of steam, and produces an extremely water line; it is necessary to blow off boiler and clean it. This should be done within a week after the boiler is installed and in operation. If one blowing off does not result in a clean water-gauge glass, proper generation of steam and a steady water line, the boiler should be blown off a second, and if necessary a third time. The following method will produce good results:—

When Water Supply Pressure is Available

Remove the safety valve from the boiler and connect a blow-off pipe to the opening, extending the pipe to the outside of the building or to some suitable drain. The size of this pipe should be as follows:

- Boilers rated from 600 sq. ft. to 1200 sq. ft. 3/4-inch pipe
 - Boilers rated from 1200 sq. ft. to 2500 sq. ft. 1-inch pipe
 - Boilers rated from 2500 sq. ft. to 4500 sq. ft. 1 1/4-inch pipe
 - Boilers rated larger than 4500 sq. ft. 1 3/4-inch pipe
- A 1/4-inch garden hose is of sufficient capacity for a boiler of about 800 square feet.

1. Close off all the radiator valves connected with the system, or if the main flow and return pipes are equipped with gate valves, these valves may be closed in place of closing the radiator valves.

2. Fill the boiler to the top of gauge glass with water. Build hot fire in boiler and blow water and steam out through the safety valve tapping and pipe above referred to. Maintain as much steam pressure as possible in boiler up to 20 pounds, as indicated on steam gauge. Supply cold water in the bottom of the boiler and maintain water line at top of gauge glass or at a point which will permit the steam to continue the blowing for about two hours. Then close off the water feed valve and drain the water through the draw-off down to the proper water line in the boiler.

3. Remove the blow-off pipe and replace the safety valve. Open up the radiator valves or the gate valves on the flow and return pipes, as the case may be, and then the heating outfit is ready for operation with the boiler thoroughly cleaned inside.

Cleaning Chimney Flues

A common and efficient method of cleaning a boiler and chimney flues—one which the U. S. Fuel Administration strongly advocates—is by the use of salt. The fire should be put in good condition with a substantial body of hot fuel. Well dried common salt is then scattered over the incandescent fuel in quantity depending upon the size of the furnace. For a house-hold furnace, a pound at a time is ample. The dampers should be kept open to maintain the furnace temperature until the flues are entirely disintegrated. This usually takes about half an hour. The salt is disintegrated by the action of the salt fumes. Repeat the application as necessary.

This method is highly endorsed for cleaning boiler tubes and furnace passages. It does not interfere with the operation of the plant and neither brickwork nor metal is deteriorated.

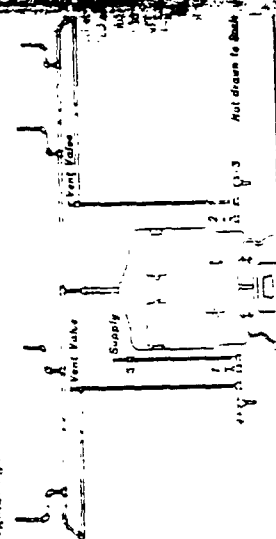
Cleaning a Water-Gauge Glass

Without Removing It

1. Draw a cupful of hot water from the Boiler, into which pour at least a tablespoonful of raw muriatic or other acid.
 2. Close both water-gauge valves.
 3. Open top water-gauge valve and also pet cock at bottom and blow water out of glass. Then immediately close the top valve and submerge the end of the pet cock in cup of hot-water acid solution. A vacuum is at once created in the gauge glass which causes the solution in the cup to rush in.
 4. Keep the pet cock immersed and operate the top valve, slightly opening and closing, alternately expelling and drawing in the solution until all grease, oil, or other matter adhering to the inside of the glass is cut out. Then close pet cock and open both water-gauge valves.
- It is necessary to have one thus operation, which need not occupy more than ten minutes. The result is a clean glass without the risk of breaking and with a desirable removal of gaskets, which is frequently the case when removing the glass for cleaning.

Piping Connections for Cleaning Steam Boiler

The object of this system is to prevent the oil, grease, grit and sand found in, and on, steam-heating system, from gathering into automatic valves and preventing their satisfactory working. It is necessary on smaller jobs to have permanent installations. The valve could be used over and over again by simply placing a flange union, after the system is cleaned, where valves Nos. 1 and 2 are shown on the drawing, and remove valves Nos. 3 and 4 after placing a plug or tap in their place. To operate: Shut off valves Nos. 1 and 2 before starting to fill boiler with water, then open water valve (No. 5) which will place a boiler with water, fill to proper height in water glass. Place a common key air vent on each return where there is an automatic, also pipe from Nos. 3 and 4 valves to screw into off all radiator valves tightly. Then start fire in boiler and try about four or five pounds of steam for position in boiler, permitting same to blow through entire system until system is free of oil, sand, and grit. If not able to maintain three or four pounds of steam, shut valves partly off Nos. 3 and 4, until able to hold that number of pounds of steam, and as water lowers in boiler turn valve (No. 5) on enough to just feed water into boiler. After this is done shut valves Nos. 3 and 4, and open Nos. 1 and 2, which will place system on a gravity—then open all radiator valves, and it will be found boiler steams easily and has steady water line, and avoids regulating the automatic air vents, saving great expense and annoyance.



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IDEAL Hot Water Supply Boiler Ratings

How to Select the Right Size Boiler

(From Tables pages 263 to 274)

For residence hot-water supply, actual practice has proven that a Hot Water Supply Boiler which will impart from 25 to 30 degrees per hour to the water in the Storage Tank is sufficiently large.

For apartment demands, which are proportionately heavier, a Hot Water Supply Boiler which will impart from 40 to 45 degrees of heat per hour is usually large enough.

By referring to the first lines in each of the tables which follow (those relating to coal fired boilers only) you will find item "1—Hours." This shows different firing periods, and the figures under each heading show conditions and results obtained from feeding the Boiler full once in five hours, six hours, and so on up to once in twelve hours. Hard coal is the basis of rating, because its heating power is constant.

Now, take for example, that eight hours is the natural firing period, and a fitter has a demand for a Boiler for a residence Storage Tank, where the need is to raise the water 30 degrees per hour, and which calls for 110 gallons per hour. The fitter runs his eye down the column under "eight" hours till he comes to the line which has 110 opposite 30 degrees "temperature rise," and finds the No. 03 Ideal Hot Water Supply Boiler to be the one which will furnish the service. The No. 0 ARCOLA will furnish the same amount (112 gallons)—either Boiler will answer.

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IDEAL Hot Water Supply Boiler Ratings*

If the Boiler is to be filled but once every twelve hours, and the gallon demand and temperature rise are to be the same (30 degrees per hour for 120 gallons) the fitter would run his eye down the columns headed by 12—watching the 30-degree line at left—he would find a No. 15 Ideal Arco Boiler (131 gallons) has the right capacity.

It is, however, for the plumber or heating contractor, who alone is familiar with all the conditions and requirements, to select from the tables the capacity of Boiler needed for each specific installation. The tables are equally applicable to the heating of water for special requirements as swimming-pools, bottle-washing vats, and other purposes.

Values of Hard and Soft Coal

*Note—All computations of fuel and power per hour in these tables are made on the basis of anthracite coal, for the reason that the available heating power of hard coal is practically constant. The semi-bituminous coals and all good caking soft coals yield just about the same quantities of available heating power as does the best anthracite coal, but the available heating power derived from the free burning soft coal (i. e., coal that does not fuse and mat together under heat), is about 40 per cent less than for caking coals.

When caking coals are burned, they fuse at comparatively low temperatures, forming a crust over the top of the fire which prevents the immediate escape of the volatile gases that comprise from 40 to 50 per cent of the fuel's heating power. These gases are then driven to the side of the firepot where they unite with the rising oxygen in the air entering through the grate and, burning at that point, are converted into valuable heating power.

When free burning coals are used, they break up at comparatively low temperatures and the hydro-carbon gases quickly escape without coming in contact with the necessary oxygen for burning.

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No. 0 Ideal-ARCOLA Hot Water Supply Boiler

Heater's total potential energy, 224,000 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal per hr., lbs.	6.40	5.33	4.57	3.90	3.55	3.20	2.90	2.65
3—Power per hr. B. t. u.	44800	37110	31990	26800	24350	22400	20100	18550
4—Radiation sq. ft.	208	178	151	126	116	105	94	83

Capacity in U. S. Gallons per Hour

Temperature Rise Fahrenheit	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Capacity	215	179	154	135	119	107	98	89	81	74	67	61	56	51	47	43

No. 1 Ideal-ARCOLA Hot Water Supply Boiler

Heater's total potential energy, 336,000 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal per hr., lbs.	9.60	8.00	6.85	6.00	5.33	4.80	4.40	4.00
3—Power per hr. B. t. u.	67200	56000	47950	42000	37110	33600	30520	28000
4—Radiation sq. ft.	348	293	251	219	200	188	174	166

Capacity in U. S. Gallons per Hour

Temperature Rise Fahrenheit	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Capacity	332	269	232	202	179	161	147	134	122	112	103	94	86	78	71	64

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No. 2 Ideal-ARCOLA Hot Water Supply Boiler

Heater's total potential energy, 448,000 British thermal units

1—Hour	5	6	7	8	9	10	11	12
Hard coal per hr., lbs.	12.80	10.66	9.14	8.00	7.11	6.40	5.81	5.33
Power per hr. B. t. u.	5000	4620	3980	3600	3200	2800	2400	2000
4—Radiation, Sq. ft.	597	497	426	373	331	298	271	248

Capacity in U. S. Gallons per Hour									
25	30	35	40	45	50	55	60	65	70
179	196	215	239	269	307	359	410	468	518
163	179	200	224	256	298	350	408	468	518
148	163	184	207	232	269	316	368	424	480
133	148	168	191	216	256	307	360	416	472
118	133	153	176	201	241	292	344	400	456
103	118	138	161	186	226	277	328	384	440
88	103	123	146	171	211	262	312	368	424
73	88	108	131	156	196	247	298	354	410
58	73	93	116	141	181	232	282	338	394
43	58	78	101	126	166	217	268	324	380
28	43	63	86	111	151	202	252	308	364
13	28	48	71	96	136	187	238	294	350
0	13	33	56	81	121	172	222	278	334
0	0	18	41	66	106	157	208	264	320
0	0	23	46	71	111	162	213	269	326
0	0	28	51	76	116	167	218	274	331
0	0	33	56	81	121	172	222	278	334
0	0	38	61	86	126	177	227	283	339
0	0	43	66	91	131	182	232	288	344
0	0	48	71	96	136	187	237	293	349
0	0	53	76	101	141	192	242	298	354
0	0	58	81	106	146	197	247	303	359
0	0	63	86	111	151	202	252	308	364
0	0	68	91	116	156	207	257	313	369
0	0	73	96	121	161	212	262	318	374
0	0	78	101	126	166	217	267	323	379
0	0	83	106	131	171	222	272	328	384
0	0	88	111	136	176	227	277	333	389
0	0	93	116	141	181	232	282	338	394
0	0	98	121	146	186	237	287	343	399
0	0	103	126	151	191	242	292	348	404
0	0	108	131	156	196	247	297	353	409
0	0	113	136	161	201	252	302	358	414
0	0	118	141	166	206	257	307	363	419
0	0	123	146	171	211	262	312	368	424
0	0	128	151	176	216	267	317	373	429
0	0	133	156	181	221	272	322	378	434
0	0	138	161	186	226	277	327	383	439
0	0	143	166	191	231	282	332	388	444
0	0	148	171	196	236	287	337	393	449
0	0	153	176	201	241	292	342	398	454
0	0	158	181	206	246	297	347	403	459
0	0	163	186	211	251	302	352	408	464
0	0	168	191	216	256	307	357	413	469
0	0	173	196	221	261	312	362	418	474
0	0	178	201	226	266	317	367	423	479
0	0	183	206	231	271	322	372	428	484
0	0	188	211	236	276	327	377	433	489
0	0	193	216	241	281	332	382	438	494
0	0	198	221	246	286	337	387	443	499
0	0	203	226	251	291	342	392	448	504
0	0	208	231	256	296	347	397	453	509
0	0	213	236	261	301	352	402	458	514
0	0	218	241	266	306	357	407	463	519
0	0	223	246	271	311	362	412	468	524
0	0	228	251	276	316	367	417	473	529
0	0	233	256	281	321	372	422	478	534
0	0	238	261	286	326	377	427	483	539
0	0	243	266	291	331	382	432	488	544
0	0	248	271	296	336	387	437	493	549
0	0	253	276	301	341	392	442	498	554
0	0	258	281	306	346	397	447	503	559
0	0	263	286	311	351	402	452	508	564
0	0	268	291	316	356	407	457	513	569
0	0	273	296	321	361	412	462	518	574
0	0	278	301	326	366	417	467	523	579
0	0	283	306	331	371	422	472	528	584
0	0	288	311	336	376	427	477	533	589
0	0	293	316	341	381	432	482	538	594
0	0	298	321	346	386	437	487	543	599
0	0	303	326	351	391	442	492	548	604
0	0	308	331	356	396	447	497	553	609
0	0	313	336	361	401	452	502	558	614
0	0	318	341	366	406	457	507	563	619
0	0	323	346	371	411	462	512	568	624
0	0	328	351	376	416	467	517	573	629
0	0	333	356	381	421	472	522	578	634
0	0	338	361	386	426	477	527	583	639
0	0	343	366	391	431	482	532	588	644
0	0	348	371	396	436	487	537	593	649
0	0	353	376	401	441	492	542	598	654
0	0	358	381	406	446	497	547	603	659
0	0	363	386	411	451	502	552	608	664
0	0	368	391	416	456	507	557	613	669
0	0	373	396	421	461	512	562	618	674
0	0	378	401	426	466	517	567	623	679
0	0	383	406	431	471	522	572	628	684
0	0	388	411	436	476	527	577	633	689
0	0	393	416	441	481	532	582	638	694
0	0	398	421	446	486	537	587	643	699
0	0	403	426	451	491	542	592	648	704
0	0	408	431	456	496	547	597	653	709
0	0	413	436	461	501	552	602	658	714
0	0	418	441	466	506	557	607	663	719
0	0	423	446	471	511	562	612	668	724
0	0	428	451	476	516	567	617	673	729
0	0	433	456	481	521	572	622	678	734
0	0	438	461	486	526	577	627	683	739
0	0	443	466	491	531	582	632	688	744
0	0	448	471	496	536	587	637	693	749
0	0	453	476	501	541	592	642	698	754
0	0	458	481	506	546	597	647	703	759
0	0	463	486	511	551	602	652	708	764
0	0	468	491	516	556	607	657	713	769
0	0	473	496	521	561	612	662	718	774
0	0	478	501	526	566	617	667	723	779
0	0	483	506	531	571	622	672	728	784
0	0	488	511	536	576	627	677	733	789
0	0	493	516	541	581	632	682	738	794
0	0	498	521	546	586	637	687	743	799
0	0	503	526	551	591	642	692	748	804
0	0	508	531	556	596	647	697	753	809
0	0	513	536	561	601	652	702	758	814
0	0	518	541	566	606	657	707	763	819
0	0	523	546	571	611	662	712	768	824
0	0	528	551	576	616	667	717	773	829
0	0	533	556	581	621	672	722	778	834
0	0	538	561	586	626	677	727	783	839
0	0	543	566	591	631	682	732	788	844
0	0	548	571	596	636	687	737	793	849
0	0	553	576	601	641	692	742	798	854
0	0	558	581	606	646	697	747	803	859
0	0	563	586	611	651	702	752	808	864
0	0	568	591	616	656	707	757	813	869
0	0	573	596	621	661	712	762	818	874
0	0	578	601	626	666	717	767	823	879
0	0	583	606	631	671	722	772	828	884
0	0	588	611	636	676	727	777	833	889
0	0	593	616	641	681	732	782	838	894
0	0	598	621	646	686	737	787	843	899
0	0	603	626	651	691	742	792	848	904
0	0	608	631	656	696	747	797	853	909
0	0	613	636	661	701	752	802	858	914
0	0	618	641	666	706	757	807	863	919
0	0	623	646	671	711	762	812	868	924
0	0	628	651	676	716	767	817	873	929
0	0	633	656	681	721	772	822	878	934
0	0	638	661	686	726	777	827	883	939
0	0	643	666	691	731	782	832	888	944
0	0	648	671	696	736	787	837	893	949
0	0	653	676	701	741	792	842	898	954
0	0	658	681	706	746	797	847	903	959
0	0	663	686	711	751	802	852	908	964
0	0	668	691	716	756	807	857	913	969

Ideal Gas ARCOLA Hot Water Supply Boilers

For Natural Gas									
Boiler Number	1	2	3	4	5	6	7	8	9
No. of Sections	1	2	3	4	5	6	7	8	9
Water Radiation Rating, sq. ft.	115	230	345	460	575	690	805	920	1035
Gas Consumption, cu ft. per hour	1	2	3	4	5	6	7	8	9
Hot Water Supply Output, B. T. U. per hour	20,700	41,400	62,100	82,800	103,500	124,200	144,900	165,600	186,300
Capacity in U. S. Gallons per hour									
25	96	112	128	144	160	176	192	208	224
30	80	96	112	128	144	160	176	192	208
35	68	80	96	112	128	144	160	176	192
40	58	68	80	96	112	128	144	160	176
45	50	58	68	80	96	112	128	144	160
50	43	50	58	68	80	96	112	128	144
55	38	43	50	58	68	80	96	112	128
60	33	38	43	50	58	68	80	96	112
65	29	33	38	43	50	58	68	80	96
70	25	29	33	38	43	50	58	68	80
75	22	25	29	33	38	43	50	58	68
80	20	22	25	29	33	38	43	50	58
85	18	20	22	25	29	33	38	43	50
90	16	18	20	22	25	29	33	38	43
95	14	16	18	20	22	25	29	33	38
100	12	14	16	18	20	22	25	29	33

NOTE: Capacities are for hourly basis and for continuous operation. Gas consumption is based on natural gas of 1100 B. T. U. and 3 ounces pressure.

Ideal Gas ARCOLA Hot Water Supply Boilers

For Artificial Gas									
Boiler Number	1	2	3	4	5	6	7	8	9
No. of Sections	1	2	3	4	5	6	7	8	9
Water Radiation Rating, sq. ft.	115	230	345	460	575	690	805	920	1035
Gas Consumption, cu ft. per hour	1	2	3	4	5	6	7	8	9
Hot Water Supply Output, B. T. U. per hour	20,700	41,400	62,100	82,800	103,500	124,200	144,900	165,600	186,300
Capacity in U. S. Gallons per hour at Tank									
25	48	56	64	72	80	88	96	104	112
30	40	48	56	64	72	80	88	96	104
35	34	40	48	56	64	72	80	88	96
40	29	34	40	48	56	64	72	80	88
45	25	29	34	40	48	56	64	72	80
50	21	25	29	34	40	48	56	64	72
55	18	21	25	29	34	40	48	56	64
60	16	18	21	25	29	34	40	48	56
65	14	16	18	21	25	29	34	40	48
70	12	14	16	18	21	25	29	34	40
75	11	12	14	16	18	21	25	29	34
80	10	11	12	14	16	18	21	25	29
85	9	10	11	12	14	16	18	21	25
90	8	9	10	11	12	14	16	18	21
95	7	8	9	10	11	12	14	16	18
100	6	7	8	9	10	11	12	14	16

NOTE: Capacities are on hourly basis and for continuous operation and are based on 1000 B. T. U. of gas per hour per one gallon of water at 180°F. Gas consumption is based on an artificial gas of 600 B. T. U. and a gas pressure of 2.5 inches of water.

IDEAL Gas-Burning Hot Water Supply Boilers

Burning Artificial Gas

Boiler Number	1	2	3	4	5	6	7	8	9
Water Radiation Rating, sq. ft.	115	230	345	460	575	690	805	920	1035
Gas Consumption, cu ft. per hour	1	2	3	4	5	6	7	8	9
Hot Water Supply Output, B. T. U. per hour	20,700	41,400	62,100	82,800	103,500	124,200	144,900	165,600	186,300
Capacity in U. S. Gallons per Hour at Tank									
25	48	56	64	72	80	88	96	104	112
30	40	48	56	64	72	80	88	96	104
35	34	40	48	56	64	72	80	88	96
40	29	34	40	48	56	64	72	80	88
45	25	29	34	40	48	56	64	72	80
50	21	25	29	34	40	48	56	64	72
55	18	21	25	29	34	40	48	56	64
60	16	18	21	25	29	34	40	48	56
65	14	16	18	21	25	29	34	40	48
70	12	14	16	18	21	25	29	34	40
75	11	12	14	16	18	21	25	29	34
80	10	11	12	14	16	18	21	25	29
85	9	10	11	12	14	16	18	21	25
90	8	9	10	11	12	14	16	18	21
95	7	8	9	10	11	12	14	16	18
100	6	7	8	9	10	11	12	14	16

NOTE: The capacities are figured on an hourly basis for continuous operation; their computation is based on a practical formula derived from actual installation, viz.: 2 cu. ft. of gas per hour for each section of water raised 100° F. Artificial gas of 600 B. T. U. at 2.5 inches pressure.

No. 02 IDEAL Hot Water Supply Boilers

Heater's total potential energy, 154,000 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal* per hr.	4.40	3.60	3.14	2.75	2.45	2.20	2.00	1.83
3—Power per hr.	10800	10920	10970	11010	11050	11090	11130	11170
4—Radiation, sq ft	205	171	147	128	114	103	93	85

Capacity in U. S. Gallons per Hour

Capacity in U. S. Gallons per Hour	5	6	7	8	9	10	11	12
25	148	123	106	93	82	71	67	62
30	123	103	88	77	68	62	56	51
35	106	88	75	66	58	51	47	43
40	92	77	66	58	51	46	42	39
45	81	69	59	52	46	41	37	34
50	71	62	53	46	41	37	33	31
55	62	55	47	41	36	32	29	26
60	55	48	41	36	32	29	26	23
65	49	43	38	33	30	27	24	22
70	44	39	34	31	27	25	22	19
75	40	36	31	27	25	22	20	18
80	37	33	29	26	23	21	19	17
85	34	31	27	24	22	20	18	16
90	32	29	25	23	21	19	17	15
95	30	27	24	21	19	17	15	14
100	28	25	22	20	18	16	14	13

No. 03 IDEAL Hot Water Supply Boilers

Heater's total potential energy, 240,000 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal* per hr.	6.10	5.31	4.51	4.00	3.55	3.20	2.91	2.67
3—Power per hr.	16100	16200	16300	16400	16500	16600	16700	16800
4—Radiation, sq ft	320	267	228	200	177	160	145	131

Capacity in U. S. Gallons per Hour

Capacity in U. S. Gallons per Hour	5	6	7	8	9	10	11	12
25	211	192	165	144	128	116	105	96
30	193	160	137	120	107	95	84	76
35	165	137	117	103	91	81	71	63
40	144	120	101	90	80	70	61	53
45	128	106	91	81	71	61	52	44
50	116	96	81	71	61	52	44	37
55	105	87	72	62	53	45	37	31
60	96	80	65	56	48	40	33	27
65	88	73	59	51	43	36	30	24
70	81	66	53	45	38	31	25	20
75	75	60	48	40	33	27	21	16
80	70	55	44	36	30	24	19	14
85	65	51	40	33	27	21	16	12
90	61	47	36	30	24	19	14	11
95	58	44	33	27	21	16	12	9
100	56	41	31	25	20	15	11	8

*If soft coal is to be used, see note, page 262.

No. 12 IDEAL-ARCO Hot Water Supply Boilers

Heater's total potential energy, 246,400 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal* per hr.	6.40	5.31	4.57	4.00	3.55	3.20	2.91	2.67
3—Power per hr.	16280	16100	15700	15300	14900	14500	14100	13700
4—Radiation, sq ft	328	271	235	205	185	161	140	127

Capacity in U. S. Gallons per Hour

Capacity in U. S. Gallons per Hour	5	6	7	8	9	10	11	12
25	236	197	169	148	131	118	107	98
30	196	163	140	123	109	98	88	80
35	169	140	120	105	93	84	74	66
40	148	123	106	93	83	73	64	56
45	132	110	94	83	74	66	57	50
50	118	97	84	74	66	58	49	42
55	108	90	77	68	60	54	45	38
60	98	82	70	61	56	49	41	34
65	90	75	64	56	50	43	35	28
70	84	70	60	53	47	42	34	27
75	78	65	56	49	43	38	31	24
80	74	62	53	46	41	37	30	23
85	69	58	49	43	38	33	27	20
90	64	54	46	40	35	30	24	18
95	62	52	44	38	33	28	22	16
100	60	50	43	37	32	27	21	15

No. 04 IDEAL Hot Water Supply Boilers

Heater's total potential energy, 320,000 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal* per hr.	8.00	6.66	5.72	5.00	4.44	4.00	3.63	3.33
3—Power per hr.	20000	16666	14444	12500	10909	9777	8888	8000
4—Radiation, sq ft	427	355	305	270	237	213	195	177

Capacity in U. S. Gallons per Hour

Capacity in U. S. Gallons per Hour	5	6	7	8	9	10	11	12
25	307	257	219	192	171	154	139	126
30	256	213	183	160	142	126	116	106
35	219	182	156	137	121	109	99	91
40	192	160	137	120	107	96	87	79
45	170	142	121	106	94	85	77	70
50	154	128	110	96	85	77	70	64
55	139	116	100	87	77	70	63	58
60	118	107	91	80	71	64	58	53
65	109	97	84	74	65	59	53	49
70	100	90	78	68	61	55	50	45
75	92	82	72	63	56	51	46	43
80	85	76	67	58	51	46	41	37
85	80	71	62	54	47	41	37	33
90	77	68	59	51	44	38	34	30
95	74	65	56	48	41	35	31	27
100	71	62	53	45	38	32	28	24

*If soft coal is to be used, see note, page 262.

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No. 05 IDEAL Hot Water Supply Boiler

Heater's total potential energy, 352,000 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs.	8.00	6.66	5.72	5.00	4.44	4.00	3.63	3.35
3—Power per hr. B. t. u.	70,000	58,666	50,285	44,000	39,111	35,000	32,000	29,333
4—Radiation, sq. ft.	410	391	336	293	261	235	213	193

Capacity in U. S. Gallons per Hour

Capacity in U. S. Gallons per Hour	5	6	7	8	9	10	11	12
25	336	280	240	210	187	168	154	140
30	280	233	200	175	156	140	128	117
35	233	191	163	143	127	115	106	98
40	191	155	133	117	103	93	85	78
45	155	127	109	96	84	76	69	63
50	127	105	90	79	70	64	58	54
55	105	88	75	66	59	54	50	46
60	88	75	64	56	50	45	41	38
65	75	64	54	47	41	37	34	31
70	64	54	45	39	34	30	27	25
75	54	45	37	32	28	24	21	19
80	45	37	30	26	22	19	17	15
85	37	30	24	20	17	15	13	12
90	30	24	20	17	15	13	11	10
95	24	20	17	15	13	11	10	9
100	20	17	15	13	11	10	9	8

No. 06 IDEAL Hot Water Supply Boiler

Heater's total potential energy, 640,000 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs.	16.00	13.33	11.43	10.00	8.89	8.00	7.27	6.66
3—Power per hr. B. t. u.	128,000	106,666	91,428	80,000	71,111	64,000	58,181	53,333
4—Radiation, sq. ft.	854	708	610	534	475	427	388	355

Capacity in U. S. Gallons per Hour

Capacity in U. S. Gallons per Hour	5	6	7	8	9	10	11	12
25	614	512	439	384	341	307	280	256
30	512	426	365	320	281	256	233	213
35	426	365	313	274	241	219	199	183
40	365	313	274	241	219	199	183	160
45	313	274	241	219	199	183	160	141
50	274	241	219	199	183	160	141	128
55	241	219	199	183	160	141	128	116
60	219	199	183	160	141	128	116	107
65	199	183	160	141	128	116	107	99
70	183	160	141	128	116	107	99	92
75	160	141	128	116	107	99	92	85
80	141	128	116	107	99	92	85	80
85	128	116	107	99	92	85	80	75
90	116	107	99	92	85	80	75	71
95	107	99	92	85	80	75	71	67
100	99	92	85	80	75	71	67	64

*If soft coal is to be used, see note, page 262.

No. 07 IDEAL Hot Water Supply Boiler

Heater's total potential energy, 704,000 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs.	16.00	13.33	11.43	10.00	8.89	8.00	7.27	6.66
3—Power per hr. B. t. u.	128,000	106,666	91,428	80,000	71,111	64,000	58,181	53,333
4—Radiation, sq. ft.	854	708	610	534	475	427	388	355

Capacity in U. S. Gallons per Hour

Capacity in U. S. Gallons per Hour	5	6	7	8	9	10	11	12
25	614	512	439	384	341	307	280	256
30	512	426	365	320	281	256	233	213
35	426	365	313	274	241	219	199	183
40	365	313	274	241	219	199	183	160
45	313	274	241	219	199	183	160	141
50	274	241	219	199	183	160	141	128
55	241	219	199	183	160	141	128	116
60	219	199	183	160	141	128	116	107
65	199	183	160	141	128	116	107	99
70	183	160	141	128	116	107	99	92
75	160	141	128	116	107	99	92	85
80	141	128	116	107	99	92	85	80
85	128	116	107	99	92	85	80	75
90	116	107	99	92	85	80	75	71
95	107	99	92	85	80	75	71	67
100	99	92	85	80	75	71	67	64

No. 08 IDEAL-ARCO Hot Water Supply Boiler

Heater's total potential energy, 403,200 British thermal units

1—Hours	5	6	7	8	9	10	11	12
2—Hard coal* per hr., lbs.	11.2	9.33	8.00	7.00	6.22	5.60	5.09	4.66
3—Power per hr. B. t. u.	90,400	75,600	67,200	60,000	53,600	48,000	43,200	39,600
4—Radiation, sq. ft.	538	448	384	336	300	270	245	222

Capacity in U. S. Gallons per Hour

Capacity in U. S. Gallons per Hour	5	6	7	8	9	10	11	12
25	388	323	277	242	216	194	176	160
30	323	268	230	201	179	161	146	134
35	268	220	191	171	153	138	125	115
40	220	191	171	153	138	125	115	107
45	191	171	153	138	125	115	107	98
50	171	153	138	125	115	107	98	91
55	153	138	125	115	107	98	91	84
60	138	125	115	107	98	91	84	78
65	125	115	107	98	91	84	78	73
70	115	107	98	91	84	78	73	68
75	107	98	91	84	78	73	68	64
80	98	91	84	78	73	68	64	60
85	91	84	78	73	68	64	60	57
90	84	78	73	68	64	60	57	54
95	78	73	68	64	60	57	54	51
100	73	68	64	60	57	54	51	48

*If soft coal is to be used, see note, page 262.

No. 08 IDEAL Hot Water Supply Boiler Heater's total potential energy, 1,000,000 British thermal units

1—Hours per hr.	2—11d coal lbs	3—Power B.T.U. Radiation, sq ft	4	5	6	7	8	9	10	11	12
24 R	20 7	17 7	15 5	13 8	12 4	11 2	10 4	9	8	7	6
1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
1335	1110	950	814	740	667	608	555	500	440	380	330
Capacity in U. S. Gallons per Hour	600	533	480	440	400	367	333	300	275	250	225
25	960	800	685	600	533	480	440	400	367	333	300
30	800	664	571	500	445	400	367	333	300	275	250
35	685	571	490	428	380	342	314	285	256	227	200
40	600	500	428	375	333	300	275	250	225	200	180
45	533	444	381	333	296	267	240	210	180	160	140
50	480	400	342	300	267	240	210	180	160	140	120
55	436	363	312	272	242	210	180	160	140	120	100
60	400	333	285	250	222	200	180	160	140	120	100
65	369	308	264	231	202	180	160	140	120	100	80
70	342	285	240	210	188	169	150	133	117	100	80
75	320	270	225	200	178	160	140	120	100	80	60
80	300	255	210	188	167	147	129	112	95	80	60
85	282	240	202	177	157	141	123	105	88	70	50
90	267	225	190	167	148	133	115	97	80	60	40
95	253	210	180	158	140	126	106	88	70	50	30
100	240	200	171	150	130	113	95	77	60	40	20

No. 09 IDEAL Hot Water Supply Boiler Heater's total potential energy, 1,100,000 British thermal units

1—Hours per hr.	2—11d coal lbs	3—Power B.T.U. Radiation, sq ft	4	5	6	7	8	9	10	11	12
24 R	20 7	17 7	15 5	13 8	12 4	11 2	10 4	9	8	7	6
1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
1470	1220	1050	910	815	735	667	612	560	500	440	380
Capacity in U. S. Gallons per Hour	600	533	480	440	400	367	333	300	275	250	225
25	1056	880	754	660	587	528	480	440	400	367	333
30	880	731	618	550	489	440	400	367	333	300	275
35	752	627	537	470	418	376	342	314	285	256	227
40	660	550	471	412	367	330	300	275	250	225	200
45	587	490	419	367	326	294	267	240	210	180	160
50	528	440	377	330	294	267	240	210	180	160	140
55	479	400	342	300	267	240	210	180	160	140	120
60	440	367	312	272	242	210	180	160	140	120	100
65	405	342	285	250	222	200	180	160	140	120	100
70	376	319	269	235	209	188	169	150	133	117	100
75	356	299	251	220	196	176	156	136	116	96	76
80	336	275	226	200	184	165	145	125	105	85	65
85	310	259	212	194	172	155	135	115	95	75	55
90	294	245	200	183	163	147	127	107	87	67	47
95	277	231	198	173	154	139	119	99	79	59	39
100	264	220	189	165	147	132	112	92	72	52	32

*If soft coal is to be used, see note, page 263.

How to Determine the Water-Heating or Tank Capacities of any IDEAL Heating Boiler

When the specifications for tank heating are greater than the capacities of Hot Water Supply Boilers, a house-heating Boiler may be used by employing the following rule: Multiply the specified quantity of water in U. S. gallons to be heated, by the factor in body of table, which coincides with the desired rise in temperature per hour and the time Boiler must run on one fuel charge, and the result will be the catalogue rating of proper size IDEAL Boiler to be used.

Boiler will run on one charge of fuel in—hours	6	7	8	9	10	11	12
20	.83	.97	1.11	1.25	1.39	1.53	1.67
30	1.25	1.46	1.67	1.87	2.08	2.29	2.50
40	1.67	1.94	2.22	2.50	2.78	3.06	3.33
50	2.08	2.43	2.78	3.13	3.47	3.82	4.17
60	2.50	2.92	3.33	3.75	4.17	4.58	5.00
70	2.92	3.40	3.89	4.37	4.86	5.35	5.83
80	3.33	3.89	4.44	5.00	5.56	6.11	6.67
90	3.75	4.37	5.00	5.63	6.25	6.87	7.50
100	4.17	4.86	5.56	6.25	6.95	7.64	8.31
110	4.58	5.35	6.11	6.88	7.64	8.40	9.17
120	5.00	5.83	6.67	7.50	8.33	9.17	10.00
130	5.41	6.32	7.22	8.12	9.03	9.93	10.81
140	5.83	6.81	7.78	8.75	9.72	10.69	11.67
150	6.25	7.29	8.33	9.38	10.42	11.46	12.50
160	6.66	7.78	8.89	10.00	11.11	12.22	13.33
170	7.08	8.26	9.44	10.63	11.81	12.99	14.17

The use of the above table is possible only when the Boiler ratings are based on the exact Boiler power, and the exact power can be determined only by accurate tests of each and every Boiler. IDEAL Boilers are the only Boilers in the world that are so rated, and therefore the power expressed in radiation may be used for the purpose of computing the water-heating power under any given set of conditions, or vice versa. The examples on the next page will make the foregoing statement clear.

How to Determine the Water-Heating or Tank Capacities of any IDEAL Heating Boiler

Example 1.—80 degrees Fahrenheit must be added per hour to 550 gallons of water contained in a 550-gallon storage tank. The heater must be run eight hours on one charge of fuel. Look in the table (page 275) opposite 80 degrees and under eight hours, and find the factor 4.41. Multiply 550 gallons by 4.41 and the result is 2,425 square feet of water boiler capacity. The nearest capacity is 2,495 square feet, which is No. 5-34 W Arco.

If the Boiler for above installation must run twelve hours on one fuel charge, a Boiler 50 per cent larger must be selected. Opposite 80 degrees and under twelve hours is the factor 6.67; and 550×6.67 is 3,669 square feet capacity.

Example 2.—It is required to add 120 degrees to 1,200 gallons of water every four hours, the Boiler to run eight hours without attention, on one fuel charge. What capacity of Boiler in square feet of radiation should be selected? Turn to the table and find opposite 120 degrees temperature rise, and under eight hours the factor 6.67. Multiply 1,200 gallons by 6.67, which gives a capacity of 8,004 square feet, which is the Boiler capacity if the work must be done in one hour; but as there are four hours in which to do the work, we divide 8,004 by 4, and find the required capacity is 2,001 square feet.

It will be found that there are several different Boilers of about 2,000 feet capacity. If on this job the Boiler must run on one fuel charge for twelve hours without attention a Boiler of 50% more capacity must be selected. Under the hour twelve is the factor 10.00; procedure is $\frac{1,200 \times 10.00}{4}$ 3,000 square feet capacity.

Example 3.—What size Boiler must be used to heat 1,500 gallons of water from 60 to 160 degrees Fahrenheit in four hours, the Boiler to run nine hours on one fuel charge of hard coal? The factor opposite 100 and under 9 is 6.75. Then $1,500 \times 6.75$ gives a Boiler capacity of 9,375 square feet if the work is done in one hour; but since there are four hours, divide 9,375 by 4, which gives the approximate capacity of 2,344 square feet.

If soft coal is used, see paragraph on soft coal, page 276.

How to Find Boiler Power Required to Heat Swimming-Pools

(Copyright, 1905, by American Radiator Company)

In heating large bodies of water, Large Boilers are employed, and when anthracite coal is burned in IDEAL Boilers there will be available, from each pound of coal burned, an average of 8,333 British thermal units, or 8.6 pounds water will be evaporated, and on this basis the chart on page 278 is plotted. The basis for finding the size IDEAL Boiler required for a given quantity of work is the consumption of 8 pounds of hard coal per square foot of grate per hour. That IDEAL Boilers will do this work is well proven by actual demonstration, in exhaustive laboratory tests and in regular installations.

The horizontal lines on chart, page 278, represent water in U. S. gallons, which may be increased by any suitable multiplier, provided the coal and steam required are increased in like proportion.

The figures at the bottom of vertical lines show the coal required, based by the combustion of the quantity of coal on the steam generated—each line representing 86 pounds of steam. The diagonal lines represent the rise, or increase, in temperature of the water per hour in Fahrenheit degrees.

Example 1. What size Boiler is required to warm the water in a swimming-pool containing 150,000 gallons from 40 degrees to 80 degrees in 24 hours, when the water in the pool is circulated through the Boiler?

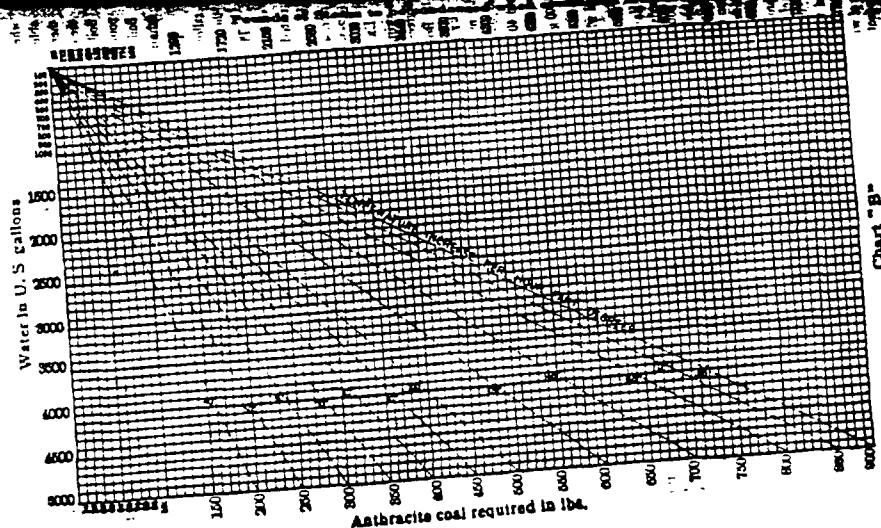
Answer. By reference to chart, page 278, it is found that the horizontal line marked 1,000 gallons intersects the 40-degree diagonal line at the 40-degree vertical line, showing that 40 pounds of coal are required to heat 40 degrees to 1,000 gallons of water. Then 100,000 gallons will require 100 times as much coal, or 4,000 pounds. In the same manner 150,000 gallons require 120 pounds, and that 10,000 gallons will require 120, or 1,200 pounds, making a total of 5,200 pounds of coal, which must be burned to add 40 degrees to 150,000 gallons of water.

Having twenty-four hours in which to heat the pool, divide 5,200 pounds by 24, and it is found that 216 pounds of coal must be burned per hour for twenty-four hours. Now, as 8 pounds of coal are burned on one square foot of grate, divide 216 by 8, which shows that Boilers containing 27 square feet of grate must be provided. To find the 27 square feet of grate, select two No. W 36-7, which have 14 square feet in each. If the temperature of 500 gallons of water is raised from 40 degrees to 150 degrees Fahrenheit in one hour, use the two temperature lines 60 and 50, the 500 gallons line is 110, and as 500 gallons is difficult to read on the chart, use the 1,000 gallons line and divide the product by 10, thus: 60 degrees and 10,000 gallons require 300 pounds of coal, and 50 degrees and 10,000 gallons require 250 pounds, a total of 550 pounds; one of which is 55 pounds, requiring a Boiler with a grate area of 7 square feet.

(Continued Page 278)

How to Find Boiler Power Required to Heat Swimming-Pools

(See explanation on pages 277 and 279)



How to Find Boiler Power Required to Heat Swimming Pools

Continued

Heating Pools by Steam Coils

EXAMPLE 2. If the same pool under like conditions is to be heated by steam through pipe coils and the temperature of the steam is 220 degrees, the mean temperature of the water is 40 plus 80 divided by 2 equals 60 degrees and 220 minus 60 equals 160 degrees temperature difference between steam and water.

Turn to chart, page 263, and note that with this temperature difference 1 square foot of iron pipe will condense about 36 pounds of steam per hour, and as 216 pounds of coal must be burned per hour, find by interpolation in chart, page 278, that 216 pounds of coal will evaporate 1,857 pounds steam, which divided by 36 will give in round figures 52 square feet, the amount of condensing pipe required. The square surface of Boilers will be the same as in Example 1.

Fifty-two square feet is equal to 120 lineal feet of 1 1/2-inch pipe, 164 feet 1 1/2-inch, or 83 feet 2-inch. If but twelve hours can be allowed to do the work, double the hourly consumption of coal and wash and furnish Boilers of double the capacity required for twenty-four hours' time.

For the twelve-hour period there will be just double the quantity of steam to condense per hour, requiring 104 square feet of condensing

surface. There is, however, another factor which must not be overlooked. In large bodies of water warmed in the manner just described, there will be a zone, of which the condensing pipe is the center, where the temperature of the water will be much higher than figured in the foregoing, unless artificial means are employed to agitate the water and keep it all at an even temperature. It will, therefore, be the practice to add at least 50 per cent to the condensing coil when heating large bodies of still water.

Hard Coal versus Soft Coal

All complications in these charts are made on the basis of Anthracite coal. Where it is desired to use fuel other than Anthracite coal proper allowances should be made. Some Bituminous coal and a few grades of Eastern Bituminous yield practically the same quantities of available heat per pound as do Anthracite fuels. Middle West Bituminous, and the lower grades of soft coal, such as Sub-Bituminous, which are found in the far West which are very high in volatile and moisture content, vary in their heat value to such an extent as to make necessary to consider each individual case by itself.

Number of Gallons in Round Tanks

Length or Depth in Feet	Diameter, Inches									
	18	24	30	36	42	48	54	60	66	72
2	26	47	73	105	141	188	238	294	356	424
2½	33	59	90	131	180	235	298	367	445	530
3	40	71	109	157	216	282	357	440	534	636
3½	47	83	127	183	252	329	416	513	623	743
4	51	95	145	209	288	376	475	586	712	848
4½	61	107	163	235	324	423	534	659	801	954
5	68	119	180	261	360	470	593	732	890	1060
5½	75	131	200	287	396	517	652	805	979	1166
6	82	143	217	313	432	561	711	878	1068	1272
6½	89	155	235	339	468	611	770	951	1157	1378
7	96	167	253	365	504	658	829	1024	1246	1484
7½	103	179	271	391	540	705	888	1097	1335	1590
8	110	191	289	417	576	752	947	1170	1424	1696
8½	117	203	307	443	612	799	1006	1233	1513	1800
9	124	215	325	469	648	846	1073	1321	1621	1920
10	131	227	343	495	684	900	1140	1419	1731	2054
12	145	259	397	561	780	1040	1280	1560	1920	2304
14	160	291	439	627	864	1128	1419	1731	2054	2454
16	175	323	481	693	948	1216	1506	1836	2214	2654
18	190	355	523	759	1032	1304	1594	1944	2374	2854
20	205	387	565	825	1116	1392	1682	2054	2494	2994

Note—Above information is quoted from standard authorities. Not guaranteed.

Capacity of Rectangular Tanks

To find how many U. S. gallons any rectangular tank will hold: Multiply the inside length, depth and width which gives the contents of the tank in cubic inches, or cubic feet as the case may be. If in inches, divide by 128 and you have the contents in cubic feet. Then multiply that result by 7.4805 (U. S. gallons in each cubic foot of water) and the final result is the number of U. S. gallons the tank will contain.

Capacity of Cylindrical Tanks

To find how many U. S. gallons a cylindrical tank will hold: Multiply the square of the inside diameter by 0.7854 which gives the area; multiply that result by the depth and this gives the cubic contents of the tank. If measurements are in inches, divide the cubic contents by 1728 and you then have contents expressed in cubic feet; then multiply by 7.4805 (U. S. gallons in each cubic foot of water) and the final result is the number of U. S. gallons the tank will contain.

Heat Units and Weight of Water

Heat units in water, between 32 and 212 degrees Fahrenheit and weight of water per cubic foot.

Temp. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.	Temp. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.
32	0.00	62.42	124	90.90	61.68
33	3.02	62.42	125	91.90	61.67
34	6.05	62.42	126	92.90	61.65
35	9.07	62.42	127	93.89	61.63
36	12.10	62.41	128	94.89	61.61
37	15.13	62.40	129	95.89	61.59
38	18.16	62.39	130	96.89	61.57
39	21.19	62.38	131	97.89	61.55
40	24.22	62.37	132	98.89	61.53
41	27.25	62.36	133	99.88	61.51
42	30.28	62.35	134	100.88	61.49
43	33.31	62.34	135	101.88	61.47
44	36.34	62.33	136	102.87	61.45
45	39.37	62.32	137	103.87	61.43
46	42.40	62.31	138	104.87	61.41
47	45.43	62.30	139	105.87	61.39
48	48.46	62.29	140	106.87	61.37
49	51.49	62.28	141	107.87	61.35
50	54.52	62.27	142	108.87	61.33
51	57.55	62.26	143	109.87	61.31
52	60.58	62.25	144	110.87	61.29
53	63.61	62.24	145	111.87	61.27
54	66.64	62.23	146	112.86	61.25
55	69.67	62.22	147	113.86	61.23
56	72.70	62.21	148	114.86	61.21
57	75.73	62.20	149	115.86	61.19
58	78.76	62.19	150	116.86	61.17
59	81.79	62.18	151	117.86	61.15
60	84.82	62.17	152	118.86	61.13
61	87.85	62.16	153	119.86	61.11
62	90.88	62.15	154	120.86	61.09
63	93.91	62.14	155	121.86	61.07
64	96.94	62.13	156	122.86	61.05
65	99.97	62.12	157	123.86	61.03
66	103.00	62.11	158	124.86	61.01
67	106.03	62.10	159	125.86	60.99
68	109.06	62.09	160	126.86	60.97
69	112.09	62.08	161	127.86	60.95
70	115.12	62.07	162	128.86	60.93
71	118.15	62.06	163	129.86	60.91
72	121.18	62.05	164	130.86	60.89
73	124.21	62.04	165	131.86	60.87
74	127.24	62.03	166	132.86	60.85
75	130.27	62.02	167	133.86	60.83
76	133.30	62.01	168	134.86	60.81
77	136.33	62.00	169	135.86	60.79
78	139.36	61.99	170	136.86	60.77
79	142.39	61.98	171	137.86	60.75
80	145.42	61.97	172	138.86	60.73
81	148.45	61.96	173	139.86	60.71
82	151.48	61.95	174	140.86	60.69
83	154.51	61.94	175	141.86	60.67
84	157.54	61.93	176	142.86	60.65
85	160.57	61.92	177	143.86	60.63
86	163.60	61.91	178	144.86	60.61
87	166.63	61.90	179	145.86	60.59
88	169.66	61.89	180	146.86	60.57
89	172.69	61.88	181	147.86	60.55
90	175.72	61.87	182	148.86	60.53
91	178.75	61.86	183	149.86	60.51
92	181.78	61.85	184	150.86	60.49
93	184.81	61.84	185	151.86	60.47
94	187.84	61.83	186	152.86	60.45
95	190.87	61.82	187	153.86	60.43
96	193.90	61.81	188	154.86	60.41
97	196.93	61.80	189	155.86	60.39
98	199.96	61.79	190	156.86	60.37
99	202.99	61.78	191	157.86	60.35
100	206.02	61.77	192	158.86	60.33
101	209.05	61.76	193	159.86	60.31
102	212.08	61.75	194	160.86	60.29
103	215.11	61.74	195	161.86	60.27
104	218.14	61.73	196	162.86	60.25
105	221.17	61.72	197	163.86	60.23
106	224.20	61.71	198	164.86	60.21
107	227.23	61.70	199	165.86	60.19
108	230.26	61.69	200	166.86	60.17
109	233.29	61.68	201	167.86	60.15
110	236.32	61.67	202	168.86	60.13
111	239.35	61.66	203	169.86	60.11
112	242.38	61.65	204	170.86	60.09
113	245.41	61.64	205	171.86	60.07
114	248.44	61.63	206	172.86	60.05
115	251.47	61.62	207	173.86	60.03
116	254.50	61.61	208	174.86	60.01
117	257.53	61.60	209	175.86	59.99
118	260.56	61.59	210	176.86	59.97
119	263.59	61.58	211	177.86	59.95
120	266.62	61.57	212	178.86	59.93
121	269.65	61.56	213	179.86	59.91
122	272.68	61.55	214	180.86	59.89
123	275.71	61.54	215	181.86	59.87
124	278.74	61.53	216	182.86	59.85
125	281.77	61.52	217	183.86	59.83
126	284.80	61.51	218	184.86	59.81
127	287.83	61.50	219	185.86	59.79
128	290.86	61.49	220	186.86	59.77
129	293.89	61.48	221	187.86	59.75
130	296.92	61.47	222	188.86	59.73

Note—Above information is quoted from standard authorities. Not guaranteed.

Heat Units Contained in 1 Lb. of Water

(B. F. Sturtevant Co.)

Temp. perature	Number of Thermal Units	Increase	Temp. perature	Number of Thermal Units	Increase
35°	35 000	155	155	155 319.5	0.011
40	40 000	160	160	160 371.5	0.015
45	45 000	165	165	165 423.5	0.019
50	50 000	170	170	170 475.5	0.023
55	55 000	175	175	175 527.5	0.027
60	60 000	180	180	180 579.5	0.031
65	65 000	185	185	185 631.5	0.035
70	70 000	190	190	190 683.5	0.039
75	75 000	195	195	195 735.5	0.043
80	80 000	200	200	200 787.5	0.047
85	85 000	205	205	205 839.5	0.051
90	90 000	210	210	210 891.5	0.055
95	95 000	215	215	215 943.5	0.059
100	100 000	220	220	220 995.5	0.063
105	105 000	225	225	225 1047.5	0.067
110	110 000	230	230	230 1099.5	0.071
115	115 000	235	235	235 1151.5	0.075
120	120 000	240	240	240 1203.5	0.079
125	125 000	245	245	245 1255.5	0.083
130	130 000	250	250	250 1307.5	0.087
135	135 000	255	255	255 1359.5	0.091
140	140 000	260	260	260 1411.5	0.095
145	145 000	265	265	265 1463.5	0.099
150	150 000	270	270	270 1515.5	0.103

Velocity of Flow of Water

Clean Pipes, 100 Feet Long, Varying Friction Head In Feet per Minute, Through Pipes of Various Sizes, for Varying Quantities of Flow

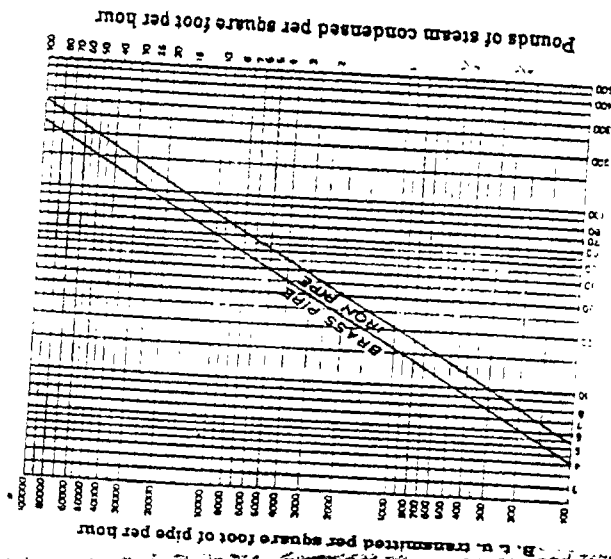
Gall. per min.	1/2 inch	3/4 inch	1 inch	1 1/4 inch	1 1/2 inch	2 inch	2 1/2 inch	3 inch	4 inch
5	218	122 1/2	78 1/2	54 1/2	40 1/2	27 1/2	19 1/2	13 1/2	7 1/2
10	436	245	157	109	81	54 1/2	38 1/2	27 1/2	15 1/2
15		367 1/2	235 1/2	163 1/2	122 1/2	81 1/2	58 1/2	40 1/2	23 1/2
20		490	311 1/2	218 1/2	152 1/2	117 1/2	78 1/2	54 1/2	30 1/2
25			392 1/2	272 1/2	183 1/2	146 1/2	97 1/2	67 1/2	38 1/2
30				354 1/2	213 1/2	175 1/2	117 1/2	81 1/2	46 1/2
35					245 1/2	203 1/2	136 1/2	94 1/2	53 1/2
40						277 1/2	156 1/2	108 1/2	61 1/2
45							175 1/2	121 1/2	69 1/2
50							305 1/2	135 1/2	76 1/2
75							457 1/2	202 1/2	115 1/2
100							610	270 1/2	153 1/2
125								337 1/2	191 1/2
150								405 1/2	230 1/2
175								472 1/2	268 1/2
200								540 1/2	306 1/2

Heating Power of Brass and Iron Pipe

For Water Storage Tanks

For use with Low Pressure Steam, up to 10 pounds by gauge

A "factor of safety" of 50% is included, to allow fouling of pipe.



Temperature difference in Fahr. degrees between steam in coil and mean or average temperature of water in tank. See page 284 for examples.

Heating Power of Brass and Iron Pipe for Lying Horizontally in Water Storage Tanks

For pipe-couls used in the heating of steam or water boilers or hot air furnaces in heating water for domestic purposes, etc., there is little difference in the total heat transmitted from the small amount of pipe used—whether iron or brass. But for large water storage tanks where quite a little piping is necessary to heat the water, the difference in the use of pipes of these two metals vary somewhat. The following reliable working information our Institute of Mechanical Engineers has prepared a comparative chart which is produced from iron piping, lying in horizontal position in a tank of water. The plotting is made on logarithmic section paper so that straight lines may be used, thus making the chart easier to read. To allow for bad water and the consequent fouling and rusting of pipes, only half of the actual condensing power is shown on the chart.

The following examples show how to use the chart

EXAMPLE 1. It is required to condense 500 pounds of steam per hour in a pipe-coul immersed in the water of a storage tank. How many square feet of pipe should the coil contain?

Temperature of steam in pipe: 210 degrees
Initial temperature of water: 140 degrees
Terminal temperature of water: 100 degrees
Temperature difference steam and water: 110 degrees

Observe that the line for IRON pipe intersects the vertical line of 120 degrees temperature difference at the horizontal line representing 22.4 pounds. The intersection of the line for BRASS pipe shows 34.1 pounds.

The quantity of pipe required in square feet is determined by dividing the 500 pounds of steam which must be condensed per hour by the quantity of steam one square foot of pipe will condense. Thus:

For IRON pipe $500 \div 22.4 = 22.2$ sq. ft. would be required.
For BRASS pipe $500 \div 14.5 = 34.5$ sq. ft. would be required.

EXAMPLE 2. Suppose a tank containing 300 U. S. gallons of cold water at 60 degrees F. is to be heated to 140 degrees F. in 2 hours; how many sq. ft. of BRASS pipe will be required, and how much steam will be condensed per hour?

300 U. S. gallons weigh $300 \times 8.33 = 2500$ pounds
Total temperature rise desired: 80 degrees
Temperature rise per hour: 40 degrees
Heat required per hour $= 2500 \times 40 = 100,000$ B. T. U.
Temperature of steam at 100 pounds pressure (approx.): 217 degrees
Mean temperature difference between steam and water: 127 degrees

Where the line for BRASS pipe intersects the vertical for 127 degrees, read the transmission per sq. ft. 16,500 B. T. U., and the condensing power, 38 pounds of steam per sq. ft. per hour. The total sq. ft. of BRASS pipe required will then be $100,000 \div 16,500 = 2.74$ sq. ft. The condensation per hour would be $2.74 \times 38 = 104.1$ pounds.

Square Feet of Surface per Lineal Foot of Pipe

On all lengths over one foot, fractions less than tenths are added to or dropped.

SIZE OF PIPE											
1	1 1/2	2	2 1/2	3	4	5	6	7	8	9	10
1	3.14	6.28	9.42	12.57	15.71	18.85	21.99	25.13	28.27	31.42	34.56
1 1/2	4.71	9.42	14.14	21.21	28.27	34.56	40.85	47.14	53.43	59.72	66.01
2	6.28	12.57	18.85	25.13	31.42	37.71	43.99	50.28	56.57	62.86	69.15
2 1/2	7.85	15.71	23.56	31.42	39.27	47.14	55.00	62.86	70.71	78.57	86.43
3	9.42	18.85	28.27	37.71	47.14	56.57	65.99	75.42	84.85	94.28	103.71
4	12.57	25.13	37.71	50.28	62.86	75.42	87.99	100.56	113.13	125.70	138.27
5	15.71	31.42	47.14	62.86	78.57	94.28	110.00	125.71	141.42	157.13	172.84
6	18.85	37.71	56.57	75.42	94.28	113.13	132.00	150.85	169.71	188.57	207.43
7	21.99	43.99	65.99	87.99	110.00	132.00	154.00	176.00	198.00	220.00	242.00
8	25.13	50.28	75.42	100.56	125.71	150.85	176.00	201.13	226.42	251.71	277.00
9	28.27	56.57	84.85	113.13	141.42	170.00	198.57	227.14	255.71	284.28	312.85
10	31.42	62.86	94.28	125.71	157.13	188.57	219.99	251.42	282.85	314.28	345.71
11	34.56	69.15	103.71	138.27	172.84	207.43	242.00	276.57	311.14	345.71	380.28
12	37.71	75.42	113.13	149.00	183.86	220.00	255.00	290.00	325.00	360.00	395.00
13	40.85	81.70	122.57	159.84	201.13	242.00	282.85	323.71	364.57	405.43	446.28
14	43.99	87.99	132.00	170.00	212.00	255.00	297.14	338.28	379.42	420.57	461.71
15	47.14	94.28	141.42	180.85	222.86	266.00	308.57	349.71	390.85	432.00	473.14
16	50.28	100.56	150.85	191.71	233.71	277.14	319.71	360.85	402.00	443.14	484.28
17	53.43	106.85	160.00	202.57	244.57	288.57	330.85	372.00	413.14	454.28	495.43
18	56.57	113.13	170.00	213.42	255.42	299.42	341.71	383.14	424.28	465.43	506.57
19	59.72	119.42	180.85	224.28	266.28	310.28	352.85	394.28	435.42	476.57	517.71
20	62.86	125.71	191.71	235.13	277.13	321.42	363.85	405.42	446.57	487.71	528.85
21	65.99	132.00	202.57	246.00	288.00	332.57	374.85	416.57	457.71	498.85	540.00
22	69.15	138.27	213.42	256.85	298.85	343.71	385.85	427.71	468.85	509.85	551.13
23	72.29	144.57	224.28	267.71	309.71	354.85	396.85	438.85	479.85	520.85	562.28
24	75.42	150.85	235.13	278.57	320.57	365.99	407.85	449.85	490.85	531.85	573.42
25	78.57	157.13	246.00	289.42	331.42	377.14	418.85	460.85	501.85	542.85	584.57
26	81.70	163.42	256.85	300.28	342.28	388.28	429.85	471.85	512.85	553.85	595.71
27	84.85	169.71	267.71	311.13	353.13	399.42	440.85	482.85	523.85	564.85	606.85
28	87.99	176.00	277.14	322.00	364.00	410.57	451.85	493.85	534.85	575.85	617.85
29	91.13	182.28	288.57	332.85	374.85	421.71	462.85	504.85	545.85	586.85	628.85
30	94.28	188.57	299.42	343.71	385.71	432.57	473.85	515.85	556.85	597.85	639.85
31	97.42	194.85	309.85	354.57	396.57	443.42	484.85	526.85	567.85	608.85	650.85
32	100.56	201.13	320.85	365.42	407.42	454.28	495.85	537.85	578.85	619.85	661.85
33	103.71	207.43	331.71	376.28	418.28	465.13	506.85	548.85	589.85	630.85	672.85
34	106.85	213.42	342.57	387.13	429.13	476.00	517.85	559.85	600.85	641.85	683.85
35	110.00	219.42	353.42	398.00	439.85	486.85	528.85	570.85	611.85	652.85	694.85
36	113.13	225.71	364.28	408.85	450.71	497.71	539.85	581.85	622.85	663.85	705.85
37	116.28	232.00	375.13	419.71	461.57	508.57	550.85	592.85	633.85	674.85	716.85
38	119.42	238.28	386.00	430.57	472.42	519.42	561.85	603.85	644.85	685.85	727.85
39	122.57	244.57	396.85	441.42	483.28	530.28	572.85	614.85	655.85	696.85	738.85
40	125.71	250.85	407.71	452.28	494.13	541.13	583.85	625.85	666.85	707.85	749.85
41	128.86	257.13	418.57	463.13	505.00	552.00	594.85	636.85	677.85	718.85	760.85
42	132.00	263.42	429.42	474.00	515.85	562.85	605.85	647.85	688.85	729.85	771.85
43	135.13	269.71	440.28	484.85	526.71	573.71	616.85	658.85	699.85	740.85	782.85
44	138.27	276.00	451.13	495.71	537.57	584.57	627.85	669.85	710.85	751.85	793.85
45	141.42	282.28	462.00	506.57	548.42	595.42	638.85	680.85	721.85	762.85	804.85
46	144.57	288.57	472.85	517.42	559.28	606.28	649.85	691.85	732.85	773.85	815.85
47	147.71	294.85	483.71	528.28	570.13	617.13	660.85	702.85	743.85	784.85	826.85
48	150.85	301.13	494.57	539.13	581.00	628.00	671.85	713.85	754.85	795.85	837.85
49	154.00	307.42	505.42	550.00	591.85	638.85	682.85	724.85	765.85	806.85	848.85
50	157.13	313.71	516.28	560.85	602.71	649.71	693.85	735.85	776.85	817.85	859.85
51	160.28	320.00	527.13	571.71	613.57	660.57	704.85	746.85	787.85	828.85	870.85
52	163.42	326.28	538.00	582.57	624.42	671.42	715.85	757.85	798.85	839.85	881.85
53	166.57	332.57	548.85	593.42	635.28	682.28	726.85	768.85	809.85	850.85	892.85
54	169.71	338.85	559.71	604.28	646.13	693.13	737.85	779.85	820.85	861.85	903.85
55	172.86	345.13	570.57	615.13	657.00	704.00	748.85	790.85	831.85	872.85	914.85
56	176.00	351.42	581.42	626.00	667.85	714.85	759.85	801.85	842.85	883.85	925.85
57	179.13	357.71	592.28	636.85	678.71	725.71	770.85	812.85	853.85	894.85	936.85
58	182.28	364.00	603.13	647.71	689.57	736.57	781.85	823.85	864.85	905.85	947.85
59	185.42	370.28	614.00	658.57	700.42	747.42	792.85	834.85	875.85	916.85	958.85
60	188.57	376.57	624.85	669.42	711.28	758.28	803.85	845.85	886.85	927.85	969.85
61	191.71	382.85	635.71	680.28	722.13	769.13	814.85	856.85	897.85	938.85	980.85
62	194.85	389.13	646.57	691.13	733.00	780.00	825.85	867.85	908.85	949.85	991.85
63	198.00	395.42	657.42	702.00	743.85	790.85	836.85	878.85	919.85	960.85	1002.85
64	201.13	401.71	668.28	712.85	754.71	801.71	847.85	889.85	930.85	971.85	1013.85
65	204.28	408.00	679.13	723.71	765.57	812.57	858.85	900.85	941.85	982.85	1024.85
66	207.42	414.28	690.00	734.57	776.42	823.42	869.85	911.85	952.85	993.85	1035.85
67	210.57	420.57	700.85	745.42	787.28	834.28	880.85	922.85	963.85	1004.85	1046.85
68	213.71	426.85	711.71	756.28	798.13	845.13	891.85	933.85	974.85	1015.85	1057.85
69	216.86	433.13	722.57	767.13	809.00	856.00	902.85	944.85	985.85	1026.85	1068.85
70	220.00	439.42	733.42	778.00	819.85	866.85	913.85	955.85	996.85	1037.85	1079.85
71	223.13	445.71	744.28	788.85	830.71	877.71	924.85	966.85	1007.85	1048.85	1090.85
72	226.28	452.00	755.13	799.71	841.57	888.57	935.85	977.85	1018.85	1059.85	1101.85
73	229.42	458.28	766.00	810.57	852.42	899.42	946.85	988.85	1029.85	1070.85	1112.85
74	232.57	464.57	776.85	821.42	863.28	910.28	957.85	999.85	1040.85	1081.85	1123.85
75	235.71	470.85	787.71	832.28	874.13	921.13	968.85	1010.85	1051.85	1092.85	1134.85
76	238.86	477.13	798.57	843.13	885.00	932.00	979.85	1021.85	1062.85	1103.85	1145.85
77	242.00	483.42	809.42	854.00	895.85	942.85	990.85	1032.85	1073.85	1114.85	1156.85
78	245.13	489.71	820.28	864.85	906.71	953.71	1001.85	1043.85	1084.85	1125.85	1167.85
79	248.28	496.00	831.13	875.71	917.57	964.57	1012.85	1054.85	1095.85	1136.85	1178.85
80	251.42	502.28									

Equalization of Pipe Areas

(Babcock and Wilcox)

Diam. of Pipes Ins.	Number of Smaller Pipes Equivalent to One Larger Pipe									
	1/2 Inch	3/4 Inch	1 Inch	1 1/4 Inch	1 1/2 Inch	2 Inch	3 Inch	4 Inch	6 Inch	8 Inch
1/2	2 27	4 88	15 8	31 7	96 9	205	4	27	36	51
3/4	1	2 05	6 9	14	42 5	90 4	5	36	49	67
1		1	3 5	6 8	20 9	44 1	6	49	67	94
1 1/4			1	1 3	6 1	13	7	62	84	111
1 1/2				1	3 1	6 5	8	82	105	141
2					1 8	3 87	10	1 05	1 31	1 66
2 1/2					1	2 12	12	1 38	1 66	2 14
3						1	15	1 61	1 9	2 37
4							20	2 07	2 37	3 15
5							25	2 47	2 87	3 55
6							30	2 87	3 27	4 01
7							35	3 27	3 67	4 51
8							40	3 67	4 07	5 01

Diam. of Pipes Ins.	Number of Smaller Pipes Equivalent to One Larger Pipe									
	5 Inch	6 Inch	7 Inch	8 Inch	9 Inch	10 Inch	12 Inch	14 Inch	16 Inch	18 Inch
1/2	377	620	918	1205	1569	205	270	336	402	468
3/4	166	273	380	498	629	770	918	1066	1214	1362
1	81	133	188	248	309	370	431	492	553	614
1 1/4	23 8	39 2	54 1	68 1	82 1	96 1	110 1	124 1	138 1	152 1
1 1/2	11 9	19 6	26 0	32 4	38 8	45 2	51 6	58 0	64 4	70 8
2	7 1	11 7	15 4	19 1	22 8	26 5	30 2	33 9	37 6	41 3
2 1/2	3 9	6 1	8 3	10 5	12 7	14 9	17 1	19 3	21 5	23 7
3	2 4	4 1	5 5	6 8	8 2	9 6	10 9	12 3	13 6	15 0
4	1 8	3 1	4 1	5 1	6 1	7 1	8 1	9 1	10 1	11 1
5	1 1	2 1	2 8	3 4	4 1	4 8	5 5	6 2	6 9	7 6
6	1	1 6	2 1	2 6	3 1	3 6	4 1	4 6	5 1	5 6
7		1 1	1 4	1 7	2 0	2 3	2 6	2 9	3 2	3 5
8			1 1	1 3	1 6	1 9	2 2	2 5	2 8	3 1

*Nominal diameters standard steam- and gas-pipes.

Example

To find number of 2-inch pipes which will deliver as much fluid as one 5-inch pipe: In column headed 5, and opposite 2 read 11.9 which is the equivalent number of 2-inch pipes.

Dimensions of Standard Wrought Iron Pipe

We do not handle or quote prices on Pipe

Nom- inal Inside Diam. Inches	Actual Diam. Inches		Thick- ness Inches	Circumference Inches		Area Square Inches	
	Inside	Outside		Inter- nal	Exter- nal	Inter- nal	Exter- nal
3/4	27	4	.07	84	1 27	.06	13
1	36	5 1/4	.09	1 14	1 70	1	23
1 1/4	49	6 7/8	.11	1 55	2 12	1 9	36
1 1/2	62	8 1/4	.11	1 95	2 63	3	55
2	82	10 5/8	.11	2 59	3 30	53	87
2 1/2	1 05	13 1/4	.13	3 29	4 13	.86	1 36
3	1 38	16 1/4	.14	4 33	5 21	1.5	2 16
3 1/2	1 61	19 1/4	.14	5 06	5 97	2.04	2 83
4	2 07	23 7/8	.15	6 49	7 46	3 36	4 43
4 1/2	2 47	28 1/4	.20	7 75	9 03	4 78	6 49
5	3 3	35 5/8	.22	9 63	11	7 39	9 62
5 1/2	4 01	42 1/4	.23	11 15	12 57	9 89	12 57
6	4 81	50 1/4	.24	12 65	14 11	12 73	15 9
6 1/2	5 51	57 1/4	.25	14 16	15 71	15 96	19 63
7	6 06	64 1/4	.26	15 85	17 48	19 99	24 31
7 1/2	7 02	74 1/4	.28	19 05	20 81	28 89	34 47
8	7 98	84 1/4	.30	22 06	23 95	38 74	45 66
8 1/2	8 94	94 1/4	.32	25 07	27 1	50 02	58 43
9	10 02	105 1/4	.34	28 08	30 24	62 72	72 76
10	11 11	116 1/4	.37	31 47	33 77	78 82	90 76
11	12 12	127 1/4	.37	34 56	36 91	95 03	108 43
12	13 13	138 1/4	.37	37 7	40 05	113 1	127 68

Capacities and Threads of Standard W. I. Pipe

Nom- inal Inside Diam. Inches	Length of Pipe to Thread Inches	Length of Pipe to Thread Feet	Con- tained Pounds of Water per Lineal Foot	Con- tained Pounds of Water per Lineal Foot	Nom- inal Inside Diam. Inches	Length of Pipe to Thread Inches	Length of Pipe to Thread Feet	Con- tained Pounds of Water per Lineal Foot	Con- tained Pounds of Water per Lineal Foot
3/4	3 1/2	1 1/4	.024	.024	3 1/2	1 1/4	1 1/4	4 285	4 285
1	4 1/2	1 3/4	.044	.044	4 1/2	1 3/4	1 51	5 517	5 517
1 1/4	5 1/2	2 1/4	.082	.082	5 1/2	2 1/4	1 2	6 908	6 908
1 1/2	6 1/2	2 3/4	.132	.132	6 1/2	2 3/4	.96	8 668	8 668
2	8 1/2	3 1/4	.23	.23	8 1/2	3 1/4	.66	12 521	12 521
2 1/2	10 1/2	3 3/4	.373	.373	10 1/2	3 3/4	.49	16 79	16 79
3	12 1/2	4 1/4	.648	.648	12 1/2	4 1/4	.38	21 088	21 088
3 1/2	14 1/2	4 3/4	.94	.94	14 1/2	4 3/4	.27 58	27 58	27 58
4	16 1/2	5 1/4	1.451	1.451	16 1/2	5 1/4	.21	31 171	31 171
4 1/2	18 1/2	5 3/4	2.072	2.072	18 1/2	5 3/4	.2	41 189	41 189
5	20 1/2	6 1/4	2.902	2.902	20 1/2	6 1/4	.17	49 017	49 017

Note—Above information is quoted from standard authorities. Not guaranteed.

Standard Steam, Gas and Water Pipe Measurements

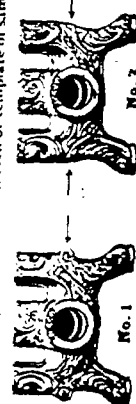
Nominal Diameter	Internal Diameter	External Diameter	Thickness	Nominal	Circumference	Transverse Area	Length of Pipe per Sq Ft of	Length of Pipe per Cu Ft of	Number of Threads and Plan of Ends	Weight per Foot	Number of Threads and Plan of Ends	Weight per Foot
10	10.750	10.875	.125	109	33.9	3.14	3.14	3.14	10	10.750	10.875	10.9
9	9.625	9.750	.125	99	31.0	2.89	2.89	2.89	9	9.625	9.750	9.7
8	8.625	8.750	.125	89	28.1	2.64	2.64	2.64	8	8.625	8.750	8.7
7	7.625	7.750	.125	79	25.1	2.39	2.39	2.39	7	7.625	7.750	7.7
6	6.625	6.750	.125	69	22.2	2.14	2.14	2.14	6	6.625	6.750	6.7
5	5.625	5.750	.125	59	19.2	1.89	1.89	1.89	5	5.625	5.750	5.7
4	4.625	4.750	.125	49	16.3	1.64	1.64	1.64	4	4.625	4.750	4.7
3	3.625	3.750	.125	39	13.3	1.39	1.39	1.39	3	3.625	3.750	3.7
2	2.625	2.750	.125	29	10.4	1.14	1.14	1.14	2	2.625	2.750	2.7
1	1.625	1.750	.125	19	7.4	.89	.89	.89	1	1.625	1.750	1.7
1/2	.875	.937	.062	10	3.7	.44	.44	.44	1/2	.875	.937	.9
3/4	1.125	1.187	.062	14	4.9	.59	.59	.59	3/4	1.125	1.187	1.2
1	1.375	1.437	.062	18	6.1	.74	.74	.74	1	1.375	1.437	1.4
1 1/4	1.625	1.687	.062	22	7.3	.89	.89	.89	1 1/4	1.625	1.687	1.7
1 1/2	1.875	1.937	.062	26	8.5	1.04	1.04	1.04	1 1/2	1.875	1.937	1.9
2	2.125	2.187	.062	30	9.7	1.19	1.19	1.19	2	2.125	2.187	2.2
2 1/2	2.375	2.437	.062	34	10.9	1.34	1.34	1.34	2 1/2	2.375	2.437	2.4
3	2.625	2.687	.062	38	12.1	1.49	1.49	1.49	3	2.625	2.687	2.7
3 1/2	2.875	2.937	.062	42	13.3	1.64	1.64	1.64	3 1/2	2.875	2.937	2.9
4	3.125	3.187	.062	46	14.5	1.79	1.79	1.79	4	3.125	3.187	3.2
4 1/2	3.375	3.437	.062	50	15.7	1.94	1.94	1.94	4 1/2	3.375	3.437	3.4
5	3.625	3.687	.062	54	16.9	2.09	2.09	2.09	5	3.625	3.687	3.7
5 1/2	3.875	3.937	.062	58	18.1	2.24	2.24	2.24	5 1/2	3.875	3.937	3.9
6	4.125	4.187	.062	62	19.3	2.39	2.39	2.39	6	4.125	4.187	4.2
6 1/2	4.375	4.437	.062	66	20.5	2.54	2.54	2.54	6 1/2	4.375	4.437	4.4
7	4.625	4.687	.062	70	21.7	2.69	2.69	2.69	7	4.625	4.687	4.7
7 1/2	4.875	4.937	.062	74	22.9	2.84	2.84	2.84	7 1/2	4.875	4.937	4.9
8	5.125	5.187	.062	78	24.1	2.99	2.99	2.99	8	5.125	5.187	5.2
8 1/2	5.375	5.437	.062	82	25.3	3.14	3.14	3.14	8 1/2	5.375	5.437	5.4
9	5.625	5.687	.062	86	26.5	3.29	3.29	3.29	9	5.625	5.687	5.7
9 1/2	5.875	5.937	.062	90	27.7	3.44	3.44	3.44	9 1/2	5.875	5.937	5.9
10	6.125	6.187	.062	94	28.9	3.59	3.59	3.59	10	6.125	6.187	6.2

Directions for Ordering Radiators

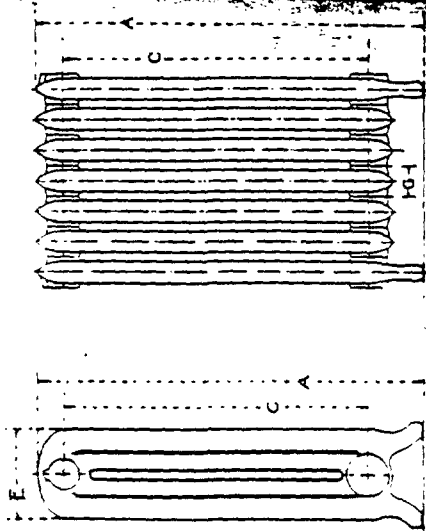
- 1 Give full name of Radiator.
- 2 With every order give full shipping instructions.
- 3 If you want Radiators for Steam or Water, and give heights.
- 4 If for Steam specify whether for one- or two-pipe work.
- 5 If for Water specify whether for one- or two-pipe work.
- 6 When ordering leg sections, advise whether for supply or return on one- or two-pipe system.
- 7 When ordering leg sections, it is desirable to give date of invoice covering Radiators for which the leg sections are wanted.
- 8 In ordering Radiators, keep as close as possible to regular goods; special lapping and shapes frequently cause delay.
- 9 For convenience in handling, customers should, as far as possible, avoid ordering Direct Radiators in larger than a 32-section stack. Radiators of 1,000-pounds weight or over are liable to be returned or broken in transportation and it is recommended that customer's order these large Radiators to be shipped in halves.
- 10 In ordering Curved or Corner Radiators, specify exact radius or angle of the bend at floor within which the Radiator is to be placed, and ship by sketch which end of Radiator is for supply connection, and which for return, as you face the inside of curve or angle.
- 11 For convenience in handling, Indirect Radiators will be shipped loose. Customers should, when ordering, be particular to specify the size of stack into which sections are to be shipped.
- 12 Correspondence regarding orders and shipments should be addressed to Branch with which order is placed, and not to Plant.

Guide for ordering Radiator repairs:

- 1 What style Radiator is required? (Give name of radiator, height, number of columns, Steam or Water, etc.)
- 2 Do you want Supply Leg, Return Leg, Center Leg, or Indirect Section? (If Steam Radiator required, advise whether Supply or Return Leg is for use on one- or two-pipe system.) (On right and left nipple Steam Radiation Supply Leg on two-pipe system has right-hand threads for nipple. Supply Leg on Radiation Supply Leg has left-hand threads for nipple. On Water Leg has right-hand threads for nipple.)
- 3 If section required has other than regular height Legs, state distance from center of opening, and state whether sections have right- or left-hand threads for nipple. If sections without feet are specified, state whether sections have right- or left-hand threads for nipple.
- 4 Advise if sections are connected with right-hand threaded nipples or right- and left-hand threaded nipples. (If right and left, state whether 60 or 90 degree threads required.)
- 5 Are sections connected with push nipple? If so, state number of rods used and location of same.
- 6 Advise if sections are furnished with 3 in. or 1 1/2-in. nipples. Advise whether sections have one or two steady blocks (spacing nipples) and whether or not rods are used at top of Radiator.
- 7 Advise if possible, Plant initials or number appearing on castings. See below for details.
- 8 If unable to answer questions, procure, if possible, Kodak picture of sections required or submit sketch or template of same.



Measurements of American Direct Radiators



A. Total height.
B. Distance from center of top to center of bottom opening.
C. Distance from center of top to center of bottom opening.
D. Width of sections.
E. Width at feet.
F. Distance from center to center of sections.
G. Distance from center to center of sections.
H. Width of column.

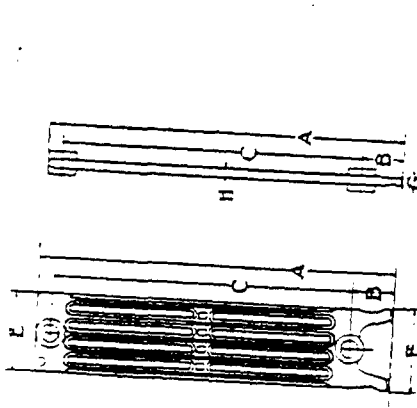
Distance from Floor to Center of Lower Tappings Measurements are in inches

Pattern	Water Supply and Return	Single Pipe Steam	Two-Pipe Steam	
			Supply	Return
Corto	4 1/2	4 1/2	4 1/2	4 1/2
Peerless 1 Column	4 1/2	4 1/2	4 1/2	4 1/2
Peerless 2 Column	4 1/2	4 1/2	4 1/2	4 1/2
Peerless 3 Column	4 1/2	4 1/2	4 1/2	4 1/2
Peerless 4 Column	4 1/2	4 1/2	4 1/2	4 1/2
Peerless Window	4 1/2	4 1/2	4 1/2	4 1/2
Peerless Plus	4 1/2	4 1/2	4 1/2	4 1/2
Peerless Plus Ventilating	4 1/2	4 1/2	4 1/2	4 1/2
Arco Window	4 1/2	4 1/2	4 1/2	4 1/2

Distance from bottom of hub to floor on center sections of radiators with regular height legs, is approximately 2 1/4 inches on 1 1/2 inch 4-column Peerless Radiators.
*Formerly Radiator.

Corto Radiator

For Steam and Water



A. Total height.
B. Distance from floor to center of tapping.
C. Distance from center of top to center of bottom opening.
D. Width of sections.
E. Width at feet.
F. Distance from center to center of sections.
G. Distance from center to center of sections.
H. Width of column.

Measurements and Tappings

Heating Surface Section	A	B	C	D	E	F	G	H
Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
4 1/2 ft.	37 1/2	4 1/2	11 1/2	8 1/2	8 1/2	8 1/2	2 1/2	1 1/2
4 ft.	34 1/2	4 1/2	10 1/2	8 1/2	8 1/2	8 1/2	2 1/2	1 1/2
3 1/2 ft.	30 1/2	4 1/2	10 1/2	8 1/2	8 1/2	8 1/2	2 1/2	1 1/2
3 ft.	26 1/2	4 1/2	10 1/2	8 1/2	8 1/2	8 1/2	2 1/2	1 1/2
2 1/2 ft.	24 1/2	4 1/2	10 1/2	8 1/2	8 1/2	8 1/2	2 1/2	1 1/2
2 ft.	19 1/2	4 1/2	10 1/2	8 1/2	8 1/2	8 1/2	2 1/2	1 1/2

Distance from bottom of hub to floor, on center sections of radiators is approximately 3 1/4 inches

Measurements of American Direct Radiators

Measurements are in inches. See outline, page 288

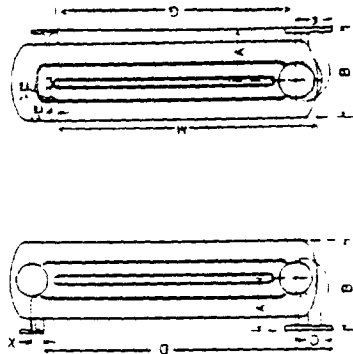
Pattern and Catalog Height	A	C	F	I	G	Heating Surface Sq. Ft.
Peerless Three Column	15 38 32 26 22 18	15 1/4 38 1/4 32 1/4 26 1/4 22 1/4 18 1/4	18 3/4 31 3/4 25 1/4 20 1/4 15 1/4 11 3/4	9 9 9 9 9 9	2 1/4 2 1/4 2 1/4 2 1/4 2 1/4 2 1/4	6 5 4 1/2 3 1/2 3 2 1/4
Peerless Four Column	15 38 32 26 22 18	15 1/4 38 1/4 32 1/4 26 1/4 22 1/4 18 1/4	18 3/4 31 3/4 25 1/4 20 1/4 15 1/4 11 3/4	10 1/2 10 1/2 10 1/2 10 1/2 10 1/2 10 1/2	3 3 3 3 3 3	10 8 6 1/2 5 4 3
Peerless Five Column	15 38 32 26 22 18	15 1/4 38 1/4 32 1/4 26 1/4 22 1/4 18 1/4	18 3/4 31 3/4 25 1/4 20 1/4 15 1/4 11 3/4	8 1/4 8 1/4 8 1/4 8 1/4 8 1/4 8 1/4	3 3 3 3 3 3	7 5 1/4 4 1/2 3 1/4 3 3
Peerless Flue Ventilating	39 1/2 33 1/2 27 1/2 21 1/2	39 1/2 33 1/2 27 1/2 21 1/2	39 1/2 33 1/2 27 1/2 21 1/2	8 1/4 8 1/4 8 1/4 8 1/4	3 3 3 3	7 5 1/4 4 1/2 3 1/4

Measurements of American Direct Radiators

Measurements are in inches. See outline, pages 288 to 289

Pattern and Catalog Height	A	C	F	I	G	Heating Surface Sq. Ft.
Curto Length 2 in per sec	38 34 1/2 31 27 1/2 23 1/2 19 1/2	31 1/4 28 1/4 24 1/4 20 1/4 16 1/4 12 1/4	8 8 8 8 8 8	8 1/4 8 1/4 8 1/4 8 1/4 8 1/4 8 1/4	2 2 2 2 2 2	1 1/4 4 3 1/2 2 1/2 2 2
Arco Window	28 24 20	22 1/4 18 1/4 14 1/4	8 1/4 8 1/4 8 1/4	8 1/4 8 1/4 8 1/4	2 1/4 2 1/4 2 1/4	4 1/2 4 3 1/2
Peerless Window (formerly Rococo)	20 18 16 14 12	15 1/4 13 1/4 11 1/4 9 1/4 7 1/4	12 1/4 12 1/4 12 1/4 12 1/4 12 1/4	12 1/4 12 1/4 12 1/4 12 1/4 12 1/4	3 3 3 3 3	5 4 1/2 3 1/2 3 3
Peerless One-column	38 32 26 20	31 1/4 25 1/4 19 1/4 13 1/4	4 1/4 4 1/4 4 1/4 4 1/4	5 1/4 5 1/4 5 1/4 5 1/4	2 1/4 2 1/4 2 1/4 2 1/4	3 2 1/2 2 1/2 2 1/2
Peerless Two-column	45 38 32 26 20 15	45 1/4 37 1/4 31 1/4 25 1/4 19 1/4 13 1/4	7 1/4 7 1/4 7 1/4 7 1/4 7 1/4 7 1/4	8 1/4 8 1/4 8 1/4 8 1/4 8 1/4 8 1/4	2 1/4 2 1/4 2 1/4 2 1/4 2 1/4 2 1/4	5 4 1/2 3 1/2 2 1/2 2 1/2 2 1/2

Measurements to show Position of Concealed Brackets

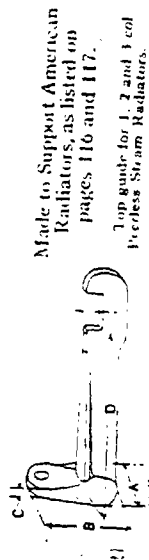


From left to right: Water Radiator, Steam Radiator, right and left threaded nipples.

Table to show Measurements in Inches in above Outline Drawings

Names of Radiators	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Peerless, 1 Col	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68
Peerless, 2 Col	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68
Peerless, 3 Col	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68
Peerless, 4 Col	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68
Peerless, 1 Col	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68
Peerless, 2 Col	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68
Peerless, 3 Col	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68
Peerless, 4 Col	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68

Measurements of Concealed Brackets



Made to Support American Radiators, as listed on pages 116 and 117.

Top guide for 1, 2 and 3 col Peerless Steam Radiators.

Top guide for 1, 2, 3 and 4 col Peerless Water Radiators.



Bottom support for 1, 2, 3 and 4 col Peerless Steam and Water Radiators. Also Centro Radiators.

Table to show measurements in inches in above Drawings.

STEAM RADIATORS	TOP GUIDE	BOTTOM SUPPORT
Single Column	A In. 2 1/4	B In. 2 1/4
Two Column	C In. 2 1/4	D In. 2 1/4
Three Column	E In. 2 1/4	F In. 2 1/4
Centro	G In. 2 1/4	H In. 2 1/4
WATER RADIATORS	I In. 2 1/4	J In. 2 1/4
Single Column	K In. 2 1/4	L In. 2 1/4
Two Column	M In. 2 1/4	N In. 2 1/4
Three Column	O In. 2 1/4	P In. 2 1/4
Four Column	Q In. 2 1/4	R In. 2 1/4
Centro	S In. 2 1/4	T In. 2 1/4
STEAM RADIATORS	U In. 2 1/4	V In. 2 1/4
Single Column	W In. 2 1/4	X In. 2 1/4
Two Column	Y In. 2 1/4	Z In. 2 1/4
Three Column	AA In. 2 1/4	AB In. 2 1/4

For application of Concealed Brackets see page 104

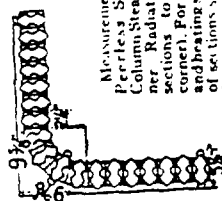
Corner Radiator Measurements

(For 45° Angle Radiators see page 297)

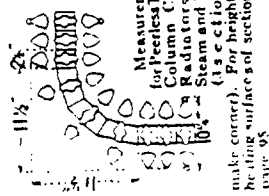
In ordering Corner Radiators give number of sections in corner and number of sections in each arm, also state which arm, *leading* into corner, has the supply leg.

In all heights of Curved and Corner Steam Radiators, owing to the difference in heights of supply and return end tapings from floor, we must know (by sketch) which end of Radiator is for supply and which for return, as you face the inside of angle or curve.

In estimating length of Radiators allow 1/4 inch for each bushing.



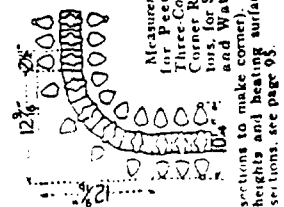
Measurements for Peerless Single Column Steam Radiators (4 sections to make corner). For heights and heating surfaces see page 91.



Measurements for Peerless Three Column Steam Radiators (4 sections to make corner). For heights and heating surfaces see page 95.



Measurements for Peerless Two Column Steam Radiators (4 sections to make corner). For heights and heating surfaces see page 91.



Measurements for Peerless Three Column Corner Radiators (4 sections to make corner). For heights and heating surfaces see page 95.

45° Angle Radiator Measurements

For Radiators as used in bay windows, etc.

In all types and heights in which 45° Angle Radiators are made (as shown below) there are two sections in the angle.



Measurements for Peerless Single Column Steam Angle Radiators. For heights and heating surfaces of sections, see page 93.



Measurements for Peerless Two Column Steam Angle Radiators. For heights and heating surfaces of sections, see page 93.



Measurements for Peerless Three Column Steam and Water Angle Radiators. For heights and heating surfaces, see page 95.



Measurements for Peerless (formerly Rococo) Window Radiators for Steam or Hot Water. For heights and heating surfaces of sections, see page 99.

Directions for Ordering Peerless Wall Radiators

(Formerly Roco Wall)

Where higher working pressures (steam or water) than 10 to 80 pounds are required, order must specifically state. In these cases wall radiators are furnished only with out-side hexagon nipples.

For convenience in handling and shipping, unless otherwise ordered, No. 5 A Radiators will be assembled in stacks not exceeding 6 sections; No. 7 A Radiators in stacks not exceeding 4 sections; No. 9 A Radiators in stacks not exceeding 3 sections; and Nos. 7 B and 9 B Radiators in stacks not exceeding 7 sections.

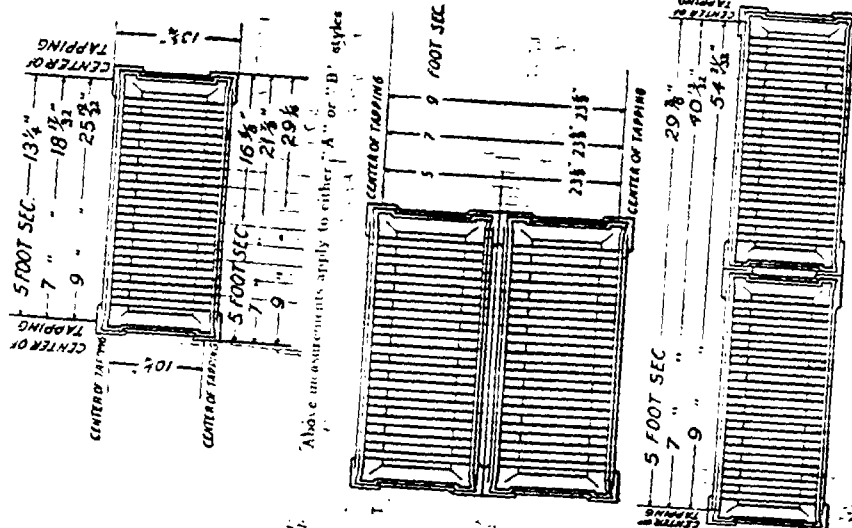
When fitter intends to erect a stack consisting of more sections than above mentioned, or when the sections or stacks are to be set in rows or series (as shown by illustrations on pages 301 to 306), we provide a right- and left-hand threaded nipple having hexagon nut at center, enabling the fitter to easily connect the stacks or rows on the job.

Peerless Wall Radiation is tapped 1 1/4 inch supply and return and bushed as desired. It is connected with 1 1/4 inch right- and left-hand threaded internal nipples. These nipples have two heavy inside lugs so that an ordinary piece of 1-inch round iron flattened at one end the length of nipple, can be inserted to any desired point in the Radiator, and by applying an ordinary wrench to bar, the nipple can be screwed or unscrewed and one or more sections may be added or taken out independently of all the others in the stack. We can furnish these bars (Dow Radiator Wrenches) in 1-foot lengths. (See page 136)

Orders should refer to figure number showing assembly (see pages 301 to 306.) The figures shown on the pages illustrate the common ways of assembling comparatively small units, but wall radiators can be assembled in any number of sections, either longer or higher, than shown in the figures. It is our practice, however, when greater number of sections of a given figure than each shown in the figure, are specified, to always build onto length, maintaining the height as shown in the figure. It is a safe way in ordering is always to send sketch unless you are ordering exactly the number of sections as shown in figure.

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Wall Radiator Measurements



Above measurements apply to either "A" or "B" styles

Note: The tapping of American Wall Radiators as shown on the following pages, are indicated by Nos. 2, 3, 4, 5, 6, 7, 8, and 9. Nos. 20, 30, 40, 50, 60, 80 and 90 indicate special tappings which can be furnished if desired, and for which an extra charge will be made. Tappings are 1 1/2 inches, supply and return, and bushed as required. Add 1 1/4 inches to length measurement for each hexagonal nipple used in assembling. See also "Directions for Ordering" page 298. For heating surfaces in length of space occupied, see page 308.

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Peerless Wall Radiator Figures

(formerly "Rococo")

Key to Figure Numbering.—The first number in each of the following Figure Numbers indicates the size of section, thus, Fig. 517 indicates a 3 foot section arranged in the manner as shown in the sketch above the number; Fig. 717 refers to 7 foot sections and to the same assemblage, and Fig. 917 refers to 9 foot sections and to the same assemblage.

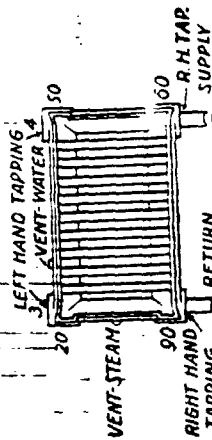


Figure 51, 71, or 91
Water and One- and Two-Pipe Steam

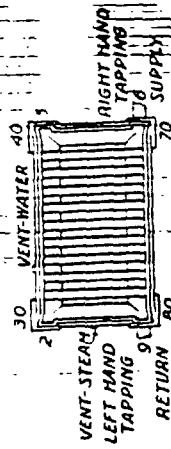


Figure 57, 77, or 97
Water and One- and Two-Pipe Steam

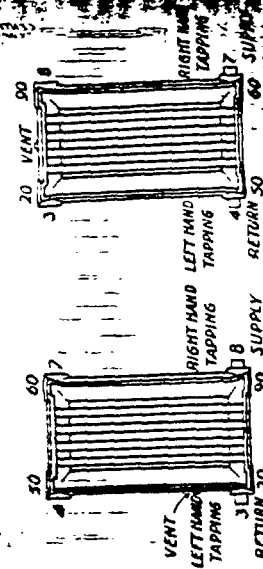


Figure 74 or 94
One- and Two-Pipe Steam

Figure 78 or 98
Water

Wall Radiators—Continued

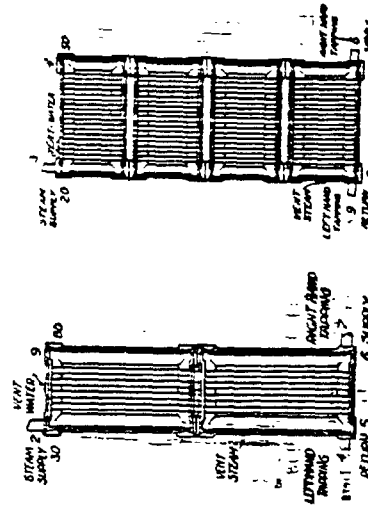


Fig. 713 or 913
Two Sections in Two Tiers—Water and Two-Pipe Steam



Figure 717 or 917
Assembled Four Sections in Single Tier—Water

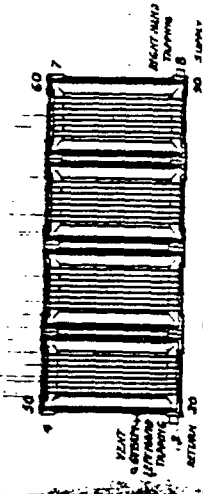


Figure 718 or 918
Assembled Four Sections in Single Tier—1- and 2-Pipe Steam

See note on Tappings, page 209. Also see page 208.

Wall Radiators Continued

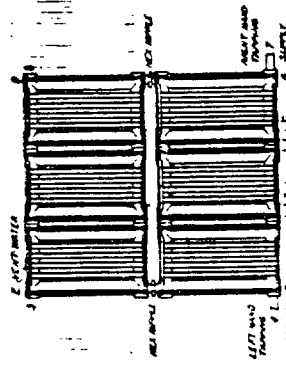


Figure 715 of 925
Assembled Six Sections in Two Tiers—Water

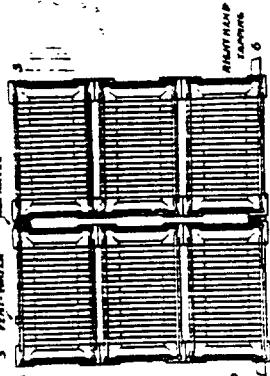


Figure 527, 727, or 927
Assembled Six Sections in Three Tiers—Water

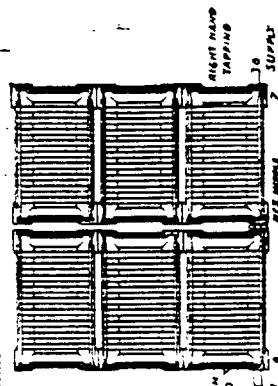


Figure 528, 728, or 928
Assembled Six Sections in Three Tiers—One- and Two-Pipe Steam
See note on Tappings, page 309. Also see page 308.

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Wall Radiators Continued

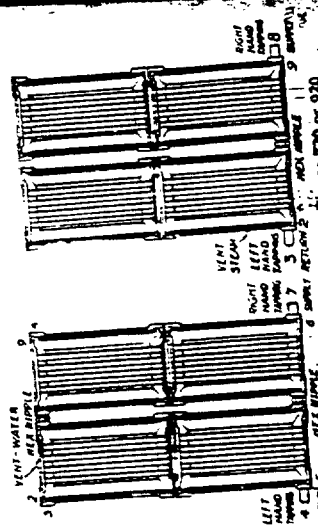


Figure 719 or 919
Assembled Four Sections in Two Tiers—Water

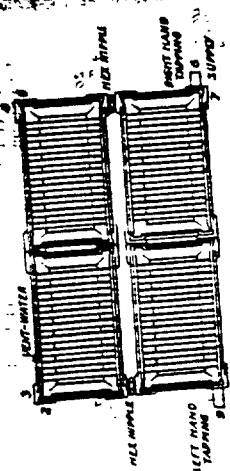


Figure 521, 721, or 921
Assembled Four Sections in Two Tiers—Water

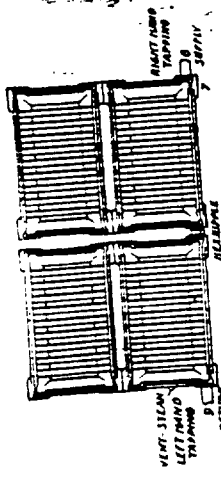


Figure 522, 722, or 922
Assembled Four Sections in Two Tiers—One- and Two-Pipe Steam
See note on Tappings, page 309. Also see page 308.

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Wall Radiators-----Continued



Figure 511, 711, or 911. Assembled Three Sections in Single Tier--Water and One- and Two-Pipe Steam.

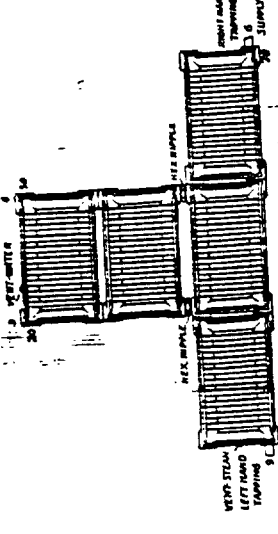


Figure 523, 723, or 923. Assembled Three and Two Sections with Three Tiers in Center--Water and One- and Two-Pipe Steam.

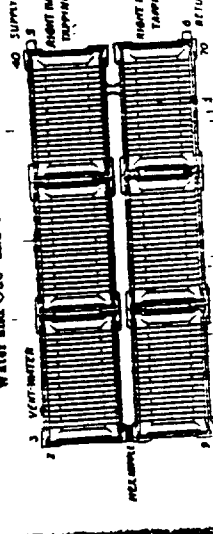


Figure 531, 731, or 931. Assembled Six Sections in Two Tiers--Water.

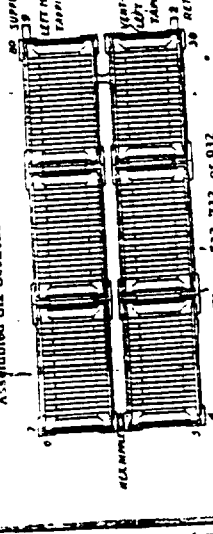


Figure 532, 732, or 932. Assembled Six Sections in Two Tiers--Two-Pipe Steam. See note on Tappings, page 299. Also see page 308.

Wall Radiators-----Continued

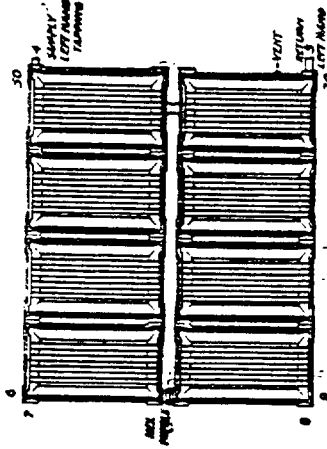


Figure 740 or 940. Assembled in Eight Sections in Two Tiers--For Two-Pipe Steam Using Spacing Saddle.

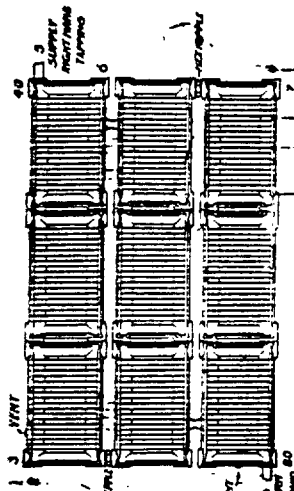


Figure 541, 741, or 941. Assembled Nine Sections in Three Tiers--Using Spacing Saddle. See note on Tappings, page 299. Also see page 308.

Wall Radiators—Continued

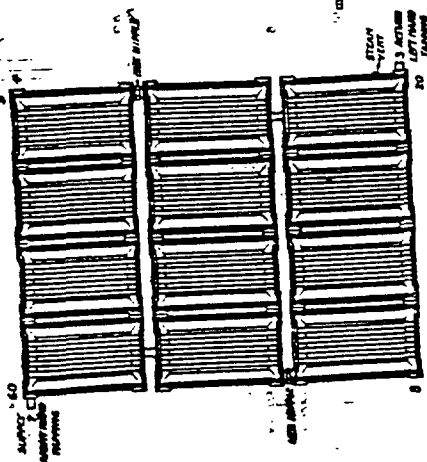
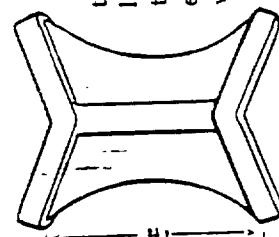


Figure 742 or 942
Assembled in Twelve Sections in Three Tiers.
(see below)

See note on Tappings, page 299. Also see page 308.

Wall Radiator Spacing Saddle



Furnished between sections in assemblages of Peerless Wall Radiators, similar to figure above. Saves extra brackets. Furnished without charge.

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Data on Wall Radiation! Efficiency Comparison of American Wall Radiators and Pipe Coils

Six comparative tests at our Institute of Thermal Research under exactly the same conditions—same steam pressure (2 lbs. at boiler), same room, same time, both surfaces 4 inches from wall, showed following co-efficients:

Pipeless Wall	Pipe Coil
2 115	2 104
2 184	2 193
2 255	2 220
1 983	1 855
2 026	2 132
2 165	2 258
Average 2 121	Average 2 127

Space Saving of Wall Radiators vs. Pipe Coils

AMERICAN Wall Radiators save one-third to one-half the space occupied by pipe coils—an important economy for commercial and manufacturing buildings, as shown in following table of heating surface that can be installed in wall space 100 feet long.

	Pipe 1" f. inch	Wall Radi- ator	Number of Sections	Percent of space saving by Wall Radiators
1 Coil 6 pipe high 1 1/2"	260 4'	360'	40-9A	38%
1 Coil 7 pipe high 1 1/2"	303 8'	360'	40-9A	18%
1 Coil 8 pipe high 1 1/2"	347 2'	630'	90-7B	81%
1 Coil 9 pipe high 1 1/2"	390 6'	630'	90-7B	61%

For Heating Liquids in Tanks

AMERICAN Wall Radiators can be used advantageously in hot water storage tanks, in place of the ordinary wrought-iron or copper coils, insuring an ample supply of hot water for a very small initial cost. They also save a tremendous quantity of water used through various temperature controls from 45° to 145° with steam at 2 lbs. pressure, or with water at a mean temperature of 135° F.

Temperature rise in Degrees Fahr.	60	80	100	120	
Peerless No. 7-A Wall Radiators	Gals. of water per hour				
1 Section, Steam to Water	330	230	170	130	
2 Sections, Steam to Water	660	460	340	260	
1 Section, Water to Water	70	45			
2 Sections, Water to Water	140	90			

*Co-efficient is the quantity of British thermal units which one square foot of radiation gives off per hour for each degree of difference between the temperature of the steam in the radiator and the temperature of the air in the room where the radiator stands.

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Peerless Wall Radiators

(Formerly "Rococo")

No. of Sect.	Type	Length of Space Occupied		Heating Surface, Square Feet	
		Type 1-A	Type 1-B, 9-H	Type 1	Type 2
1		1-10 1/2	1-10 1/2	1-10 1/2	1-10 1/2
2		2-10 1/2	2-10 1/2	2-10 1/2	2-10 1/2
3		3-10 1/2	3-10 1/2	3-10 1/2	3-10 1/2
4		4-10 1/2	4-10 1/2	4-10 1/2	4-10 1/2
5		5-10 1/2	5-10 1/2	5-10 1/2	5-10 1/2
6		6-10 1/2	6-10 1/2	6-10 1/2	6-10 1/2
7		7-10 1/2	7-10 1/2	7-10 1/2	7-10 1/2
8		8-10 1/2	8-10 1/2	8-10 1/2	8-10 1/2
9		9-10 1/2	9-10 1/2	9-10 1/2	9-10 1/2
10		10-10 1/2	10-10 1/2	10-10 1/2	10-10 1/2
11		11-10 1/2	11-10 1/2	11-10 1/2	11-10 1/2
12		12-10 1/2	12-10 1/2	12-10 1/2	12-10 1/2
13		13-10 1/2	13-10 1/2	13-10 1/2	13-10 1/2
14		14-10 1/2	14-10 1/2	14-10 1/2	14-10 1/2
15		15-10 1/2	15-10 1/2	15-10 1/2	15-10 1/2
16		16-10 1/2	16-10 1/2	16-10 1/2	16-10 1/2
17		17-10 1/2	17-10 1/2	17-10 1/2	17-10 1/2
18		18-10 1/2	18-10 1/2	18-10 1/2	18-10 1/2
19		19-10 1/2	19-10 1/2	19-10 1/2	19-10 1/2
20		20-10 1/2	20-10 1/2	20-10 1/2	20-10 1/2
21		21-10 1/2	21-10 1/2	21-10 1/2	21-10 1/2
22		22-10 1/2	22-10 1/2	22-10 1/2	22-10 1/2
23		23-10 1/2	23-10 1/2	23-10 1/2	23-10 1/2
24		24-10 1/2	24-10 1/2	24-10 1/2	24-10 1/2
25		25-10 1/2	25-10 1/2	25-10 1/2	25-10 1/2
26		26-10 1/2	26-10 1/2	26-10 1/2	26-10 1/2
27		27-10 1/2	27-10 1/2	27-10 1/2	27-10 1/2
28		28-10 1/2	28-10 1/2	28-10 1/2	28-10 1/2
29		29-10 1/2	29-10 1/2	29-10 1/2	29-10 1/2
30		30-10 1/2	30-10 1/2	30-10 1/2	30-10 1/2
31		31-10 1/2	31-10 1/2	31-10 1/2	31-10 1/2
32		32-10 1/2	32-10 1/2	32-10 1/2	32-10 1/2
33		33-10 1/2	33-10 1/2	33-10 1/2	33-10 1/2
34		34-10 1/2	34-10 1/2	34-10 1/2	34-10 1/2
35		35-10 1/2	35-10 1/2	35-10 1/2	35-10 1/2
36		36-10 1/2	36-10 1/2	36-10 1/2	36-10 1/2
37		37-10 1/2	37-10 1/2	37-10 1/2	37-10 1/2
38		38-10 1/2	38-10 1/2	38-10 1/2	38-10 1/2
39		39-10 1/2	39-10 1/2	39-10 1/2	39-10 1/2
40		40-10 1/2	40-10 1/2	40-10 1/2	40-10 1/2
41		41-10 1/2	41-10 1/2	41-10 1/2	41-10 1/2
42		42-10 1/2	42-10 1/2	42-10 1/2	42-10 1/2
43		43-10 1/2	43-10 1/2	43-10 1/2	43-10 1/2
44		44-10 1/2	44-10 1/2	44-10 1/2	44-10 1/2
45		45-10 1/2	45-10 1/2	45-10 1/2	45-10 1/2
46		46-10 1/2	46-10 1/2	46-10 1/2	46-10 1/2
47		47-10 1/2	47-10 1/2	47-10 1/2	47-10 1/2
48		48-10 1/2	48-10 1/2	48-10 1/2	48-10 1/2
49		49-10 1/2	49-10 1/2	49-10 1/2	49-10 1/2
50		50-10 1/2	50-10 1/2	50-10 1/2	50-10 1/2

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Indirect Radiator Heating Free Area Between Indirect Sections

Name of Section	Spaced in Centers, Inches	Net Air Space of Free Area per Section, Sq. Inches
Perfection Pin, 10 or 15 ft.	22 1/2	38.3
Perfection Pin, 10 or 15 ft.	27 1/2	32.4
Excelsior, Standard Size	32 1/2	42.6
Excelsior, Standard Size	37 1/2	51.2
Sanitary Pin	42 1/2	64.8
Sanitary Pin	47 1/2	71.1
Sanitary Pin	52 1/2	83.1
Sanitary Pin	57 1/2	94.1
Sanitary Pin	62 1/2	104.1
Sanitary Pin	67 1/2	114.1
Sanitary Pin	72 1/2	124.1
Sanitary Pin	77 1/2	134.1
Sanitary Pin	82 1/2	144.1
Sanitary Pin	87 1/2	154.1
Sanitary Pin	92 1/2	164.1
Sanitary Pin	97 1/2	174.1
Sanitary Pin	102 1/2	184.1
Sanitary Pin	107 1/2	194.1
Sanitary Pin	112 1/2	204.1
Sanitary Pin	117 1/2	214.1
Sanitary Pin	122 1/2	224.1
Sanitary Pin	127 1/2	234.1
Sanitary Pin	132 1/2	244.1
Sanitary Pin	137 1/2	254.1
Sanitary Pin	142 1/2	264.1
Sanitary Pin	147 1/2	274.1
Sanitary Pin	152 1/2	284.1
Sanitary Pin	157 1/2	294.1
Sanitary Pin	162 1/2	304.1
Sanitary Pin	167 1/2	314.1
Sanitary Pin	172 1/2	324.1
Sanitary Pin	177 1/2	334.1
Sanitary Pin	182 1/2	344.1
Sanitary Pin	187 1/2	354.1
Sanitary Pin	192 1/2	364.1
Sanitary Pin	197 1/2	374.1
Sanitary Pin	202 1/2	384.1
Sanitary Pin	207 1/2	394.1
Sanitary Pin	212 1/2	404.1
Sanitary Pin	217 1/2	414.1
Sanitary Pin	222 1/2	424.1
Sanitary Pin	227 1/2	434.1
Sanitary Pin	232 1/2	444.1
Sanitary Pin	237 1/2	454.1
Sanitary Pin	242 1/2	464.1
Sanitary Pin	247 1/2	474.1
Sanitary Pin	252 1/2	484.1
Sanitary Pin	257 1/2	494.1
Sanitary Pin	262 1/2	504.1
Sanitary Pin	267 1/2	514.1
Sanitary Pin	272 1/2	524.1
Sanitary Pin	277 1/2	534.1
Sanitary Pin	282 1/2	544.1
Sanitary Pin	287 1/2	554.1
Sanitary Pin	292 1/2	564.1
Sanitary Pin	297 1/2	574.1
Sanitary Pin	302 1/2	584.1
Sanitary Pin	307 1/2	594.1
Sanitary Pin	312 1/2	604.1
Sanitary Pin	317 1/2	614.1
Sanitary Pin	322 1/2	624.1
Sanitary Pin	327 1/2	634.1
Sanitary Pin	332 1/2	644.1
Sanitary Pin	337 1/2	654.1
Sanitary Pin	342 1/2	664.1
Sanitary Pin	347 1/2	674.1
Sanitary Pin	352 1/2	684.1
Sanitary Pin	357 1/2	694.1
Sanitary Pin	362 1/2	704.1
Sanitary Pin	367 1/2	714.1
Sanitary Pin	372 1/2	724.1
Sanitary Pin	377 1/2	734.1
Sanitary Pin	382 1/2	744.1
Sanitary Pin	387 1/2	754.1
Sanitary Pin	392 1/2	764.1
Sanitary Pin	397 1/2	774.1
Sanitary Pin	402 1/2	784.1
Sanitary Pin	407 1/2	794.1
Sanitary Pin	412 1/2	804.1
Sanitary Pin	417 1/2	814.1
Sanitary Pin	422 1/2	824.1
Sanitary Pin	427 1/2	834.1
Sanitary Pin	432 1/2	844.1
Sanitary Pin	437 1/2	854.1
Sanitary Pin	442 1/2	864.1
Sanitary Pin	447 1/2	874.1
Sanitary Pin	452 1/2	884.1
Sanitary Pin	457 1/2	894.1
Sanitary Pin	462 1/2	904.1
Sanitary Pin	467 1/2	914.1
Sanitary Pin	472 1/2	924.1
Sanitary Pin	477 1/2	934.1
Sanitary Pin	482 1/2	944.1
Sanitary Pin	487 1/2	954.1
Sanitary Pin	492 1/2	964.1
Sanitary Pin	497 1/2	974.1
Sanitary Pin	502 1/2	984.1
Sanitary Pin	507 1/2	994.1
Sanitary Pin	512 1/2	1004.1
Sanitary Pin	517 1/2	1014.1
Sanitary Pin	522 1/2	1024.1
Sanitary Pin	527 1/2	1034.1
Sanitary Pin	532 1/2	1044.1
Sanitary Pin	537 1/2	1054.1
Sanitary Pin	542 1/2	1064.1
Sanitary Pin	547 1/2	1074.1
Sanitary Pin	552 1/2	1084.1
Sanitary Pin	557 1/2	1094.1
Sanitary Pin	562 1/2	1104.1
Sanitary Pin	567 1/2	1114.1
Sanitary Pin	572 1/2	1124.1
Sanitary Pin	577 1/2	1134.1
Sanitary Pin	582 1/2	1144.1
Sanitary Pin	587 1/2	1154.1
Sanitary Pin	592 1/2	1164.1
Sanitary Pin	597 1/2	1174.1
Sanitary Pin	602 1/2	1184.1
Sanitary Pin	607 1/2	1194.1
Sanitary Pin	612 1/2	1204.1
Sanitary Pin	617 1/2	1214.1
Sanitary Pin	622 1/2	1224.1
Sanitary Pin	627 1/2	1234.1
Sanitary Pin	632 1/2	1244.1
Sanitary Pin	637 1/2	1254.1
Sanitary Pin	642 1/2	1264.1
Sanitary Pin	647 1/2	1274.1
Sanitary Pin	652 1/2	1284.1
Sanitary Pin	657 1/2	1294.1
Sanitary Pin	662 1/2	1304.1
Sanitary Pin	667 1/2	1314.1
Sanitary Pin	672 1/2	1324.1
Sanitary Pin	677 1/2	1334.1
Sanitary Pin	682 1/2	1344.1
Sanitary Pin	687 1/2	1354.1
Sanitary Pin	692 1/2	1364.1
Sanitary Pin	697 1/2	1374.1
Sanitary Pin	702 1/2	1384.1
Sanitary Pin	707 1/2	1394.1
Sanitary Pin	712 1/2	1404.1
Sanitary Pin	717 1/2	1414.1
Sanitary Pin	722 1/2	1424.1
Sanitary Pin	727 1/2	1434.1
Sanitary Pin	732 1/2	1444.1
Sanitary Pin	737 1/2	1454.1
Sanitary Pin	742 1/2	1464.1
Sanitary Pin	747 1/2	1474.1
Sanitary Pin	752 1/2	1484.1
Sanitary Pin	757 1/2	1494.1
Sanitary Pin	762 1/2	1504.1
Sanitary Pin	767 1/2	1514.1
Sanitary Pin	772 1/2	1524.1
Sanitary Pin	777 1/2	1534.1
Sanitary Pin	782 1/2	1544.1
Sanitary Pin	787 1/2	1554.1
Sanitary Pin	792 1/2	1564.1
Sanitary Pin	797 1/2	1574.1
Sanitary Pin	802 1/2	1584.1
Sanitary Pin	807 1/2	1594.1
Sanitary Pin	812 1/2	1604.1
Sanitary Pin	817 1/2	1614.1
Sanitary Pin	822 1/2	1624.1
Sanitary Pin	827 1/2	1634.1
Sanitary Pin	832 1/2	1644.1
Sanitary Pin	837 1/2	1654.1
Sanitary Pin	842 1/2	1664.1
Sanitary Pin	847 1/2	1674.1
Sanitary Pin	852 1/2	1684.1
Sanitary Pin	857 1/2	1694.1
Sanitary Pin	862 1/2	1704.1
Sanitary Pin	867 1/2	1714.1
Sanitary Pin	872 1/2	1724.1
Sanitary Pin	877 1/2	1734.1
Sanitary Pin	882 1/2	1744.1
Sanitary Pin	887 1/2	1754.1
Sanitary Pin	892 1/2	1764.1
Sanitary Pin	897 1/2	1774.1
Sanitary Pin	902 1/2	1784.1
Sanitary Pin	907 1/2	1794.1
Sanitary Pin	912 1/2	1804.1
Sanitary Pin	917 1/2	1814.1
Sanitary Pin	922 1/2	1824.1
Sanitary Pin	927 1/2	1834.1
Sanitary Pin	932 1/2	1844.1
Sanitary Pin	937 1/2	1854.1
Sanitary Pin	942 1/2	1864.1
Sanitary Pin	947 1/2	1874.1
Sanitary Pin	952 1/2	1884.1
Sanitary Pin	957 1/2	1894.1
Sanitary Pin	962 1/2	1904.1
Sanitary Pin	967 1/2	1914.1
Sanitary Pin	972 1/2	1924.1
Sanitary Pin	977 1/2	1934.1
Sanitary Pin	982 1/2	1944.1
Sanitary Pin	987 1/2	1954.1
Sanitary Pin	992 1/2	1964.1
Sanitary Pin	997 1/2	1974.1
Sanitary Pin	1002 1/2	1984.1
Sanitary Pin	1007 1/2	1994.1
Sanitary Pin	1012 1/2	2004.1
Sanitary Pin	1017 1/2	2014.1
Sanitary Pin	1022 1/2	2024.1
Sanitary Pin	1027 1/2	2034.1
Sanitary Pin	1032 1/2	2044.1
Sanitary Pin	1037 1/2	2054.1
Sanitary Pin	1042 1/2	2064.1
Sanitary Pin	1047 1/2	2074.1
Sanitary Pin	1052 1/2	2084.1
Sanitary Pin	1057 1/2	2094.1
Sanitary Pin	1062 1/2	2104.1
Sanitary Pin	1067 1/2	2114.1
Sanitary Pin	1072 1/2	2124.1
Sanitary Pin	1077 1/2	2134.1
Sanitary Pin	1082 1/2	2144.1
Sanitary Pin	1087 1/2	2154.1
Sanitary Pin	1092 1/2	2164.1
Sanitary Pin	1097 1/2	2174.1
Sanitary Pin	1102 1/2	2184.1
Sanitary Pin	1107 1/2	2194.1
Sanitary Pin	1112 1/2	2204.1
Sanitary Pin	1117 1/2	2214.1
Sanitary Pin	1122 1/2	2224.1
Sanitary Pin	1127 1/2	2234.1
Sanitary Pin	1132 1/2	2244.1
Sanitary Pin	1137 1/2	2254.1
Sanitary Pin	1142 1/2	2264.1
Sanitary Pin	1147 1/2	2274.1
Sanitary Pin	1152 1/2	2284.1

Indirect Radiator Heating

Directions for Setting Excelsior Indirect Steam Radiators

Hangers made of $\frac{1}{2}$ -inch or $\frac{5}{8}$ -inch round iron having coach screw threads at one end and an eye or ring turned at the other end large enough to receive 1-inch or $\frac{1}{2}$ -inch iron pipe, may be easily screwed to the joists or timbers overhead. These hangers are usually placed one at each side of the four corners about 6 inches from the end and opposite each other, so that the horizontal pipe support may pass through the rings or eyes. The hanger supporting the return end of the stack should be slightly lower ($\frac{1}{4}$ to $\frac{1}{2}$ -inch) than the others, so that the water of condensation may have a positive flow toward the return connection. The distance from the top of the stack to the ceiling should be from 10 to 12 inches, and the air space below the stack to the bottom of the casing, from 6 to 8 inches. The ceiling over the stack is usually covered with galvanized iron or tin.

Data for Excelsior Indirect Steam Radiators

Heat Sg Ft	Cold Air Sg Ft	Diap. Inches	Dist. Inches	Hot Air Sg Ft	Size for Work Inches	Size of Regis- ter Inches	Ratio of 1 to 35	Ratio of 1 to 30	Cu Ft	Cu Ft	Ratio of 1 to 35	Ratio of 1 to 30
24	16	6	8	48	4x12	8x8	720	840	90	840	90	90
36	24	8	12	72	6x12	9x12	1080	1260	1440	1440	1440	1440
48	32	10	16	96	8x12	10x14	1440	1680	1920	1920	1920	1920
60	40	12	20	120	10x12	12x15	1800	2100	2400	2400	2400	2400
72	48	14	24	144	12x12	14x16	2160	2520	2880	2880	2880	2880
84	56	16	28	168	14x12	16x18	2520	2940	3360	3360	3360	3360
96	64	18	32	192	16x12	18x20	2880	3360	3840	3840	3840	3840
108	72	20	36	216	18x12	20x24	3240	3780	4320	4320	4320	4320
120	80	22	40	240	20x12	22x24	3600	4200	4800	4800	4800	4800
132	88	24	44	264	22x12	24x24	3960	4620	5280	5280	5280	5280
144	96	26	48	288	24x12	26x24	4320	5040	5760	5760	5760	5760

For additional measurements and data see pages 309, 310.

Indirect Radiator Heating

Free Area Through Registers

For Calculating Air Passage in Indirect or Hot-Blast Heating

Register Opening Inches	Free Area in Square Feet	Register Opening Inches	Free Area in Square Feet
8 x 8	0.10	18 x 24	2.00
8 x 10	0.17	18 x 27	2.25
8 x 12	0.24	18 x 30	2.50
9 x 12	0.30	18 x 36	3.00
10 x 10	0.40	20 x 20	1.85
10 x 12	0.50	20 x 22	2.01
10 x 14	0.65	20 x 24	2.22
10 x 16	0.74	20 x 26	2.27
10 x 18	0.83	20 x 28	2.41
10 x 20	0.91	20 x 30	2.59
10 x 22	1.02	20 x 32	2.72
10 x 24	1.11	20 x 34	2.86
10 x 26	1.20	20 x 36	2.96
10 x 28	1.28	20 x 38	3.13
10 x 30	1.37	20 x 40	3.33
12 x 12	1.33	24 x 24	3.00
12 x 14	1.50	24 x 27	3.37
12 x 16	1.67	24 x 30	3.75
12 x 18	1.83	24 x 32	4.00
12 x 20	2.00	24 x 34	4.33
12 x 22	2.17	24 x 36	4.67
12 x 24	2.33	24 x 38	5.00
12 x 26	2.50	24 x 40	5.33
12 x 28	2.67	24 x 42	5.67
12 x 30	2.83	24 x 44	6.00
12 x 32	3.00	24 x 46	6.33
12 x 34	3.17	24 x 48	6.67
12 x 36	3.33	24 x 50	7.00
12 x 38	3.50	24 x 52	7.33
12 x 40	3.67	24 x 54	7.67
12 x 42	3.83	24 x 56	8.00
12 x 44	4.00	24 x 58	8.33
12 x 46	4.17	24 x 60	8.67
12 x 48	4.33	24 x 62	9.00
12 x 50	4.50	24 x 64	9.33
12 x 52	4.67	24 x 66	9.67
12 x 54	4.83	24 x 68	10.00
12 x 56	5.00	24 x 70	10.33
12 x 58	5.17	24 x 72	10.67
12 x 60	5.33	24 x 74	11.00
12 x 62	5.50	24 x 76	11.33
12 x 64	5.67	24 x 78	11.67
12 x 66	5.83	24 x 80	12.00
12 x 68	6.00	24 x 82	12.33
12 x 70	6.17	24 x 84	12.67
12 x 72	6.33	24 x 86	13.00
12 x 74	6.50	24 x 88	13.33
12 x 76	6.67	24 x 90	13.67
12 x 78	6.83	24 x 92	14.00
12 x 80	7.00	24 x 94	14.33
12 x 82	7.17	24 x 96	14.67
12 x 84	7.33	24 x 98	15.00
12 x 86	7.50	24 x 100	15.33
12 x 88	7.67	24 x 102	15.67
12 x 90	7.83	24 x 104	16.00
12 x 92	8.00	24 x 106	16.33
12 x 94	8.17	24 x 108	16.67
12 x 96	8.33	24 x 110	17.00
12 x 98	8.50	24 x 112	17.33
12 x 100	8.67	24 x 114	17.67
12 x 102	8.83	24 x 116	18.00
12 x 104	9.00	24 x 118	18.33
12 x 106	9.17	24 x 120	18.67
12 x 108	9.33	24 x 122	19.00
12 x 110	9.50	24 x 124	19.33
12 x 112	9.67	24 x 126	19.67
12 x 114	9.83	24 x 128	20.00
12 x 116	10.00	24 x 130	20.33
12 x 118	10.17	24 x 132	20.67
12 x 120	10.33	24 x 134	21.00
12 x 122	10.50	24 x 136	21.33
12 x 124	10.67	24 x 138	21.67
12 x 126	10.83	24 x 140	22.00
12 x 128	11.00	24 x 142	22.33
12 x 130	11.17	24 x 144	22.67
12 x 132	11.33	24 x 146	23.00
12 x 134	11.50	24 x 148	23.33
12 x 136	11.67	24 x 150	23.67
12 x 138	11.83	24 x 152	24.00
12 x 140	12.00	24 x 154	24.33
12 x 142	12.17	24 x 156	24.67
12 x 144	12.33	24 x 158	25.00
12 x 146	12.50	24 x 160	25.33
12 x 148	12.67	24 x 162	25.67
12 x 150	12.83	24 x 164	26.00
12 x 152	13.00	24 x 166	26.33
12 x 154	13.17	24 x 168	26.67
12 x 156	13.33	24 x 170	27.00
12 x 158	13.50	24 x 172	27.33
12 x 160	13.67	24 x 174	27.67
12 x 162	13.83	24 x 176	28.00
12 x 164	14.00	24 x 178	28.33
12 x 166	14.17	24 x 180	28.67
12 x 168	14.33	24 x 182	29.00
12 x 170	14.50	24 x 184	29.33
12 x 172	14.67	24 x 186	29.67
12 x 174	14.83	24 x 188	30.00
12 x 176	15.00	24 x 190	30.33
12 x 178	15.17	24 x 192	30.67
12 x 180	15.33	24 x 194	31.00
12 x 182	15.50	24 x 196	31.33
12 x 184	15.67	24 x 198	31.67
12 x 186	15.83	24 x 200	32.00
12 x 188	16.00	24 x 202	32.33
12 x 190	16.17	24 x 204	32.67
12 x 192	16.33	24 x 206	33.00
12 x 194	16.50	24 x 208	33.33
12 x 196	16.67	24 x 210	33.67
12 x 198	16.83	24 x 212	34.00
12 x 200	17.00	24 x 214	34.33
12 x 202	17.17	24 x 216	34.67
12 x 204	17.33	24 x 218	35.00
12 x 206	17.50	24 x 220	35.33
12 x 208	17.67	24 x 222	35.67
12 x 210	17.83	24 x 224	36.00
12 x 212	18.00	24 x 226	36.33
12 x 214	18.17	24 x 228	36.67
12 x 216	18.33	24 x 230	37.00
12 x 218	18.50	24 x 232	37.33
12 x 220	18.67	24 x 234	37.67
12 x 222	18.83	24 x 236	38.00
12 x 224	19.00	24 x 238	38.33
12 x 226	19.17	24 x 240	38.67
12 x 228	19.33	24 x 242	39.00
12 x 230	19.50	24 x 244	39.33
12 x 232	19.67	24 x 246	39.67
12 x 234	19.83	24 x 248	40.00
12 x 236	20.00	24 x 250	40.33
12 x 238	20.17	24 x 252	40.67
12 x 240	20.33	24 x 254	41.00
12 x 242	20.50	24 x 256	41.33
12 x 244	20.67	24 x 258	41.67
12 x 246	20.83	24 x 260	42.00
12 x 248	21.00	24 x 262	42.33
12 x 250	21.17	24 x 264	42.67
12 x 252	21.33	24 x 266	43.00
12 x 254	21.50	24 x 268	43.33
12 x 256	21.67	24 x 270	43.67
12 x 258	21.83	24 x 272	44.00
12 x 260	22.00	24 x 274	44.33
12 x 262	22.17	24 x 276	44.67
12 x 264	22.33	24 x 278	45.00
12 x 266	22.50	24 x 280	45.33
12 x 268	22.67	24 x 282	45.67
12 x 270	22.83	24 x 284	46.00
12 x 272	23.00	24 x 286	46.33
12 x 274	23.17	24 x 288	46.67
12 x 276	23.33	24 x 290	47.00
12 x 278	23.50	24 x 292	47.33
12 x 280	23.67	24 x 294	47.67
12 x 282	23.83	24 x 296	48.00
12 x 284	24.00	24 x 298	48.33
12 x 286	24.17	24 x 300	48.67
12 x 288	24.33	24 x 302	49.00
12 x 290	24.50	24 x 304	49.33
12 x 292	24.67	24 x 306	49.67
12 x 294	24.83	24 x 308	50.00
12 x 296	25.00	24 x 310	50.33
12 x 298	25.17	24 x 312	50.67
12 x 300	25.33	24 x 314	51.00
12 x 302	25.50	24 x 316	51.33
12 x 304	25.67	24 x 318	51.67
12 x 306	25.83	24 x 320	52.00
12 x 308	26.00	24 x 322	52.33
12 x 310	26.17	24 x 324	52.67
12 x 312	26.33	24 x 326	53.00
12 x 314	26.50	24 x 328	53.33
12 x 316	26.67	24 x 330	53.67
12 x 318	26.83	24 x 332	54.00
12 x 320	27.00	24 x 334	54.33
12 x 322	27.17	24 x 336	54.67
12 x 324	27.33	24 x 338	55.00
12 x 326	27.50	24 x 340	55.33
12 x 328	27.67	24 x 342	55.67
12 x 330	27.83	24 x 344	56.00
12 x 332	28.00	24 x 346	56.33
12 x 334	28.17	24 x 348	56.67
12 x 336	28.33	24 x 350	57.00
12 x 338	28.50	24 x 352	57.33
12 x 340	28.67	24 x 354	57.67
12 x 342	28.83	24 x 356	58.00
12 x 344	29.00	24 x 358	58.33
12 x 346	29.17	24 x 360	58.67
12 x 348	29.33	24 x 362	59.00
12 x 350	29.50	24 x 364	59.33
12 x 352	29.67	24 x 366	59.67
12 x 354	29.83	24 x 368	60.00
12 x 356	30.00	24 x 370	60.33
12 x 358	30.17	24 x 372	60.67
12 x 360	30.33	24 x 374	61.00
12 x 362	30.50	24 x 376	61.33
12 x 364	30.67	24 x 378	61.67
12 x 366	30.83	24 x 380	62.00
12 x 368	31.00	24 x 382	62.33
12 x 370	31.17	24 x 384	62.67
12 x 372	31.33	24 x 386	63.00
12 x 374	31.50	24 x 388	63.33
12 x 376	31.67	24 x 390	63.67
12 x 378	31.83	24 x 392	64.00
12 x 380	32.00	24 x 394	64.33
12 x 382	32.17	24 x 396	64.67
12 x 384	32.33	24 x 398	65.00
12 x 386	32.50	24 x 400	65.33
12 x 388	32.67	24 x 402	65.67
12 x 390	32.83	24 x 404	66.00
12 x 392	33.00	24 x 406	66.33
12 x 394	33.17	24 x 408	66.67
12 x 396	33.33	24 x 410	67.00
12 x 398	33.50	24 x 412	67.33
12 x 400	33.67	24 x 414	67.67
12 x 402	33.83	24 x 416	68.00
12 x 404	34.00	24 x 418	68.33
12 x 406	34.17	24 x 420	68.67
12 x 408	34.33	24 x 422	69.00
12 x 410	34.50	24 x 424	69.33
12 x 412	34.67	24 x 426	69.67
12 x 414	34.83	24 x 428	70.00
12 x 416	35.00	24 x 430	70.33
12 x 418	35.17	24 x 432	70.67
12 x 420	35.33	24 x 434	71.00
12 x 422	35.50	24 x 436	71.33
12 x 424	35.67	24 x 438	71.67
12 x 426	35.83	24 x 440	72.00
12 x 428	36.00	24 x 442	72.33
12 x 430	36.17	24 x 444	72.67
12 x 432	36.33	24 x 446	73.00
12 x 434	36.50	24 x 448	73.33
12 x 436	36.67	24 x 450	73.67
12 x 438	36.83	24 x 452	74.00
12 x 440	37.00	24 x 454	74.33
12 x 442	37.17	24 x 456	74.67
12 x 444	37.33	24 x 458	75.00
12 x 446	37.50	24 x 460	75.33
12 x 448	37.67	24 x 462	75.67
12 x 450	37.83	24 x 464	76.00
12 x 452	38.00	24 x 466	76.33
12 x 454	38.17	24 x 468	76.67
12 x 456	38.33	24 x 470	77.00
12 x 458	38.50	24 x 472	77.33
12 x 460	38.67	24 x 474	77.67
12 x 462	38.83	24 x 476	78.00
12 x 464	39.00	24 x 478	78.33
12 x 466	39.17	24 x 480	78.67
12 x 468	39.33	24 x 482	79.00
12 x 470	39.50	24 x 484	79.33
12 x 472	39.67	24 x 486	79.67
12 x 474	39.83	24 x 488	80.00
12 x 476	40.00	24 x 490	80.33
12 x 478	40.17	24 x 492	80.67
12 x 480	40.33	24 x 494	81.00
12 x 482	40.50	24 x 496	81.33
12 x 484	40.67	24 x 498	81.67
12 x 486	40.83	24 x 500	82.00
12 x 488	41.00	24 x 502	82.33
12 x 490	41.17	24 x 504	82.67
12 x 492	41.33	24 x 506	83.00
12 x 494	41.50	24 x 508	83.33
12 x 496	41.67	24 x 510	83.67
12 x 498	41.83	24 x 512	84.00
12 x 500	42.00	24 x 514	84.33
12 x 502	42.17	24 x 516	84.67
12 x 504	42.		

Factors of Ventilation

Pure air, such as exists in the open country away from the contamination of large industrial centers, contains about 4 parts of Carbon Dioxide (CO_2) per 10,000 parts of air. Badly ventilated rooms often contain as many as 20 or more parts of CO_2 per 10,000. Medical authorities have determined that an increase of 2 parts of CO_2 per 10,000 of air should be the recognized standard of purity, and any excess of CO_2 above this amount should be considered as vitiation. (See Table, page 315, "Volume of air necessary for Standard of Purity.")

Ventilation, whether natural or mechanical, consists in the displacement of vitiated air from an apartment and its replacement by fresh air. To state that the air in an apartment is renewed any given number of times per hour is not strictly accurate, as a positive change does not actually occur; the incoming air mixes with and dilutes the foul air to a point suitable for healthful respiration.

In mechanical ventilation the movement of air is maintained by means of various types of fans, either driven by a steam engine, electric motor, or other prime mover, and with fans of known efficiencies the results can be accurately estimated.

The principal advantages of the use of mechanical systems of heating and ventilation are:

1. Positive circulation of air at any desired temperature to all parts of the building.
2. Practical uniformity of ventilation regardless of indoor and outdoor temperatures and atmospheric conditions, as a positive movement of the air is possible through all ducts, flues, etc., at any required pressure.

In natural ventilation systems, the movement of the air in flues, ducts, etc., is induced solely by the thermal head produced by the difference in density between the column of air in the ducts and that of the outside atmosphere; the higher the temperature in the ducts the more rapid does the draught become.

The direction and velocity of the wind outside a building will materially affect the natural ventilation, retarding or accelerating the movement of the air through ducts and flues, according to the exposure of the buildings and the position of inlets and outlets in relation to same.

Factors of Ventilation—Continued

Loss of heat caused by:

- First. B. t. u. necessary to warm air.
- Second. B. t. u. absorbed by walls.
- Third. B. t. u. absorbed by ceiling.
- Fourth. B. t. u. absorbed by floor.
- Fifth. B. t. u. absorbed by window.

Sources of heat in rooms (Schumann, authorities):

- First. B. t. u. generated by occupants.
- Second. B. t. u. generated by gas, lamps, or candles.
- Third. B. t. u. generated by heating apparatus.

Approximate Data

Each cubic foot gas burned requires 8.5 cubic feet air.
Each pound oil burned requires 150 cubic feet air.
Each pound candles burned requires 160 cubic feet air.
B. t. u. generated by an adult per hour, 191.

B. t. u. generated by burning 1 cubic foot gas, 600.
B. t. u. generated by burning 1 pound oil or candles, 15,000 to 18,000.

Average gas burner consumes approximately 4 cubic feet gas per hour, which equals 2400 B. t. u. per hour.
The average flame from oil lamp 430 to 515 B. t. u. per hour.
The average candle 451 to 545 B. t. u. per hour.

Specifications of Massachusetts District Police for Heating and Ventilating Public Buildings, Schools, etc.

(Form No. 83)

1. That the apparatus will, with proper management, heat all the rooms including corridors to 70 degrees in any weather.

2. That with the rooms at 70 degrees and a difference of not less than 40 degrees between the temperature of the outside air and that of the air entering the room at the warm-air inlet, the apparatus will supply at least 30 cubic feet of air per minute for each scholar accommodated in the rooms.

3. That such supply of air will so circulate in the rooms that no uncomfortable draught will be felt, and that the difference in temperature between any two points on the breathing plane (5 feet) in the occupied portion of a room will not exceed 3 degrees.

4. That vitiated air in amount equal to supply from inlets will be removed through the vent ducts.

Note.—Above information is quoted from standard authorities, not guaranteed.

Properties of Air

Temp. Degrees Fahrenheit	B. U. Air Cubic Feet per Degree Fahr	B. U. Air Cubic Feet per Degree Fahr	B. U. Air Cubic Feet per Degree Fahr	B. U. Air Cubic Feet per Degree Fahr
0	0.0056	0.02054	48.5	48.7
12	0.0061	0.02066	50.1	50.0
22	0.0066	0.02078	51.7	51.8
32	0.0071	0.02090	53.2	53.2
42	0.0076	0.02102	54.8	54.8
52	0.0081	0.02114	56.3	56.3
62	0.0086	0.02126	57.9	57.9
72	0.0091	0.02138	59.4	59.4
82	0.0096	0.02150	61.0	61.0
92	0.0101	0.02162	62.5	62.5
102	0.0106	0.02174	64.1	64.1
112	0.0111	0.02186	65.6	65.6
122	0.0116	0.02198	67.2	67.2
132	0.0121	0.02210	68.7	68.7
142	0.0126	0.02222	70.3	70.3
152	0.0131	0.02234	71.8	71.8
162	0.0136	0.02246	73.3	73.3
172	0.0141	0.02258	74.9	74.9
182	0.0146	0.02270	76.4	76.4
192	0.0151	0.02282	77.9	77.9
202	0.0156	0.02294	79.4	79.4
212	0.0161	0.02306	81.0	81.0

Volume and Density of Air

Temp. Degrees Fahrenheit	Volume of 1 lb. of Air at Atmos- pheric Pressure of 14.7 lbs. Cubic Feet	Density or Weight of 1 Cu. Ft. of Air at 14.7 lbs. Pressure lbs. lbs.	Volume of 1 lb. of Air at Atmos- pheric Pressure of 14.7 lbs. Cubic Feet	Density or Weight of 1 Cu. Ft. of Air at 14.7 lbs. Pressure lbs. lbs.
0	11.583	0.005611	16.860	0.05913
32	12.387	0.005718	16.910	0.05913
40	12.586	0.005749	17.111	0.05844
50	12.840	0.005783	17.612	0.05671
62	13.141	0.005827	18.116	0.05500
70	13.342	0.005859	18.621	0.05330
80	13.593	0.005895	19.121	0.05160
90	13.845	0.005931	19.621	0.05000
100	14.096	0.005967	20.121	0.04840
110	14.347	0.006003	20.621	0.04680
120	14.598	0.006039	21.121	0.04520
130	14.849	0.006075	21.621	0.04360
140	15.100	0.006111	22.121	0.04200
150	15.351	0.006147	22.621	0.04040
160	15.602	0.006183	23.121	0.03880
170	15.853	0.006219	23.621	0.03720
180	16.104	0.006255	24.121	0.03560
190	16.355	0.006291	24.621	0.03400
200	16.606	0.006327	25.121	0.03240

Note.—Above information is quoted from standard authorities.
Not guaranteed.

Moisture Absorbed by Air

The quantity of water which air is capable of absorbing to the point of maximum saturation, in grains per cubic foot for various temperatures.

Temperatures Degrees Fahr.	Grains per Cu. Ft.	Grains per Cu. Ft.	Grains per Cu. Ft.	Grains per Cu. Ft.	Grains per Cu. Ft.	Grains per Cu. Ft.	Grains per Cu. Ft.	Grains per Cu. Ft.	Grains per Cu. Ft.
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
40	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
60	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
70	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
80	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
90	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
110	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
140	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
150	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
160	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
170	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
190	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Relative Humidity of the Air

Temperature of the Air Degrees Fahr.	Relative Humidity Percentage	Temperature of the Air Degrees Fahr.	Relative Humidity Percentage	Temperature of the Air Degrees Fahr.	Relative Humidity Percentage	Temperature of the Air Degrees Fahr.	Relative Humidity Percentage
0	0.0000	10	0.0000	20	0.0000	30	0.0000
10	0.0000	20	0.0000	30	0.0000	40	0.0000
20	0.0000	30	0.0000	40	0.0000	50	0.0000
30	0.0000	40	0.0000	50	0.0000	60	0.0000
40	0.0000	50	0.0000	60	0.0000	70	0.0000
50	0.0000	60	0.0000	70	0.0000	80	0.0000
60	0.0000	70	0.0000	80	0.0000	90	0.0000
70	0.0000	80	0.0000	90	0.0000	100	0.0000
80	0.0000	90	0.0000	100	0.0000	110	0.0000
90	0.0000	100	0.0000	110	0.0000	120	0.0000
100	0.0000	110	0.0000	120	0.0000	130	0.0000
110	0.0000	120	0.0000	130	0.0000	140	0.0000
120	0.0000	130	0.0000	140	0.0000	150	0.0000
130	0.0000	140	0.0000	150	0.0000	160	0.0000
140	0.0000	150	0.0000	160	0.0000	170	0.0000
150	0.0000	160	0.0000	170	0.0000	180	0.0000
160	0.0000	170	0.0000	180	0.0000	190	0.0000
170	0.0000	180	0.0000	190	0.0000	200	0.0000

Volume of Air Necessary for Standard of Purity

Temp. Degrees Fahr.	Volume of Air Cubic Feet	Temp. Degrees Fahr.	Volume of Air Cubic Feet	Temp. Degrees Fahr.	Volume of Air Cubic Feet	Temp. Degrees Fahr.	Volume of Air Cubic Feet
0	0.0000	10	0.0000	20	0.0000	30	0.0000
10	0.0000	20	0.0000	30	0.0000	40	0.0000
20	0.0000	30	0.0000	40	0.0000	50	0.0000
30	0.0000	40	0.0000	50	0.0000	60	0.0000
40	0.0000	50	0.0000	60	0.0000	70	0.0000
50	0.0000	60	0.0000	70	0.0000	80	0.0000
60	0.0000	70	0.0000	80	0.0000	90	0.0000
70	0.0000	80	0.0000	90	0.0000	100	0.0000
80	0.0000	90	0.0000	100	0.0000	110	0.0000
90	0.0000	100	0.0000	110	0.0000	120	0.0000
100	0.0000	110	0.0000	120	0.0000	130	0.0000
110	0.0000	120	0.0000	130	0.0000	140	0.0000
120	0.0000	130	0.0000	140	0.0000	150	0.0000
130	0.0000	140	0.0000	150	0.0000	160	0.0000
140	0.0000	150	0.0000	160	0.0000	170	0.0000
150	0.0000	160	0.0000	170	0.0000	180	0.0000
160	0.0000	170	0.0000	180	0.0000	190	0.0000
170	0.0000	180	0.0000	190	0.0000	200	0.0000

Note.—Above information is quoted from standard authorities.
Not guaranteed.

Air Heating Table

Cubic feet of air one Btu will raise one degree Fahr. at different temperature.

Specific heat of air . 2375 . At zero one cubic foot of air

weighs 086 lb. and $\frac{11\ 574}{086} = 134\ 58$

From this formula the following table is constructed, small fractional decimals being omitted

Temp air	Weight of 1 cu. ft.	Cu. ft. in lb.	H. U. will raise 1 deg. F.	Cu. ft. in lb.	H. U. will raise 1 deg. F.	Weight of 1 cu. ft.	Temp air
0	0.864	11.58	48.7	11.58	48.7	0.864	0
12	0.842	11.87	50.00	11.87	50.00	0.842	12
22	0.824	12.14	51.00	12.14	51.00	0.824	22
32	0.807	12.40	52.10	12.40	52.10	0.807	32
42	0.791	12.64	53.10	12.64	53.10	0.791	42
52	0.776	12.88	54.10	12.88	54.10	0.776	52
62	0.761	13.13	55.20	13.13	55.20	0.761	62
70	0.750	13.34	56.30	13.34	56.30	0.750	70
72	0.747	13.39	56.10	13.39	56.10	0.747	72
82	0.733	13.64	57.40	13.64	57.40	0.733	82
92	0.720	13.90	58.60	13.90	58.60	0.720	92
102	0.707	14.14	59.20	14.14	59.20	0.707	102

B. T. U. Required for Heating Air

This table specifies the quantity of heat in British thermal units required to raise one cubic foot of air through any given temperature interval.

[illegible]

Above table from F. Schumann, *Manual of Heating and Ventilation*, pages 41 and 61

Constants for Heat Transmission

Requirements for Heat Transmission

B. t. u.'s transmitted per square foot per hour per degree difference in temperature between inside and outside air are as follows:

FLOORS--Continued	
Walls	4" thick
Plain Brick	64

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80																				

wood strip nailed to brick work and are lathed and plastered in these strips; this construction provides an airspace. The amount of concrete in

The one of square Feet of each kind of surface is multiplied by its respective constant as shown above by the difference in temperature between both sides of surface, i. e., walls, ceilings, floors, windows and doors. Each loss through air changes is calculated on the basis of 100 cubic Feet of Contents, otherwise figured the same by their constants given for different air changes. The sum of the above

... gives the loss of heat in Btu per sq ft per hr all over the surface. Add to Radiation for Intermittent Heating one-half percent if heated day time only, and the location of the building per cent with the building is heated day time only, and the location of the building is exposed to wind per cent when the building is heated intermittently with intermittent heating.

The above information was compiled from well-known authorities and is not guaranteed.

Full Area of Two-Pane Windows

Giving the Total Area of Two-Pane Windows, including the Sash

Width of Glass	Width of Opening	Height of Glass	Height of Opening	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"	50"	52"	54"
In	Pt. In			3'-6"	3'-10"	4'-2"	4'-6"	4'-10"	5'-2"	5'-6"	5'-10"	6'-2"	6'-6"	6'-10"	7'-2"	7'-6"	7'-10"	8'-2"	8'-6"	8'-10"	9'-2"	9'-6"
16	1-8	Standard Sizes of Two-Light Windows		5.8	6.4	7.0	7.5	8.0	8.6	9.2	9.7	10.3	10.8	11.4	11.9	12.5	13.0	13.6	14.1	14.7	15.2	15.8
18	1-10			6.4	7.0	7.6	8.2	8.9	9.5	10.1	10.7	11.3	11.9	12.5	13.1	13.7	14.3	14.9	15.5	16.1	16.7	17.3
20	1-12			7.0	7.6	8.3	8.9	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6	17.3	18.0	18.7	19.4
22	1-14			7.6	8.3	9.0	9.7	10.5	11.2	12.0	12.7	13.5	14.2	15.0	15.7	16.5	17.2	18.0	18.8	19.5	20.3	21.0
24	1-16			8.2	8.9	9.7	10.5	11.3	12.1	12.9	13.7	14.5	15.3	16.1	16.9	17.7	18.5	19.3	20.1	20.9	21.7	22.5
26	1-18			8.7	9.5	10.3	11.1	12.0	12.8	13.7	14.5	15.4	16.2	17.1	18.0	18.8	19.7	20.5	21.4	22.2	23.1	23.9
28	1-20			9.3	10.1	11.0	11.8	12.7	13.6	14.5	15.4	16.3	17.2	18.1	19.0	19.9	20.8	21.7	22.6	23.4	24.3	25.2
30	1-22			9.9	10.8	11.7	12.6	13.5	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1
32	1-24			10.5	11.4	12.3	13.2	14.1	15.0	15.9	16.8	17.7	18.6	19.5	20.4	21.3	22.2	23.1	24.0	24.9	25.8	26.7
34	1-26			11.1	12.0	12.9	13.8	14.7	15.6	16.5	17.4	18.3	19.2	20.1	21.0	21.9	22.8	23.7	24.6	25.5	26.4	27.3
36	1-28			11.7	12.6	13.5	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	27.9
38	1-30			12.3	13.2	14.1	15.0	15.9	16.8	17.7	18.6	19.5	20.4	21.3	22.2	23.1	24.0	24.9	25.8	26.7	27.6	28.5
40	1-32			12.9	13.8	14.7	15.6	16.5	17.4	18.3	19.2	20.1	21.0	21.9	22.8	23.7	24.6	25.5	26.4	27.3	28.2	29.1
42	1-34			13.5	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	27.9	28.8	29.7
44	1-36			14.1	15.0	15.9	16.8	17.7	18.6	19.5	20.4	21.3	22.2	23.1	24.0	24.9	25.8	26.7	27.6	28.5	29.4	30.3
46	1-38			14.7	15.6	16.5	17.4	18.3	19.2	20.1	21.0	21.9	22.8	23.7	24.6	25.5	26.4	27.3	28.2	29.1	30.0	30.9
48	1-40			15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	27.9	28.8	29.7	30.6	31.5
50	1-42			15.9	16.8	17.7	18.6	19.5	20.4	21.3	22.2	23.1	24.0	24.9	25.8	26.7	27.6	28.5	29.4	30.3	31.2	32.1
52	1-44			16.5	17.4	18.3	19.2	20.1	21.0	21.9	22.8	23.7	24.6	25.5	26.4	27.3	28.2	29.1	30.0	30.9	31.8	32.7
54	1-46			17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	27.9	28.8	29.7	30.6	31.5	32.4	33.3
56	1-48			17.7	18.6	19.5	20.4	21.3	22.2	23.1	24.0	24.9	25.8	26.7	27.6	28.5	29.4	30.3	31.2	32.1	33.0	33.9
58	1-50			18.3	19.2	20.1	21.0	21.9	22.8	23.7	24.6	25.5	26.4	27.3	28.2	29.1	30.0	30.9	31.8	32.7	33.6	34.5
60	1-52			18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	27.9	28.8	29.7	30.6	31.5	32.4	33.3	34.2	35.1
62	1-54			19.5	20.4	21.3	22.2	23.1	24.0	24.9	25.8	26.7	27.6	28.5	29.4	30.3	31.2	32.1	33.0	33.9	34.8	35.7

Table of Approximate Cubic Air Contents of Rooms ordinarily found in House Heating

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		SIZE OF ROOMS IN FEET (Use Nearest Size)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
		3x10	4x18	5x20	6x21	7x21	8x22	9x22	10x22	11x23	12x23	13x23	14x23	15x23	16x23	17x23	18x23	19x23	20x23	21x23	22x23	23x23	24x23	25x23	26x23	27x23	28x23	29x23	30x23	31x23	32x23	33x23	34x23	35x23	36x23	37x23	38x23	39x23	40x23	41x23	42x23	43x23	44x23	45x23	46x23	47x23	48x23	49x23	50x23	51x23	52x23	53x23	54x23	55x23	56x23	57x23	58x23	59x23	60x23	61x23	62x23	63x23	64x23	65x23	66x23	67x23	68x23	69x23	70x23	71x23	72x23	73x23	74x23	75x23	76x23	77x23	78x23	79x23	80x23	81x23	82x23	83x23	84x23	85x23	86x23	87x23	88x23	89x23	90x23	91x23	92x23	93x23	94x23	95x23	96x23	97x23	98x23	99x23	100x23	101x23	102x23	103x23	104x23	105x23	106x23	107x23	108x23	109x23	110x23	111x23	112x23	113x23	114x23	115x23	116x23	117x23	118x23	119x23	120x23	121x23	122x23	123x23	124x23	125x23	126x23	127x23	128x23	129x23	130x23	131x23	132x23	133x23	134x23	135x23	136x23	137x23	138x23	139x23	140x23	141x23	142x23	143x23	144x23	145x23	146x23	147x23	148x23	149x23	150x23	151x23	152x23	153x23	154x23	155x23	156x23	157x23	158x23	159x23	160x23	161x23	162x23	163x23	164x23	165x23	166x23	167x23	168x23	169x23	170x23	171x23	172x23	173x23	174x23	175x23	176x23	177x23	178x23	179x23	180x23	181x23	182x23	183x23	184x23	185x23	186x23	187x23	188x23	189x23	190x23	191x23	192x23	193x23	194x23	195x23	196x23	197x23	198x23	199x23	200x23	201x23	202x23	203x23	204x23	205x23	206x23	207x23	208x23	209x23	210x23	211x23	212x23	213x23	214x23	215x23	216x23	217x23	218x23	219x23	220x23	221x23	222x23	223x23	224x23	225x23	226x23	227x23	228x23	229x23	230x23	231x23	232x23	233x23	234x23	235x23	236x23	237x23	238x23	239x23	240x23	241x23	242x23	243x23	244x23	245x23	246x23	247x23	248x23	249x23	250x23	251x23	252x23	253x23	254x23	255x23	256x23	257x23	258x23	259x23	260x23	261x23	262x23	263x23	264x23	265x23	266x23	267x23	268x23	269x23	270x23	271x23	272x23	273x23	274x23	275x23	276x23	277x23	278x23	279x23	280x23	281x23	282x23	283x23	284x23	285x23	286x23	287x23	288x23	289x23	290x23	291x23	292x23	293x23	294x23	295x23	296x23	297x23	298x23	299x23	300x23	301x23	302x23	303x23	304x23	305x23	306x23	307x23	308x23	309x23	310x23	311x23	312x23	313x23	314x23	315x23	316x23	317x23	318x23	319x23	320x23	321x23	322x23	323x23	324x23	325x23	326x23	327x23	328x23	329x23	330x23	331x23	332x23	333x23	334x23	335x23	336x23	337x23	338x23	339x23	340x23	341x23	342x23	343x23	344x23	345x23	346x23	347x23	348x23	349x23	350x23	351x23	352x23	353x23	354x23	355x23	356x23	357x23	358x23	359x23	360x23	361x23	362x23	363x23	364x23	365x23	366x23	367x23	368x23	369x23	370x23	371x23	372x23	373x23	374x23	375x23	376x23	377x23	378x23	379x23	380x23	381x23	382x23	383x23	384x23	385x23	386x23	387x23	388x23	389x23	390x23	391x23	392x23	393x23	394x23	395x23	396x23	397x23	398x23	399x23	400x23	401x23	402x23	403x23	404x23	405x23	406x23	407x23	408x23	409x23	410x23	411x23	412x23	413x23	414x23	415x23	416x23	417x23	418x23	419x23	420x23	421x23	422x23	423x23	424x23	425x23	426x23	427x23	428x23	429x23	430x23	431x23	432x23	433x23	434x23	435x23	436x23	437x23	438x23	439x23	440x23	441x23	442x23	443x23	444x23	445x23	446x23	447x23	448x23	449x23	450x23	451x23	452x23	453x23	454x23	455x23	456x23	457x23	458x23	459x23	460x23	461x23	462x23	463x23	464x23	465x23	466x23	467x23	468x23	469x23	470x23	471x23	472x23	473x23	474x23	475x23	476x23	477x23	478x23	479x23	480x23	481x23	482x23	483x23	484x23	485x23	486x23	487x23	488x23	489x23	490x23	491x23	492x23	493x23	494x23	495x23	496x23	497x23	498x23	499x23	500x23	501x23	502x23	503x23	504x23	505x23	506x23	507x23	508x23	509x23	510x23	511x23	512x23	513x23	514x23	515x23	516x23	517x23	518x23	519x23	520x23	521x23	522x23	523x23	524x23	525x23	526x23	527x23	528x23	529x23	530x23	531x23	532x23	533x23	534x23	535x23	536x23	537x23	538x23	539x23	540x23	541x23	542x23	543x23	544x23	545x23	546x23	547x23	548x23	549x23	550x23	551x23	552x23	553x23	554x23	555x23	556x23	557x23	558x23	559x23	560x23	561x23	562x23	563x23	564x23	565x23	566x23	567x23	568x23	569x23	570x23	571x23	572x23	573x23	574x23	575x23	576x23	577x23	578x23	579x23	580x23	581x23	582x23	583x23	584x23	585x23	586x23	587x23	588x23	589x23	590x23	591x23	592x23	593x23	594x23	595x23	596x23	597x23	598x23	599x23	600x23	601x23	602x23	603x23	604x23	605x23	606x23	607x23	608x23	609x23	610x23	611x23	612x23	613x23	614x23	615x23	616x23	617x23	618x23	619x23	620x23	621x23	622x23	623x23	624x23	625x23	626x23	627x23	628x23	629x23	630x23	631x23	632x23	633x23	634x23	635x23	636x23	637x23	638x23	639x23	640x23	641x23	642x23	643x23	644x23	645x23	646x23	647x23	648x23	649x23	650x23	651x23	652x23	653x23	654x23	655x23	656x23	657x23	658x23	659x23	660x23	661x23	662x23	663x23	664x23	665x23	666x23	667x23	668x23	669x23	670x23	671x23	672x23	673x23	674x23	675x23	676x23	677x23	678x23	679x23	680x23	681x23	682x23	683x23	684x23	685x23	686x23	687x23	688x23	689x23	690x23	691x23	692x23	693x23	694x23	695x23	696x23	697x23	698x23	699x23	700x23	701x23	702x23	703x23	704x23	705x23	706x23	707x23	708x23	709x23	710x23	711x23	712x23	713x23	714x23	715x23	716x23	717x23	718x23	719x23	720x23	721x23	722x23	723x23	724x23	725x23	726x23	727x23	728x23	729x23	730x23	731x23	732x23	733x23	734x23	735x23	736x23	737x23	738x23	739x23	740x23	741x23	742x23	743x23	744x23	745x23	746x23	747x23	748x23	749x23	750x23	751x23	752x23	753x23	754x23	755x23	756x23	757x23	758x23	759x23	760x23	761x23	762x23	763x23	764x23	765x23	766x23	767x23	768x23	769x23	770x23	771x23	772x23	773x23	774x23	775x23	776x23	777x23	778x23	779x23	780x23	781x23	782x23	783x23	784x23	785x23	786x23	787x23	788x23	789x23	790x23	791x23	792x23	793x23	794x23	795x23	796x23	797x23	798x23	799x23	800x23	801x23	802x23	803x23	804x23	805x23	806x23	807x23	808x23	809x23	810x23	811x23	812x23	813x23	814x23	815x23	816x23	817x23	818x23	819x23	820x23	821x23	822x23	823x23	824x23	825x23	826x23	827x23	828x23	829x23	830x23	831x23	832x23	833x23	834x23	835x23	836x23	837x23	838x23	839x23	840x23	841x23	842x23	843x23	844x23	845x23	846x23	847x23	848x23	849x23	850x23	851x23	852x23	853x23	854x23	855x23	856x23	857x23	858x23	859x23	860x23	861x23	862x23	863x23	864x23	865x23	866x23	867x23	868x23	869x23	870x23	871x23	872x23	873x23	874x23	875x23	876x23	877x23	878x23	879x23	880x23	881x23	882x23	883x23	884x23	885x23	886x23	887x23	888x23	889x23	890x23	891x23	892x23	893x23	894x23	895x23	896x23	897x23	898x23	899x23	900x23	901x23	902x23	903x23	904x23	905x23	906x23	907x23	908x23	909x23	910x23	911x23	912x23	913x23	914x23	915x23	916x23	917x23	918x23	919x23	920x23	921x23	922x23	923x23	924x23	925x23	926x23	927x23	928x23	929x23	930x23	931x23	932x23	933x23	934x23	935x23	936x23	937x23	938x23	939x23	940x23	941x23	942x23	943x23	944x23	945x23	946x23	947x23	948x23	949x23	950x23	951x23	952x23	953x23	954x23	955x23	956x23	957x23	958x23	959x23	960x23	961x23	962x23	963x23	964x23	965x23	966x23	967x23	968x23	969x23	970x23	971x23	972x23	973x23	974x23	975x23	976x23	977x23	978x23	979x23	980x23	981x23	982x23	983x23	984x23	985x23	986x23	987x23	988x23	989x23	990x23	991x23	992x23	993x23	994x23	995x23	996x23	997x23	998x23	999x23	1000x23	1001x23	1002x23	1003x23	1004x23	1005x23	1006x23	1007x23	1008x23	1009x23	1010x23	1011x23	1012x23	1013x23	1014x23	1015x23	1016x23	1017x23	1018x23	1019x23	1020x23	1021x23	1022x23	1023x23	1024x23	1025x23	1026x23	1027x23	1028x23	1029x23	1030x23	1031x23	1032x23	1033x23	1034x23	1035x23	1036x23	1037x23	1038x23	1039x23	1040x23	1041x23	1042x23	1043x23	1044x23	1045x23	1046x23	1047x23	1048x23	1049x23	1050x23	1051x23	1052x23	1053x23	1054x23	1055x23	1056x23	1057x23	1058x23	1059x23	1060x23	1061x23	1062x23	1063x23	1064x23	1065x23	1066x23	1067x23	1068x23	1069x23	1070x23	1071x23	1072x23	1073x23	1074x23	1075x23	1076x23	1077x23	1078x23	1079x23	1080x23	1081x23	1082x23	1083x23	1084x23	1085x23	1086x23	1087x23	1088x23	1089x23	1090x23	1091x23	1092x23	1093x23	1094x23	1095x23	1096x23	1097x23	1098x23	1099x23	1100x23	1101x23	1102x23	1103x23	1104x23	1105x23	1106x23	1107x23	1108x23	1109x23	1110x23	1111x23	1112x23	1113x23	1114x23	1115x23	1116x23	1117x23	1118x23	1119x23	1120x23	1121x23	1122x23	

Table of Square Feet of Wall Surface ordinarily found in House Heating
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Table of Square Feet of Wall																				
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RUNNING FEET OF EXPOSED WALL WITHOUT REGARD TO WINDOW OPENINGS																				
Height of Ceiling	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	
8 1/2	51	60	69	78	87	96	105	114	123	132	141	150	159	168	177	186	195	204	213	
9	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216	
9 1/2	57	66	75	84	93	102	111	120	129	138	147	156	165	174	183	192	201	210	219	
10	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	
10 1/2	63	73	84	94	105	115	125	135	145	155	165	175	185	195	205	215	225	235	245	
11	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220	231	242	253	264	
11 1/2	69	80	92	104	115	126	138	149	161	172	184	195	207	218	229	240	252	263	275	
12	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	
12 1/2	75	87	100	112	125	137	150	162	175	187	200	212	225	238	250	262	275	287	300	
13	78	91	104	117	130	143	156	169	181	195	208	221	234	247	260	273	286	299	312	
14	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336	
Height of Ceiling	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	
8	200	208	216	224	232	240	248	256	264	272	280	288	296	304	312	320	328	336	344	
8 1/2	212	221	230	238	246	255	263	272	280	289	298	306	315	324	333	342	351	360	369	
9	225	234	243	252	261	270	279	288	297	306	315	324	333	342	351	360	369	378	387	
9 1/2	237	247	256	266	275	285	294	304	313	323	332	342	351	361	370	380	389	399	408	
10	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	
10 1/2	262	273	283	294	305	315	325	336	346	357	367	378	388	399	409	420	431	441	451	
11	275	286	297	308	319	330	341	352	363	374	385	396	407	418	429	440	451	462	473	
11 1/2	287	299	310	322	333	345	356	368	379	391	403	414	426	437	449	460	471	483	494	
12	300	312	324	336	348	360	372	384	396	408	420	432	444	456	468	480	492	504	516	
12 1/2	313	325	337	350	362	375	387	400	412	425	437	450	462	475	487	500	512	525	537	
13	325	338	351	364	377	390	403	416	429	442	455	468	481	494	507	520	533	546	559	
14	338	352	365	379	392	406	420	434	448	462	476	490	504	518	532	546	560	574	588	

Highest Evaporative Results From Selected Free-Burning and Caking Soft Fuels From U. S. Geological Survey Bulletin No. 332 and U. S. Bureau of Mines Bulletin No. 21

State	Test No.	Kind of Fuel	County	B. t. u. per lb.
Alabama	315	Soft—Caking	Bibb	13,021
Alabama	464	Soft—Free-Burning	Jefferson	13,441
Alabama	293	Soft—Caking	Sebastian	13,705
Alabama	308	Soft—Caking	Johnson	14,175
Alabama	310	Soft—Caking	Quarles	9,549
Alabama	481	Soft—Free-Burning	Chattahoochee	12,865
Alabama	448	Soft—Free-Burning	Williamson	12,920
Alabama	511	Soft—Free-Burning	St. Clair	13,271
Alabama	509	Soft—Caking	Saline	13,621
Alabama	428	Soft—Free-Burning	Prentiss	13,079
Alabama	435	Soft—Caking	Prentiss	13,545
Alabama	443	Soft—Free-Burning	Prentiss	13,930
Alabama	449	Soft—Free-Burning	Prentiss	13,932
Alabama	451	Soft—Free-Burning	Prentiss	13,932
Alabama	453	Soft—Free-Burning	Prentiss	13,932
Alabama	455	Soft—Free-Burning	Prentiss	13,932
Alabama	457	Soft—Free-Burning	Prentiss	13,932
Alabama	459	Soft—Free-Burning	Prentiss	13,932
Alabama	461	Soft—Free-Burning	Prentiss	13,932
Alabama	463	Soft—Free-Burning	Prentiss	13,932
Alabama	465	Soft—Free-Burning	Prentiss	13,932
Alabama	467	Soft—Free-Burning	Prentiss	13,932
Alabama	469	Soft—Free-Burning	Prentiss	13,932
Alabama	471	Soft—Free-Burning	Prentiss	13,932
Alabama	473	Soft—Free-Burning	Prentiss	13,932
Alabama	475	Soft—Free-Burning	Prentiss	13,932
Alabama	477	Soft—Free-Burning	Prentiss	13,932
Alabama	479	Soft—Free-Burning	Prentiss	13,932
Alabama	481	Soft—Free-Burning	Prentiss	13,932
Alabama	483	Soft—Free-Burning	Prentiss	13,932
Alabama	485	Soft—Free-Burning	Prentiss	13,932
Alabama	487	Soft—Free-Burning	Prentiss	13,932
Alabama	489	Soft—Free-Burning	Prentiss	13,932
Alabama	491	Soft—Free-Burning	Prentiss	13,932
Alabama	493	Soft—Free-Burning	Prentiss	13,932
Alabama	495	Soft—Free-Burning	Prentiss	13,932
Alabama	497	Soft—Free-Burning	Prentiss	13,932
Alabama	499	Soft—Free-Burning	Prentiss	13,932
Alabama	501	Soft—Free-Burning	Prentiss	13,932
Alabama	503	Soft—Free-Burning	Prentiss	13,932
Alabama	505	Soft—Free-Burning	Prentiss	13,932
Alabama	507	Soft—Free-Burning	Prentiss	13,932
Alabama	509	Soft—Free-Burning	Prentiss	13,932
Alabama	511	Soft—Free-Burning	Prentiss	13,932
Alabama	513	Soft—Free-Burning	Prentiss	13,932
Alabama	515	Soft—Free-Burning	Prentiss	13,932
Alabama	517	Soft—Free-Burning	Prentiss	13,932
Alabama	519	Soft—Free-Burning	Prentiss	13,932
Alabama	521	Soft—Free-Burning	Prentiss	13,932
Alabama	523	Soft—Free-Burning	Prentiss	13,932
Alabama	525	Soft—Free-Burning	Prentiss	13,932
Alabama	527	Soft—Free-Burning	Prentiss	13,932
Alabama	529	Soft—Free-Burning	Prentiss	13,932
Alabama	531	Soft—Free-Burning	Prentiss	13,932
Alabama	533	Soft—Free-Burning	Prentiss	13,932
Alabama	535	Soft—Free-Burning	Prentiss	13,932
Alabama	537	Soft—Free-Burning	Prentiss	13,932
Alabama	539	Soft—Free-Burning	Prentiss	13,932
Alabama	541	Soft—Free-Burning	Prentiss	13,932
Alabama	543	Soft—Free-Burning	Prentiss	13,932
Alabama	545	Soft—Free-Burning	Prentiss	13,932
Alabama	547	Soft—Free-Burning	Prentiss	13,932
Alabama	549	Soft—Free-Burning	Prentiss	13,932
Alabama	551	Soft—Free-Burning	Prentiss	13,932
Alabama	553	Soft—Free-Burning	Prentiss	13,932
Alabama	555	Soft—Free-Burning	Prentiss	13,932
Alabama	557	Soft—Free-Burning	Prentiss	13,932
Alabama	559	Soft—Free-Burning	Prentiss	13,932
Alabama	561	Soft—Free-Burning	Prentiss	13,932
Alabama	563	Soft—Free-Burning	Prentiss	13,932
Alabama	565	Soft—Free-Burning	Prentiss	13,932
Alabama	567	Soft—Free-Burning	Prentiss	13,932
Alabama	569	Soft—Free-Burning	Prentiss	13,932
Alabama	571	Soft—Free-Burning	Prentiss	13,932
Alabama	573	Soft—Free-Burning	Prentiss	13,932
Alabama	575	Soft—Free-Burning	Prentiss	13,932
Alabama	577	Soft—Free-Burning	Prentiss	13,932
Alabama	579	Soft—Free-Burning	Prentiss	13,932
Alabama	581	Soft—Free-Burning	Prentiss	13,932
Alabama	583	Soft—Free-Burning	Prentiss	13,932
Alabama	585	Soft—Free-Burning	Prentiss	13,932
Alabama	587	Soft—Free-Burning	Prentiss	13,932
Alabama	589	Soft—Free-Burning	Prentiss	13,932
Alabama	591	Soft—Free-Burning	Prentiss	13,932
Alabama	593	Soft—Free-Burning	Prentiss	13,932
Alabama	595	Soft—Free-Burning	Prentiss	13,932
Alabama	597	Soft—Free-Burning	Prentiss	13,932
Alabama	599	Soft—Free-Burning	Prentiss	13,932
Alabama	601	Soft—Free-Burning	Prentiss	13,932
Alabama	603	Soft—Free-Burning	Prentiss	13,932
Alabama	605	Soft—Free-Burning	Prentiss	13,932
Alabama	607	Soft—Free-Burning	Prentiss	13,932
Alabama	609	Soft—Free-Burning	Prentiss	13,932
Alabama	611	Soft—Free-Burning	Prentiss	13,932
Alabama	613	Soft—Free-Burning	Prentiss	13,932
Alabama	615	Soft—Free-Burning	Prentiss	13,932
Alabama	617	Soft—Free-Burning	Prentiss	13,932
Alabama	619	Soft—Free-Burning	Prentiss	13,932
Alabama	621	Soft—Free-Burning	Prentiss	13,932
Alabama	623	Soft—Free-Burning	Prentiss	13,932
Alabama	625	Soft—Free-Burning	Prentiss	13,932
Alabama	627	Soft—Free-Burning	Prentiss	13,932
Alabama	629	Soft—Free-Burning	Prentiss	13,932
Alabama	631	Soft—Free-Burning	Prentiss	13,932
Alabama	633	Soft—Free-Burning	Prentiss	13,932
Alabama	635	Soft—Free-Burning	Prentiss	13,932
Alabama	637	Soft—Free-Burning	Prentiss	13,932
Alabama	639	Soft—Free-Burning	Prentiss	13,932
Alabama	641	Soft—Free-Burning	Prentiss	13,932
Alabama	643	Soft—Free-Burning	Prentiss	13,932
Alabama	645	Soft—Free-Burning	Prentiss	13,932
Alabama	647	Soft—Free-Burning	Prentiss	13,932
Alabama	649	Soft—Free-Burning	Prentiss	13,932
Alabama	651	Soft—Free-Burning	Prentiss	13,932
Alabama	653	Soft—Free-Burning	Prentiss	13,932
Alabama	655	Soft—Free-Burning	Prentiss	13,932
Alabama	657	Soft—Free-Burning	Prentiss	13,932
Alabama	659	Soft—Free-Burning	Prentiss	13,932
Alabama	661	Soft—Free-Burning	Prentiss	13,932
Alabama	663	Soft—Free-Burning	Prentiss	13,932
Alabama	665	Soft—Free-Burning	Prentiss	13,932
Alabama	667	Soft—Free-Burning	Prentiss	13,932
Alabama	669	Soft—Free-Burning	Prentiss	13,932
Alabama	671	Soft—Free-Burning	Prentiss	13,932
Alabama	673	Soft—Free-Burning	Prentiss	13,932
Alabama	675	Soft—Free-Burning	Prentiss	13,932
Alabama	677	Soft—Free-Burning	Prentiss	13,932
Alabama	679	Soft—Free-Burning	Prentiss	13,932
Alabama	681	Soft—Free-Burning	Prentiss	13,932
Alabama	683	Soft—Free-Burning	Prentiss	13,932
Alabama	685	Soft—Free-Burning	Prentiss	13,932
Alabama	687	Soft—Free-Burning	Prentiss	13,932
Alabama	689	Soft—Free-Burning	Prentiss	13,932
Alabama	691	Soft—Free-Burning	Prentiss	13,932
Alabama	693	Soft—Free-Burning	Prentiss	13,932
Alabama	695	Soft—Free-Burning	Prentiss	13,932
Alabama	697	Soft—Free-Burning	Prentiss	13,932
Alabama	699	Soft—Free-Burning	Prentiss	13,932
Alabama	701	Soft—Free-Burning	Prentiss	13,932
Alabama	703	Soft—Free-Burning	Prentiss	13,932
Alabama	705	Soft—Free-Burning	Prentiss	13,932
Alabama	707	Soft—Free-Burning	Prentiss	13,932
Alabama	709	Soft—Free-Burning	Prentiss	13,932
Alabama	711	Soft—Free-Burning	Prentiss	13,932
Alabama	713	Soft—Free-Burning	Prentiss	13,932
Alabama	715	Soft—Free-Burning	Prentiss	13,932
Alabama	717	Soft—Free-Burning	Prentiss	13,932
Alabama	719	Soft—Free-Burning	Prentiss	13,932
Alabama	721	Soft—Free-Burning	Prentiss	13,932
Alabama	723	Soft—Free-Burning	Prentiss	13,932
Alabama	725	Soft—Free-Burning	Prentiss	13,932
Alabama	727	Soft—Free-Burning	Prentiss	13,932
Alabama	729	Soft—Free-Burning	Prentiss	13,932

Names of Sizes	Anthracite or "Hard"	Names of Sizes	Domestic "hard coal"
Will pass through		Will pass through	

Heat Value and Composition of Various Fuels

NOTE.—Above information
Not guaranteed

Bituminous or 'Soft'

"No. 1" goes through 1½ inch screen, over ¼ inch screen.
 "No. 2" goes through 1½ inch screen, over ¼ inch screen.
 "No. 3" goes through 1 inch screen, over ¼ inch screen.
 "No. 1" Damsite "Nitt." goes through 1 inch screen, over 1½ inch screen.
 "No. 2" goes through 1 inch screen, over ¼ inch screen.
 "No. 3" Washed Chestnut goes through 1½ inch screen, over ¼ inch screen.
 "No. 2" Washed Sliver goes through 2 inch screen, over 1½ inch screen.
 "No. 2" Washed Sliver goes through 2 inch screen, over 1½ inch screen.

Combustion of Coal and Oil

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Definition of Caking, Caking, and Free Burning as Applied to Bituminous Coals

The terms caking, caking, and free burning are so often used incorrectly that in many cases the meaning of these terms is misunderstood.

The most common misinterpretation is in the use of the two terms—caking and caking.

Caking: First, we must remember that all bituminous coals caking when burned, for the reason that the process of caking means the driving off of the volatile matter contained in the coal as well as the moisture. In other words, the gaseous part of the coal is driven off and what is left is the carbon or coke. The percentage of coke remaining depends upon the amount of volatile and moisture contained in the coal.

It makes no difference whether the coal is semi-bituminous, bituminous, sub-bituminous or lignite, the process is the same.

Caking: The term caking applies to all fuels that have a strong tendency to bridge, or in other words, fuse together into a mass which chokes the air passages through the fuel bed, shutting off the air supply. This is one of the principal characteristics of practically all eastern bituminous and semi-bituminous coals.

The use of caking coals means that the fire has to be shed often in order to break up the fuel bed to permit the passage of air. Therefore, the use of caking coal is a question of attention, and not capacity. The use of free burning coals reduces the amount of slicing required which means with this type of fuel that less attention is necessary.

Free Burning: The definition for the term free burning is just as its name indicates. This term applies to all fuels which burn freely without any tendency to bridge or fusing together which would mean restriction of the air passages through the fuel bed.

These terms are not in general use except among engineers and it is the writer's general practice to confine good recommendation in regard to fuel for any size or type of boiler to its name and size instead of by its general characteristics.

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Comparative Values of Coal and Oil

Proximate Analysis		
Fixed Carbon	Percent	Heat Unit, Btu.
Volatile Matter	73.30	10,480
Moisture	17.61	1,040
Ash	0.49	0.15
Ultimate Analysis		
Carbon	82.26	87.61
Hydrogen	3.89	10.48
Sulfur	0.49	1.02
Fixed Oxygen	4.12	0.08
Nitrogen	0.64	0.78
Ash	8.60	
Sludge		
Calorific Heat	14,067	18,619

Evaporation of Water from Coal and Oil

Taken from the United States Geological Survey Report on Petroleum for 1904

Pound of Combustible		Barrels of petroleum required to do same amount of evaporation	
Pittsburgh lump and nut, Penna.	10.0	4.0	
Pittsburgh nut and slack, Penna.	8.0	3.2	
Anthracite, Pennsylvania	9.8	3.9	
Indiana block	9.5	3.8	
Georges Creek lump, Maryland	10.0	4.0	
New River, West Virginia	9.7	3.8	
Bedford lump, West Virginia	10.5	4.2	
Cardiff lump, Wales	10.0	4.0	
Cape Breton, Canada	9.2	3.7	
Nanaimo, British Columbia	7.3	2.9	
Co-operative, British Columbia	8.9	3.6	
Greta, Washington	7.6	3.0	
Carbon Hill, Washington	7.6	3.0	

Under favorable conditions 1 pound of oil will evaporate from 14 to 16 pounds of water from and at 212°; 1 pound of coal will evaporate from 18 to 20 pounds of water from and at 212°.

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Approximate Factors for Equivalent Evaporation

Temperature of Feed Water F. Degrees	Gauge pressure—pounds				
	1	5	10	15	20
40	1.1781	1.1791	1.1811	1.1821	1.1831
45	1.1731	1.1741	1.1751	1.1761	1.1781
50	1.1681	1.1691	1.1701	1.1711	1.1721
55	1.1631	1.1641	1.1651	1.1661	1.1671
60	1.1581	1.1591	1.1601	1.1611	1.1621
65	1.1531	1.1541	1.1551	1.1561	1.1571
70	1.1471	1.1491	1.1501	1.1511	1.1521
75	1.1421	1.1431	1.1451	1.1461	1.1471
80	1.1371	1.1381	1.1391	1.1401	1.1411
85	1.1321	1.1331	1.1341	1.1351	1.1361
90	1.1271	1.1281	1.1291	1.1301	1.1311
95	1.1221	1.1231	1.1241	1.1251	1.1261
100	1.1171	1.1181	1.1191	1.1201	1.1211
110	1.1061	1.1071	1.1091	1.1101	1.1111
120	1.0961	1.0971	1.0981	1.0991	1.1001
130	1.0861	1.0871	1.0881	1.0891	1.0901
140	1.0751	1.0761	1.0781	1.0791	1.0801
150	1.0651	1.0661	1.0671	1.0681	1.0701
160	1.0551	1.0561	1.0571	1.0581	1.0591
170	1.0451	1.0461	1.0471	1.0481	1.0491
180	1.0341	1.0351	1.0361	1.0381	1.0391
190	1.0241	1.0251	1.0261	1.0271	1.0281
200	1.0141	1.0151	1.0161	1.0171	1.0181

The factor for equivalent evaporation is the ratio of the heat necessary to convert a pound of water at any given temperature into steam at any definite pressure, to the amount of heat necessary to convert a pound of water at 212° into steam at atmospheric pressure (14.7 pounds at sea level).

Properties of Saturated Steam

Boiling Temp.	Absolute Press. lbs.	Inches Vacuum	Steam Gauge Press. lbs.	Latent Heat	Heat Unit	Vol. lb. Steam Cu. Ft.
157	4.408	20.91	100.1	124.86	82.6	
161	4.851	20.01	100.8	127.86	77.2	
165	5.313	19.06	101.5	132.86	69.1	
169	5.855	18.00	102.2	136.86	61.3	
172	6.273	17.15	102.9	139.87	59.4	
176	6.867	16.09	103.6	143.87	54.5	
179	7.341	15.91	104.3	146.88	51.2	
182	7.85	15.94	105.0	149.89	48.12	
185	8.38	15.94	105.7	152.89	45.25	
187	8.76	15.94	106.4	155.90	43.45	
190	9.34	15.94	107.1	158.91	41.65	
192	9.74	15.94	107.8	161.92	39.85	
194	10.17	15.94	108.5	164.93	38.05	
197	10.81	15.94	109.2	167.94	36.25	
199	11.20	15.94	109.9	170.95	34.45	
201	11.76	15.94	110.6	173.96	32.65	
203	12.26	15.94	111.3	176.97	30.85	
205	12.77	15.94	112.0	179.98	29.05	
207	13.30	15.94	112.7	182.99	27.25	
209	13.85	15.94	113.4	185.00	25.45	
210	14.13	15.94	113.7	187.01	23.65	
212	14.70	15.94	114.4	190.02	21.85	
215	15.60	15.94	115.1	193.03	20.05	
217	16.22	15.94	115.4	195.04	18.25	
219	16.86	15.94	116.1	197.05	16.45	
222	17.87	15.94	116.8	199.06	14.65	
225	18.91	15.94	117.5	201.07	12.85	
227	19.64	15.94	117.8	203.08	11.05	
230	20.77	15.94	118.5	205.09	9.25	
232	21.56	15.94	118.8	207.10	7.45	
235	22.79	15.94	119.5	209.11	5.65	
237	23.61	15.94	120.2	211.12	3.85	
240	24.97	15.94	120.9	213.13	2.05	
242	25.88	15.94	121.6	215.14	0.25	
244	26.83	15.94	122.3	217.15		
246	27.80	15.94	123.0	219.16		
250	29.82	15.94	123.7	221.17		
252	30.88	15.94	124.4	223.18		
255	32.53	15.94	125.1	225.19		
257	33.66	15.94	125.8	227.20		
259	34.81	15.94	126.5	229.21		

Measurement of Pressure and Weight

346[illegible]

5.51

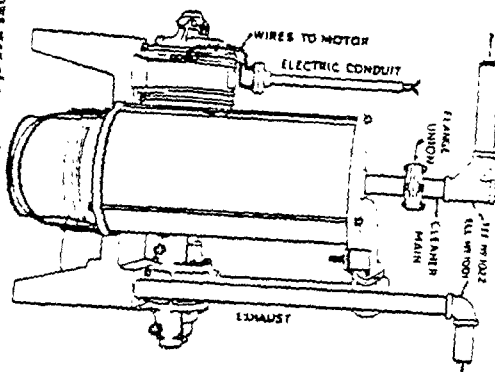
Circumference of Circles

Diam.	Circum- ference	Diam.	Circum- ference	Diam.	Circum- ference	Diam.	Circum- ference
1	3.1416	10	31.416	50	91.218	65	201.201
1 1/2	4.7124	11	34.907	51	97.389	66	207.345
2	6.2832	12	37.699	52	103.628	67	210.481
2 1/2	7.8540	13	40.841	53	109.911	68	213.617
3	9.4248	14	43.982	54	116.239	69	216.753
3 1/2	10.9956	15	47.124	55	122.567	70	219.911
4	12.5664	16	50.265	56	128.895	71	223.053
4 1/2	14.1372	17	53.407	57	135.223	72	226.195
5	15.7080	18	56.549	58	141.551	73	229.336
5 1/2	17.2788	19	59.690	59	147.879	74	232.478
6	18.8496	20	62.832	60	154.207	75	235.619
6 1/2	20.4204	21	65.973	61	160.535	76	238.761
7	21.9912	22	69.115	62	166.863	77	241.903
7 1/2	23.5620	23	72.257	63	173.191	78	245.044
8	25.1328	24	75.398	64	179.519	79	248.186
8 1/2	26.7036	25	78.540	65	185.847	80	251.327
9	28.2744	26	81.681	66	192.175	81	254.469
9 1/2	29.8452	27	84.823	67	198.503	82	257.611
10	31.4160	28	87.965	68	204.831	83	260.752
10 1/2	32.9868	29	91.106	69	211.159	84	263.894
11	34.5576			70	217.487	85	267.035
11 1/2	36.1284			71	223.815	86	270.177
12	37.6992			72	230.143	87	273.319
12 1/2	39.2700			73	236.471	88	276.460
13	40.8408			74	242.799	89	279.602
13 1/2	42.4116			75	249.127	90	282.743
14	43.9824			76	255.455	91	285.885
14 1/2	45.5532			77	261.783	92	289.027
15	47.1240			78	268.111	93	292.168
15 1/2	48.6948			79	274.439	94	295.310
16	50.2656			80	280.767	95	298.451
16 1/2	51.8364			81	287.095	96	301.593
17	53.4072			82	293.423	97	304.734
17 1/2	54.9780			83	299.751	98	307.876
18	56.5488			84	306.079	99	311.018
18 1/2	58.1196			85	312.407		
19	59.6904			86	318.735		
19 1/2	61.2612			87	325.063		
20	62.8320			88	331.391		
20 1/2	64.4028			89	337.719		
21	65.9736			90	344.047		
21 1/2	67.5444			91	350.375		
22	69.1152			92	356.703		
22 1/2	70.6860			93	363.031		
23	72.2568			94	369.359		
23 1/2	73.8276			95	375.687		
24	75.3984			96	382.015		
24 1/2	76.9692			97	388.343		
25	78.5400			98	394.671		
25 1/2	80.1108			99	401.000		
26	81.6816						
26 1/2	83.2524						
27	84.8232						
27 1/2	86.3940						
28	87.9648						
28 1/2	89.5356						
29	91.1064						
29 1/2	92.6772						
30	94.2480						
30 1/2	95.8188						
31	97.3896						
31 1/2	98.9604						
32	100.5312						
32 1/2	102.1020						
33	103.6728						
33 1/2	105.2436						
34	106.8144						
34 1/2	108.3852						
35	109.9560						
35 1/2	111.5268						
36	113.0976						
36 1/2	114.6684						
37	116.2392						
37 1/2	117.8100						
38	119.3808						
38 1/2	120.9516						
39	122.5224						
39 1/2	124.0932						
40	125.6640						
40 1/2	127.2348						
41	128.8056						
41 1/2	130.3764						
42	131.9472						
42 1/2	133.5180						
43	135.0888						
43 1/2	136.6596						
44	138.2304						
44 1/2	139.8012						
45	141.3720						
45 1/2	142.9428						
46	144.5136						
46 1/2	146.0844						
47	147.6552						
47 1/2	149.2260						
48	150.7968						
48 1/2	152.3676						
49	153.9384						
49 1/2	155.5092						
50	157.0800						
50 1/2	158.6508						
51	160.2216						
51 1/2	161.7924						
52	163.3632						
52 1/2	164.9340						
53	166.5048						
53 1/2	168.0756						
54	169.6464						
54 1/2	171.2172						
55	172.7880						
55 1/2	174.3588						
56	175.9296						
56 1/2	177.5004						
57	179.0712						
57 1/2	180.6420						
58	182.2128						
58 1/2	183.7836						
59	185.3544						
59 1/2	186.9252						
60	188.4960						
60 1/2	190.0668						
61	191.6376						
61 1/2	193.2084						
62	194.7792						
62 1/2	196.3500						
63	197.9208						
63 1/2	199.4916						
64	201.0624						
64 1/2	202.6332						
65	204.2040						
65 1/2	205.7748						
66	207.3456						
66 1/2	208.9164						
67	210.4872						
67 1/2	212.0580						
68	213.6288						
68 1/2	215.1996						
69	216.7704						
69 1/2	218.3412						
70	219.9120						
70 1/2	221.4828						
71	223.0536						
71 1/2	224.6244						
72	226.1952						
72 1/2	227.7660						
73	229.3368						
73 1/2	230.9076						
74	232.4784						
74 1/2	234.0492						
75	235.6200						
75 1/2	237.1908						
76	238.7616						
76 1/2	240.3324						
77	241.9032						
77 1/2	243.4740						
78	245.0448						
78 1/2	246.6156						
79	248.1864						
79 1/2	249.7572						
80	251.3280						
80 1/2	252.8988						
81	254.4696						
81 1/2	256.0404						
82	257.6112						
82 1/2	259.1820						
83	260.7528						
83 1/2	262.3236						
84	263.8944						
84 1/2	265.4652						
85	267.0360						
85 1/2	268.6068						
86	270.1776						
86 1/2	271.7484						
87	273.3192						
87 1/2	274.8900						
88	276.4608						
88 1/2	278.0316						
89	279.6024						
89 1/2	281.1732						
90	282.7440						
90 1/2	284.3148						
91	285.8856						
91 1/2	287.4564						
92	289.0272						
92 1/2	290.5980						
93	292.1688						
93 1/2	293.7396						
94	295.3104						
94 1/2	296.8812						
95	298.4520						
95 1/2	299.9828						
96	301.5136						
96 1/2	303.0444						
97	304.5752						
97 1/2	306.1060						
98	307.6368						
98 1/2	309.1676						
99	310.7384						
99 1/2	312.2692						
100	313.8000						

To find the circumference of a circle when diameter is given, multiply the given diameter by 3.1416

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Arco Wand Vacuum Cleaner Data



Shows way of connecting cleaner-main and exhaust. Also shows wire connections to motor.

Piping

Provide cleanness plugs in horizontal cleaner-mains at turns and at base of risers, and so install that the flow of dirt-laden air will be away from the plugs.

Use black pipe, plugged and reamed. Merchant black pipe may be used, but be sure that the inside is smooth and free from dents, kinks, fins, or burrs. The ends of all pipe should be squared and reamed.

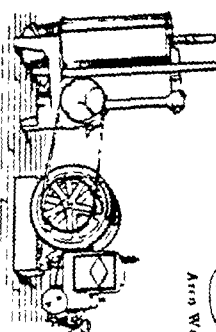
Applying Pipe-Joint Paste

In the installation of piping for vacuum cleaning, always apply pipe-joint paste to the made threads of pipe and fittings. When the threads are made up, all surplus lead or paste will be forced to the outside of the fittings and pipe, leaving the interior free from such substances.

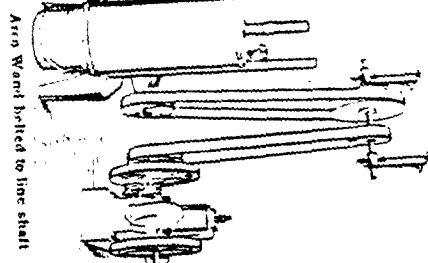
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Belted for Nos. 34, 36 and 48 Machines

The Arco Wand Vacuum Cleaner can be belted directly to gasoline engine or to line shaft, when the gasoline engine or line shaft can be readily started or stopped before and after using the Vacuum Cleaner. (See Illustrations on this page.)



When the speed of the gasoline engine or line shaft is slow, the Vacuum Cleaner should be belted with countershaft.



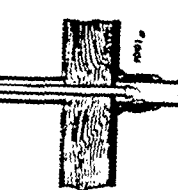
Arco Wand belted direct to gasoline engine
 Pump speeds Nos. 34 and 36 machines, 1150 R. P. M.
 No. 48 machine, 650 R. P. M.

To Determine the Size and Speed of Pulleys

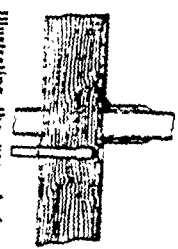
For Nos. 34, 36 and 48 Arco Wand Vacuum Cleaners

Having	To Find	Rule
Diam. of Driving Pulley	Speed of Driven Pulley	Multiply Diam. of Driving Pulley by Speed and divide by Diam. of Driven Pulley.
Speed of Driving Pulley	Diam. of Driven Pulley	Divide Speed of Driving Pulley by Speed of Driven Pulley.
Diam. of Driving Pulley	Speed of Driven Pulley	Multiply Diam. of Driving Pulley by Speed and divide by Diam. of Driven Pulley.
Speed of Driving Pulley	Diam. of Driven Pulley	Divide Speed of Driving Pulley by Speed of Driven Pulley.
Diam. of Driving Pulley	Speed of Driven Pulley	Multiply Diam. of Driving Pulley by Speed and divide by Diam. of Driven Pulley.
Speed of Driving Pulley	Diam. of Driven Pulley	Divide Speed of Driving Pulley by Speed of Driven Pulley.

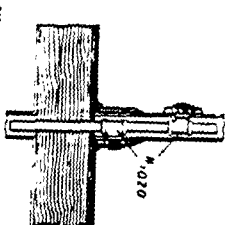
Arco Wand Vacuum Cleaner Data



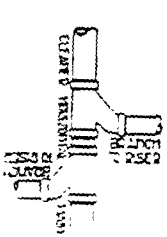
Typical floor inlet coupling in partition. One inlet coupling to be located in baseboard in each story.



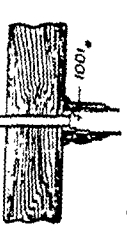
Illustrating the use of Arco Wand Floor Inlet Coupling in floor.



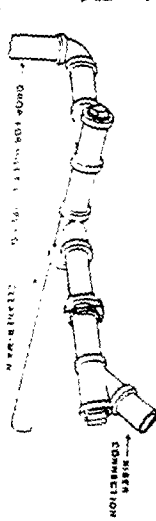
Illustrating typical floor inlet coupling with two inlet couplings on same floor. Each block, same finish as baseboard, should be provided for the upper inlet coupling.



Plan view, section of Cleaner-main in basement showing method of making branch connections to floor. Always use two long double branch fitting or cross.



Typical connection to inlet coupling located in baseboard of first story only.



Section of Cleaner-main. When it is necessary to drop a pipe for an inlet coupling located below the Cleaner-main, always make the connection from the side of the Cleaner-main, and never from the bottom. Drainage Fittings List Prices, see page 145.

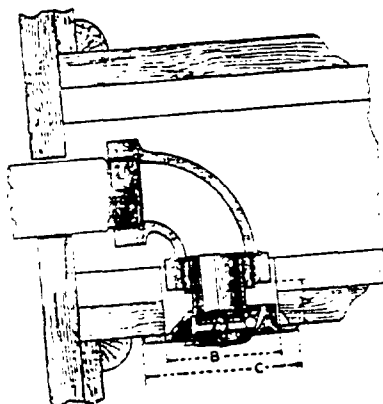
Arco Wand Vacuum Cleaner Data

Installing Inlet Coupling

Use Inlet Coupling Wrench. No. 1 one hinged cover to turn Inlet Coupling into place.

First: After applying pipe-joint paste to make thread of inlet coupling bushing, screw it tightly into opening of drainage fitting, using Inlet Coupling Wrench.

Second: After applying pipe-joint paste to make thread of inlet coupling, screw it into inlet coupling bushing. Raise cover of Inlet Coupling and invert Inlet Coupling.



Wrench, with side lug of wrench in recess provided for raising cover. Draw Inlet Coupling up snugly against the base-board, stopping with cover hinge at the top.

Hose Size—Inches	1	1 1/4	1 1/2
A Minimum measurement face of fitting to face of base-board	1 1/4"	1 3/4"	1"
B Diameter hole in base-board	3 1/4"	3 1/2"	3 3/4"
C Outside diameter of Inlet Coupling	4"	4 1/2"	4 3/4"
Pipe	1 1/2"	1 3/4"	2"
Inlet Coupling threaded pipe size	1 1/2 x 1 1/4	2 x 1 1/2	2 1/2 x 1 1/2
Inlet Coupling Pushing threaded pipe size	1 1/2 x 1 1/4	2 x 1 1/2	2 1/2 x 1 1/2

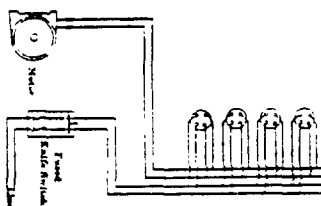
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Arco Wand Vacuum Cleaner Data

Learn from the local electric power station whether Direct or Alternating Current is to be used. If Direct Current, ascertain the voltage; or, if Alternating Current, the voltage, phase and cycles. If this information is sent to us, with a request, a correct wiring chart will be sent making it easy for electrician to make proper wiring connections.

Wiring Diagram of Direct Current or Alternating Current Single-Phase Installations with Remote Control for 1/2 and 3/4-Horse-power Motors.

Be careful to connect proper switch terminals to motor and line leads. Failure to do this will result in short circuiting line if two or more switches are closed at one time. One of these switches must be located not to exceed 4 feet from vacuum cleaner relief valve so that both can be reached at the same time. If motor is connected for 220 volts, ten (10) ampere double-pole flush switches to be used. If motor is connected for 110 volts, twenty (20) ampere double-pole rotary surface switches to be used.



Wiring Diagram of Direct Current or Alternating Current Single-Phase Installations with Remote Control for 1/2, 1, 2, and 3-Horse-power Motors.

Switches No. 1 and No. 2 are three-way snap switches. A control circuit of this nature consists primarily of two (2) three-way switches and if more control points are needed, four-way switches will be connected between the two three-ways, i. e., if four control points are wanted two (2) four-way switches will be connected between two (2) three-way switches. Switch No. 1 must be located not to exceed 4 feet from Vacuum Cleaner Relief Valve so that both can be reached at the same time. If metal conduit is used, be sure to draw all three control wires into one conduit.

Note: For 3-Horse-power direct current motors, use self starter, with several trips of starting resistance instead of magnetic switch.

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Parliament Beating Terms

Actual Evaporation.—By this term is meant the total

Actual Evaporation.—By this term is meant the total quantity of *water* (in pounds) evaporated from any temperature *body* (water or steam) at any pressure. The heat used required depends on the feed water temperature and the pressure and temperature at which the steam is made.

Atmospheric Pressure.—This is the pressure due to the weight of the atmosphere. It is generally expressed in pounds per square inch or in inches of mercury column. To find the pressure in pounds, put square inch, when expressed in inches of mercury column, multiply the latter by .491, which is accurate for mercury at 70° and near enough for most calculations for other temperatures.

Normal atmospheric pressure is 14.7 pounds per square inch.

The average atmospheric pressure for any locality depends on the altitude above sea-level. (See Fitter, p. 258.)

Absolute Pressure. The sum of the gauge and atmospheric pressure is called the absolute pressure.

Boiler Heating Surface (Direct).—That surface which receives the radiant heat of the fire, or that surface on which the fire burns.

Boiler Heating Surface (Indirect Flue).—That surface on which the fire does not shine, but with which the hot gases come in contact before reaching the smokehood.

The *vine of indirect surface* depends on its position on the velocity of gas particles over it; on the contact of the gas particles with it; on its cleanliness, or the ease with which it can be cleaned, and many other factors. Consequently, it is *not* possible to compare two boilers merely on heating surface.

B. t. u. (British Thermal Unit).—The quantity of heat required to raise 1 pound of water 1 degree Fahrenheit.

Calorie. The Continental heat unit, or calorie, is the quantity of heat required to raise the temperature of 1 kilogram of water 1 degree Centigrade, and as 1 kilogram is equal to 2.205 pounds and 1 degree Centigrade is equal to 1.8 degrees Fahrenheit, it is obvious that one calorie measures the same quantity of heat as does 3.969 B. T. U. This is shown by multiplying 1 kcal by 2.205.

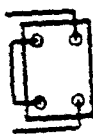
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No.	1-Phase, 60 Cycle Motors		H. C. Wye Amperes	Use Fuse Amperes
	Voltage	Full Load Amperes		
1	110 V.	9	No. 14	6
2	110 V.	9 1/2	No. 14	6
3	110 V.	10	No. 14	6
4	110 V.	10 1/2	No. 14	6
5	110 V.	11	No. 14	6
6	110 V.	11 1/2	No. 14	6
7	110 V.	12	No. 14	6
8	110 V.	12 1/2	No. 14	6
9	110 V.	13	No. 14	6
10	110 V.	13 1/2	No. 14	6
11	110 V.	14	No. 14	6
12	110 V.	14 1/2	No. 14	6
13	110 V.	15	No. 14	6
14	110 V.	15 1/2	No. 14	6
15	110 V.	16	No. 14	6
16	110 V.	16 1/2	No. 14	6
17	110 V.	17	No. 14	6
18	110 V.	17 1/2	No. 14	6
19	110 V.	18	No. 14	6
20	110 V.	18 1/2	No. 14	6
21	110 V.	19	No. 14	6
22	110 V.	19 1/2	No. 14	6
23	110 V.	20	No. 14	6
24	110 V.	20 1/2	No. 14	6
25	110 V.	21	No. 14	6
26	110 V.	21 1/2	No. 14	6
27	110 V.	22	No. 14	6
28	110 V.	22 1/2	No. 14	6
29	110 V.	23	No. 14	6
30	110 V.	23 1/2	No. 14	6
31	110 V.	24	No. 14	6
32	110 V.	24 1/2	No. 14	6
33	110 V.	25	No. 14	6
34	110 V.	25 1/2	No. 14	6
35	110 V.	26	No. 14	6
36	110 V.	26 1/2	No. 14	6
37	110 V.	27	No. 14	6
38	110 V.	27 1/2	No. 14	6
39	110 V.	28	No. 14	6
40	110 V.	28 1/2	No. 14	6
41	110 V.	29	No. 14	6
42	110 V.	29 1/2	No. 14	6
43	110 V.	30	No. 14	6
44	110 V.	30 1/2	No. 14	6
45	110 V.	31	No. 14	6
46	110 V.	31 1/2	No. 14	6
47	110 V.	32	No. 14	6
48	110 V.	32 1/2	No. 14	6
49	110 V.	33	No. 14	6
50	110 V.	33 1/2	No. 14	6
51	110 V.	34	No. 14	6
52	110 V.	34 1/2	No. 14	6
53	110 V.	35	No. 14	6
54	110 V.	35 1/2	No. 14	6
55	110 V.	36	No. 14	6
56	110 V.	36 1/2	No. 14	6
57	110 V.	37	No. 14	6
58	110 V.	37 1/2	No. 14	6
59	110 V.	38	No. 14	6
60	110 V.	38 1/2	No. 14	6
61	110 V.	39	No. 14	6
62	110 V.	39 1/2	No. 14	6
63	110 V.	40	No. 14	6
64	110 V.	40 1/2	No. 14	6
65	110 V.	41	No. 14	6
66	110 V.	41 1/2	No. 14	6
67	110 V.	42	No. 14	6
68	110 V.	42 1/2	No. 14	6
69	110 V.	43	No. 14	6
70	110 V.	43 1/2	No. 14	6
71	110 V.	44	No. 14	6
72	110 V.	44 1/2	No. 14	6
73	110 V.	45	No. 14	6
74	110 V.	45 1/2	No. 14	6
75	110 V.	46	No. 14	6
76	110 V.	46 1/2	No. 14	6
77	110 V.	47	No. 14	

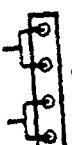
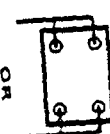
[illegible]

Direct Current Motors			
100 V	2 1/2	No. 14	4
220 V	1 1/2	No. 14	3
110 V	1 1/2	No. 14	3
110 V	1 1/2	No. 14	3
220 V	1 1/2	No. 14	3
115 V	1 1/2	No. 14	3
210 V	4 1/2	No. 10	2
115 V	16 1/2	No. 14	1
210 V	6 1/2	No. 8	1
115 V	2 1/2	No. 12	1
230 V	12	No. 12	1

If the distance of transmission is greater than 50 feet the above should be used.



Terminal Connected for
220 Volts Single Phase A. C.



Terminal Connected for
110 Volts Single Phase A.C.

Familiar Heating Terms — Continued

when translating from the English to the metric standard to the Continental Metric Standard, the heat measure to call 1 Calorie equal to 1.971 B. T. U.

Caloric Value (Heat Value).—The heat value in B. T. U. generated by the complete combustion of 1 pound of a solid or liquid fuel or 1 cubic foot of a gaseous fuel at standard pressure and temperature.

For fuels containing hydrogen, two heat values may be found, the higher and the lower.

The higher or gross heat value is the heat obtained from complete combustion when the water vapor formed is condensed and thereby gives up its latent heat.

The lower or net heat value is the heat obtained when the water vapor formed during combustion escapes without condensing.

Calorimeter.—An apparatus for measuring quantities of heat.

Calorimeter, Bomb.—Used to determine the caloric value of a solid or liquid fuel.

A small weighed quantity of the fuel is placed in a cup in a closed shell filled with oxygen under pressure. By means of an electric spark or electrically heated wire the fuel is ignited. The heat generated by the fuel in burning is given to the water surrounding the "bomb." By knowing the weight of water, the temperature rise, the heat absorbed by the calorimeter and the heat lost by radiation, the heat generated by the fuel can be computed.

The heat value is generally determined for a sample from which the moisture has been removed by heating.

Calorimeter, Junkers.—Used to find the heat value of a gas. The gas is burned in a shell surrounded by circulating water. The water completely absorbs the heat given up by the gas. By measuring the gas at standard conditions and determining the quantity and temperature rise of the water, the heat given up by the gas or its heat value can be computed.

Clinker.—Clinker is slag caused by the fusing or melting together of the constituents of the ash. The extent to which fuel clinkers depends on the composition of the ash as well as the temperature at which it melts.

CO.—Symbol for carbon monoxide which denotes incomplete combustion of the carbon in the fuel.

CO₂.—Symbol for Carbon Dioxide, which is the result of complete combustion of the carbon in the fuel.

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Familiar Heating Terms — Continued

Coal, Caking.—Coal which fuses and becomes a pasty mass when heated, as opposed to free burning (non-caking coal). (See page 341)

Coal, Free-Burning (non-caking).—Coal which does not fuse together and become a pasty mass when heated, but burns freely. (See page 321)

Combustion Chamber.—That part of the boiler in which the fuel mixes with the oxygen and burns.

Combustion, Rate of.—The number of pounds of coal burned per square foot of grate per hour.

Condensation.—The change from a vapor into a liquid due to cooling.

Condensing Power (of radiation).—The number of pounds of equivalent evaporation condensed by 1 square foot of radiation per hour for average conditions. *See page 156 by Examination Questions 1465-1570, 1571-1572, 1573-1574, 1575-1576, 1577-1578, 1579-1580, 1581-1582, 1583-1584, 1585-1586, 1587-1588, 1589-1590, 1591-1592, 1593-1594, 1595-1596, 1597-1598, 1599-1600, 1601-1602, 1603-1604, 1605-1606, 1607-1608, 1609-1610, 1611-1612, 1613-1614, 1615-1616, 1617-1618, 1619-1620, 1621-1622, 1623-1624, 1625-1626, 1627-1628, 1629-1630, 1631-1632, 1633-1634, 1635-1636, 1637-1638, 1639-1640, 1641-1642, 1643-1644, 1645-1646, 1647-1648, 1649-1650, 1651-1652, 1653-1654, 1655-1656, 1657-1658, 1659-1660, 1661-1662, 1663-1664, 1665-1666, 1667-1668, 1669-1670, 1671-1672, 1673-1674, 1675-1676, 1677-1678, 1679-1680, 1681-1682, 1683-1684, 1685-1686, 1687-1688, 1689-1690, 1691-1692, 1693-1694, 1695-1696, 1697-1698, 1699-1700, 1701-1702, 1703-1704, 1705-1706, 1707-1708, 1709-1710, 1711-1712, 1713-1714, 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3535-3536, 3537-3538, 3539-3540, 3541-3542, 3543-3544, 3545-35*

Familiar Heating Terms—Continued

Heating Surface.—The surface of a boiler which have hot faces on one side and steam or water on the other.

Heat Transmission.—The passage of heat through any substance from a medium on one side of the substance to a medium on the other side of lower temperature.

For example:—from the steam in a radiator to the air in the room through the radiator.

Heat Transmission, Co-efficient of.—The number of Btu. passing through 1 square foot of surface, in 1 hour, when the difference in temperature of the gases, liquids or solids on the two sides of the surface is 1 degree Fahrenheit.

Ignition Temperature.—The temperature to which a combustible must be raised to cause a rapid union with oxygen.

Latent Heat.—That heat which changes the physical state of a substance without changing its temperature.

Latent Heat of Fusion.—The heat required to change a solid into a liquid at the melting point.

Latent Heat of Evaporation.—The heat required to change a liquid into a vapor at the boiling point.

In speaking of steam, the term Latent Heat means the latent heat of evaporation.

Potential Energy.—Potential energy in speaking of boilers and hot water heaters has been used to denote the total amount of heat received by the water from its charge of available fuel.

Radiation.—The passage of heat from one body to another without the aid of any carrying medium. The heat passes in rays like the light from the sun.

Steam is water vapor.

Saturated Steam is water vapor in the condition in which it would be generated from the water at its pressure.

Wet Steam is steam containing entrained moisture.

Dry Steam is saturated steam containing no entrained moisture.

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Familiar Heating Terms—Continued

Note: The temperature at which water boils depends on the absolute pressure. This fact is taken advantage of in some hot water systems. By placing pressure on the system, it can be operated at higher temperatures than when open to the atmosphere.

When dry steam has been generated, if it comes in contact with heating surface, it will become superheated.

Steam, Volume of.—If water at 39.2 degrees Fahrenheit is evaporated into steam at atmospheric pressure, the volume of steam will be 1,616 times as great as the volume of water from which it was evaporated.

If water at boiling point is evaporated into steam at atmospheric pressure, the volume of steam will be 1,577 times as great as the volume of water from which it was evaporated.

In other words, a cubic inch of water will produce almost a cubic foot of steam or vapor.

Thermal Capacity is the quantity of heat (Btu.) required to raise 1 pound of a substance 1 degree Fahrenheit. (Usually termed the specific heat.)

Thermometers.—For measuring temperatures, but often supposed to be for measuring heat. They are, however, in no sense the sources of heat, but give simply relative comparisons as to the degree of heat in the body measured; that is, a thermometer registering 180 degrees in one body, while in another a thermometer registers 60 degrees, shows that one body is 120 degrees warmer than the other.

The Fahrenheit Thermometer ("F" or "Fahr.") is used in America, Great Britain and the British Colonies. The freezing point of water is taken at 32 degrees above zero, and the temperature of pure boiling water at 212 degrees. In both cases the measurement is recorded under the ordinary atmospheric pressure of 14.7 pounds per square inch. Between 32 and 212 degrees there are 180 degrees, which are usually spaced into 1-degree intervals.

The Centigrade Thermometer ("C"), known in Germany as "Celsius thermometer," is used in France and most other countries in Europe. 0 degrees or zero corresponds to the freezing point, or melting ice (which is marked 32 on the Fahrenheit scale), and 100 degrees to boiling water. From the freezing to the boiling point there are 100 degrees.

The Reaumur Thermometer ("R") is used in Russia, Turkey, and Egypt. 0 degrees or zero corresponds to

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Familiar Heating Terms--Continued

melting way, 80 degree to boiling water. From freezing to boiling points there are 80 degrees.

Each degree Fahrenheit is $\frac{5}{9}$ of a degree Centigrade, and $\frac{9}{5}$ of a degree Reaumur. The Centigrade temperature interval between the freezing and the boiling point being 100 and the Fahrenheit interval 180, it follows that 1 degree Centigrade is equal to 1.8 degrees Fahrenheit.

Centigrade temperatures are converted into Fahrenheit's scale by multiplying the former by 9 and dividing by 5, and adding 32 degrees to the quotient; and conversely, Fahrenheit temperatures are converted into Centigrade scale by dividing 32 and taking $\frac{5}{9}$ of the remainder.

EXAMPLE: Centigrade degrees $\frac{20 \times 9}{5} = 36$,
and $36 + 32 = 68$ degrees F.

Fahrenheit degrees $68 - 32 = 36$,
and $36 \times \frac{5}{9} = 20$ degrees C.

Water.—Water presents a singular exception to the general law of expansion by heat. If water at 39.2 degrees is cooled, it expands as it cools till reduced to 32 degrees, when it solidifies in the form of ice; and if water at 39.2 degrees is heated it expands as the temperature increases in accordance with the general law.

For all practical purposes it is sufficiently accurate to say that:

- 1 cubic foot of water weighs 62.5 pounds.
- 1 cubic inch of water weighs 0.036 pound.
- 7.48 U. S. gallons equal 1 cubic foot.
- 6 Imperial gallons equal 1 cubic foot.
- 1 U. S. gallon weighs 8.33 pounds.
- 1 Imperial gallon weighs 10 pounds.

The pressure produced by a column of water is called the "static head." A head or column of water 1 foot high produces a pressure of 0.433 pound per square inch.

From the table on the following page (page 345) it will be seen that when the expansion tank is 20 feet above the boiler, the pressure per square inch at the boiler is 8.66 pounds, and the boiling point is 216.2 degrees.

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Familiar Heating Terms--Continued

With this temperature at the boiler, if there is no loss of heat in the piping, the temperature of the radiators on the first floor will not be higher than about 231 degrees, because they will be about 5 feet nearer the tank than is the boiler. The radiators on the second floor may carry a temperature not to exceed 219 degrees, because they are only 5 feet below the expansion tank.

The natural loss of heat in the piping will reduce these temperatures to some extent.

Pressures and Boiling Points of Water for given Static Heads

Height of Column, Feet	Pressure per Square Inch, Pounds	Boiling Point at Boiler which is at the Bottom of the Column, Degrees Fahrenheit
1	0.866	214.9
2	1.732	216.3
3	2.598	217.6
4	3.464	219.0
5	4.330	220.3
6	5.196	221.6
7	6.062	222.8
8	6.928	224.1
9	7.794	225.3
10	8.660	226.6
15	12.990	236.2
20	17.320	245.7
25	21.650	253.8
30	25.980	257.7
35	30.310	261.3
40	34.640	
45	38.970	
50	43.300	

An artificial pressure may be carried on a water-heating apparatus by closing the outlet of the tank by a safety valve. This is done sometimes to increase the temperature of the water, and at other times to cause a more rapid circulation in remote parts of the apparatus.

The reason that the flow of water through the pipes is accelerated by increasing the pressure is because that with the higher temperature, due to the pressure, the rising line of pipe, or flow pipe from the boiler, is emitted

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Familiar Heating Terms—Continued

with steam, making it much lighter than the return column, and thus causing a more rapid circulation of the water through the system.

This principle is made use of by the French and Belgian heating engineers in nearly all of their water heating apparatus, permitting them to use much smaller pipes than is considered good practice in this country. It is unlawful in those countries to place any pressure on the system other than the static head, and to prevent the escape of steam two or more condensing tanks are employed.

The rapidity with which the water flows through the piping of a French or Belgian emission system, which is due to the great difference in weight between the rising and falling columns, causes it to circulate far below the boiler. There are, therefore, systems of this kind in operation where the radiation is successfully heated 30 feet or more below the boiler. The same principle is employed in heating Padstun can with hot water.

Boiler Capacity and Horsepower

The rating of a boiler is an expression for the amount of heat which the boiler is to give out per hour at the boiler outlet, while burning the fuel charge in the given time.

If the given time is 8 hours, the boiler is rated on an 8 hour basis. If the given time is 6 hours, the boiler is rated on a 6 hour basis.

For the purpose of rating steam boilers, 212.6 B.t.u. per hour equals 1 square foot of radiation.

For rating water boilers, 150 B.t.u. per hour equals 1 square foot of radiation.

The boiler heat power is defined as the evaporation of 34.72 pounds of water per hour from a feed water temperature of 212 degrees into steam at 212 degrees. This is equal to $31.5 \times 970 \text{ B.t.u. per hour} = 30478.8 \text{ B.t.u. per hour}$.

One boiler heat power is equal therefore to 30478.8 B.t.u. per hour of steam radiation.

Note that boiler heat power is not derived from engine horsepower.

1 H. P. hour = 2545 B.t.u.

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Familiar Heating Terms—Continued

Miscellaneous Rules

To find the B.t.u. output per hour of a steam boiler, multiply the *efficiency* in square feet by 242.6.

To find the B.t.u. output per hour of a water boiler, multiply the output in square feet by 150.

To find the output in square feet of steam radiation, divide the output in B.t.u. per hour by 242.6.

To find the output in square feet of water radiation, divide the output in B.t.u. per hour by 150.

The fuel capacity of a boiler is generally taken as the weight of the fuel from the grate to the center of the fire door.

The available fuel is generally taken as 80 per cent of the fuel capacity of the boiler. Its value is not constant, however, but depends on the type of fuel and boiler.

Ratings, efficiencies, firing periods and all other data should be determined from actual performance tests under proper conditions, and not from computations.

The following example illustrates the manner of computing the heat required to make a pound of steam under any conditions:

Problem.—Compute the quantity of heat required to change 1 pound of ice at 40 degrees below zero into steam at 7.05 pound gauge pressure with 80 degrees superheat when the atmospheric pressure is 14.86 pounds per square inch.

Solution.—The absolute pressure equals $7.05 + 14.86 = 18.91$ pounds per square inch. At 18.91 pounds boiling point equals 225 degrees Fahrenheit. Latent heat equals 962 B.t.u.

To raise 1 pound ice 1 degree Fahrenheit requires 0.5 B.t.u.

To raise 1 pound water 1 degree Fahrenheit requires 1.0 B.t.u.

To raise 1 pound steam 1 degree Fahrenheit requires 0.48 B.t.u.

To melt 1 pound ice at 42 degrees Fahrenheit requires 142.6 B.t.u.

Heat to raise temperature of ice to M.P. = $72 \times 0.5 = 36$ B.t.u.

Heat to melt ice at M.P. = 142.6 B.t.u.

Heat to raise temperature of water to B.P. = 193.1 B.t.u.

Heat to evaporate water at B.P. = 962 B.t.u.

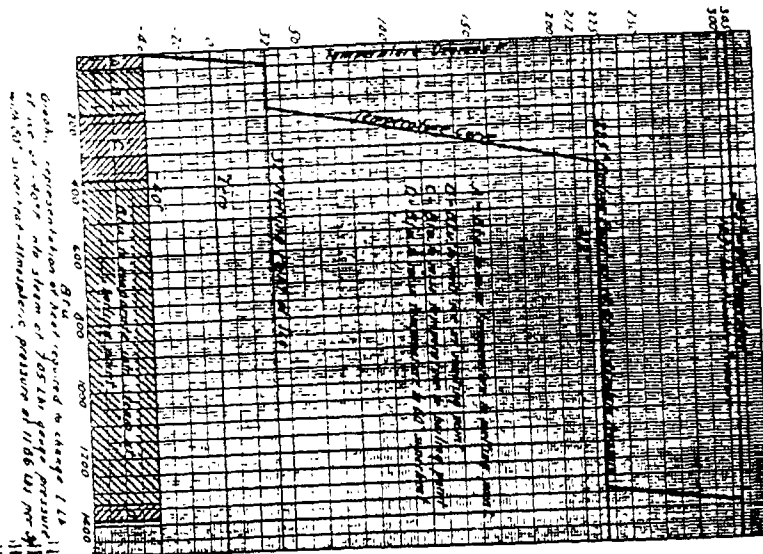
Heat to superheat steam 80 degrees = $80 \times .48 = 38.4$ B.t.u.

Total heat required = 1372.7 B.t.u.

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Familiar Heating Terms - Continued

The problem is represented graphically in the diagram below from which a mental picture can be made of the various steps possible in the making of a pound of steam.



Graph, representing steam at 100 lbs. pressure, 1 lb. of water, at 200° F., and at 1000° F., pressure at 1100 lbs. per sq. in.

Classified Telegraph Code General Code

Quotations and Correspondence

Advice if you have received shipment	Ababa
Answer by first mail	Abat
per cwt. and minimum weight on	Abat
Answering your wire of date less than carload	Abat
rate per cwt. on	Abat
At what price and how soon can you furnish	Abat
Change my route to read as follows	Abat
Do not understand the meaning of	Abat
P. O. B. factory less the actual rate of freight	Abat
in carloads or less to any railroad point	Abat
of destination not to exceed 55c per 100 lbs. Abat	Abat
factory shipment with regular freight allow-	Abat
ance	Abat
Have received no reply to our letter of	Abat
Have received no reply to our telegram of	Abat
Have written	Abat
Immediate specification, three months' de-	Abat
livery limit	Abat
Inclosure mentioned in your letter of	Abat
received, mail same at once	Abat
In market for	Abat
Mad as promptly as possible	Abat
Must have information immediately	Abat
Quote best price on	Abat
Quote best price on	Abat
standard (18-inch) height of	Abat
Referring to our letter of	Abat
Referring to our telegram of	Abat
Referring to our order	Abat
Referring to telephone conversation of today	Abat
Referring to your letter of	Abat
Referring to your telegram of	Abat
Replying to your telephone of	Abat
See our letter of	Abat
We are making today	Abat
We quote you for immediate acceptance	Abat
Will be in	Abat
Will be in	Abat
Will write you tomorrow morning	Abat
Wire credit approval	Abat
Wire at once less than carload freight rate on	Abat
Wire carload freight rate on	Abat
Wire reply quickly	Abat
5 per cent	Abat
2 1/2 per cent	Abat
7 1/2 per cent	Abat
10 per cent	Abat

Orders and Shipments

[illegible]

Orders and Shipments Continued

Plant have not sufficient weight for minimum car - pack permits extra additional specifications for minimum car at	Code Word
Plant	Basically
Referring to your collection notice	Basketry
Referring to our order (No. or date)	Basswood
Referring to your order (No. or date)	Bassoons
See our correction notice	Batter
Send us small lot, unless car going at once	Bayanran
Send us ball of lading covering our order (No.)	Bayberry
Shall we recall?	Baconage
Ship by best route	Beadwork
Ship by boat	Beamingly
Ship by express	Beastlike
Ship by express, C. O. D. amount to collect \$	Beastly
Ship by freight	Beddable
Ship by freight prepaid	Bedulla
Ship by Parcel Post	Bedulpe
Ship by same route as our order (No. or date)	Bedford
Ship immediately	Begable
Ship immediately our order No.	Begonia
Ship in first car to	Beltome
Ship what you can at once	Beltable
Ship with draft and bill of lading attached	Bemebel
Shipping instructions for order (No. or date)	Bengasale
at	Benzate
To be same pattern as our order No.	Bengamote
Trace at once and advise date of delivery to consignee of material covered by our orders	Berralla
We are forwarding you today our confirming order No.	Beverage
We cannot comply with your instructions when and by what route did you ship our order	Bewilder
When can you make shipment?	Bibulatory
When and from where can you ship?	Bicentral
When will order (No. or date) be shipped?	Bifrons
When will you have can in which you will include Order No.	Bilander
When will you ship car containing our order?	Billiards
When will you ship car containing requisition No.	Billings
Will send shipping instructions by mail	Bimonsus
Write at once routing our material covered by	Bindweed
Wire	Biological
ing. Requirements	Branch prospects car includ

General Code—Continued

Orders and Shipments—Continued

Wire us car number and initial immediately upon shipment of car. Birthnot
You may substitute on our order (No. or date). Bitterly
Your order (No. or date) does not specify. Bivalent
Your order (No. or date) was shipped. Bivouac

Manufacturing Plants

Plant	Code Word	Plant	Code Word
Austin St.	Chantoyant	Kansas City	Chantoyant
Buffalo	Chevron	Litchfield	Chevron
Bayonne	Chattahoochee	Mable	Chevy
Birmingham	Chattahoochee	Buffalo	Chevy
Band	Chattahoochee	Nichigan	Chattahoochee
Brandford, Ont.	Chattahoochee	Pierce, Buffalo	Chattahoochee
Detroit	Chattahoochee	Standard	Chattahoochee
Equipment	Chattahoochee	Springfield	Chattahoochee
Buffalo	Chattahoochee	Trussville	Chattahoochee
Holland	Chattahoochee		
Bremen, Ind.	Chattahoochee		
Houston	Chattahoochee		
Rockford, Ill.	Chattahoochee		

Transportation Lines

Line	Code Word
Alcorn, Canton & Vicksburg Rv	Dactyl
Alabama Great Southern R. R.	Dactyl
Alabama & Vid. Long Rv	Dactyl
Anchor Line	Dactyl
Ann Arbor R. R.	Dactyl
Atchafalaya, Topeka & Santa Fe Rv	Dactyl
Atlanta & West Point R. R.	Dactyl
Atlanta, Birmingham & Atlantic Rv	Dactyl
Atlantic Coast Line R. R.	Dactyl
Baltimore & Ohio R. R.	Dactyl
Baltimore & Annapolis R. R.	Dactyl
Bessmer & Lake Erie R. R.	Dactyl
Boston & Albany R. R.	Dactyl
Boston & Maine R. R.	Dactyl
Hayne City, Gaylord & Alpena R. R.	Dactyl
Buffalo & Rochester R. R.	Dactyl
Buffalo, Rochester & Pittsburgh Rv	Dactyl
Canadian Northern Rv	Dactyl
Canadian Pacific Rv	Dactyl
Carolina, Cincinnati & Ohio Rv	Dactyl
Central New England Rv	Dactyl

General Code—Continued

Transportation Lines—Continued

Line	Code Word
Central of Georgia Rv	Deanship
Central R. R. of New Jersey	Deanship
Central Vermont Rv	Deanship
Chesapeake & Ohio Rv	Deanship
Chesapeake & Ohio Rv. of Indiana	Deanship
Chicago & Alton R. R.	Deanship
Chicago & Eastern Illinois R. R.	Deanship
Chicago & North-Western Rv	Deanship
Chicago, Burlington & Quincy R. R.	Deanship
Chicago (Great Western) R. R.	Deanship
Chicago, Indianapolis & Louisville Rv	Deanship
Chicago, Milwaukee & Gary Rv	Deanship
Chicago, Milwaukee & St. Paul Rv	Deanship
Chicago, Peoria & St. Louis R. R.	Deanship
Chicago, Rock Island & Pacific Rv	Deanship
Chicago, St. Paul, Minneapolis & Omaha Rv	Deanship
Chicago, Terre Haute & Southeastern Rv	Deanship
Cincinnati, Indianapolis & Western R. R.	Deanship
Cincinnati, New Orleans & Texas Pacific R. R.	Deanship
Cincinnati Northern R. R.	Deanship
Cincinnati & Buffalo Transit Co	Deanship
Cleveland, Cincinnati, Chicago & St. Louis Rv	Deanship
Clyde Steamship Co	Deanship
Coal & Coke R. R.	Deanship
Colorado & Southern R. R.	Deanship
Copper Range R. R.	Deanship
Crosby Transportation Co	Deanship
Cumberland Valley R. R.	Deanship
Delaware & Hudson Co	Deanship
Delaware, Lackawanna & Western R. R.	Deanship
Denver & Rio Grande R. R.	Deanship
Denver & Salt Lake R. R.	Deanship
Detroit & Cleveland Navigation Co	Deanship
Detroit & Mackinac R. R.	Deanship
Detroit & Toledo Shore Line R. R.	Deanship
Detroit, Toledo & Iron Rv	Deanship
Duluth & Iron Range R. R.	Deanship
Duluth, Missoula & Northern Rv	Deanship
Duluth, South Shore & Atlantic Rv	Deanship
Elgin, Joliet & Eastern Rv	Deanship
El Paso & Southern Railway System	Deanship
Erie R. R.	Deanship
Florida East Coast Rv	Deanship
Port Dodge, Des Moines & Southern R. R.	Deanship
Pt. Worth & Denver City Rv	Deanship
Galveston, Harrisburg & San Antonio Rv	Deanship

General Code--Continued

Transportation Lines--Continued

	Code Word
Georgia R. R.	Dependent
Goodrich Transit Co.	Dependent
Grand Rapids & Indiana Ry.	Dependent
Grand Trunk Ry.	Dependent
Grand Trunk Pacific Ry.	Dependent
Great Lakes Transit Corp.	Dependent
Great Northern Ry.	Dependent
Green Bay & Western R. R.	Dependent
Gulf, Colorado & Santa Fe R. R.	Dependent
Hocking Valley Ry.	Dependent
Houston & Texas Central R. R.	Dependent
Illinois Central R. R.	Dependent
Illinois Traction System	Dependent
Indiana Harbor Belt R. R.	Dependent
International & Great Northern Ry.	Dependent
Kanawha & Michigan Ry.	Dependent
Kansas City, Mexico & Orient R. R.	Dependent
Kansas City, Southern Ry.	Dependent
Kewanee, Green Bay & Western R. R.	Dependent
Lake Erie & Western R. R.	Dependent
Lehigh & Hudson River R. R.	Dependent
Lehigh Valley R. R.	Dependent
Lehigh Valley Transportation Line	Dependent
Long Island R. R.	Dependent
Los Angeles & Salt Lake R. R.	Dependent
Louisiana & Arkansas R. R.	Dependent
Louisiana Ry. & Nav. Co.	Dependent
Louisville & Nashville R. R.	Dependent
Louisville, Henderson & St. Louis R. R.	Dependent
Maine Central R. R.	Dependent
Mallory Steamship Co.	Dependent
Merchants & Miners Transportation Co.	Dependent
Michigan Central R. R.	Dependent
Midland Valley R. R.	Dependent
Mineral Range R. R.	Dependent
Minneapolis & St. Louis R. R.	Dependent
Minneapolis, St. Paul & Sault Ste. Marie Ry.	Dependent
Missouri, Kansas & Texas Ry.	Dependent
Missouri, Oklahoma & Gulf R. R.	Dependent
Missouri Pacific R. R.	Dependent
Mobile & Ohio R. R.	Dependent
Morgan Line	Dependent
Morgan's Louisiana & Texas R. R.	Dependent
Nashville, Chattanooga & St. Louis Ry.	Dependent
New England Steamship Lines	Dependent
New Orleans & Northeastern R. R.	Dependent
New Orleans Great Northern R. R.	Dependent
New York Central Lines	Dependent

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General Code--Continued

Transportation Lines--Continued

	Code Word
New York, Chicago & St. Louis R. R.	Different
New York, New Haven & Hartford R. R.	Different
New York, Ontario & Western Ry.	Different
Norfolk & Western Ry.	Different
Norfolk Southern R. R.	Different
Norfolk Pacific Ry.	Different
Ocean Steamship Line	Different
Old Dominion Steamship Co.	Different
Oregon Short Line R. R.	Different
Oregon-Washington R. R. & Navigation Co.	Different
Pennsylvania Co.	Different
Pennsylvania R. R. (Eastern Lines)	Different
Pennsylvania R. R. (Western Lines)	Different
Pere Marquette Ry.	Different
Philadelphia & Reading Ry.	Different
Pittsburgh, Cincinnati, Chicago & St. Louis R. R.	Different
Pittsburgh & Lake Erie R. R.	Different
Quincy, Omaha & Kansas City R. R.	Different
Richmond, Fredericksburg & Potomac R. R.	Different
Rutland R. R.	Different
St. Joseph & Grand Island R. R.	Different
St. Louis San Francisco R. R.	Different
St. Louis Southwestern Ry.	Different
Seaboard Air Line Ry.	Different
Southern Pacific Co.	Different
Southern Ry.	Different
Tennessee Central R. R.	Different
Texas & New Orleans R. R.	Different
Texas & Pacific Ry.	Different
Toledo & Ohio Central Ry.	Different
Toledo, Peoria & Western R. R.	Different
Toledo, St. Louis & Western R. R.	Different
Toronto, Hamilton & Buffalo Ry.	Different
Union Pacific R. R.	Different
Vicksburg, Shreveport & Pacific Ry.	Different
Virginian Ry.	Different
Wabash Ry.	Different
Washington, Baltimore & Annapolis Elec. R. R.	Different
Washington Southern Ry.	Different
Western & Atlantic Ry.	Different
Western Maryland Ry.	Different
Western Pacific Ry.	Different
West Shore R. R.	Different
Whiteling & Lake Erie Ry.	Different
White Star Line	Different
Yazoo & Mississippi Valley R. R.	Different
Zanesville & Western R. R.	Different

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General Code--Continued

Inches	Code Word	Inches	Code Word
1 1/8	Ebullient	4 1/4	Emblazon
1 1/4	Eburnine	5	Embovice
1 3/4	Ecdesine	5 1/4	Embossed
1 3/8	Eclimite	5 1/2	Emerson
1 3/4	Echobess	5 3/4	Emigrate
1 3/4	Ecliptic	6	Eminence
1 3/8	Ectatic	6 1/4	Emissary
1	Edeless	6 1/2	Emphasis
1 1/8	Edifying	6 3/4	Empirical
1 1/4	Educative	7	Emploress
1 3/8	Edulation	7 1/4	Emulation
1 3/4	Effusion	7 1/2	Emulsiy
1 3/4	Egantine	7 3/4	Enactment
1 3/4	Egyptian	8	Enchanted
1 3/8	Ejaculate	8 1/4	Encompass
2	Elatelly	8 1/2	Encumber
2 1/4	Effective	8 3/4	Endearing
2 1/2	Elegance	9	Endlessly
2 3/4	Elephant	9 1/4	Enduring
3	Elevated	9 1/2	Energetic
3 1/4	Eligible	9 3/4	Enlilade
3 1/2	Elongate	10	Enlighten
3 3/4	Eluquent	10 1/4	Entangle
4	Elusively	11	Environ
4 1/4	Embarass	11 1/2	Epicurian
4 1/2	Emblush	12	Equipoise

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General Code - Continued

Time	
1 day	Code Word
2 days	Pabricate
3 days	Pabulous
4 days	Pactioner
5 days	Pactioner
6 days	Pactioner
10 days	Pactioner
1 week	Pactioner
2 weeks	Pactioner
3 weeks	Pactioner
1 month	Pactioner

Dates

In telegraphing dates, prefix the day of the month.
For example: "January" would mean "first day of January."

Date	Code Word	Date	Code Word
1st	Gab	17th	Gor
2d	Gad	18th	Gos
3d	Gah	19th	Gey
4th	Gai	20th	Gib
5th	Gau	21st	Gil
6th	Gav	22d	Gil
7th	Gat	23d	Gil
8th	Gaw	24th	Gil
9th	Geb	25th	Gil
10th	Ged	26th	Gil
11th	Ged	27th	Gil
12th	Ged	28th	Gil
13th	Ged	29th	Gil
14th	Ged	30th	Gil
15th	Ged	31st	Gil
16th	Ged		

Note—Adding "noon" or "at" to any of above code words will signify morning or afternoon of any of the dates given. Thus "Gaw" will signify "the afternoon of the 25th," and so on.

Month	Code Word	Month	Code Word
January	Good	July	Gray
February	Good	August	Green
March	Good	September	Green
April	Good	October	Green
May	Good	November	Green
June	Good	December	Green

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General Code—Continued

Numbers

These figures may be used in giving quantities, order numbers, amounts in dollars, weights, car numbers, etc. To make a word above 99, use the code as follows: For example, 142—14 hol, 2 hie, "holhel." Or 1425—14 hol, 25 hus—"holhus." Or, 14,251—14 hol, 25 hus, 1 hie—"holholhusie." Or, say, car number 100,009—10 hex, 00 hac, 09 hie—"hexhac09."

Code Word	Code Word	Code Word
0 Hab	27 Iba	64 Kab
00 Hac	28 Ibe	65 Kac
01 Hae	29 Ibo	66 Kae
02 Hah	30 Ibu	67 Kae
03 Hai	31 Ica	68 Kan
04 Hap	32 Ico	69 Kap
05 Har	33 Ide	70 Kar
06 Has	34 Ido	71 Keb
07 Hax	35 Idu	72 Ked
08 Hec	36 Ila	73 Kel
09 Hed	37 Ifo	74 Keh
1 Hee	38 Ife	75 Kek
2 Hef	39 Iga	76 Kel
3 Heg	40 Ige	77 Kem
4 Heh	41 Igo	78 Kep
5 Hei	42 Iha	79 Kes
6 Hej	43 Ihe	80 Ket
7 Hes	44 Ihu	81 Kew
8 Het	45 Iio	82 Kex
9 Hev	46 Iia	83 Koi
10 Hex	47 Iie	84 Koh
11 Hec	48 Ifo	85 Kol
12 Hef	49 Ima	86 Konf
13 Heg	50 Imo	87 Kon
14 Heh	51 Ina	88 Kos
15 Hai	52 Iuc	89 Kov
16 Hap	53 Ipa	90 Kub
17 Har	54 Ipe	91 Kuc
18 Hax	55 Iro	92 Kud
19 Hec	56 Iqu	93 Kuf
20 Hed	57 Isa	94 Kul
21 Hee	58 Iso	95 Kum
22 Hef	59 Ita	96 Kun
23 Heg	60 Ito	97 Kup
24 Heh	61 Iva	98 Kut
25 Hei	62 Iux	99 Kuw
26 Hes	63 Iwo	

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Boiler Code

Ideal-Arcola Radiator Boiler (Code Word Label)

Boiler No.	Code Word
No. 0	Labeht
No. 1	Labeit
No. 2	Labate
No. 3	Labite
No. 4	Laboite
No. 5	Labats

Ideal-Arcola Heating Outfit (Code Word Lactin)

Outfit No.	Code Word	Outfit No.	Code Word
1-PA-75	Lactert	3-PA-275	Lactam
1-PA-100	Lactie	3-PA-300	Lactral
1-PA-125	Lacting	4-PA-325	Lactide
1-PA-150	Lactet	4-PA-350	Lactum
2-PA-175	Lactrus	4-PA-375	Lactone
2-PA-200	Lactroc	5-PA-400	Lactose
2-PA-225	Lactuer	5-PA-425	Lactyl
3-PA-250	Lactage	5-PA-450	Lactal

Ideal-Arcola Hot Water Supply Boiler (Code Word Ladanum)

Boiler No.	Code Word
No. 0	Ladter
No. 1	Laden

Ideal-Arcola Hot Water Supply Outfit (Code Word Lactly)

Outfit No.	Code Word	Outfit No.	Code Word
0-52 Black	Ladno	0-52 Gray	Ladletul
1-100 Black	Ladkin	1-100 Gray	Ladtrane

Ideal-Arcola Garage Heating Boiler (Code Word Ladybird)

Ideal-Arcola Garage Heating Outfit (Code Word Lactaps)

Outfit No.	Code Word
0-40	Lecavo
0-75	Lactie

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Boiler Code—Continued

Ideal Gas Arcola Radiator Boiler

Boiler No.	Code Word (Natural)	Code Word (Artificial)
No. 0	Lagona	Lagomat
No. 1	Lagonum	Lagomorph
No. 2	Lagris	Lagopous
No. 3	Lagart	Lagone
No. 4	Lagging	Lagol
No. 5	Lagly	Lagolity

Ideal Gas Arcola Heating Outfit

Code Word (Natural)

Code Word (Artificial)

Outfit No.	Code Word (Natural)	Code Word (Artificial)
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1-GA-75	Laid	Laid
1-GA-100	Laid	Laid
1-GA-125	Laid	Laid
1-GA-150	Laid	Laid
2-GA-175	Laid	Laid
2-GA-200	Laid	Laid
2-GA-225	Laid	Laid
3-GA-250	Laid	Laid
3-GA-275	Laid	Laid
3-GA-300	Laid	Laid
4-GA-325	Laid	Laid
4-GA-350	Laid	Laid
5-GA-375	Laid	Laid
5-GA-400	Laid	Laid
5-GA-425	Laid	Laid
5-GA-450	Laid	Laid

Ideal Gas Arcola Hot Water Supply Boiler

Code Word (Natural)

Code Word (Artificial)

Boiler No.	Code Word (Natural)	Code Word (Artificial)
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No. 0	Lamby	Lamby
No. 1	Lamby	Lamby

Boiler Code—Continued

Ideal Gas Arcola Hot Water Supply Outfit

Code Word (Natural)

Code Word (Artificial)

Outfit No.	Code Word (Natural)	Code Word (Artificial)
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0-Gas-52-Black	Lamia	Lamnia
0-Gas-100-Black	Laminal	Lamniar
0-Gas-52-Galy	Laminalic	Lamniary
0-Gas-100-Galy	Laminal	Lamniary

Ideal Gas Arcola Garage Heating Boiler

Code Word (Natural)

Code Word (Artificial)

Ideal Gas Arcola Garage Heating Outfit

Code Word (Natural)

Code Word (Artificial)

Outfit No.	Code Word (Natural)	Code Word (Artificial)
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0-Gas-40	Lampem	Lampem
0-Gas-75	Lampic	Lampic

Ideal Type "A" Boilers

Code Word

Code Word

Boiler No.	Code Word	Boiler No.	Code Word
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1-A-4	Lanary	1-A-40	Lapwing
1-A-5	Lanary	1-A-50	Larboard
1-A-6	Lanary	1-A-60	Larby
1-A-7	Lanary	1-A-70	Larby
2-A-5	Lanching	2-A-50	Larby
2-A-6	Lanching	2-A-60	Larby
2-A-7	Lanching	2-A-70	Larby
2-A-8	Lanching	2-A-80	Larby
2-A-9	Lanching	2-A-90	Larby
3-A-5	Lanching	3-A-50	Larby
3-A-6	Lanching	3-A-60	Larby
3-A-7	Lanching	3-A-70	Larby
3-A-8	Lanching	3-A-80	Larby
3-A-9	Lanching	3-A-90	Larby
3-A-10	Lanching	3-A-100	Larby
3-A-11	Lanching	3-A-110	Larby

Boiler Code—Continued

Ideal Type "C" Boilers

Code Word Laurentian

Boiler No.	Code Word	Boiler No.	Code Word
1-C-4	Lavante	1-C-40	Leading
1-C-5	Lavender	1-C-50	League
1-C-6	Lavishment	1-C-60	Leakette
1-C-7	Lavishly	1-C-70	Leashold
1-C-8	Laxitate	1-C-80	Leaven
1-C-9	Laymat	1-C-90	Lectern
1-C-10	Lazar	1-C-100	Ledger

Ideal Gas Boiler

Code Word (Natural) Leol
Code Word (Artificial) Leoncel

Boiler No.	Code Word	Boiler No.	Code Word
2-G-3	Leomse	2-G-30	Leonus
2-G-4	Leon	2-G-40	Leot
2-G-5	Leonine	2-G-50	Leot
2-G-6	Leonkan	2-G-60	Leot
2-G-7	Leopard	2-G-70	Leot
2-G-8	Leopace	2-G-80	Leot
2-G-9	Leopaphic	2-G-90	Leot
2-G-10	Leopaphic	2-G-100	Leot
2-G-11	Leopaphic	2-G-110	Leot

Water

2-G-30	Leopaphic	2-G-30	Leot
2-G-40	Leopaphic	2-G-40	Leot
2-G-50	Leopaphic	2-G-50	Leot
2-G-60	Leopaphic	2-G-60	Leot
2-G-70	Leopaphic	2-G-70	Leot
2-G-80	Leopaphic	2-G-80	Leot
2-G-90	Leopaphic	2-G-90	Leot
2-G-100	Leopaphic	2-G-100	Leot
2-G-110	Leopaphic	2-G-110	Leot

Ideal 23-Inch Water Tube Boiler

Without Ideal Smoke Preventing Device

(Code Word) Leton

Boiler No.	Code Word	Boiler No.	Code Word
S-23-T-5	Leton	S-23-T-5	Leton
S-23-T-6	Leton	S-23-T-6	Leton
S-23-T-7	Leton	S-23-T-7	Leton
S-23-T-8	Leton	S-23-T-8	Leton
S-23-T-9	Leton	S-23-T-9	Leton

Boiler Code—Continued

Ideal 23-Inch Water Tube Boiler

With Ideal Smoke Preventing Device

(Code Word) Leton

Boiler No.	Code Word	Boiler No.	Code Word
T-23-9	Leton	T-23-90	Leton
T-23-10	Leton	T-23-100	Leton
T-23-11	Leton	T-23-110	Leton

Ideal 29-Inch Water Tube Boiler

Without Ideal Smoke Preventing Device

(Code Word) Leucon

Boiler No.	Code Word	Boiler No.	Code Word
S-29-T-5	Leucon	S-29-T-5	Leucon
S-29-T-6	Leucon	S-29-T-6	Leucon
S-29-T-7	Leucon	S-29-T-7	Leucon
S-29-T-8	Leucon	S-29-T-8	Leucon
S-29-T-9	Leucon	S-29-T-9	Leucon
S-29-T-10	Leucon	S-29-T-10	Leucon

Ideal 29-Inch Water Tube Boiler

With Ideal Smoke Preventing Device

(Code Word) Leucon

Boiler No.	Code Word	Boiler No.	Code Word
T-29-7	Leucon	T-29-70	Leucon
T-29-8	Leucon	T-29-80	Leucon
T-29-9	Leucon	T-29-90	Leucon
T-29-10	Leucon	T-29-100	Leucon
T-29-11	Leucon	T-29-110	Leucon

Ideal 36-Inch Water Tube Boiler

Without Ideal Smoke Preventing Device

(Code Word) Libet

Boiler No.	Code Word	Boiler No.	Code Word
S-36-T-5	Libet	S-36-T-5	Libet
S-36-T-6	Libet	S-36-T-6	Libet
S-36-T-7	Libet	S-36-T-7	Libet
S-36-T-8	Libet	S-36-T-8	Libet
S-36-T-9	Libet	S-36-T-9	Libet
S-36-T-10	Libet	S-36-T-10	Libet
S-36-T-11	Libet	S-36-T-11	Libet
S-36-T-12	Libet	S-36-T-12	Libet

Boiler Code—Continued

Ideal 36-Inch Water Tube Boiler With Ideal Smoke Preventing Device

(Code Word Librate)

Steam		Water	
Boiler No.	Code Word	Boiler No.	Code Word
T-36-8	Libratory	T-36-80	Licht
T-36-9	Libyan	T-36-90	Lick
T-36-10	Licence	T-36-100	Licour
T-36-11	Lich	T-36-110	Lictor
T-36-12	Lichon	T-36-120	Lilgic

Ideal 79-Inch Water Tube Boiler Without Ideal Smoke Preventing Device

(Code Word Ligament)

Steam		Water	
Boiler No.	Code Word	Boiler No.	Code Word
S-79-T-7	Ligin	W-79-T-7	Ligroin
S-79-T-8	Ligate	W-79-T-8	Ligsum
S-79-T-9	Ligator	W-79-T-9	Ligula
S-79-T-10	Ligature	W-79-T-10	Ligure
S-79-T-11	Ligance	W-79-T-11	Likalle
S-79-T-12	Ligger	W-79-T-12	Liken
S-79-T-13	Light	W-79-T-13	Liking
S-79-T-14	Lighter	W-79-T-14	Lilac
S-79-T-15	Lignous	W-79-T-15	Lilacin

Ideal 79-Inch Water Tube Boiler With Ideal Smoke Preventing Device

(Code Word Linachina)

Steam		Water	
Boiler No.	Code Word	Boiler No.	Code Word
T-79-9	Limbat	T-79-90	Limpet
T-79-10	Limber	T-79-100	Limpid
T-79-11	Limbus	T-79-110	Limpkin
T-79-12	Limcklin	T-79-120	Limsy
T-79-13	Limner	T-79-130	Limule
T-79-14	Limnible	T-79-140	Limulus
T-79-15	Limner	T-79-150	Limy

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Boiler Code—Continued

Ideal 15-Inch Sectional Boiler (Code Word Lion)

Steam		Water	
Boiler No.	Code Word	Boiler No.	Code Word
S-15-4	Lipaemia	W-15-4	Liplet
S-15-5	Lipans	W-15-5	Lipogram
S-15-6	Lipic	W-15-6	Liporna

Ideal 19-Inch Sectional Boiler (Code Word Lips)

Steam		Water	
Boiler No.	Code Word	Boiler No.	Code Word
S-19-5	Lipyl	W-19-5	Liqueur
S-19-6	Liquate	W-19-6	Liquidity
S-19-7	Liquify	W-19-7	Liquidize

Ideal 22-Inch Sectional Boiler (Code Word Lim)

Steam		Water	
Boiler No.	Code Word	Boiler No.	Code Word
S-22-5	Lirella	W-22-5	Lisper
S-22-6	Liskon	W-22-6	Lissom
S-22-7	Liste	W-22-7	Listel

Ideal 25-Inch Sectional Boiler (Code Word Listful)

Steam		Water	
Boiler No.	Code Word	Boiler No.	Code Word
S-25-5	Litharge	W-25-5	Lithe
S-25-6	Litich	W-25-6	Lithely
S-25-7	Litency	W-25-7	Litherly
S-25-8	Litetic	W-25-8	Lithic

Ideal 28-Inch Sectional Boiler (Code Word Lithion)

Steam		Water	
Boiler No.	Code Word	Boiler No.	Code Word
S-28-5	Lithology	W-28-5	Litigant
S-28-6	Lithosian	W-28-6	Litigator
S-28-7	Lithoxyl	W-28-7	Litigious
S-28-8	Lithy	W-28-8	Litimus

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Boiler Code—Continued

Ideal 36-Inch Sectional Boiler (Code Word . . . Lobbies)

Boiler No.	Code Word	Boiler No.	Code Word
S-36-5	Lobby	W-36-5	Lobby
S-36-6	Lobby	W-36-6	Lobby
S-36-7	Lobby	W-36-7	Lobby
S-36-8	Lobby	W-36-8	Lobby
S-36-9	Lobby	W-36-9	Lobby
S-36-10	Lobby	W-36-10	Lobby

Ideal 48-Inch Sectional Boiler Without Ideal Smoke Preventing Device (Code Word . . . Lobbies)

Boiler No.	Code Word	Boiler No.	Code Word
S-48-6	Lobby	W-48-6	Lobby
S-48-7	Lobby	W-48-7	Lobby
S-48-8	Lobby	W-48-8	Lobby
S-48-9	Lobby	W-48-9	Lobby
S-48-10	Lobby	W-48-10	Lobby

Ideal 48-Inch Sectional Boiler With Ideal Smoke Preventing Device (Code Word . . . Lobular)

Boiler No.	Code Word	Boiler No.	Code Word
T-48-0	Lobby	T-48-60	Lobby
T-48-7	Lobby	T-48-70	Lobby
T-48-8	Lobby	T-48-80	Lobby
T-48-9	Lobby	T-48-90	Lobby
T-48-10	Lobby	T-48-100	Lobby
T-48-11	Lobby	T-48-110	Lobby
T-48-12	Lobby	T-48-120	Lobby

Boiler Code—Continued

Ideal Smokeless Down Draft Boiler (Code Word . . . Lobby)

Boiler No.	Code Word	Boiler No.	Code Word
361 S	Lobby	364 W	Lobby
371 S	Lobby	371 W	Lobby
381 S	Lobby	381 W	Lobby
391 S	Lobby	391 W	Lobby
401 S	Lobby	401 W	Lobby
411 S	Lobby	411 W	Lobby
421 S	Lobby	421 W	Lobby
431 S	Lobby	431 W	Lobby
441 S	Lobby	441 W	Lobby
451 S	Lobby	451 W	Lobby
461 S	Lobby	461 W	Lobby
471 S	Lobby	471 W	Lobby
481 S	Lobby	481 W	Lobby
491 S	Lobby	491 W	Lobby
501 S	Lobby	501 W	Lobby
511 S	Lobby	511 W	Lobby
521 S	Lobby	521 W	Lobby
531 S	Lobby	531 W	Lobby
541 S	Lobby	541 W	Lobby
551 S	Lobby	551 W	Lobby
561 S	Lobby	561 W	Lobby
571 S	Lobby	571 W	Lobby
581 S	Lobby	581 W	Lobby
591 S	Lobby	591 W	Lobby
601 S	Lobby	601 W	Lobby
611 S	Lobby	611 W	Lobby
621 S	Lobby	621 W	Lobby
631 S	Lobby	631 W	Lobby
641 S	Lobby	641 W	Lobby
651 S	Lobby	651 W	Lobby
661 S	Lobby	661 W	Lobby
671 S	Lobby	671 W	Lobby
681 S	Lobby	681 W	Lobby
691 S	Lobby	691 W	Lobby
701 S	Lobby	701 W	Lobby
711 S	Lobby	711 W	Lobby
721 S	Lobby	721 W	Lobby
731 S	Lobby	731 W	Lobby
741 S	Lobby	741 W	Lobby
751 S	Lobby	751 W	Lobby
761 S	Lobby	761 W	Lobby
771 S	Lobby	771 W	Lobby
781 S	Lobby	781 W	Lobby
791 S	Lobby	791 W	Lobby
801 S	Lobby	801 W	Lobby
811 S	Lobby	811 W	Lobby
821 S	Lobby	821 W	Lobby
831 S	Lobby	831 W	Lobby
841 S	Lobby	841 W	Lobby
851 S	Lobby	851 W	Lobby
861 S	Lobby	861 W	Lobby
871 S	Lobby	871 W	Lobby
881 S	Lobby	881 W	Lobby
891 S	Lobby	891 W	Lobby
901 S	Lobby	901 W	Lobby
911 S	Lobby	911 W	Lobby
921 S	Lobby	921 W	Lobby

NUMBER 3 SERIES (Code Word . . . Naderia)

Boiler No.	Code Word	Boiler No.	Code Word
3-19 S	Naderia	4-19 S	Naderia
3-20 S	Naderia	4-20 S	Naderia
3-21 S	Naderia	4-21 S	Naderia
3-22 S	Naderia	4-22 S	Naderia
3-23 S	Naderia	4-23 S	Naderia
3-24 S	Naderia	4-24 S	Naderia
3-25 S	Naderia	4-25 S	Naderia
3-26 S	Naderia	4-26 S	Naderia
3-27 S	Naderia	4-27 S	Naderia
3-28 S	Naderia	4-28 S	Naderia
3-29 S	Naderia	4-29 S	Naderia
3-30 S	Naderia	4-30 S	Naderia
3-31 S	Naderia	4-31 S	Naderia
3-32 S	Naderia	4-32 S	Naderia
3-33 S	Naderia	4-33 S	Naderia
3-34 S	Naderia	4-34 S	Naderia

Boiler Code.....Continued

Peerless Boilers

(Cole Word Metaphor)

NUMBER 6 SERIES

Number	Steam	Code Word	Number	Water	Code Word
1500	Metaplast		1501	Middings	
1600	Meleonic		1601	Mightily	
1800	Meletragic		1801	Milanesse	
1900	Melhuiric		1901	Milician	

Standard Boilers

(Code Word: Minstrel)

Standard Boilers

(Code Word Minstrel)

Waler

Number	Code Word	Number	Code Word
15.1-W	Minorate	25.3-W	Mobilize
17.1-W	Ministrul	25.4-W	Moccasin
17.2-W	Minuscule	28.1-W	Molensse
17.3-W	Minutely	28.2-W	Moderatism
19.1-W	Minutabls	28.3-W	Modium
19.2-W	Minutifical	28.4-W	Motuator
19.3-W	Minutibul	31.1-W	Molasses
22.1-W	Minusmer	31.2-W	Molecular
22.2-W	Missoner	31.3-W	Mollifer
22.3-W	Misselcoe	31.4-W	Mollifer
22.4-W	Mitewort	34.1-W	Monarchal
25.1-W	Mitigant	34.2-W	Monetary
25.2-W	Mititrom	34.3-W	Monobeam
		34.4-W	Monostitue

ers

(*Chick World . . . Mascot*)

Water

Number	Code Word
01	Nainsook
02	Namesbulo
03	Nankcen
04	Napiform
05	Narcissus
06	Narrot
07	Nativity
08	Naturallh
09	Naughtly
10 Arco	Narcolinne
12 Arco	Narration
15 Arco	Natory

(Cole World N.

(Cole World N.

Code Word

01	.....	Nainsook
02	.....	Nameable
03	.....	Nankcen
04	.....	Naplform
05	.....	Narcissus
06	.....	Narrot
07	.....	Nativity
08	.....	Natural
09	.....	Naughty
10	.....	Narcolline
12	.....	Narrolline
15	.....	Narrolline
Arco	.....	Narrolline

Boiler Code—Continued

Ideal Boiler Parts List of Sections—All Types

	Code Word
Back Section	Pagentry
Back Section, Open	Pagonal
Center Air Tube Section	Pagula
Center Connecting Section	Paguna
Center Leg Section	Pahl
Center Section	Paien
Closed Bridgeway Center Section	Palace
Closed Center Section	Palatal
Closed Connecting Section	Paleness
Closed Diving Flue Section	Pallete
Closed Rear Center Section	Palsside
Double Section	Pancelled
Firepot Section	Pantaloos
First Section over Firepot	Pantleg
Five Flue Center Section	Panyard
Four Flue Center Section	Papagay
Front Center Section	Paparchy
Front Flue Section	Papresent
Front Flue Connecting (Closed Section)	Papillar
Front Flue Connecting (Open Section)	Paque
Front Section	Parabola
Grate Center Section	Parachute
Grate Connecting Section	Paradise
Grate Front Flue Section	Parade
Grate Front Flue Connecting Section	Paradise
Half Open Center Section	Paragram
Half Open Connecting Section	Parapet
Half Open Front Flue Section	Parasang
Holland "A" Section	Parasle
Holland "J" Section	Parasal
Intermediate Section for Premier	Paravant
Left End Section	Parboil
Leg Section	Parcase
Open Bridgeway Connecting Section	Parcel
Open Bridgeway Center Section	Parceler
Open Center Section	Parcelment
Open Connecting Section	Partial
Open Diving Flue Section	Partish
Open Rear Center Section	Partior
Open Rear Connecting Section	Park
Rear Center Section	Parakeet
Rear Center Air Tube	Parot
Rear Connecting Section	Partridge
Right End Section	Parture
Second Section Over Firepot	Pasport
Single Section	Pasturage

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Boiler Code—Continued

Ideal Boiler Parts—Continued

	Code Word
Six Inch Rear Section	Pasly
Space Section	Patsche
Steam Dome	Patria
Third Section over Firepot	Patrician
Three Hole Section	Patrol
Two Hole Section	Patrol
Water Dome Section	Patronage
No. 1 Section	Patten
No. 2 Section	Patulous

List of Grate Bars

	Code Word
One Set Grate Bars Only	Perception
One Set Grate Bars Complete with Connecting Bars and Arms	Perchance

Radiator Code

Style and Kind of Radiators

	Code Word
Angle 45° Steam	Sagente
Angle 45° Water	Sagina
Arco Window Steam	Sagittal
Arco Window Water	Sabb
Caulinal Indirect	Santive
Circular for Steam	Santaled
Circular for Water	Santonin
Corner for Steam	Sangaree
Corner for Water	Saporous
Corto Steam	Sapago
Corto Water	Sapwood
Curved for Steam	Sartoline
Curved for Water	Sartorial
Dining Room Steam	Satirist
Dining Room Water	Saturian
Direct Indirect for Steam	Sautenne
Direct Indirect for Water	Savours
Excelsior Indirect Steam	Saxonsm
Excelsior Indirect Water	Scabbie
Italian Ornamental Flue Box base Steam	Scampish
Italian Ornamental Flue Box base Water	Scapular
Italian Ornamental Flue Steam	Scarless
Italian Ornamental Flue Water	Scenario

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Radiator Code—Continued

Style and Kind of Radiators - Continued

Perfection Pin Indirect, extra large, with right- and left-hand threaded nipple connections	Scrutator	Code Word
Perfection Pin Indirect, standard size, with right- and left-hand threaded nipple connections		
Sanitary School Pin Indirect, Steam	Scumming	
Sanitary School Pin Indirect, Water	Severity	
Single Foot, Steam	Sextones	
Single Foot, Water	Sextuple	
Steering Indirect	Shackle	
Vento Blast Radiator, Regular, 30 inch	Shadness	
Vento Blast Radiator, Regular, 40 inch	Shagbark	
Vento Blast Radiator, Regular, 50 inch	Shagreen	
Vento Blast Radiator, Regular, 60 inch	Shallown	
Vento Blast Radiator, Regular, 72 inch	Shapless	
Vento Blast Radiator, Regular, 72 inch	Sharking	
Vento Blast Radiator, Narrow, 40 inch	Shattery	
Vento Blast Radiator, Narrow, 50 inch	Shattering	
Vento Blast Radiator, Narrow, 60 inch	Shedding	

Code Word

After Adjustable Wall Brackets, for 1 row	Shirting
After Adjustable Wall Brackets, for 2 rows	Shivers
Box base with back opening, Detroit Plant	Substant
Box base with bottom opening, Detroit Plant	Sichian
Box base with back opening, Titusville Plant	Sideral
Box base with bottom opening, Titusville Plant	Sidewalk
Box base, New Adjustable, back opening	Signify
Box base, New Adjustable, bottom opening	Signoidal
Brackets, No. 1	Signally
Brackets, No. 2	Signited
Brackets, No. 1	Silently
Brackets, No. M	Silicde
Brackets, No. M	Silkness
Brackets, No. N	Siluran
Brackets, No. O	Silvaze
Brackets, No. P	Similize
Bushings, 2 inches, reducing to 1½ inches	Simplex
Bushings, 2 inches, reducing to 1½ inches	Simulator
Bushings, 2 inches, reducing to 1½ inch	Sinclair
Bushings, 2 inches, reducing to 1½ inch	Sincere
Bushings, 1½ inches, reducing to 1¼ inches	Sincrete
Bushings, 1½ inches, reducing to 1 inch	Singingly
Bushings, 1½ inches, reducing to ¾ inch	Sinistre

Radiator Code - Continued

Radiator Miscellaneous - Continued

	Code Word
Bushings, 1 1/2 inches, reducing to 1/2 inch	Siphonless
Concealed Brackets (Peebles)	Siphonic
Concealed Brackets (Peebles)	Siphonic
Nipples, 2 -inch 90° right- and left-hand	Skinner
Nipples, 1 1/2-inch 90° right- and left-hand	Skinner
Nipples, 2-inch 90° right- and left-hand with hexagon nut at center	Skinner
Nipples, 2 -inch, 60° right- and left-hand	Skinner
Nipples, 1 1/2-inch, 60° right- and left-hand	Skinner
Nipples, 2-inch, 60° right- and left-hand	Skinner
Nipples, 2-inch, right-hand threaded	Skinner
Nipples, 2 1/2-inch slip	Skinner
Pedestals, inches high	Slacking
Pedestals to make distance from floor to center of supply tapping	Slacking
Plugs, 2-inch	Slacking
Plugs, 1 1/2-inch	Slacking
Plugs, 1/2-inch Brass (for air valve tapping)	Slacking
Plugs, 3/8-inch Iron (for air valve tapping)	Slacking
Saddles for marble tops	Slacking
Scidel Single Wall Radiator Bracket	Slacking
Tops, fitted with saddles for marble	Slacking
Wall Boxes, iron, 5x17 1/2	Slacking
Wall Boxes, bronze, 5x17 1/2	Slacking
Wall Boxes, bronze, 8x25	Slacking
Wall Boxes, bronze, 8x25	Slacking

Number of Sections

	Code Word
2 Sections	Smallish
3 Sections	Smallish
4 Sections	Smallish
5 Sections	Smallish
6 Sections	Smallish
7 Sections	Smallish
8 Sections	Smallish
9 Sections	Smallish
10 Sections	Smallish
11 Sections	Smallish
12 Sections	Smallish
13 Sections	Smallish
14 Sections	Smallish
15 Sections	Smallish
16 Sections	Smallish
17 Sections	Smallish
18 Sections	Smallish

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Radiator Code - Continued

Names of Sections

	Code Word
Blank Leg Section, Steam	Spillless
Drip Leg Section	Spilling
Intermediate Hot Water Leg Section	Spilling
Intermediate Hot Water Leg Section	Spilling
Intermediate Steam Leg Section	Spilling
Intermediate Steam Leg Section	Spilling
Return Steam Leg Section	Spilling
Return Hot Water Leg Section	Spilling
Supply Hot Water Leg Section	Spilling
Supply Steam Leg Section for double pipe	Spilling
Supply Steam Leg Section for single pipe	Spilling
Supply Steam Leg Section with both supply and return at bottom	Spilling

Heights

	Code Word
13 -inch Ht.	Spiller
14 -inch Ht.	Spiller
15 -inch Ht.	Spiller
16 -inch Ht.	Spiller
18 -inch Ht.	Spiller
19 -inch Ht.	Spiller
19 1/2 -inch Ht.	Spiller
20 -inch Ht.	Spiller
21 1/2 -inch Ht.	Spiller
22 -inch Ht.	Spiller
23 -inch Ht.	Spiller
24 -inch Ht.	Spiller
25 -inch Ht.	Spiller

Quantity

	Code Word
200 sq. ft.	Starched
300 sq. ft.	Starched
400 sq. ft.	Starched
500 sq. ft.	Starched
600 sq. ft.	Starched
700 sq. ft.	Starched
800 sq. ft.	Starched
900 sq. ft.	Starched
1,000 sq. ft.	Starched
1,200 sq. ft.	Starched
1,500 sq. ft.	Starched
1,800 sq. ft.	Starched
2,000 sq. ft.	Starched
2,500 sq. ft.	Starched
3,000 sq. ft.	Starched

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Specialties Code
Mentoring Specialties, etc.

Air Valves, Aero Automatic, No. 499	Code Word
Air Valves, Ideal Air Line, No. 516	Talented
Air Valves, Ideal Air Line, No. 516	Talisman
Air Valves, Compression, W. W. No. 520	Tallness
Air Valves, Compression Key, No. 521	Tameness
Air Valves, Ideal Aird, No. 500	Tamark
Air Valves, Libra Automatic, No. 395	Tamark
Air Valves, Norwall Siphon No. 561	Taproot
Air Valves, Allen No. 560	Tartaric
Air Cell Covering	Tasteful
Asphacetal, Honeywell, No. 729	Taunting
Asbestos Cement, Plastic (. . . pounds of)	Tawdry
Asphaltum Black (. . . gallons of)	Teachess
	Teaching
Bronze, Aluminum, in one-pound cans	Telluric
Bronze, Pale Gold (. . . pounds of)	Tellable
Bronze, Rich Gold (. . . pounds of)	Temperate
Bronzing Liquid (. . . cans of)	Temporal
Brushes, Bronze and Enamel	Tenderly
Brushes, Plue	Tensible
Draw Off Cock, Ideal, No. 110	Tenting
Diaphragm, Rubber	Tepidly
Elbows, Union (No. 112)	Ternless
Enamel (. . . cans of)	Terrapin
Floor and Ceiling Plates, Snaplock Black	
No. 708	Terrorize
Floor and Ceiling Plates, Snaplock Nickel	
plated, No. 709	Testable
Floor and Ceiling Plates, Plain, No. 706	Testament
Floor and Ceiling Plates, Nickel-Plated, No. 707	Testate
Gauges, Steam Retard	Tetragon
Gauges, Steam	Tetrapod
Gauges, Altitude	Textural
Generator, Honeywell Mercury	Theorem
Heater, Water Excelsior, No. 740	Theuric
Heater, Water Bungalow, Taco, Iron	Thicket
Heater, Water, Bungalow, Taco, Brass	Thickish
Heater, Water, Ar-Taco, Iron	Thinking
Heater, Water, Ar-Taco, Brass	Thirsty
Japan, Nitroon (. . . cans of)	Thither
Putty for Boilers (. . . pound can)	Thiomatic
Regulator, Arco Temperature	Throbbing
Regulator, Steam, No. 22	Thruster

Vacuum Cleaner Code

Arco Wand Vacuum Cleaners

Tool Chest (No.)	Towling
Thermometers, Straight	Toucan
Thermometers, Anglr	Toughly
Tanks, Expansion, Galvanized (No.)	Towing
Tanks, Expansion, Automatic (No.)	Towling
Tanks, Storage, Black Steel (No.)	Towling
Tanks, Storage, Galvanized (No.)	Towling
Tank Brackets	Towling
Tank Trimming, Expansion	Towling
Tanks, Expansion, Galvanized Steel (No.)	Towling
Tanks, Expansion, Automatic (No.)	Towling
Tanks, Storage, Black Steel (No.)	Towling
Tanks, Storage, Galvanized (No.)	Towling
Thermometers, Straight	Towling
Thermometers, Anglr	Towling
Tool Chest (No.)	Towling

Union	Tractable
Valves, Clog, No. 189	Tragapant
Valves, Hot Water, No. 101	Tramplin
Valves, Hot Water Improved, No. 101-A	Tramport
Valves, Hot Water, Straightway, No. 116	Transit
Valves, Ideal Packless, No. 850	Transom
Valves, Ideal Packless, R. H. Corner, No. 851	Trapdoor
Valves, Ideal Packless, I. H. Corner, No. 852	Tresary
Valves, Detroit Multibolt, No. 168	Treasure
Valves, Pop Safety, Ideal, No. 921	Trestling
Valves, Pop Safety Vapor, No. 961	Trenblin
Valves, Steam, Angle with Union, No. 72	Trenchan
Valves, Steam, Corner, R. H., No. 32	Triepass
Valves, Steam, Corner, I. H., No. 37	Trailgoup
Valves to be equipped with lock and shield	Triaboun
Vent, Ideal, Quick, No. 815	Tribute
Vento Vent, Ideal, No. 817	Trident

3:4

	Code Word
Equipment No. 3	Complete
Equipment No. 30-T	Complete
Equipment No. 4	Complete
Equipment No. 5	Complete
Equipment No. 50-T	Complete
Equipment No. 6	Complete
	Complete

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Vacuum Cleaner --Continued

Tools and Parts --Continued

	Code Word
Brush, 6-inch Hand, 1 1/4- or 1 1/2-inch hose size	Vehicle
Brush, 5-inch Hand, 1-inch hose size	Vehicle
Brush, 5-inch Hand, 1 1/4- or 1 1/2-inch hose size	Ventrilo
Brush, 2 1/2-inch Hand, 1-inch hose size	Velvet
Brush, 2 1/2-inch Hand, 1 1/4- or 1 1/2-inch hose size	Velour
Duster, 1-inch hose size	Venalize
Duster, 1 1/4- or 1 1/2-inch hose size	Venier
Pelted Sweeper, 10-inch, 1-inch hose size	Velocity
Pelted Sweeper, 12-inch, 1-inch hose size	Vellamy
Pelted Sweeper, 12-inch, 1 1/4- or 1 1/2-inch hose size	Vending
Pelted Sweeper, 15-inch, 1 1/4- or 1 1/2-inch hose size	Venery
Pelted Sweeper, 18-inch, 1 1/4- or 1 1/2-inch hose size	Venire
Pelts for 10-inch Pelted Sweeper	Venoman
Pelts for 12-inch Pelted Sweeper	Venian
Pelts for 15-inch Pelted Sweeper	Venling
Pelts for 18-inch Pelted Sweeper	Venlose
Pibre, 8-inch Round Tool, 1-inch hose size	Ventures
Pibre, 8-inch Round Tool, 1 1/4- or 1 1/2-inch hose size	Vergers
Pibre, 15-inch Angle Tool, 1-inch hose size	Versify
Pibre, 15-inch Angle Tool, 1 1/4- or 1 1/2-inch hose size	Verdi
Gulper Tool, 1-inch hose size	Vertel
Gulper Tool, 1 1/4- or 1 1/2-inch hose size	Vertigate
Observation Glass Complete, 1-inch hose size	Ventral
Observation Glass Complete, 1 1/4- or 1 1/2-inch hose size	Venture
Observation Glass Globe	Venues
Renovator, 4-inch, 1-inch hose size	Verly
Renovator, 4-inch (Adjustable Suction Type), 1-inch hose size	Vernum
Renovator, 4-inch, 1 1/4- or 1 1/2-inch hose size	Vernam
Renovator, 4-inch (Adjustable Suction Type), 1 1/4- or 1 1/2-inch hose size	Verbose
Renovator, 7-inch, 1-inch hose size	Verbatim
Renovator, 10-inch, 1-inch hose size	Verdict
Renovator, 10-inch, 1 1/4- or 1 1/2-inch hose size	Verne
Renovator, 12-inch, 1 1/4- or 1 1/2-inch hose size	Vernon
Renovator, 12-inch (Adjustable Suction Type), 1 1/4- or 1 1/2-inch hose size	Verping
Radiator Tool, 1-inch hose size	Verly
Radiator Tool (underneath), 1-inch hose size	Vermes

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Vacuum Cleaner Code--Continued

Tools and Parts--Continued

	Code Word
Tuft Cleaner, 1-inch hose size	Version
Tuft Cleaner, 1 1/4- or 1 1/2-inch hose size	Versus
Wand (Handle) No. 3, 1-inch hose size	Verrigo
Wand (Handle) No. 5, 1 1/4- or 1 1/2-inch hose size	Vesper
Wall Handle, 1-inch hose size	Vessel
Wall Handle, 1 1/4- or 1 1/2-inch hose size	Vestry
Wood Pace Sweeper, 12-inch, 1 1/4- or 1 1/2-inch hose size	Vestments
Wood Pace Sweeper, 15-inch, 1 1/4- or 1 1/2-inch hose size	Vestibule
Wood Pace Sweeper, 18-inch, 1 1/4- or 1 1/2-inch hose size	Vestigate

Inlet Couplings

	Code Word
Inlet Coupling, Wall Type, 1-inch hose size	Versic
Inlet Coupling, Floor Type, 1-inch hose size	Vertebra
Inlet Coupling Lock and Key, 1-inch hose size	Vertex
Inlet Coupling, Wall Type, 1 1/4-inch hose size	Verbena
Inlet Coupling, Floor Type, 1 1/4-inch hose size	Vesicant
Inlet Coupling Lock and Key, 1 1/4-inch hose size	Vesicate
Inlet Coupling, Wall Type, 1 1/2-inch hose size	Vestment
Inlet Coupling, Floor Type, 1 1/2-inch hose size	Vestal
Inlet Coupling Lock and Key, 1 1/2-inch hose size	Vestige
Inlet Coupling Bushings (1 1/2 x 1 1/4 inches), 1-inch hose size	Vetcher
Inlet Coupling Bushings (2 x 1 1/4 inches), 1 1/4-inch hose size	Vetced
Inlet Coupling Bushings (2 1/4 x 2 inches), 1 1/2-inch hose size	Vetunios
Inlet Coupling Wrench, 1-inch hose size	Vexing
Inlet Coupling Wrench, 1 1/4-inch hose size	Vertical
Inlet Coupling Wrench, 1 1/2-inch hose size	Vialnet

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Hose, Feline, 1 inch with Coupling, .5 foot lengths	Coke, Wash
Hose, Feline, 1 inch with Coupling, .10 foot lengths	Waddle
Hose, Feline, 1 inch with Coupling, .15 foot lengths	Wacker
Hose, Feline, 1 inch with Coupling, .20 foot lengths	Wadding
Hose, Feline, 1 inch with Coupling, .25 foot lengths	Waders
Hose, Feline, 1 inch with Couplings, .30 foot lengths	Waffer
Hose, Feline, 1 inch with Couplings, .35 foot lengths	Waffle
Hose, Rubber, 1 1/4 inch with Coupling, .15 foot lengths	Wagger
Hose, Rubber, 1 1/4 inch with Coupling, .25 foot lengths	Wagers
Hose, Rubber, 1 1/4 inch with Coupling, .35 foot lengths	Walter
Hose, Rubber, 1 1/4 inch with Coupling, .50 foot lengths	Walton
Hose, Rubber, 1 1/2 inch with Coupling, .15 foot lengths	Wamble
Hose, Rubber, 1 1/2 inch with Coupling, .25 foot lengths	Wampum
Hose, Rubber, 1 1/2 inch with Coupling, .35 foot lengths	Wampy
Hose, Rubber, 1 1/2 inch with Coupling, .50 foot lengths	Wander
Hose Bracket, 1 inch	Washed
Hose Bracket, 1 1/4 or 1 1/2 inch	Washen
Hose Couplings, Complete, 1 inch	Warmer
Hose Couplings, Complete, 1 1/4 inch	Wardle
Hose Couplings, Complete, 1 1/2 inch	Warden
Hose Couplings, Female End, 1 inch	Warning
Hose Couplings, Female End, 1 1/4 inch	Waring
Hose Couplings, Female End, 1 1/2 inch	Warant
Hose Couplings, Male End, 1 inch	Warful
Hose Couplings, Male End, 1 1/4 inch	Warless
Hose Couplings, Male End, 1 1/2 inch	Warman

Motors for Arco Wand

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