



G-60 GAS BOILER

INSTRUCTION MANUAL

CERTIFIED BY AMERICAN GAS ASSOCIATION

**NOTICE TO INSTALLER AND OPERATOR
THIS BOOKLET MUST BE AFFIXED ON OR
ADJACENT TO THE HEATING EQUIPMENT.**

BP-100-G60



02323

G-60 GAS BOILER

TO THE OWNER:

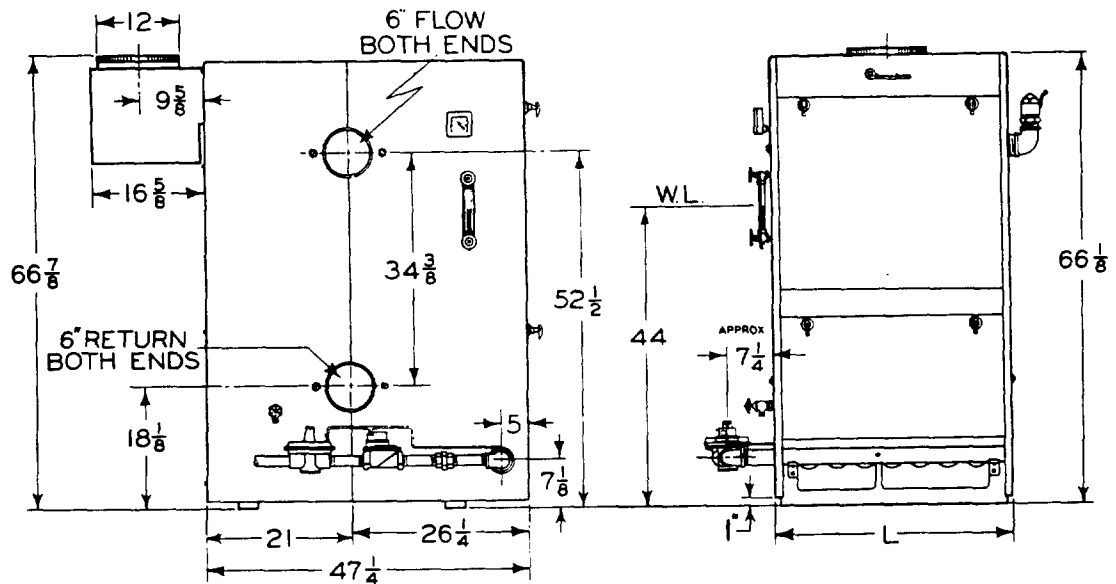
The American-Standard Boiler which has been installed for you is the heart of your hydronic heating system. Its design represents advanced engineering and manufacturing techniques to produce a product which will provide you with heating comfort at the lowest operating and maintenance cost. The sections are made of cast iron which is well known for its long life and corrosion resistant properties. When hot water is used as a heating medium, the entire system is filled with water and an expansion tank provides space for the increased volume as the water in the system expands when it is heated. In a steam system the water is to be maintained at the indicated level. Under no conditions should any boiler be fired unless it is properly filled with water. If a boiler is not in use during the winter season it must be drained or otherwise protected against freezing temperatures.

A gas fired boiler uses gas as a fuel. The chemical composition of natural gas is similar to gasoline which is used as the fuel in an automobile engine. The toxic nature of automobile exhaust fumes is well known. These fumes are toxic because the hydrocarbon fuel is not completely burned. In a properly adjusted and normally operating gas fired appliance such as a kitchen range, boiler, water heater, etc., the hydrocarbon fuel is burned completely, producing harmless combustion by-products, and these products are normally vented to the outside atmosphere. Normal prudence will dictate that the venting system and combustion process of any gas fired appliance be checked periodically to assure that normal operation is taking place. Any abnormalities in combustion or venting of flue products to the outside atmosphere should be promptly corrected.

By following the suggestions contained in this manual, you can assume your boiler will function properly for many years. Should any problem arise, contact your nearest American-Standard contractor, whose name can be found in the "yellow pages" of your telephone directory.

AMERICAN-STANDARD

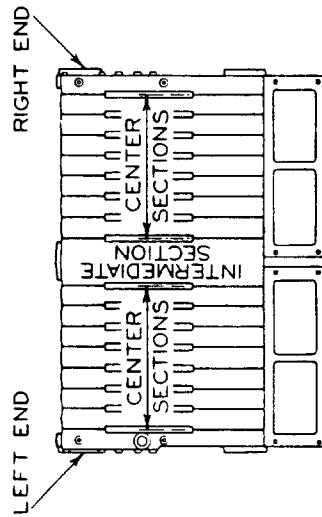
GENERAL DIMENSIONS FOR 6 TO 11 SECTION BOILERS



BOILER NUMBER	No. OF SECTIONS	No. OF BURNERS	L	SIZE GAS CONNECTION	
				NATURAL BUTANE & PROPANE	MIXED
G-606	6	5	27 1/8	1 1/4	2
G-607	7	6	31 1/4	1 1/4	2
G-608	8	7	35 3/8	1 1/4	2
G-609	9	8	39 1/2	1 1/4	2
G-6010	10	9	43 5/8	1 1/2	2
G-6011	11	10	47 3/4	1 1/2	2 1/2

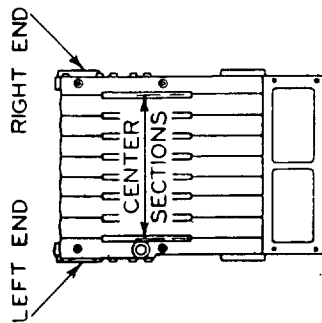
G-60 GAS BOILER

BOILER NUMBER	ARRANGEMENT OF SECTIONS			
	LE	C	I	RE
G-6013	1	5	1	5
G-6015	1	6	1	6
G-6017	1	7	1	7
G-6019	1	8	1	8
G-6021	1	9	1	9

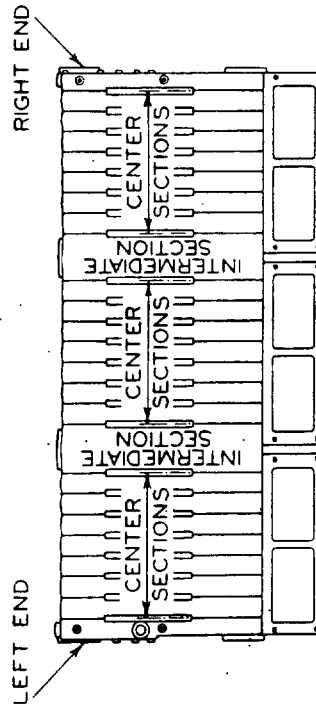


G-6013 THRU G-6021

BOILER NUMBER	ARRANGEMENT OF SECTIONS			
	LE	C	I	RE
G-606	1	4	1	1
G-607	1	5	1	1
G-608	1	6	1	1
G-609	1	7	1	1
G-6010	1	8	1	1
G-6011	1	9	1	1



G-606 THRU G-6011



G-6022 THRU G-6031

BOILER NUMBER	ARRANGEMENT OF SECTIONS			
	LE	C	I	RE
G-6022	1	6	1	6
G-6025	1	7	1	7
G-6028	1	8	1	8
G-6031	1	9	1	9

CODE

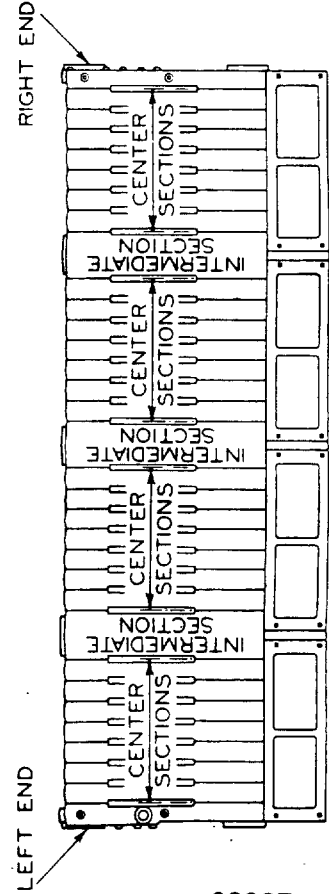
LE - LEFT END SECTION

C - CENTER SECTIONS

I - INTERMEDIATE SECTION

RE - RIGHT END SECTION

BOILER NUMBER	ARRANGEMENT OF SECTIONS			
	LE	C	I	RE
G-6033	1	7	1	7
G-6037	1	8	1	8
G-6041	1	9	1	9

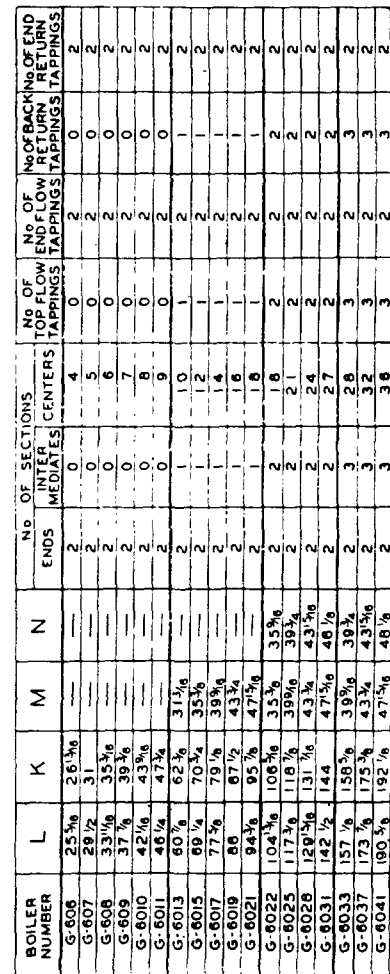


G-6033 THRU G-6041

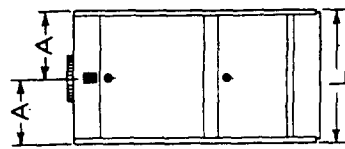
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Boiler Number	DIMENSIONS - INCHES							No. Of Burners	No. Of Draft- hoods	No. Of Flue Outlets	
	A	B	C	D	E	F	G				L
G-606			6-1/4	16	8	78-5/8		27-1/8	5	1	1
G-607			6-1/4	16	8	78-3/8		31-1/4	6	1	1
G-608			6-1/4	16	8	78-5/8		35-3/8	7	1	1
G-609			6-1/4	16	8	78-5/8		39-1/2	8	1	1
G-6010			6-1/4	20	9	80-5/8		43-5/8	9	1	1
G-6011			6-1/4	20	9	80-5/8		47-3/4	10	1	1
G-6013	31-3/8		6-1/2	16	8	78-5/8	31-3/8	62-3/4	12	2	2
G-6015	35-1/2		8-3/8	16	8	78-5/8	35-9/16	71	14	2	2
G-6017	39-3/8		8-3/8	16	8	78-5/8	39-3/4	79-1/4	16	2	2
G-6019	43-3/4		8-3/8	20	9	80-5/8	43-15/16	87-1/2	18	2	2
G-6021	47-7/8		8-3/8	20	9	80-5/8	48-1/8	95-3/4	20	2	2
G-6022	35-1/2	35-9/16	8-3/8	16	8	78-5/8	35-9/16	106-5/8	21	3	3
G-6025	39-5/8	39-3/4	8-3/8	16	8	78-5/8	39-3/4	119	24	3	3
G-6028	43-3/4	43-15/16	8-3/8	20	9	80-5/8	43-15/16	131-3/8	27	3	3
G-6031	47-13/16	48-1/8	8-3/8	20	9	80-5/8	48-1/8	143-3/4	30	3	3
G-6033	39-5/8	39-3/4	8-3/8	16	8	78-5/8	39-3/4	158-3/4	32	4	4
G-6037	43-11/16	43-15/16	8-3/8	20	9	80-5/8	43-15/16	175-1/4	36	4	4
G-6041	47-3/4	48-1/8	8-3/8	20	9	80-5/8	48-1/8	191-3/4	40	4	4

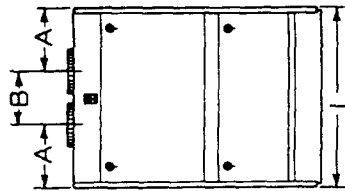
1. Assemble base, sections, platework, burners, manifold(s), jacket(s), and canopy(s) as instructed in the regular Installation Manual.
Top jacket panel(s) must be in place before draft hood is connected.
2. Place draft hood firmly on the flue outlet collar of the canopy which projects above the jacket.
 - a. 6 to 11 section boilers-Draft hood can be positioned to direct the draft hood outlet to front, rear or either side of boiler.
 - b. 13 to 41 section boilers-Draft hood must be positioned with outlet directed to front or rear of boiler.
3. Install flue pipe connecting draft hood(s) to breeching or chimney. Flue pipe must have adequate support. Do not depend upon draft hood to support flue pipe or breeching.



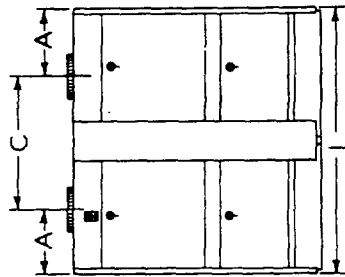
DRAFT HOOD OUTLET DIMENSIONS FOR 6 TO 41 SECTION BOILERS



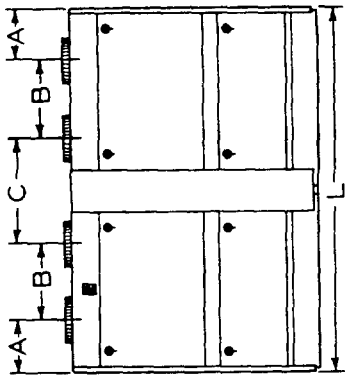
6-7-8 SECTIONS



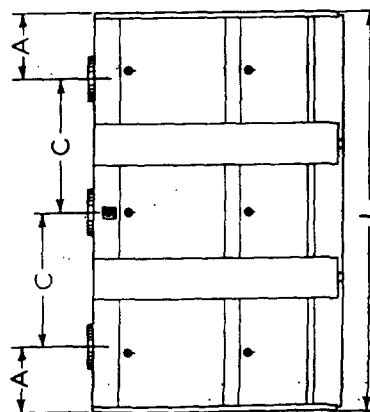
9-10-11 SECTIONS



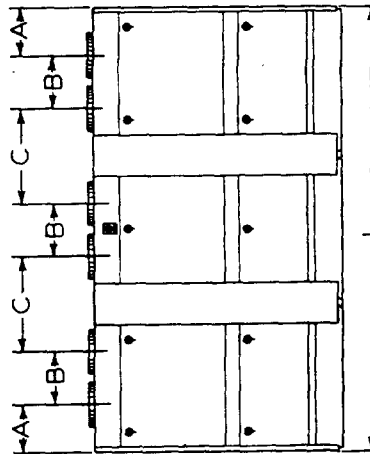
13-15 SECTIONS



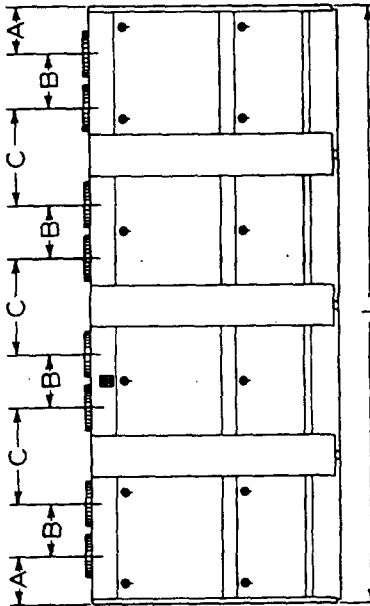
17-19-21 SECTIONS



22 SECTIONS



25-28-31 SECTIONS



33-37-41 SECTIONS

DIMENSIONS FOR DRAFT HOOD OUTLETS

No OF SECTIONS	6	7	8	9	10	11	13	15	17	19	21	22	25	28	31	33	37	41
No OF FLUE OUTLETS	1	1	1	2	2	2	2	2	4	4	4	3	6	6	6	8	8	8
A	13 $\frac{1}{8}$	15 $\frac{1}{8}$	17 $\frac{1}{8}$	12 $\frac{1}{2}$	13 $\frac{1}{8}$	13 $\frac{1}{8}$	15 $\frac{1}{8}$	17 $\frac{1}{8}$	12 $\frac{1}{2}$	13 $\frac{1}{8}$	13 $\frac{1}{8}$	17 $\frac{1}{8}$	12 $\frac{1}{2}$	13 $\frac{1}{8}$	13 $\frac{1}{8}$	12 $\frac{1}{2}$	13 $\frac{1}{8}$	13 $\frac{1}{8}$
B	—	—	—	14 $\frac{1}{2}$	16 $\frac{1}{2}$	20 $\frac{1}{2}$	—	—	14 $\frac{1}{2}$	16 $\frac{1}{2}$	20 $\frac{1}{2}$	—	14 $\frac{1}{2}$	16 $\frac{1}{2}$	20 $\frac{1}{2}$	14 $\frac{1}{2}$	16 $\frac{1}{2}$	20 $\frac{1}{2}$
C	—	—	—	—	—	—	31 $\frac{1}{8}$	35 $\frac{1}{8}$	25 $\frac{1}{2}$	27 $\frac{1}{2}$	27 $\frac{1}{2}$	35 $\frac{1}{8}$	25 $\frac{1}{2}$	27 $\frac{1}{2}$	27 $\frac{1}{2}$	25 $\frac{1}{2}$	27 $\frac{1}{2}$	27 $\frac{1}{2}$
L	27 $\frac{1}{2}$	31 $\frac{1}{2}$	35 $\frac{1}{2}$	39 $\frac{1}{2}$	43 $\frac{1}{2}$	47 $\frac{1}{2}$	62 $\frac{1}{2}$	71	79 $\frac{1}{2}$	87 $\frac{1}{2}$	95 $\frac{1}{2}$	106 $\frac{1}{2}$	119	131 $\frac{1}{2}$	143 $\frac{1}{2}$	158 $\frac{1}{2}$	175 $\frac{1}{2}$	191 $\frac{1}{2}$
MINIMUM EQUIVALENT DIAMETER OF FLUE HEADER	14	16	16	16	16	16	18	18	20	20	22	22	24	24	26	26	30	30

CAUTION: This appliance should be installed in accordance with the latest A.S.A. instructions for "Installation of Gas Appliances and Gas Piping". Reference should also be made to gas company regulations and local building, plumbing or other codes in effect in the area in which the installation is made.

On hot water systems, expansion tank should not be installed in cold or exposed place. If pipe leading to or from the tank freezes, serious damage may result. If valve of any description is installed in the piping leading to or from the expansion tank BE SURE THAT IT IS OPEN WHILE THE BOILER IS IN OPERATION.

MINIMUM CLEARANCE

Between boiler, vent collector and any combustible material - 6 inches. Front or sides for servicing, cleaning or removal of controls, burners and circulator - 24 inches. Access passage at a side to another side requiring service or cleaning - 18 inches.

In utility room installations, the door shall be wide enough to allow the largest part to enter or to permit the replacement of another appliance such as a water heater.

LOCATION

Locate the boiler near the chimney or flue and as centralized with respect to the heat distribution system as practicable. Provide necessary service accessibility clearance.

If water condition exists in the basement, or if it has been necessary to waterproof the basement floor, the boiler should be mounted on a concrete or hollow tile base, preferably to a height of at least three inches.

AIR FOR COMBUSTION AND VENTILATION

Adequate facilities must be available for providing air for combustion and ventilation. Except for installations in large spaces (such as full basements) where infiltration can normally be assumed to provide sufficient air, this will usually necessitate:

- (a) Two openings, one near the floor, the other near the ceiling, installed in the door or a single wall of the heater room.
- (b) Opening to interior space, minimum free area of one (1) square inch per (1000) Btu per hour of input rating. (This method should always be used where practicable).
- (c) Openings to outdoors - minimum free area of 1 square inch per 4000 Btu per hour of input rating, or in accordance with the methods outlined in the latest issue of A.S.A. Z21.30 entitled "Installation of Gas Appliances and Gas Piping". (This method should only be used where openings to interior spaces are impracticable).

CHIMNEY

1. Flue or vent connection to chimney shall not be smaller than 12" diameter for 6-7-8 section boilers and for larger sizes not smaller than equivalent diameters shown in chart on Page 4.
2. Where two or more appliances vent into a common flue, the area of the common flue should at least equal the area of the largest flue or vent connector plus 50 per cent of the areas of the additional flue or vent connectors.
3. Flue or vent connector must be inserted into but not beyond the inside of the chimney flue.
4. Horizontal runs of flue pipe should be kept at a minimum and should be installed with a 1/4" pitch per foot maintained.

CAUTION

If and when this boiler is used in connection with refrigeration systems, boiler should be so installed that chilled medium is piped parallel with the heating boiler using appropriate valves to prevent the chilled medium from entering the heating boiler.

When hot water heating boilers are connected to heating coils located in air handling units, where they may be exposed to refrigerated air circulation, such boiler piping system shall be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

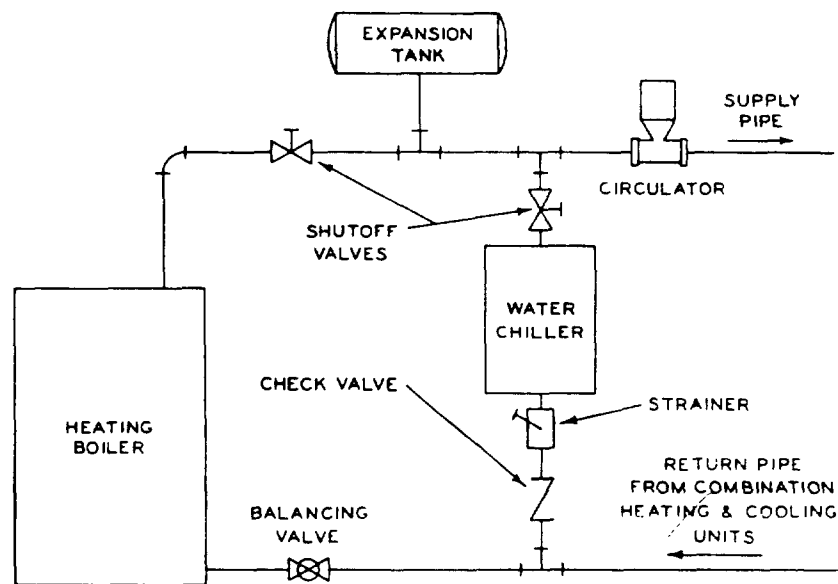


FIG. 1 RECOMMENDED BOILER PIPING FOR COMBINATION HEATING & COOLING UNITS

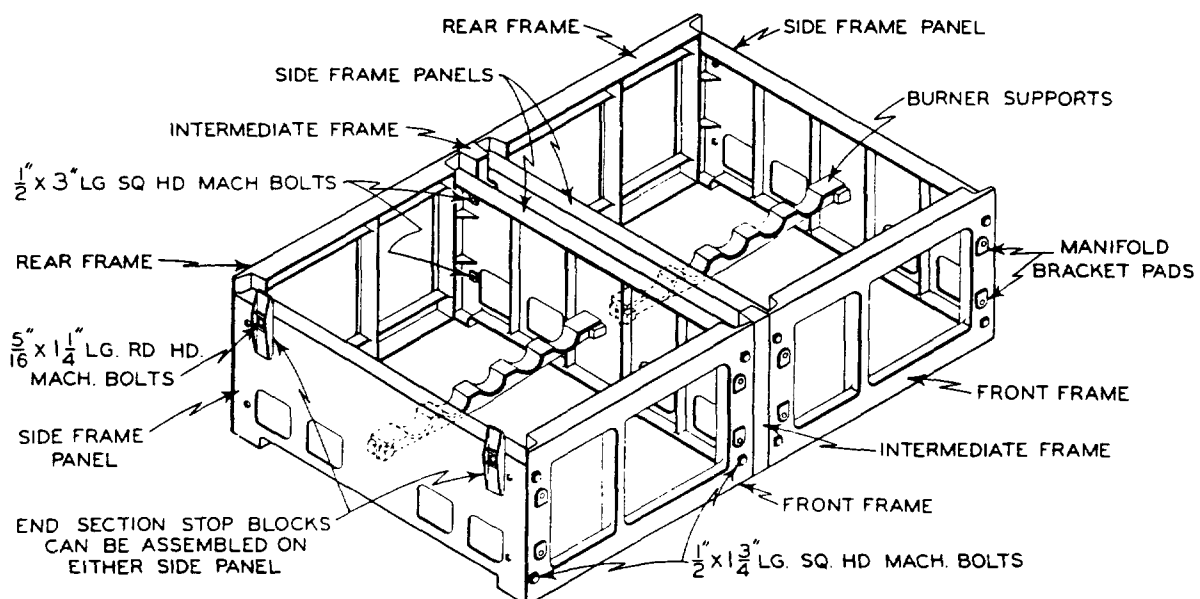


FIG. 2 BASE FOR TWO COMBUSTION CHAMBERS SHOWN

ASSEMBLY OF BASE

Base for 13 through 21 Section Boilers, as shown on preceding page. - Only half of the assembly is required for 6 through 11 section boilers.

For 6 through 11 section boilers - Bolt front and rear base frames to right and left hand base side panels with ribs inside. Word "TOP" is cast on all base panels to indicate correct position.

Be sure that corners of base are square, then level base with front in final position with regard to chimney.

Attach two end section STOP BLOCKS on end of base from which assembly is started with 5/16" x 1-1/4" bolts, making nuts finger tight only and leaving block in horizontal position temporarily.

For 13 through 41 section boilers - Select intermediate spacers from boiler parts, two for 13 through 21 sections; four for 22 through 31 sections; and six for 33 through 41 section boilers. Bolt two spacers between the flat sides of two side frame panels so that spacers are flush at the bottom. Assemble all spacers and side panels required for the boiler using 1/2" x 3" bolts provided.

Assemble front and rear base frames to bolted side panel assemblies, then assemble a base side panel on each end. Draw bolts only moderately tight. Be sure that corners of base are square, then level base with front in final position with regard to chimney and draw all bolts up tight. See Fig. 2.

NOTE: All reference to right or left parts refer to observer's right or left when facing front of boiler.

ASSEMBLY OF SECTIONS

1. Select either right end section (less 1/2" gauge and trim tappings) or left end section (with 1/2" gauge and trim tappings) and place on base with flat outside face flush with outside of side panel (Cleanout opening to front of boiler). Support with wood prop. Turn stop block up to vertical position and tighten nuts. This operation is important to make sure that end section does not move off of the base during subsequent section assembly operations. See Fig. 3.
2. Clean nipples and nipple openings with kerosene or gasoline and apply a thin film of good lubricating oil. Do not use paint or red lead.



FIG. 3—Mounting End Section

ASSEMBLY OF SECTIONS

3. Drive nipples squarely into end section using block of wood and hammer or preferably an aluminum headed hammer, if available. Gauge nipples in both directions to insure that they are driven squarely and to proper depth in nipple openings; nipple setting gauge is provided for this purpose. Cutout in gauge should rest on both sides of nipple when legs of gauge are touching finished ribs on section. Most nipple leaks are caused by tilted or cocked nipples. See Figs. 4 and 5.

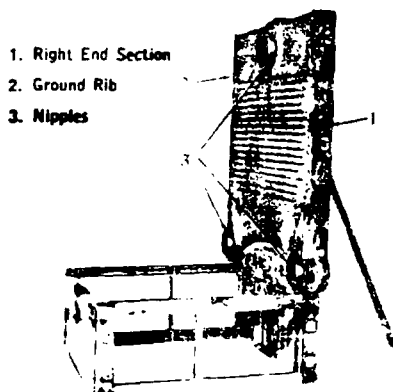


1. Nipple Gauge

FIG. 4—Gaging Nipple

4. Paint ground bead around outside edges of section only with red lead.

5. Place center section on base with cleanout openings to front and engaging nipples in the end section. Drive sections together with heavy block of wood striking sections squarely as possible over nipple ports.

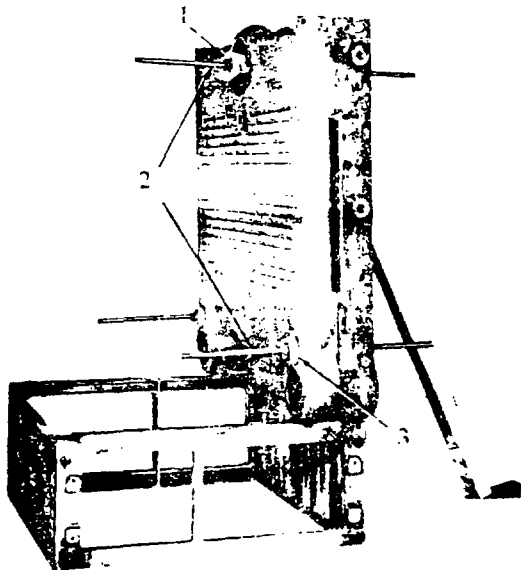


1. Right End Section
2. Ground Rib
3. Nipples

FIG. 5—Starting Assembly

6. For 6 through 11 Section Boilers - Insert one tie rod through each bolt hole above lower nipple ports and one tie rod through upper nipple port. Place assembling blocks on upper rod and assembling washers on lower rods as shown and place nuts and washers on all rods. See Fig. 6.

For 13 through 41 Section Boilers - Use Assembling clamps with loose jaws against end section in place of block, nuts and washers. Place clamps on rods with flat side against section. Insert jaws in blocks with serrated end against rod and draw up on rod from opposite end. Tap jaw lightly to tighten grip on rod. Do not permit jaws to clamp on threads. Place nuts and washers on other end. See Fig. 7.



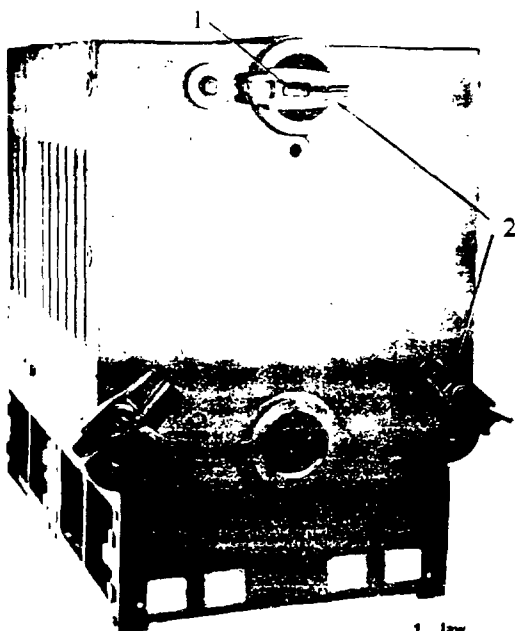
- 1. Assembling Block
- 2. Tie Rods
- 3. Assembling Washer

FIG. 6—Assembling Sections

7. All Sizes - Draw up evenly on all tie rods starting with lower tie rods. Tighten nuts alternately and bump sections with heavy block of wood at nipple ports to facilitate assembly. Continue to draw up alternately until sections make contact at ground joints. Apply oil or grease freely to tie rod threads while assembling sections to prevent stripping of threads on rods.

Paint ground rib of each section with red lead and continue assembling sections ONE AT A TIME until all center sections are assembled.

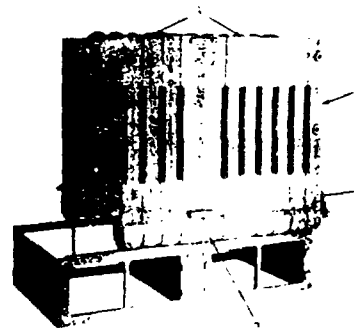
8. For 13 through 41 Section Boilers - Continue to assemble sections until ready for intermediate (thick) section, then lengthen tie rods with couplings provided. Repeat this operation as each intermediate section is assembled. See Fig. 8.



- 1. Jaw
- 2. Clamps

FIG. 7—Assembling Clamps

9. Remove upper tie rod and assembling blocks. Remove nuts and washers from lower rods. In case of 13 through 41 section, also remove clamps. Place remaining end section in position and insert tie rods through all tie rod holes in sections. Draw sections together as in previous operations until all ground joints are tight. Then back-off all tie rod nuts one half turn. Rods must not project beyond large bosses to avoid interference with jacket.



- 1. Right End Section
- 2. Intermediate Section
- 3. Center Section

FIG. 8—Assembling Larger Boilers

TESTING

Before connecting boiler, plug openings, fill boiler with water and subject to not less than 10 lbs. nor more than 50 lbs. pressure. Inspect boiler inside and outside for leakage as a result of breakage from handling and shipping. To safeguard accuracy of gauge and controls supplied with boiler do not install until after test of the boiler. This precaution of testing the boiler will simplify handling of any necessary replacements or adjustments and assist in treating with claims against transportation companies. After test, drain and remove plugs where required.

ASSEMBLY OF PLATEWORK, MAIN BURNERS AND MANIFOLD

1. Putty outside of sections at joints with boiler putty.

Assemble hook bolts to the cleanout cover plates with washers and nuts started on threads. Place the asbestos wick packing in the groove around each plate pressing it down so that it will adhere to the grooved surface.

Assemble the plates to the boiler by placing the lower end of the plate in the recess about $3/4$ " above the bottom. The upper end of the plate should be held out an inch or more at the top. Push the hook bolt in as far as the nut will permit and turn the hook down.

Push the plate down toward the lower end of the recess and at the same time engage the hook on the projecting lugs in the cleanout opening. Hold the plate firmly in the recess and tighten the nut on the hook bolt sufficiently to seal all around each plate.

2. Place burner support in position between lugs provided on inside of base frame side panels. See Fig. 9.
3. Attach manifold support brackets to front base frame with $3/8$ " cap screws provided.
4. See that orifices in ends of orifice holders assembled in manifold are screwed in tight and that orifices are drilled to size specified on tag attached to manifold.

Assemble $1/4$ "-20 set screws to the manifold brackets and place manifold in position. Tighten set screws temporarily.

5. Assemble sheet metal locknuts and air shutters on the spud holders. The flatside of the locknuts and boss side of the air shutters should face the manifold.



1. Cleanout Cover Plates
2. Burner Support

FIG. 9—Section Assemblage

6. Starting at either end of base, place each mixer tube firmly on its orifice holder and on the burner support. Place burners on mixer tubes. Ends of burners with two tapped holes for pilot brackets should face the front. See that burners are straight and level when assembly is complete. Tighten set screws in manifold brackets. See Fig. 10.

For 13 through 41 Section Boilers - Couple manifolds at unions as required. See that orifice holders are in straight line before placing manifold assembly in the brackets and tightening the set screws. See Fig. 11.

PILOT BURNERS

Attach pilot burner assemblies to main burners. When one pilot burner with vent tube assembly is supplied, it should be attached to the third burner from the left end in all cases. If two pilot burner and vent tube assemblies are supplied, the second assembly should be attached to the second burner from the right end, except for six section boilers where it is attached to the first burner from the right end. See Figs. 12, 13, 14, 15, 16, 17, 18 and 19 for pilot installations covering all boiler assemblages for various types of gases.

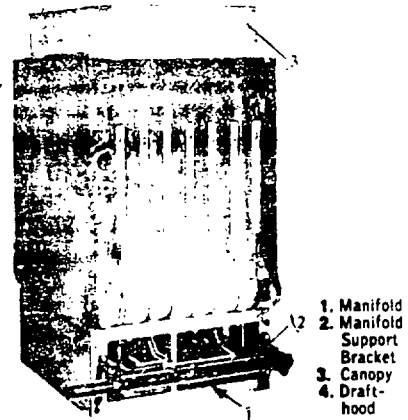


FIG. 10—Burners, Manifold, Canopy And Draft-hood Assembled

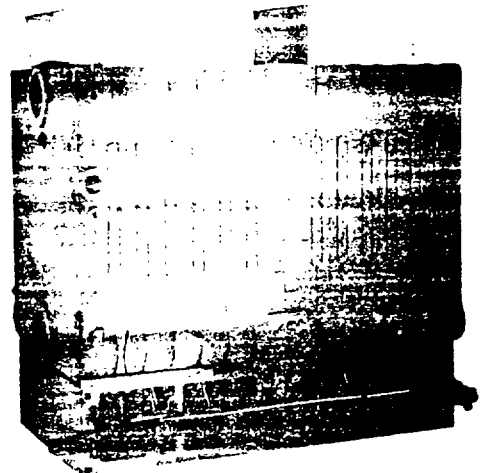


FIG. 11—Manifold And Canopy Assembly—Larger Boilers

FOR 100% SHUTOFF - One or two pilot burners with 24" thermocouples are provided as required. One Pilot with 24" thermocouple must be attached to the second burner from the right hand end, except for the G-606 boiler in which case the pilot is attached to the first burner from the right hand end. Refer to Fig. 18, Page 16 for the position of the second pilot burner near to the centrally located pilot switch on G-6028 and larger boilers for Mixed Gas.

FOR ELECTRIC IGNITION - Attach electric pilot burner igniter assemblies to main burners. See Figures 14, 15 and 16.

NOTE: - Pilots with electric igniters are to be located only where pilots with thermocouples are designated by symbols in Figures 15 and 16.

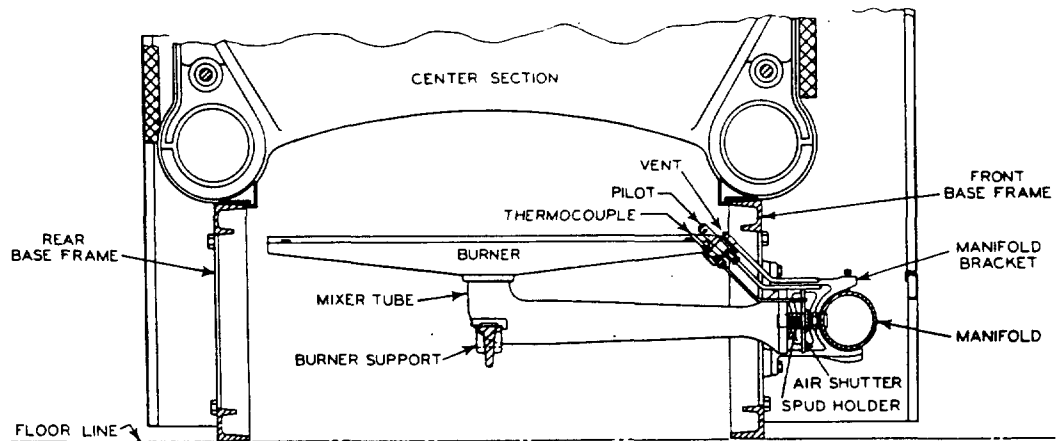


Fig. 12 - Burner Installation - Pilot Burner, Thermocouple and Vent Tube.

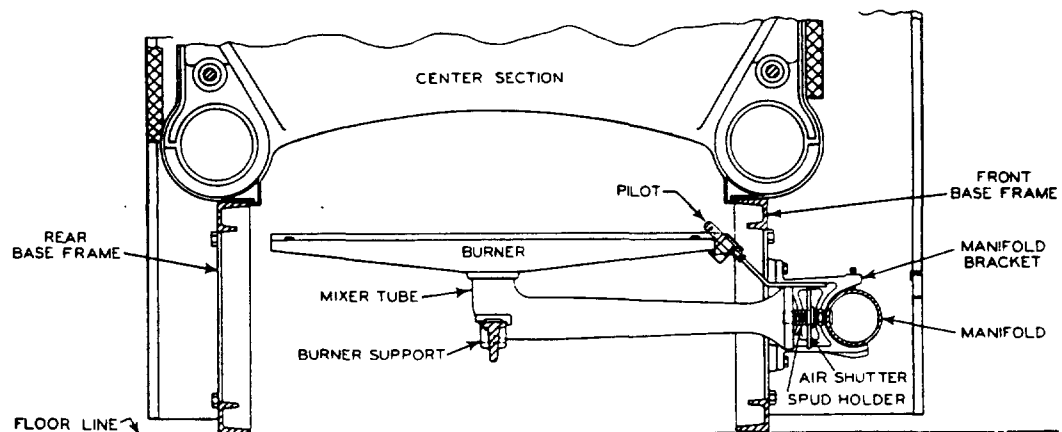


Fig. 13 - Burner Installation - Auxiliary (Stand-By) Pilot Burner.

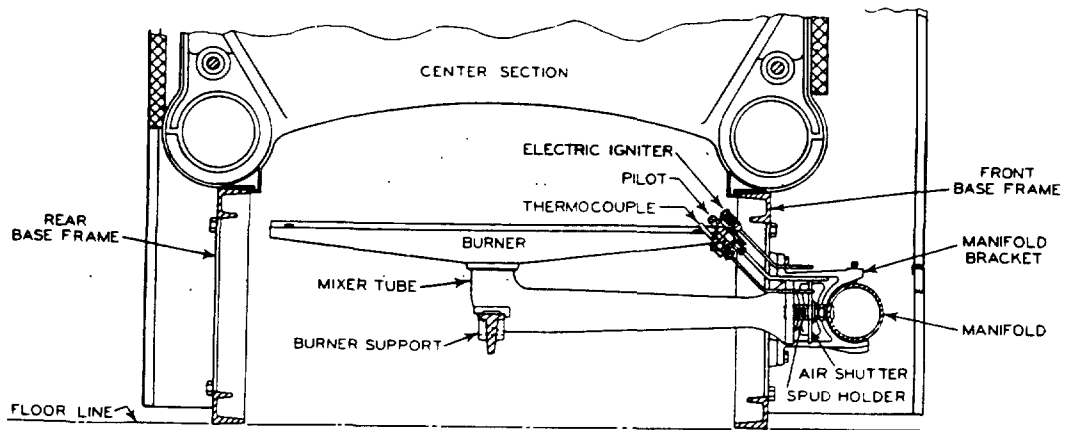


Fig. 14 - Burner Installation - Pilot Assembly for Electric Ignition.

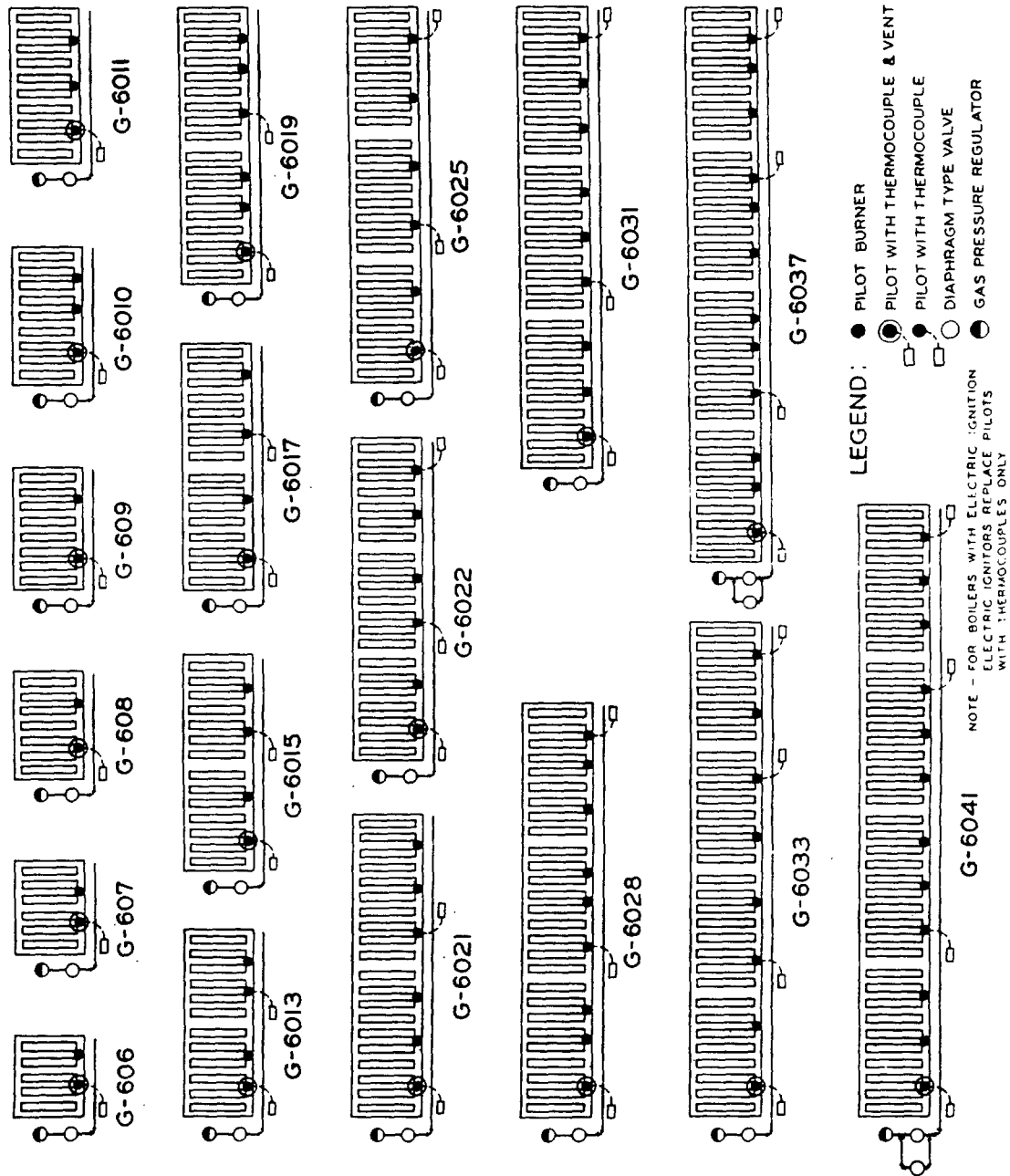
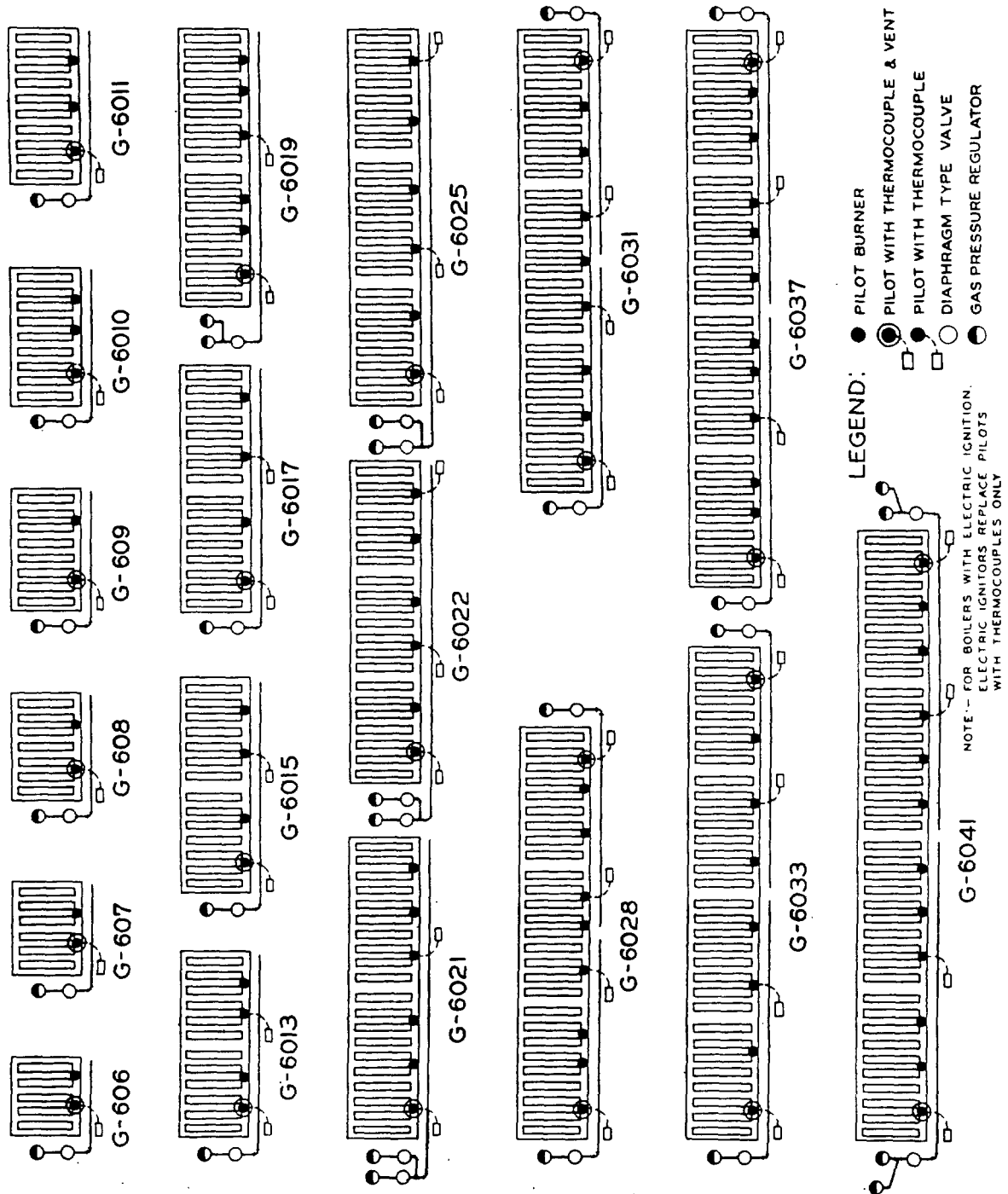


Fig. 15 - Burner, Pilot and Control Installation for Natural Gas, Non-100% Shutoff



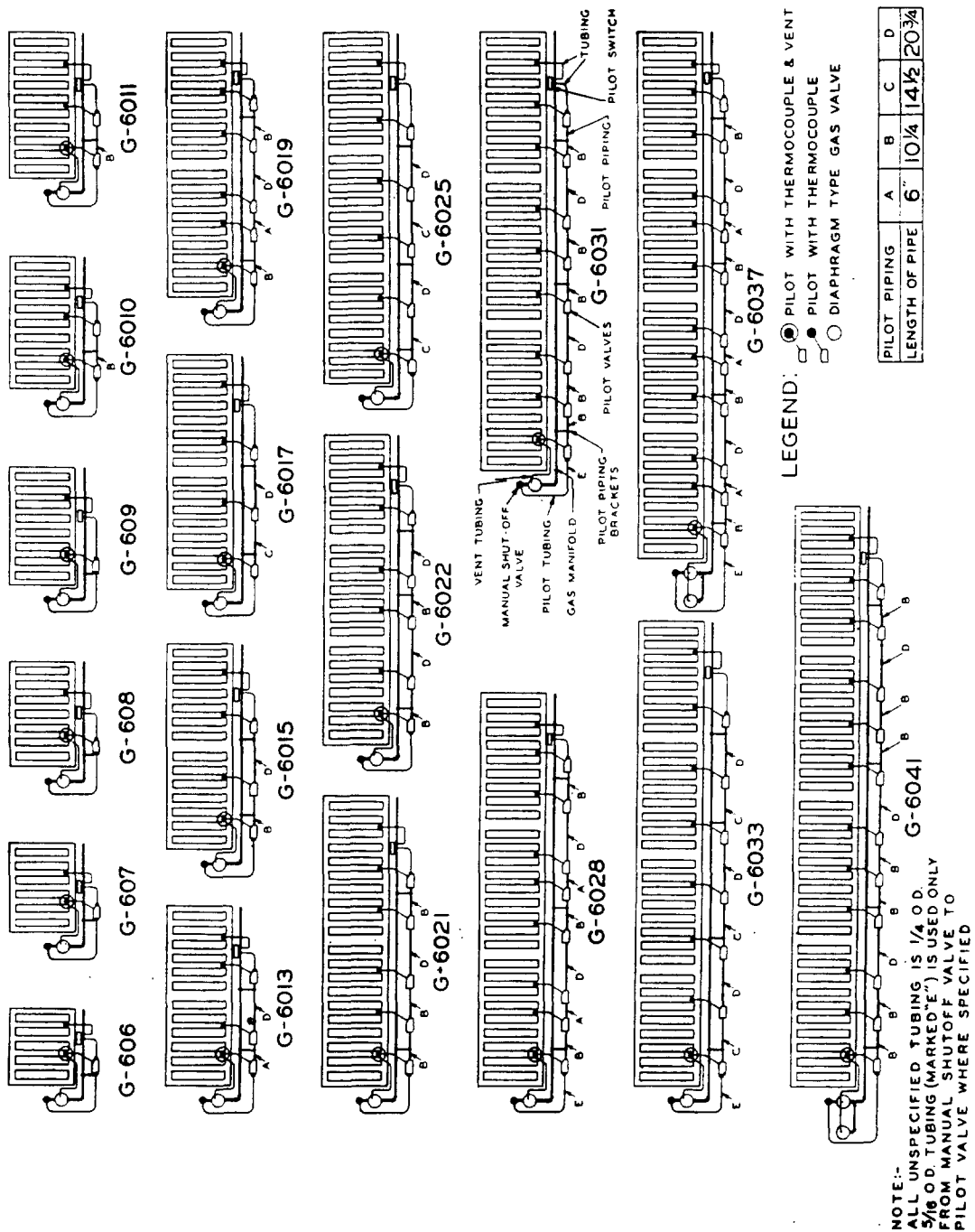


Fig. 17 - Burner, Pilot and Control Installation for Butane and Propane Gases, 100% Shutoff

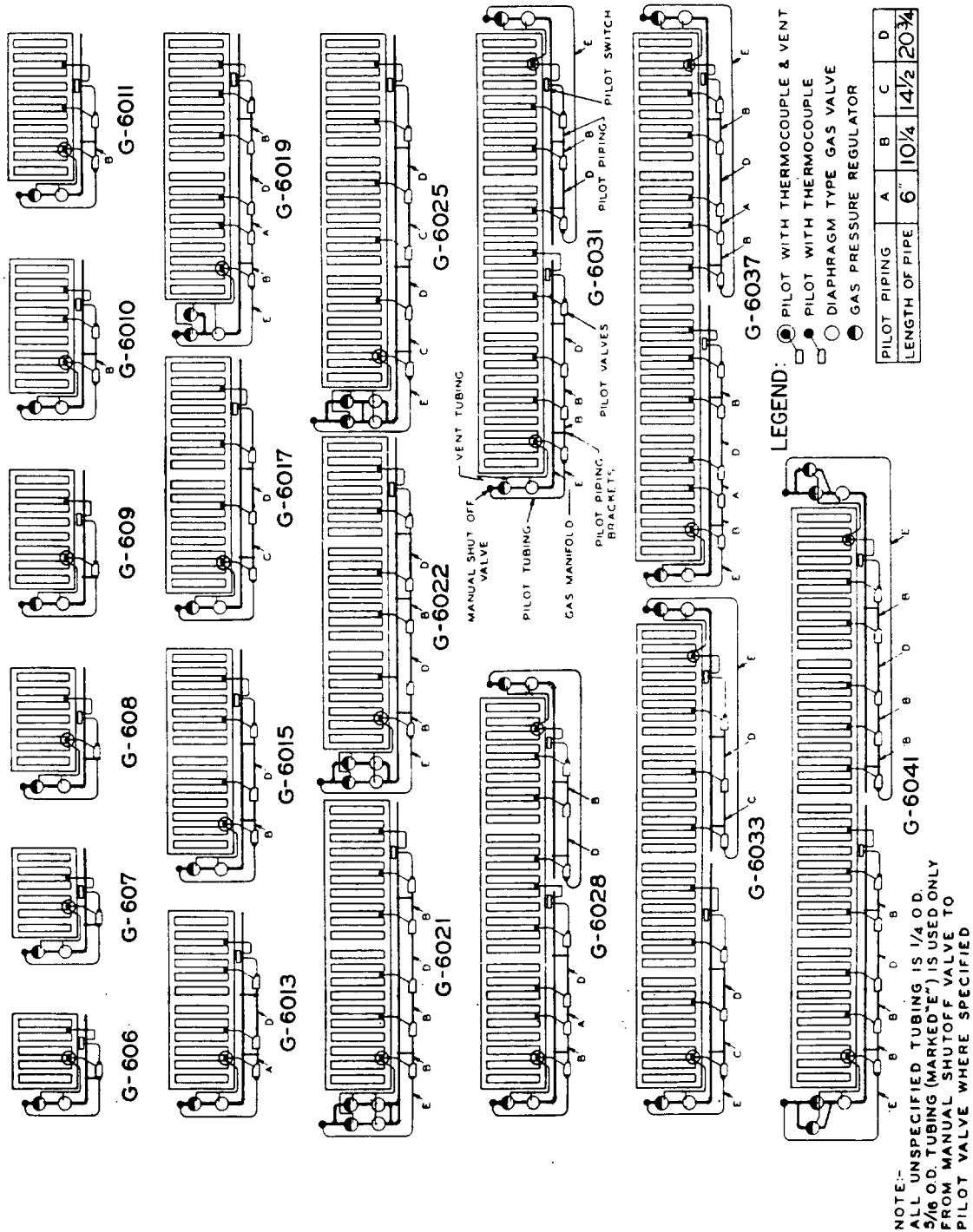


Fig. 18 - Burner, Pilot and Control Installation for Mixed Gas, 100% Shutoff

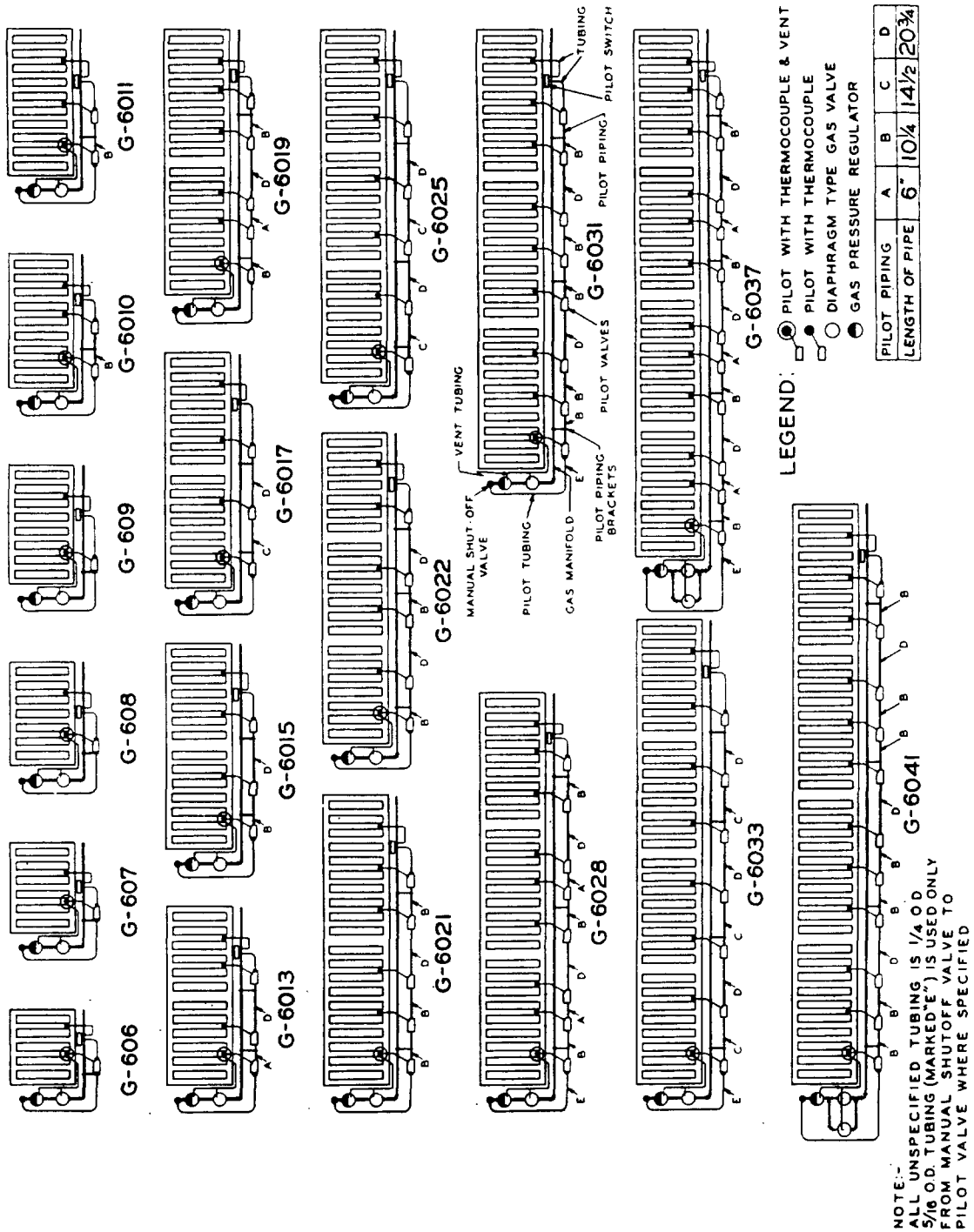


Fig. 19 - Burner, Pilot and Control Installation for Natural Gas - 100% Shutoff

ASSEMBLY OF JACKET, CONTROLS AND WIRING

For 6 through 11 Section Boilers

1. Attach canopy hooks to front of canopy with four 1/4" - 20 x 1/2" washer head screws.
2. Place canopy on the boiler with the canopy hooks engaging hook lugs cast in flueways on center sections and seal between outside of canopy and sections with boiler putty. See Fig. 20.
3. Assemble draughthood to canopy with four #10 x 1/2" sheet metal screws.
4. Assemble the three pieces of the front liner panel with sheet metal screws. Remove necessary knockouts for controls either for steam or water boiler as required. Attach terminal block, instruction plate, number and series plate and Baso switches to the panels. In case of boilers equipped for electric ignition, attach the Baso igniter switches next to and to the right of the pilot switches.

Attach the front liner panel assembly to the tapped bosses on the end sections and install controls. See Fig. 21 Controls for Steam Boilers are shown.

Install control wiring to accord with wiring diagram supplied. See following page for pictorial views of wiring installations.

5. Assemble front half of left side jacket panel after removing knockouts for water column trim in case of STEAM BOILERS.
6. Assemble front half of right side jacket panel.
7. Assemble two front cross ties, center and bottom, then place back panel in position. See Fig. 22.
8. Assemble upper front jacket panel. **IMPORTANT!** The top flange must be inserted under top flange of the side panels.
9. Assemble rear half of left side jacket panel.

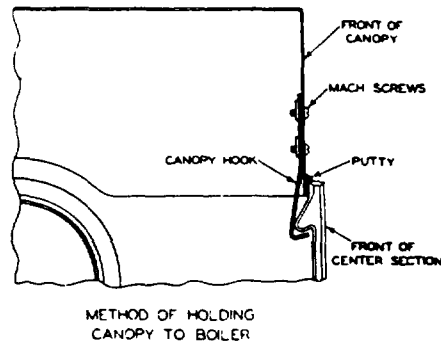
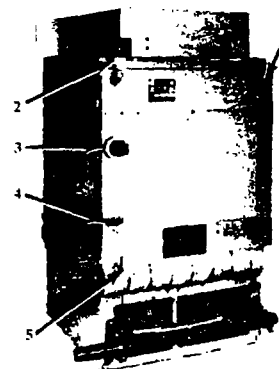
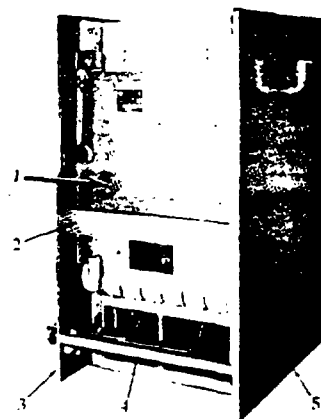


Fig. 20—Installation Of Canopy



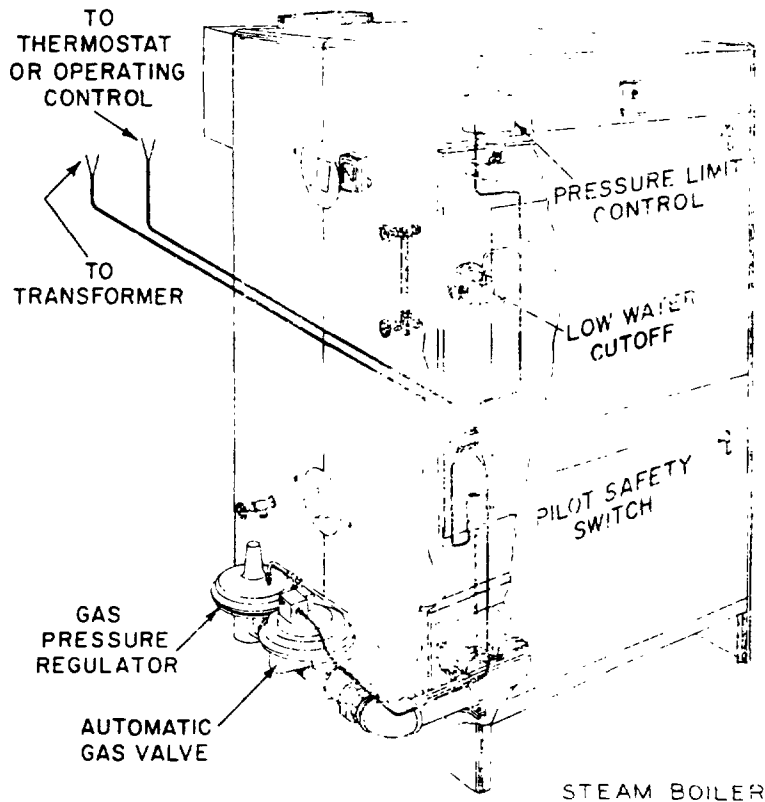
1. Front Liner with Cleanout Door
2. Steam Limit Control (Steam Boilers) or Immersion Operating Control (Water Boilers)
3. Low Water Cutoff
4. Terminal Block
5. Baso Automatic Pilot Switch

Fig. 21—Front Liner And Controls Installed

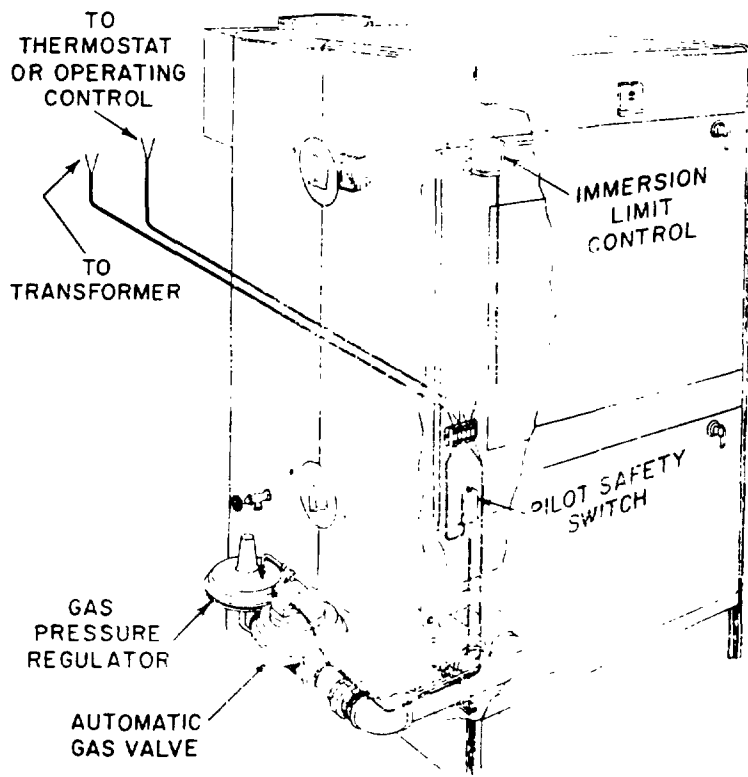


1. Front Liner with Cleanout Door
2. Front Center Cross Tie
3. Left Hand Side Panel
4. Front Bottom Cross Tie
5. Right Hand Side Panel

Fig. 22—Side Panels Installed



ALL WIRING EXCEPT WIRE
TO THERMOSTAT TO BE
UL LABELED LOW
VOLTAGE SAFETY CIRCUIT
WIRE-105°C TEMPERATURE
RATING



ALL WIRING EXCEPT WIRE
TO THERMOSTAT TO BE
UL LABELED LOW
VOLTAGE SAFETY CIRCUIT
WIRE-105°C TEMPERATURE
RATING

10. Assemble rear half of right side jacket panel. See Fig. 23.
11. Assemble back panel to side panels. Assemble back filler pieces, one on each side of draft hood.
12. Assemble top panel.

FOR 13 through 41 SECTION BOILERS

1. Attach canopy hooks to front of canopies with four 1/4" - 20 x 1/2" washer head screws.
2. Place canopies on the boiler with the canopy hooks engaging hook lugs cast in flueways on center sections and seal between outside of canopies and sections with boiler putty.

3. Assemble the three pieces of the front liner panels with sheet metal screws.

Remove necessary knockouts for controls either for steam or water boiler as required. Attach terminal block, instruction plate, number and series plate and Basco pilot switches to panels. Also attach Basco Igniter switches next to and to right of Basco Pilot switches in case of boiler equipped for electric ignition.

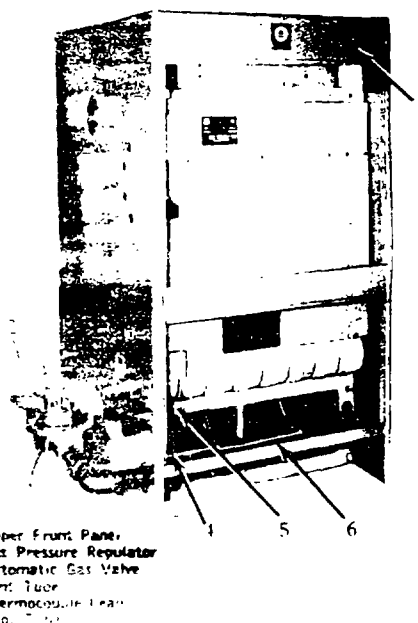


FIG. 23—Assembling Jacket And Controls

4. Attach the front liner panel assemblies to the upper section on the intermediate and end sections. Liner with terminal block and instruction plate is installed at the left side of the boiler. Install controls. See Figure 24. Controls for Steam boiler are shown).

5. Assemble front spacer (or spacers) to intermediate section (or sections) against front liners. Offset ends of spacer should be at top. Use 1/4" - 20 x 1/2" washer head screws. See Fig. 24.

6. Assemble back spacer (or spacers) to rear side of intermediate section (or sections).

7. Assemble front and back (narrow) panels to intermediate panel spacers with 1/4" - 20 x 1/2" washer head screws.

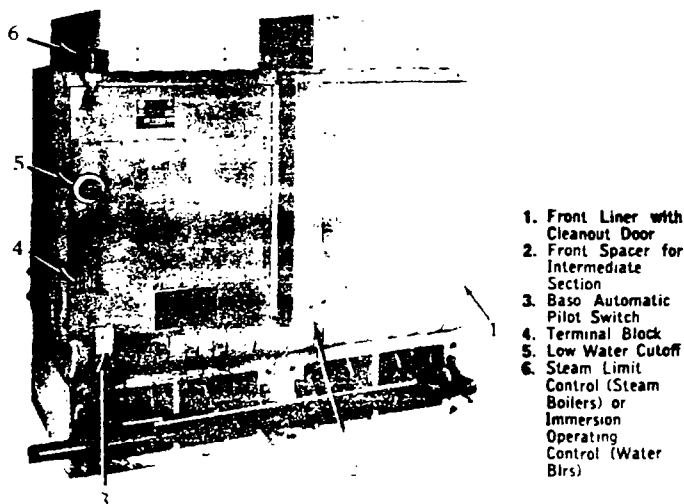
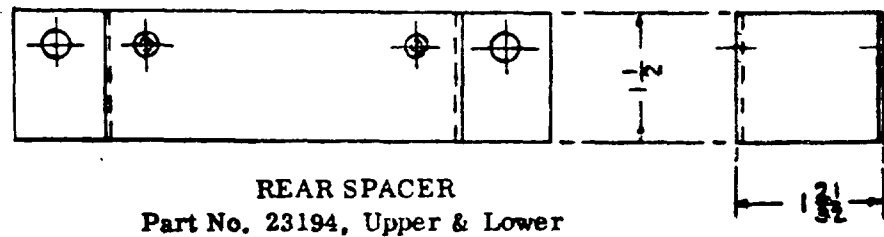
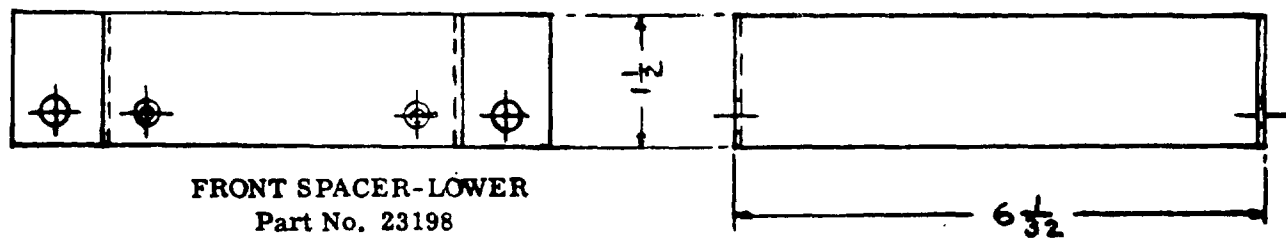
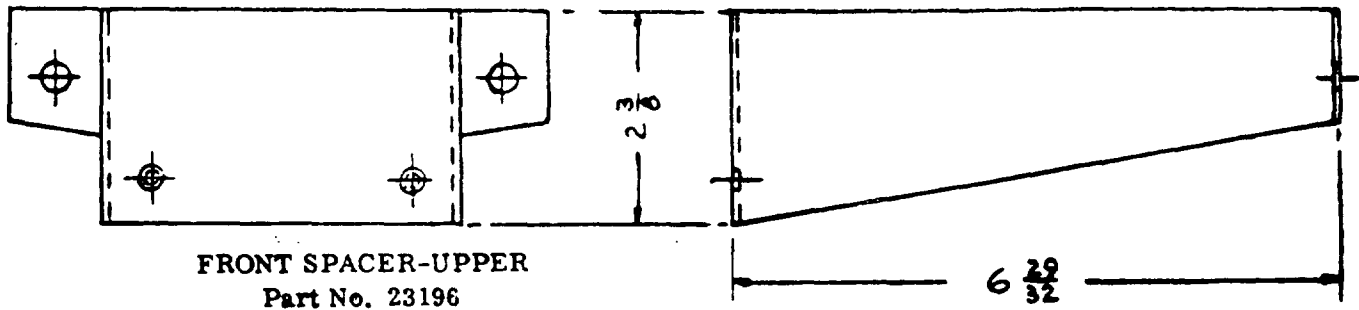


FIG. 24—Starting Jacket Assembly—Larger Boilers

REVISED JACKET SPACERS FOR INTERMEDIATE SECTIONS



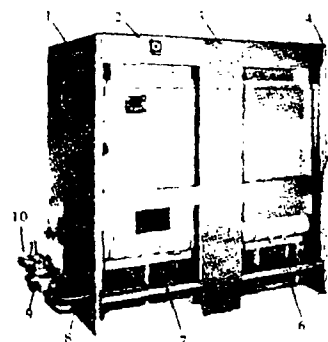
Separate upper and lower spacer brackets replace the box type intermediate section spacer shown on page 20, Fig. 24. Spacers are to be attached with 1/4"-20 x 1/2" washer head screws same as directed for assembling the box type spacers.

8. Assemble top (narrow) panels to front and back intermediate panels with #10 x 1" sheet metal screws.
9. Assemble front half of left side jacket panels after removing knockouts for water column trim in case of STEAM BOILERS. Assemble front half of right side jacket panel.
10. Assemble front cross ties, center and bottom. See Fig. 25.
11. Install control wiring to accord with wiring diagram supplied. See also Page 19 for pictorial views of wiring installation.
12. Assemble upper front jacket panels. **IMPORTANT !** The top flange must be inserted under top flange of the side panels. See Fig. 25.
13. Assemble rear half of left side jacket panel also rear half of right side jacket panel.
14. Assemble back panels to narrow back panels and side panels. Assemble back filler pieces one at each upper corner of jacket.
15. Assemble drafthood to canopies with four #10 x 1/2" sheet metal screws. See Fig. 26.
16. Assemble top panels.

ASSEMBLY OF MANIFOLD PIPING AND PILOT TUBING.

1. For 6 through 11 Section Boilers - Hold manifold securely with wrench and assemble elbow, then assemble nipple with seat half of union so that they are level and face to back of boiler. Also assemble a nipple with remaining half of union in automatic gas valve.
2. Make up drip leg piping (not supplied by AR & SS Corp.) of suitable height and install the manual shutoff valve assembly. See Figs. 27 and 28.
3. Make suitable connection between the tee in drip leg piping and the gas pressure regulator. Be sure to leave sufficient space between pipe cap on bottom of drip leg and floor to allow for drip removal.

NOTE: See Instructions at back of Manual, if boiler is provided with Dual gas equipment.



- | | |
|-------------------------------------|----------------------------|
| 1. Left Hand Side Panel | 6. Front Bottom Cross Tie |
| 2. Upper Front Panel | 7. Pilot Tube |
| 3. Intermediate Section Front Panel | 8. Vent Tube |
| 4. Right Hand Side Panel | 9. Automatic Gas Valve |
| 5. Front Center Cross Tie | 10. Gas Pressure Regulator |

Fig. 25—Assembling Jacket And Controls Larger Boilers

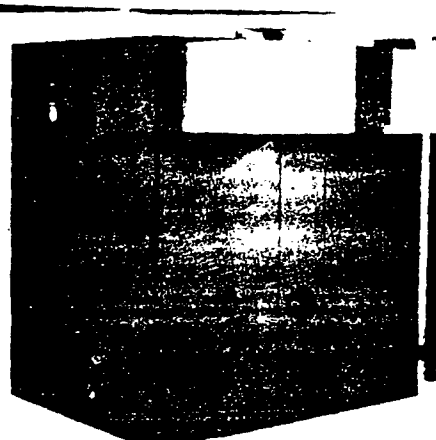


Fig. 26—Jacket Assembly—Rear View

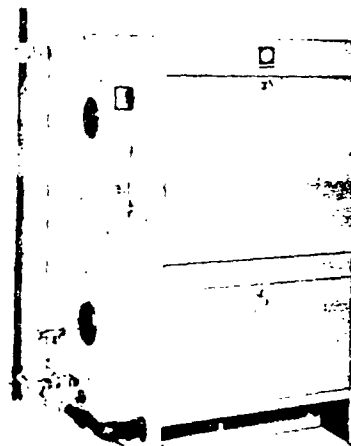


Fig. 27—Assembled Steam Boiler

4. Connect the piping and control assembly to the manifold piping at the union and place support block under drip leg to insure that installation is square and level.
5. For Boiler with NON-100% Shutoff, MANUAL and ELECTRIC Ignition - connect pilot line from manual shutoff valve assembly to the left pilot burner tube running the tubing through the manifold opening in the jacket. Inter-connect pilot line to the remaining pilot burners. Tubing is to be installed above orifice holders.
6. For Boiler with 100% Shutoff - Refer to Fig. 11 for installation of pilot burners. Attach the pilot switch at the R.H. side of the Front Line Panel with two #10 x 1/2" sheet metal screws. For boilers with more than one combustion chamber, locate the pilot switch to serve the pilot nearest to the right end of the entire boiler.

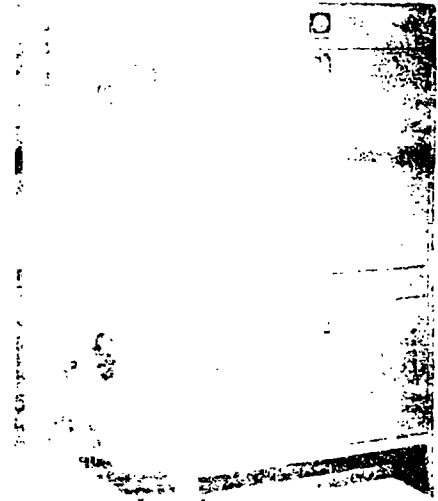


Fig. 11 - Pilot Valve Assembly

Two switches are provided for G-6028 and larger boilers for Mixed Gas. See Fig. 18 for location of pilot switches on these boilers.

Connect pilot line from the manual shutoff valve assembly to the pilot valve nearest to the L.H. end of the boiler running the tubing through the manifold opening in the jacket. Tubing is to be installed above the orifice holders.

In case of G-6028 and larger boilers for Mixed Gas - connect the pilot line from the manual shutoff valve assembly at the R.H. end of the boiler to the pilot valve near the center of the boiler. See Fig. 18.

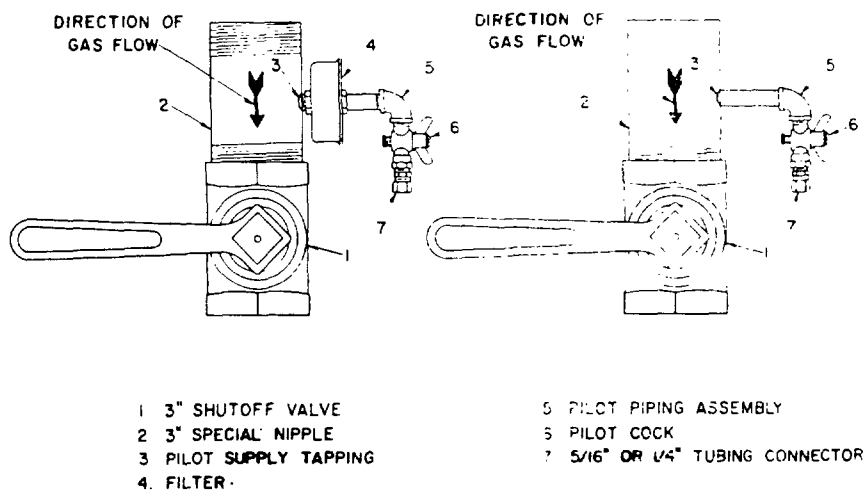
The pilot line (or lines) should be assembled for the various boilers according to the coded lengths shown in Fig. 17, 18 and 19 whichever is applicable. ALL GAS PIPING AND ALL PILOT VALVES ARE ASSEMBLED SO THAT GAS SUPPLY ENTERS FROM THE VALVE MARKED "IN".

The pilot line assembly should be supported by the gas pipe with support clamp (or clamps) provided. On G-609 and smaller sizes, the support should be the gas pipe with the coupling at the pilot valve. Refer to Figs. 17, 18 and 19 for approximate location of clamp (or clamps). Pilot line connecting tubing should be installed above the main burner orifice holders if not supported by clamp (or clamps).

Connect the pilot supply tube from each pilot burner to its respective pilot valve.

Make connection from the right hand piping on the bottom of the pilot switch (or switches, marked "OUT" to the last pilot burner served by the pilot line (or lines) with 1/4" O.D. tubing. Connect the last pilot valve on the pilot line (or lines) to the inlet fitting on the bottom of the pilot switch (or switches) with 1/4" O.D. tubing.

CAUTION: - Before any system of gas piping is finally put into service, it shall be carefully tested to assure that it is gas tight. Soap and water solution or other material acceptable for the purpose shall be used.



NOTE: - FILTER FURNISHED ON SPECIAL ORDER ONLY

**3" MAIN GAS LINE SHUTOFF VALVES AND PILOT
SUPPLY LINE CONNECTIONS FOR LARGER BOILERS.**

FIG.	BOILER SIZES AFFECTED	REFERENCE IN MANUAL PAGE	FIG.	GASES
B	28, 31, 33, 37 and 41 Section	13 17	15 19	Natural Gas, Non-100% Shutoff. Natural Gas, 100% Shutoff.
A	17, 19, 21, 22, 25 31, 33, 37 and 41	14 16	16 18	Mixed, Non-100% Shutoff. Mixed, 100% Shutoff.
B	28, 31, 33, 37 and 41 Section	15	17	Butane and Propane, 100% Shutoff.

NOTE: - All of the above section assemblages have one 3" shutoff valve installed at the L. H. side of the boiler, EXCEPT for 31, 33, 37 and 41 Section boilers for Mixed Gas. These have two 3" shutoff valves, one at L. H. side and one at R. H. side of boiler.

7. Remove vent fitting from regulator (not used for L. P. gas) and see that flame check is in place. See Fig. 30. Replace vent fitting and install tube between pressure regulator and gas valve, using tee connector, also between tee connector and vent tube connector inside of the boiler jacket. See Fig. 23.

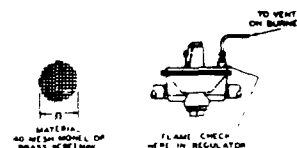


FIG. 30—Flame Check

8. For 100% shutoff connect the thermocouple lead (or leads, attached to pilot burners) each to its respective pilot valve. Also connect the thermocouple lead of the last pilot burner (s) to the switch (or switches) located on the front liner panel.

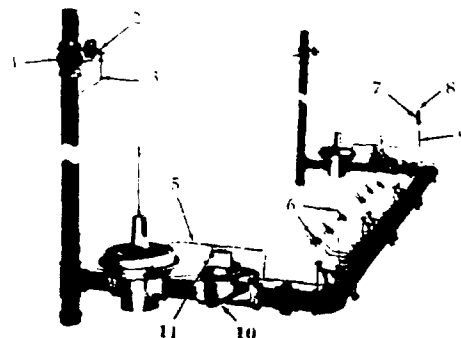
For Non-100% shutoff installation thermocouple leads attach to Baso Pilot switch (or switches).

For assembly of manifold piping and pilot tubing, refer to Figs. 12, 13, 14, 15, 16, 17, 18 and 19 whichever is applicable.

For 13 through 37 Section Boilers - Follow instructions as directed for 6 through 11 section boilers as piping arrangement and controls, except for size, are essentially the same where gas supply to manifold is on the left side.

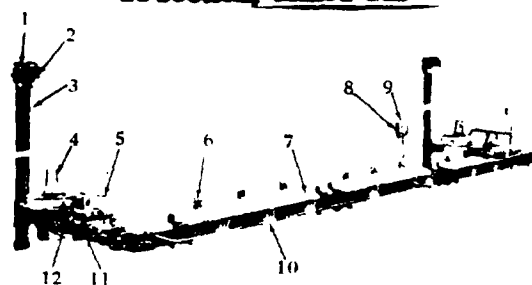
28 SECTION AND LARGER BOILERS FOR MIXED GAS - the gas supply to the manifolds is from both right and left sides. For Non-100% shutoff piping and control arrangement, See Fig. 31. For 100% shutoff piping and control arrangement, See Fig. 32. Pilot tubing hookup to the pilot burners for 28 section and larger boilers is assembled from each side of the boiler. Pilot tubing hookup for all other boiler sizes is assembled from the left side.

See Fig. 33 for piping arrangement of 19 section and Fig. 33A for 21 through 25 section boilers.



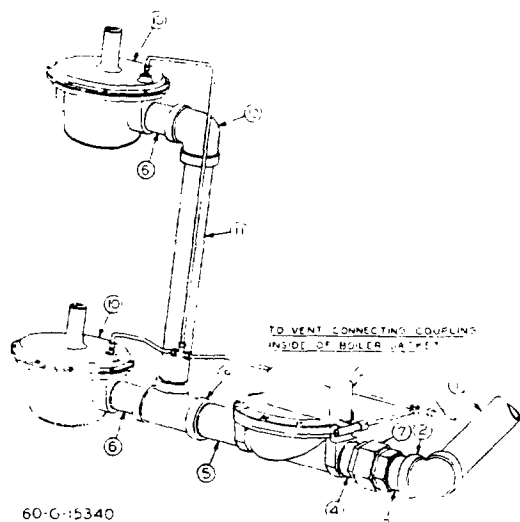
- | | |
|---------------------------|--------------------------------|
| 1. Manual Shutoff Valve | 7. Baso Automatic Pilot Switch |
| 2. Pilot Cock | 8. Reset Button |
| 3. Pilot Line | 9. Thermocouple |
| 4. Gas Pressure Regulator | 10. Automatic Gas Valve |
| 5. Vent Line | 11. Manual Control Lever |
| 6. Pilot Burner | |

Fig. 31 - Controls-Manual Ignition-31 Section, Mixed Gas



- | | |
|---------------------------|-----------------------------|
| 1. Manual Shutoff Valve | 7. Thermocouple |
| 2. Pilot Cock | 8. Baso Safety Pilot Switch |
| 3. Pilot Line | 9. Plunger Button |
| 4. Gas Pressure Regulator | 10. Automatic Pilot Valve |
| 5. Vent Line | 11. Automatic Gas Valve |
| 6. Pilot Burner | 12. Manual Control Lever |

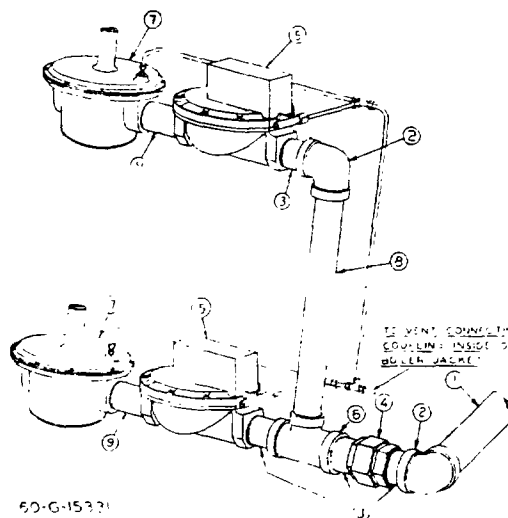
Fig. 32 - Controls-Manual Ignition 100% Shutoff, 31 Section, Mixed Gas



60-G-15340

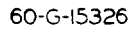
FIG. 33

02351



60-G-15331

FIG. 33A



TO VENT CONNECTING COUPLING
INSIDE OF BOILER JACKET

60-G-15354

TO VENT CONNECTING COUPLING
INSIDE OF BOILER JACKET

R.H. SIDE
OF BOILER

L.H. SIDE
OF BOILER

60-G-15328

FIG. 33D 28, 31 & 33 Section Mixed C

02352

Piping Arrangement for 37 & 41 Section
Natural, Butane & Propane Gases

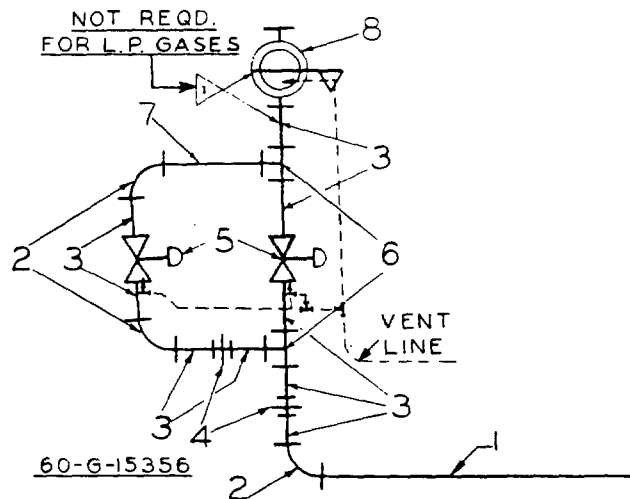
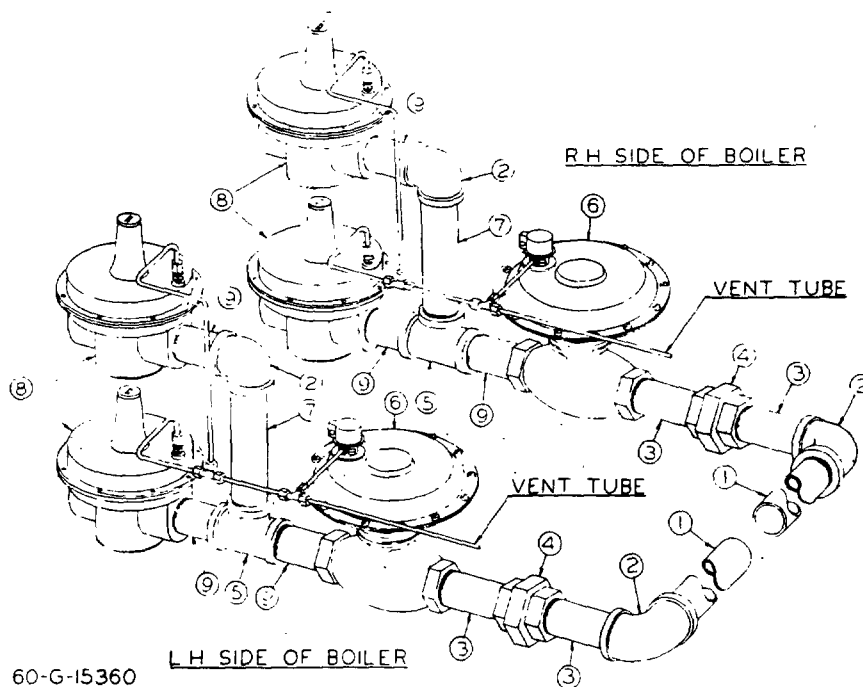


FIG. 33F

Description Of Parts	Natural	Butane Propane
(1) 3" Manifold	1 Req'd.	1 Req'd.
(2) 3" Elbow	3 "	3 "
(3) 3" x 3" Nipple	11 "	10 "
(4) 3" Union	3 "	3 "
(5) 3" Gas Valve	2 "	2 "
(6) 3" Tee	2 "	2 "
(7) 3" Regulator	1 "	0 "



41 Section Mixed Gas

- (1) 3" Manifold
- (2) 3" Elbow
- (3) 3" x 3" Nipple
- (4) 3" Union
- (5) 3" Tee
- (6) 3" Gas Valve
- (7) 3" x 20" Nipple
- (8) 3" Regulator
- (9) 3" x 4" Nipple

FIG. 33G

ALL BOILERS

Install drain cock in each end section. Assemble front jacket panel cleanout doors and burner access doors.

CAUTION

Steam boiler safety valve or water boiler relief valve must be installed in tapping equal to or larger than the inlet pipe size of the valve.

STEAM BOILERS

Install steam gauge and water column trimings in left end section. Install safety valve piping and safety valve in right end section.

Bushing is provided on 15 thru 41 section boilers for installing safety valve in upper 6" tapping on right end. Plug all unused tappings.

Fig. 34 shows front view of complete steam boiler (8 sections).

Fig. 35 shows rear view of complete steam boiler (8 sections).

Fig. 36 shows front view of complete steam boiler (22 sections).

Fig. 37 shows rear view of complete steam boiler (22 sections).

WATER BOILERS

Install combination altitude gauge and thermometer in left end section. Install relief valve in 1-1/2" tapping near top of R.H. end section for all except 41 section boiler in which case the valve is to be installed in 6" tapping with bushing. Fig. 38 shows front view of complete water boiler (8 sections).

FILLING SYSTEM

CAUTION: Never start boiler unless it is properly filled. After boiler is in operation make up water should be added slowly.

Steam boilers should be filled until water is visible approximately 3-1/4" in the gauge glass.

Fill open hot water system to 1/3 height of expansion tank, remove rim and glass from gauge and set movable pointer under automatic pointer. Replace rim and glass.

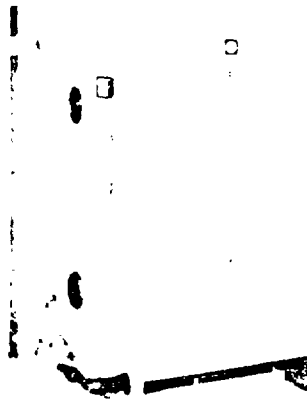


FIG. 34—8 Section Steam Boiler
—Front View

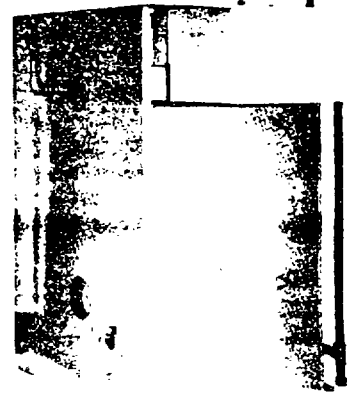


FIG. 35—8 Section Steam Boiler
—Rear View

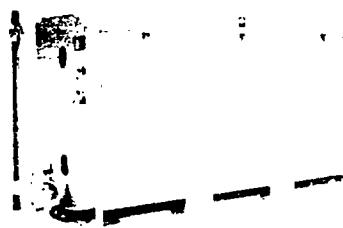


FIG. 36—22 Section Steam Boiler
—Front View

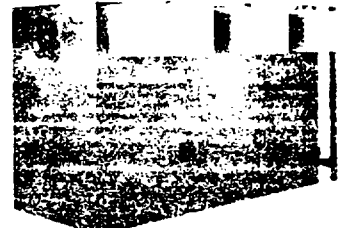


FIG. 37—22 Section Steam Boiler
—Rear View

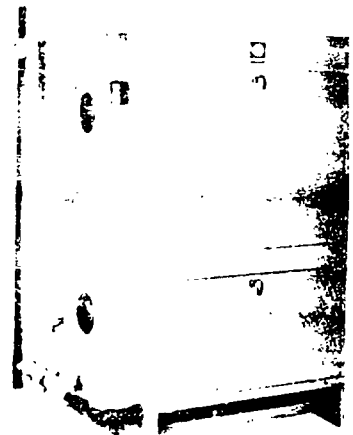


FIG. 38—8 Section Water Boiler—
Front View

Fill closed hot water systems until relief valve opens. This should be at a pressure not greater than 50 Lbs. per square inch. Remove the rim and glass from the gauge and set the movable pointer at a point which will represent an altitude slightly higher than the highest point in the heating system. (An altitude approximately 115 feet represents a pressure of 50 Lbs. per sq. inch). Note that the altitude temperature gauge is calibrated both in feet of altitude and lbs per square inch. Replace rim and glass and reduce pressure by draining out water until the indicating pointer lines up with the movable pointer. See also Page 32.

Keep system filled. Pointers on gauge should be even. If pressure exceeds 50 lbs. relieve at once by opening relief valve or drain cock.

PILOT ADJUSTMENT

Light boiler as directed in operating instructions and check for gas leaks. Adjust pilot flame to extend over top of burner. Pilot rate can be adjusted with screw underneath cap on pilot throttling cock.

NORMAL PILOT INPUT FOR BASO PILOT BURNERS

	<u>Nat.</u>	<u>Mixed</u>	<u>L. P.</u>
Input per Pilot Burner Btu/Hr.	1400	1200	1000

MANIFOLD PRESSURE ADJUSTMENT FOR MAIN BURNER INPUT

After boiler is warmed up, shut off all other gas appliances connected to gas meter and time gas consumption. Adjust pressure regulator to give rated input indicated on nameplate.

$$\text{Gas Consumption (Cubic Feet Per Hr.)} = \frac{\text{Input Rating (Btu Per Hr.)}}{\text{Heating Value of Gas (Btu Per Cu. Ft.)}}$$

To increase consumption, turn adjustment screw (beneath cap on pressure regulator) clockwise; to decrease, turn screw counter-clockwise.

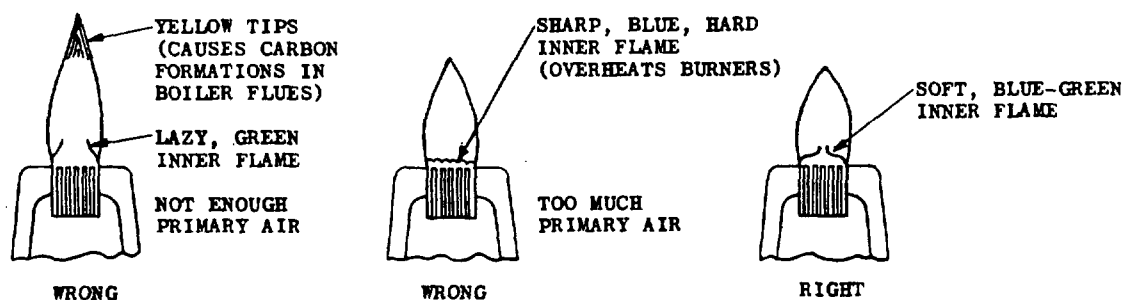
A 1/8" pipe plug is placed in the manifold to provide for checking the gas pressure in the manifold with a manometer or small pressure gauge. The manifold pressure should be set at 3.5 inches of water for natural and mixed gases. To adjust the pressure, remove the cap on the gas pressure regulator and screw in the adjusting screw to raise pressure or screw out the adjusting screw to lower pressure. Only small variations in gas flow should be made by means of the gas pressure regulator adjustment. In no case should the final manifold pressure vary more than plus or minus 0.3 inches water column from the above specified pressures. Any necessary major changes in the flow should be made by changing the size of the burner orifice.

MAIN BURNER AIR ADJUSTMENT

Drill port burners are normally used with natural gas. To adjust the air setting, allow 5 minutes for the burners to heat up; open the air shutter until the flame lifts off the burner (too much air), then close until the flame returns to the burner. There should be no yellow in the flame. (Orange appearance is caused by lint and dust particles in air and does not affect normal performance.)

Ribbon burners - L-P gas

L-P burner flames must be adjusted properly to prevent excessive burner temperatures. Adjust the air shutter to a blue-green inner flame without yellow in flame. (See illustrations).



Ribbon burners - Natural and mixed gases.

Adjust air shutter to give sharp blue flame with no yellow. For natural gas, good performance is usually obtained with air shutter set to maximum open position. For mixed gas, the setting is usually 1/2 to 3/4 open.

CHECKUP OF LOW WATER CUTOFF

1. Light pilot as indicated in Operating Instructions. Turn thermostat to highest temperature. Automatic gas valve should open.
2. Open drain cock and drain water until water level is below centerline of low water cutoff. Automatic gas valve should close.
3. Refill until water level is above centerline of low water cutoff. Automatic gas valve should open.

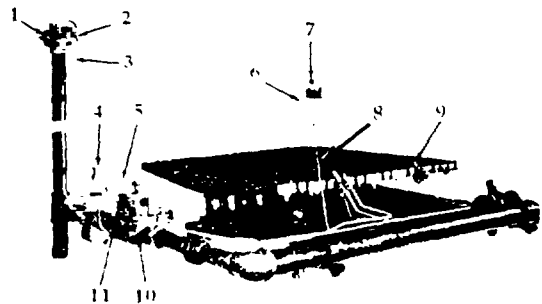
OPERATING INSTRUCTIONS
FOR SHUTTING OFF AND RELIGHTING
MANUAL IGNITION - NON-100% SHUTOFF

TO SHUT OFF:

1. Close Manual shutoff valve(s) "1" and pilot valve(s) "2".

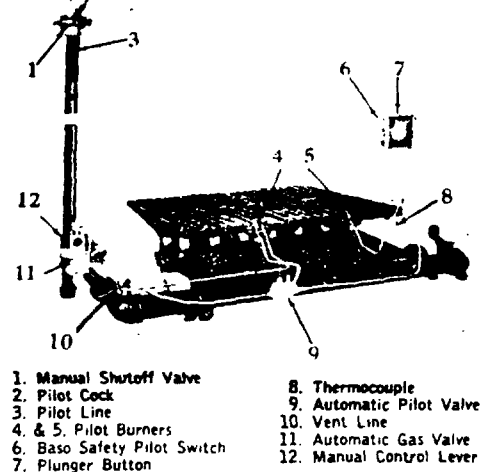
TO LIGHT:

1. Set thermostat (or operating control) at lowest temperature.
2. Be sure Manual shutoff valve(s) "1" and pilot valve(s) "2" have been shut off for at least five minutes before proceeding.
3. Open pilot valve(s) "2" and light all pilot burners.
4. Wait two minutes.
5. Press reset button(s) on all automatic pilot switches.
6. Open Manual shutoff valve(s) "1".
7. Set thermostat (or operating control) at desired temperature.



- | | |
|---------------------------|--------------------------------|
| 1. Manual Shutoff Valve | 6. Base Automatic Pilot Switch |
| 2. Pilot Cock | 7. Reset Button |
| 3. Pilot Line | 8. Thermocouple |
| 4. Gas Pressure Regulator | 9. Pilot Burner |
| 5. Vent Line | 10. Automatic Gas Valve |
| | 11. Manual Control Lever |

**Fig. 39--Controls--Manual Ignition
Nat. and Mixed Gases**



- | | |
|-----------------------------|--------------------------|
| 1. Manual Shutoff Valve | 8. Thermocouple |
| 2. Pilot Cock | 9. Automatic Pilot Valve |
| 3. Pilot Line | 10. Vent Line |
| 4. & 5. Pilot Burners | 11. Automatic Gas Valve |
| 6. Base Safety Pilot Switch | 12. Manual Control Lever |
| 7. Plunger Button | |

**Fig. 40--Controls--Manual Ignition--100%
Shutoff--Butane and Propane Gases**

SHUTTING OFF AND RELIGHTING MANUAL IGNITION - 100% SHUTOFF

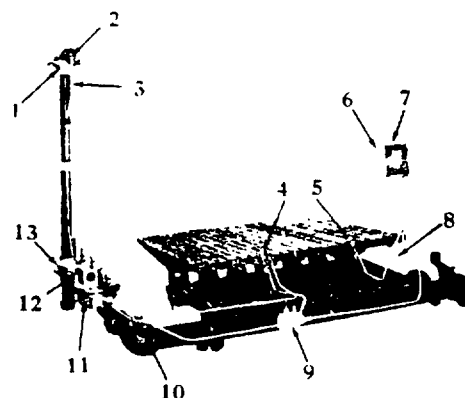
See Fig. 41

TO SHUT OFF:

1. Close manual shutoff valve "1" and pilot valve "2".
2. Turn off switch in electric line to appliance.

TO LIGHT:

1. Set thermostat to lowest temperature.
2. Be sure manual shutoff valve "1" and pilot valve "2" have been shut off for at least five minutes before proceeding.
3. Open pilot valve "2".
4. Press plunger on Baso automatic pilot valve "9" and light pilot "4". Hold plunger for one minute. For additional valves repeat.
5. Press plunger "7" on Baso automatic pilot switch "6" and light pilot "5". Hold plunger "7" for one minute.
6. Open manual shutoff valve "1".
7. Turn on switch in electric line to appliance.
8. Set thermostat to desired temperature.



- | | |
|-----------------------------|----------------------------|
| 1. Manual Shutoff Valve | 8. Thermocouple |
| 2. Pilot Cock | 9. Automatic Pilot Valve |
| 3. Pilot Line | 10. Vent Line |
| 4. & 5. Pilot Burners | 11. Automatic Gas Valve |
| 6. Baso Safety Pilot Switch | 12. Manual Control Lever |
| 7. Plunger Button | 13. Gas Pressure Regulator |

FIG. 41—Controls—Manual Ignition—100% Shutoff

SHUTTING OFF AND RELIGHTING ELECTRIC IGNITION - NON-100% SHUTOFF

See Fig. 42

TO SHUT OFF:

1. Close manual shutoff valve "A" and pilot valve "B".
2. Turn off switch in electric line to appliance.

TO LIGHT:

1. Set thermostat (or operating control) to lowest temperature.
2. Be sure manual shutoff valve "A" and pilot valve "B" have been shut off for at least five minutes before proceeding.
3. Turn on switch in electric line to appliance.
4. Open pilot valve "B".
5. Press red electric igniter button "C" until pilot burner lights.
6. Press plunger "D" on Baso automatic pilot switch. (For additional combustion chambers, repeat steps 5 and 6).
7. Open manual shutoff valve "A".
8. Light main burners by setting thermostat (or operating control) to highest temperature. Wait for approximately 30 seconds, then return to lowest setting. Be sure that all auxiliary pilots have lit.
9. Set thermostat (or operating control) to desired temperature.

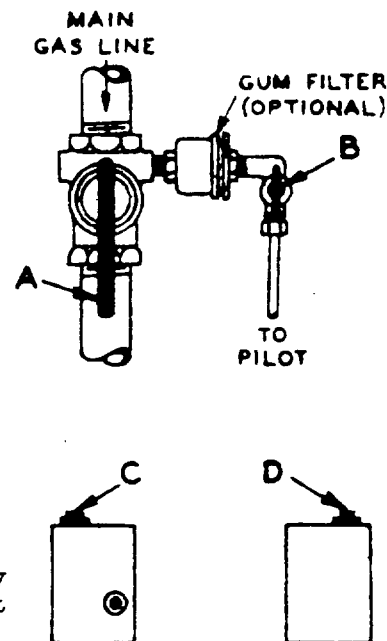


FIG. 42—Electric Ignition

PILOT GOES OUT

If the pilot flame is extinguished, the automatic pilot will shut off the automatic gas valve. If boiler is not operating correctly, call Heating Contractor or Gas Company service man. If boiler is operating correctly, relight as directed on pages 27 and 28.

EMERGENCY INSTRUCTIONS FOR OPERATION
DURING FAILURE OF ELECTRIC POWER SUPPLY

In the event of failure of electric power supply the gas burner operating this boiler will automatically shut off. It is possible to operate this burner manually by following the directions given below.

CAUTION - The BURNER SHOULD BE OPERATED MANUALLY ONLY AS AN EMERGENCY MEASURE. THE AUTOMATIC SAFETY CONTROLS WHICH PROTECT THE BOILER DURING NORMAL OPERATION ARE NOT OPERATIVE. CONSTANT SUPERVISION IS REQUIRED TO PREVENT THE POSSIBILITY OF DAMAGE TO THE BOILER BECAUSE OF LOW WATER OR FLAME LOSS. NEVER LEAVE THE BURNER OPERATING MANUALLY IF IT IS TO BE UNSUPERVISED FOR ANY LENGTH OF TIME.

IN SUPPLYING THESE BRIEF DIRECTIONS FOR MANUAL OPERATION OF THE BURNER, THE MANUFACTURER CAN ASSUME NO RESPONSIBILITY FOR THE SAFE OPERATION OF THE BURNER, BOILER AND OTHER EQUIPMENT. SAFETY DEPENDS UPON THE CARE AND JUDGMENT EXERCISED BY THE OPERATOR. ALL POSSIBILITIES CANNOT BE COVERED IN THESE BRIEF DIRECTIONS.

BASIC STEPS IN MANUAL OPERATION

1. Be sure the burner pilot is burning properly. If so, when: -
 2. Turn off electric power switch controlling the burner. LEAVE THIS SWITCH OFF UNTIL POWER HAS BEEN RESTORED.
 3. Burner may now be operated manually by opening the automatic gas control valve in accordance with instructions printed on the valve cover.
 4. If the boiler operated by the gas burner is installed on a forced circulation hot water heating system (incorporating electric circulating pump) OPEN FLOW CONTROL VALVE OR VALVES IF PROVIDED IN THE WATER LINES. (Note: - It is suggested that the original position of these valves be carefully observed and these observations recorded, to permit restoring these valves to their original position when automatic operation is resumed).
- Also, REDUCE THE MAIN BURNER FLAME TO A MINIMUM ADJUSTMENT (Approximately 1/3 or 1/4 normal size) BY PARTIALLY CLOSING THE MANUAL GAS SHUT OFF VALVE.

TO RESTORE BURNER TO AUTOMATIC OPERATION
UPON RESUMPTION OF SUPPLY OF ELECTRIC CURRENT

1. Return automatic gas control valve to its original "automatic" setting in accordance with instructions on valve cover.
2. Turn on electric power supply switch.
3. On forced circulation hot water heating systems, return flow control valves, if provided, to their normal operating positions.
4. Turn manual gas shut off valve to its wide open position.

MINIMUM RECOMMENDATIONS FOR SYSTEM PIPING

Figs. 43 and 44 illustrate minimum recommended system piping arrangements for both water and steam boilers. These suggestions are to be regarded as the minimum size and number of connections for satisfactory boiler operation. The return connections to steam boilers should always be connected through a Hartford Loop which will include a properly sized equalizing connection between the steam supply and the Hartford Return. For the G-60 Boiler this connection should be a minimum of 3" pipe.

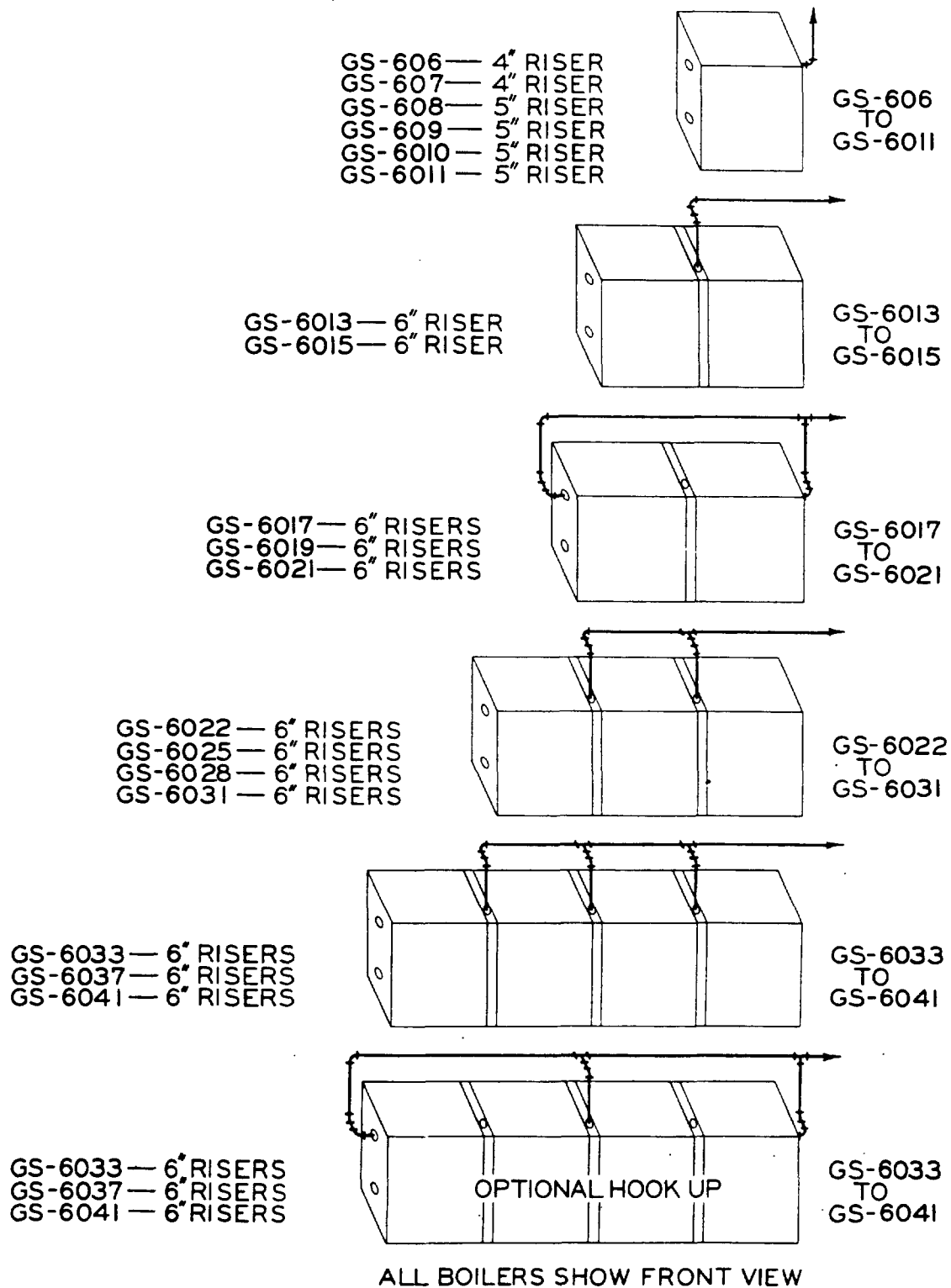


Fig. 43 - Minimum Piping Recommendations - Steam Boilers

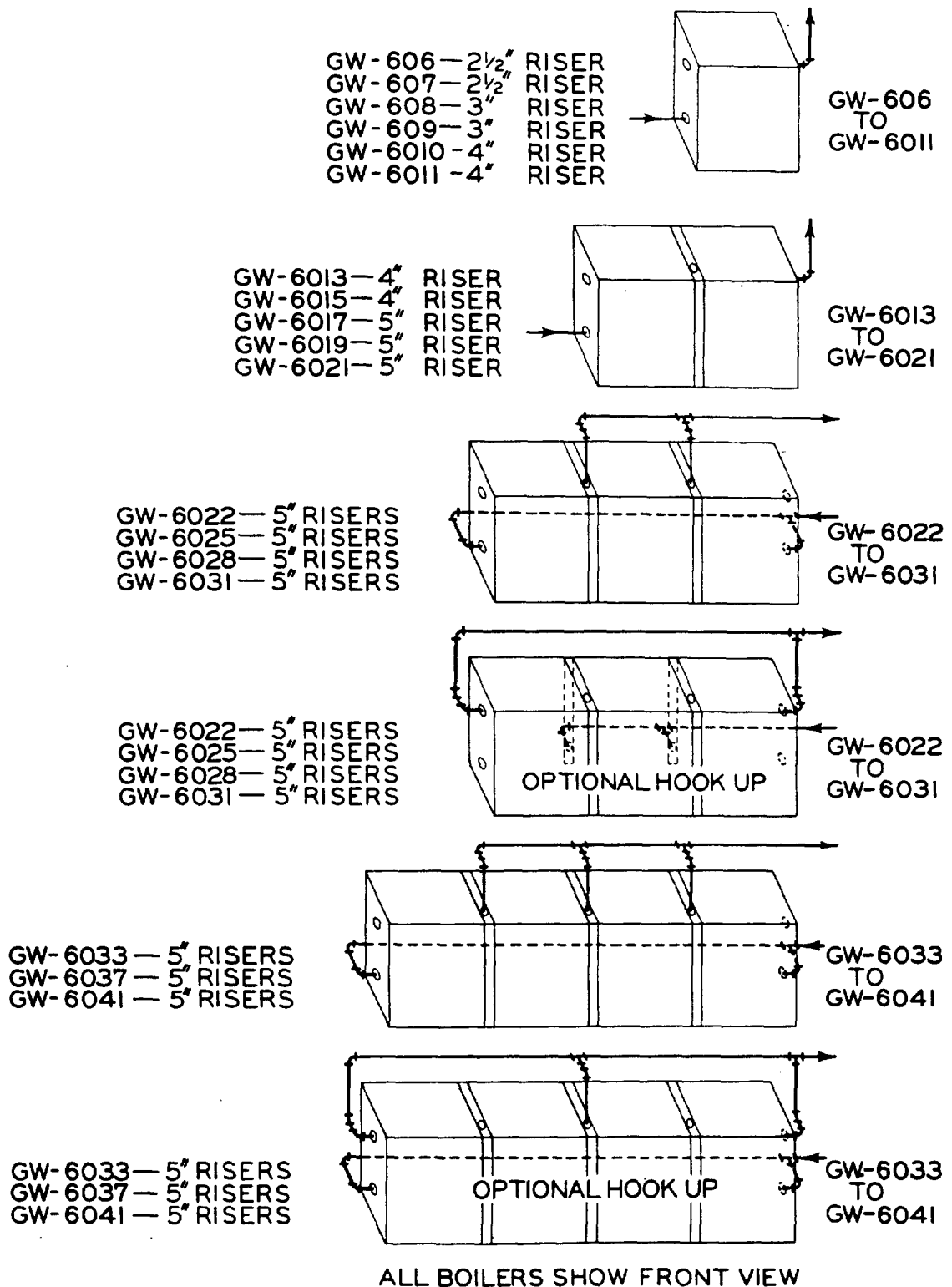


Fig. 44 - Minimum Piping Recommendations - Water Boilers

MAINTENANCEGENERAL

IT IS IMPORTANT THAT THIS BOILER BE INSPECTED ONCE A YEAR BY A COMPETENT SERVICEMAN TO INSURE CONTINUED RELIABLE, SAFE OPERATION.

This inspection should include checking of all boiler safety controls, pilot(s), section flueways and burners. See next page for instructions on burner and section inspection and cleaning.

IN FALL BEFORE STARTING BOILER

Drain system sufficiently to remove sludge in bottom of boiler. Do not drain more water than necessary to remove sludge, then refill to proper level as directed in this manual.

MAINTENANCE OF BOILER WHILE IN OPERATION

Check water level regularly and add water slowly when needed. This boiler is fired automatically. Test safety valve on steam boiler at beginning of season and once a month thereafter:

- a. Fasten cord or wire to valve lever.
- b. When pressure is up, stand safe distance away and pull cord. (Steam should be released.)

IN WINTER WHILE NOT IN OPERATION

Drain entire system to prevent damage from freezing. Drain through drain cocks located at lowest point in system. Be sure boiler is completely drained.

IN SUMMER WHILE NOT IN OPERATION

Keep the system filled as during the heating season. This is the recommended time to have a periodic check up of all safety controls and a close inspection of the burners, flue passageways, and flue pipe. It is also good practice to recheck the input firing rate and the gas air mixture on the burners to see that the boiler is operating at normal efficiency.

GENERAL MAINTENANCE OF HEATING SYSTEM

Keep radiators and convectors clean. If a hot water radiator is hot at the bottom but not at the top, it indicates that air has accumulated inside and should be vented. To vent radiator hold small cup under air vent (located near top of radiator), open vent until water escapes and then close. Fill steam boilers and hot water systems only as directed in this manual. See Caution note.

If much water is added to system, it is advisable to heat system to a high temperature and vent again. This will make less venting necessary during the winter.

CAUTION:

On hot water systems, the expansion tank should not be set in a cold or an exposed place. If the pipe leading to or from the tank freezes, serious damage may result. If valve of any description is installed in the piping leading to or from the expansion tank BE SURE THAT IT IS OPEN WHILE THE BOILER IS IN OPERATION.

INSPECTION AND CLEANING OF BOILER BURNERS AND FLUEWAYS

To assure maximum efficiency and safe operation, burners and boiler flues should be inspected once a year and cleaned, if necessary.

Inspection Procedure:

1. Turn manual shutoff valve (s) and pilot shutoff valve (s) to off positions.
2. Remove lower front panel (s).
3. Lift burners off mixer tube and remove. (On large boilers it is not necessary to remove all burners; only a sufficient number to determine the degree of cleanliness.)
4. Remove mixer tube by lifting and sliding back to clear the spuds.
5. Check burner gas ports for lint and dirt.
6. Section cleanliness can be checked with a mirror and light inserted in the opening where the burners and mixer tubes have been removed.

BURNER CLEANING:

1. Drilled Port Burner - Pass a #36 or #37 drill through ports and then shake the dislodged foreign material out.
2. Ribbon Burners - Remove end and center ribbon clamps and then the ribbon assembly from the burner head. Ribbons are riveted at one end to insure proper assembly. "Fan" ribbons and clean with a brush. Reassemble to burner head.

SECTION CLEANING:

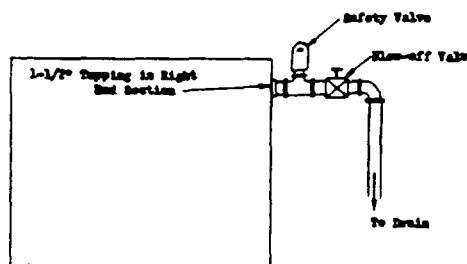
1. Important - Make sure all burners and mixer tubes have been removed from boiler.
2. Remove upper front access door (s).
3. Remove cleanout access door (s) from the front liner (see Figure 22).
4. Remove cleanout cover plates (see Figure 9).
5. Clean sections with a wire flue brush starting at the top and working down one row at a time.
6. Replace cleanout cover plate and seal where necessary.
7. Reassemble all other parts including burners and light pilots.
8. Check burner air adjustment as directed in this manual.

CLEANING BOILERS

The grease used to lubricate the cutting tools during erection of new piping systems serves as a carrier for dirt, with the result that a scum of fine particles and grease accumulates on the surface of the water in all new boilers, while heavier particles may settle to the bottom of the boiler and form sludge. These impurities tend to cause foaming, preventing the generation of steam and causing an unsteady water line.

This unavoidable accumulation of oil and grease should be removed by blowing off the boiler as follows:

If not already provided, install a surface flow connection of at least 1-1/4 inch nominal pipe size with outlet extended to within 18 inches of the floor or to sewer, inserting a valve in line close to boiler. Bring water line to center of outlet, raise steam pressure, and while burners are operating open valve in blow-off line. When pressure recedes, close valve and repeat process, adding water at intervals to maintain proper level. As a final operation bring the pressure in the boiler to about 10 lbs., close blow-off and manual valves, then open drain valve. After boiler has cooled, partly fill and flush out several times before filling it to proper water level for normal service. The use of soda or any alkali, vinegar or any acid is not recommended for cleaning heating boilers because of the difficulty of complete removal and the possibility of subsequent injury after the cleaning process has been completed.



Suggested Piping Arrangement for
Blowing-Off Steam Boiler

CAUTION

After the blow off operation, a checkup should be made of the Low Water Cutoff as directed on Page 27.

NOTE: All parts of this boiler have been carefully inspected and packed. See Packing and Parts List sheet for details.

In case of shortage, make sure that all parts have been removed from shipping container and examine packing material thoroughly. If part cannot be found, report shortage to your dealer, giving boiler size, series number, date, inspector's number and packer's number. (Refer to Packing and Parts List)

GIVE BOILER SIZE AND SERIES NUMBER WHEN
ORDERING REPAIR PARTS

BOILER SIZE

SERIES NO. (See Series Plate on boiler).

DATE . . . (on packing and parts list).