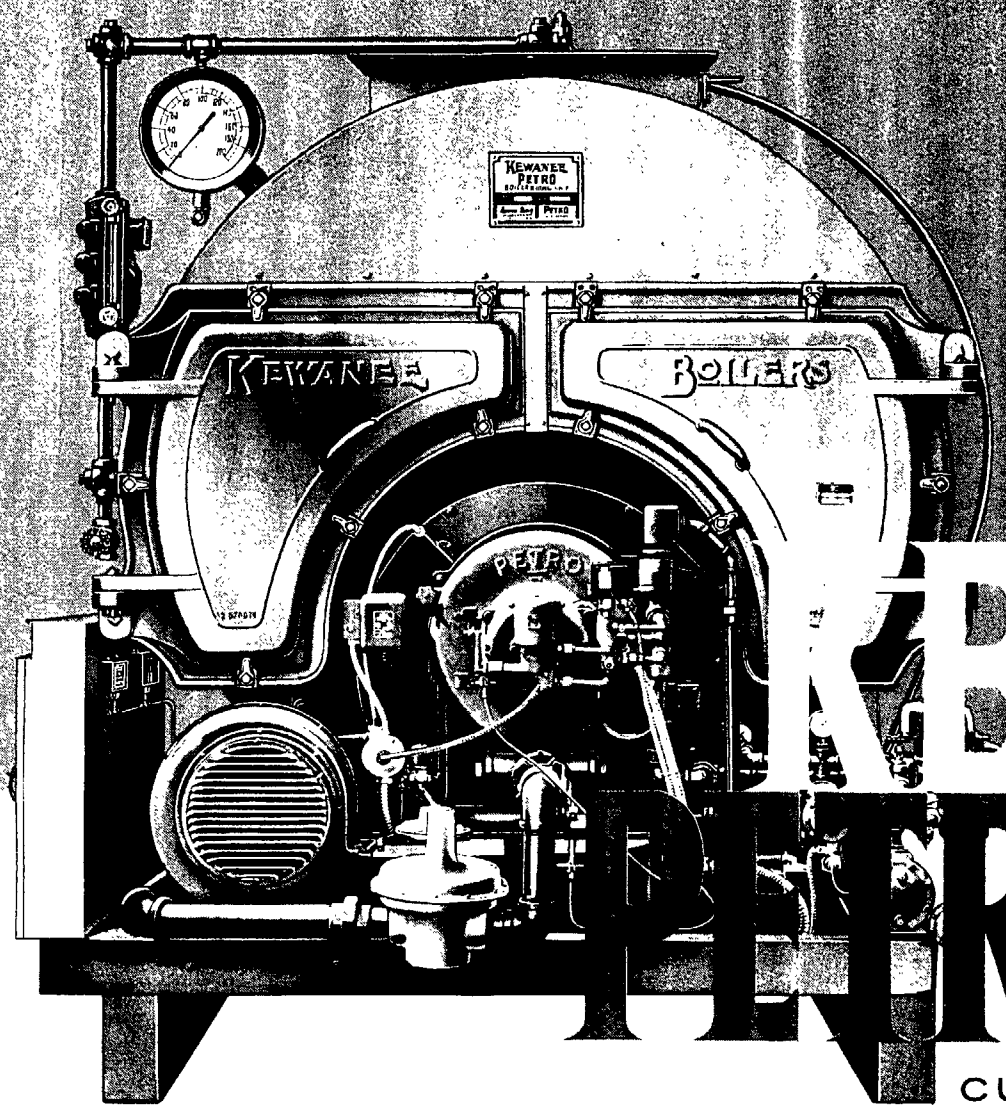


PLAINTIFF'S EXHIBIT
ASI-1229

KEWANEE PETRO

BOILER AND BURNER

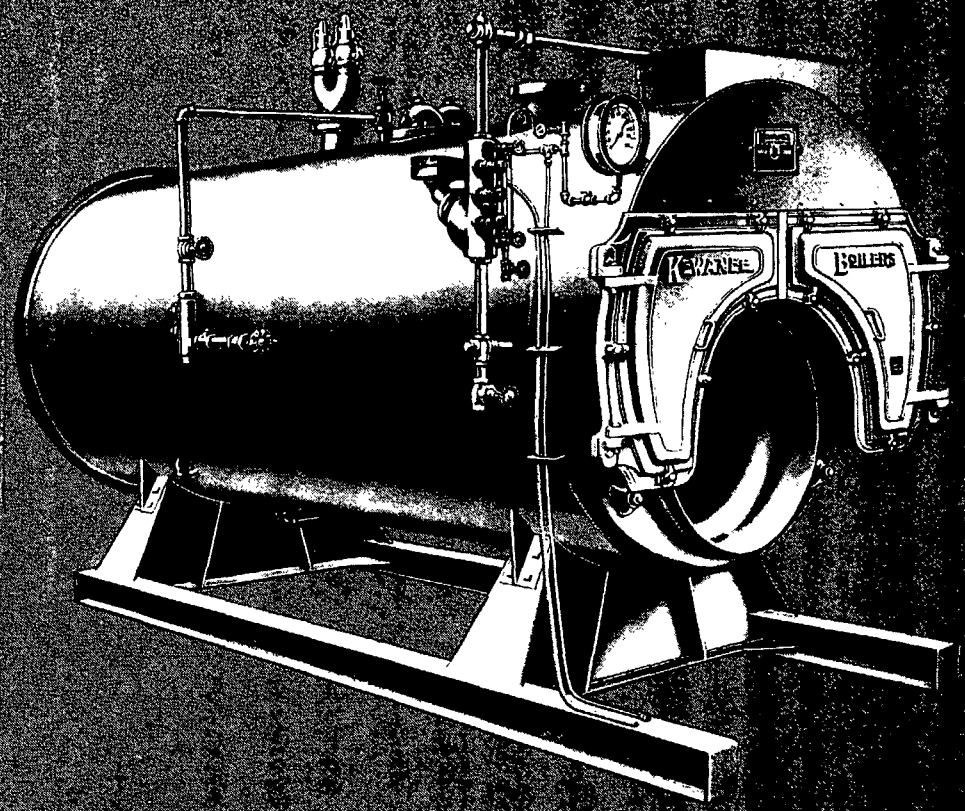
CUSTOM-CREATED

FOR EACH OTHER

28810

AIA FILE NO. 34-B-1
(JULY, 1958)

ENGINEERED FOR FAMOUS "CRUISING SPEED" OPERATION



Your boiler is vital—and Kewanee knows it! Since 1868 Kewanee Boilers have been built to play vital roles. Today's Kewanee Scotch Boilers are reliable sources of low cost hot water or steam for plants and buildings everywhere. They are easy to fire, easy to inspect, easy to keep clean and efficient. Kewanee's S.B.I. ratings—based on 8.2 square feet per boiler horsepower—provide 50% reserve capacity, for "cruising speed" operation under normal loads. This improves efficiency . . . prolongs boiler life.

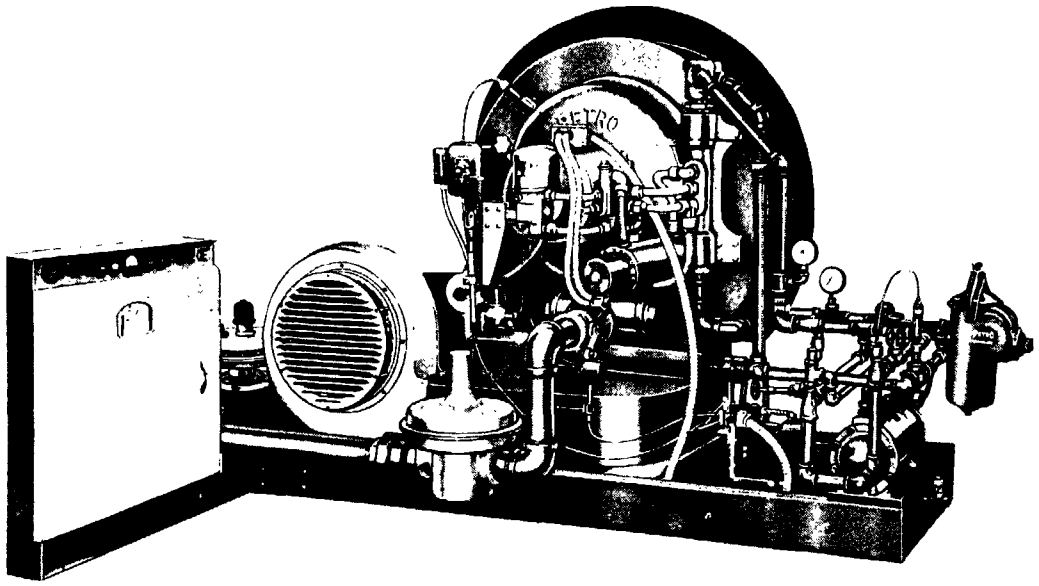
KEWANEE

SCOTCH MARINE

BOILER

28811

SIMPLIFIED, SUPERIOR DESIGN FOR ALL-FUEL EFFICIENCY



In developing Kewanee-Petro Boiler-Burner Units, Kewanee and Petro engineering staffs worked closely to make certain all component parts performed perfectly together. No detail was overlooked . . . nothing was assumed or left to chance.

The firing rate of the Petro burner has been matched to the heating surface of the Kewanee boiler—and is automatically modulated in accordance with the load, to maintain a steady steam pressure under all conditions. Flame size, shape and swirl is controlled to provide the most efficient heat transfer from the furnace tube to the surrounding water.

The burner may be installed in the field or in the factory. Normally, the boiler is shipped to the jobsite first—to be installed in position before walls and roof are completed. The burner arrives later, when it can be fully protected against weather, theft and accidental damage. All controls are wired and in place for fast, simple mounting. Whenever specified, however, the unit can be fully assembled and fire-tested at the factory, then shipped as a complete package.

Among both owners and burner experts, the name "Petro" commands a reputation for efficient, dependable gas and oil firing. All through the history of gas and oil firing equipment, Petro burners have trailblazed with superior design and construction features. Today's modern Petro burners offer automatically controlled preheating of heavy oils . . . complete mixing of gas and air before combustion . . . efficient dual fuel firing, with fast fuel changeover. Oils as heavy as No. 6 can be effectively fired . . . gas under high pressure or with pressure as low as 2 oz.

PETRO BURNER

FOR OIL, GAS OR

DUAL FUEL

28812

AMERICAN-Standard PRODUCTS

PETRO

THE PETRO BURNER FOR HEAT

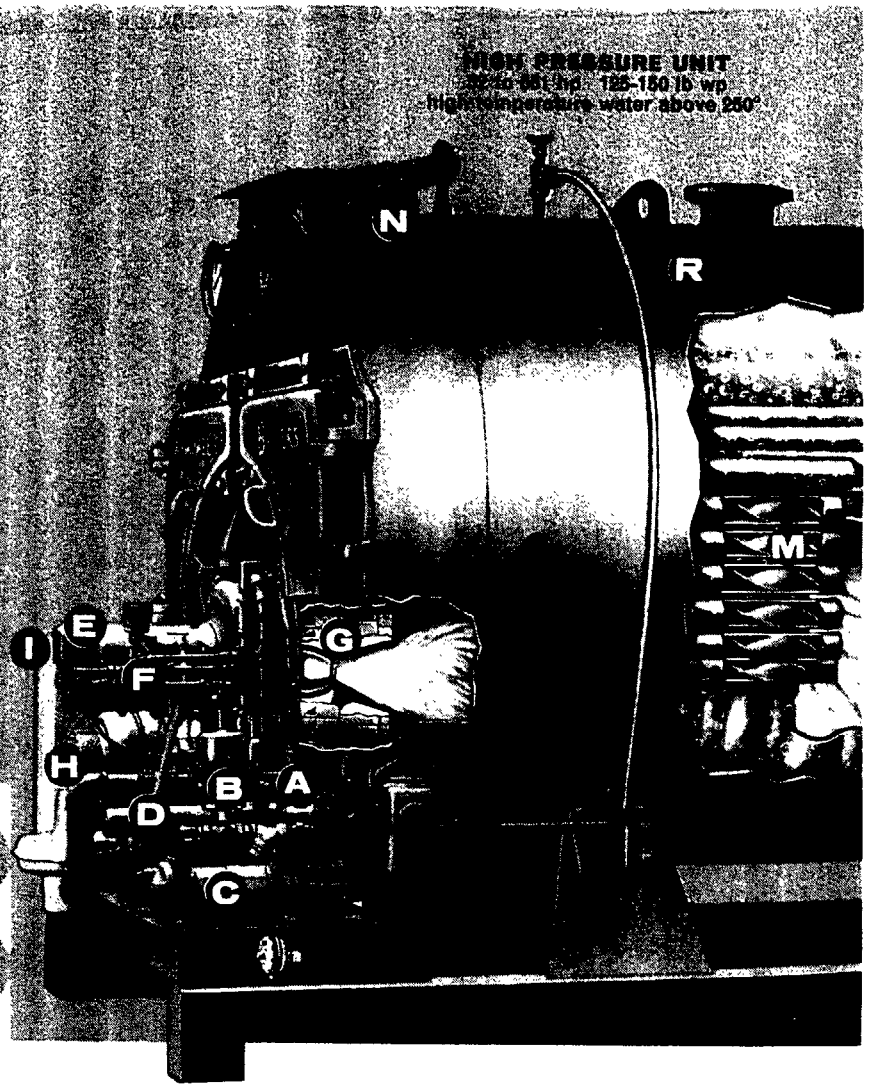
THE KEWANEE BOILER FOR

HEATING SURFACE

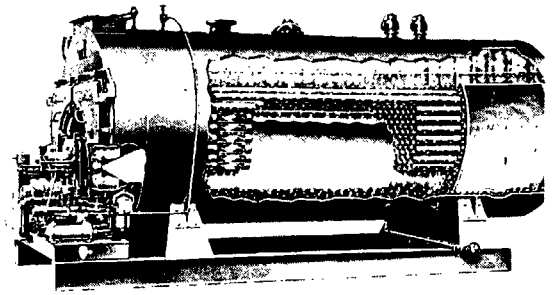
KEWANEE PETRO

COMPACT, EFFICIENT

BOILER-BURNER UNIT

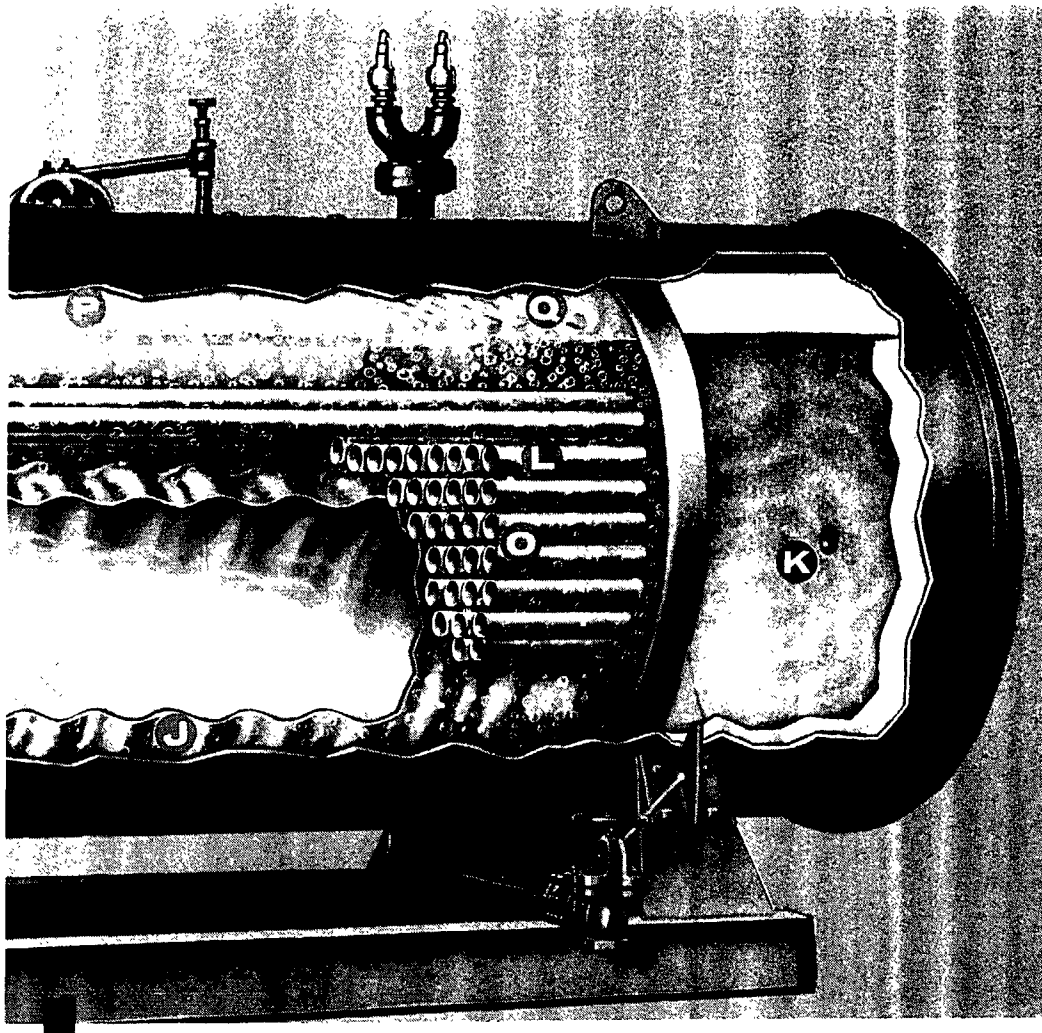


HIGH PRESSURE UNIT
30 to 481 hp 125-150 lb wp
high temperature water above 250°



LOW PRESSURE UNIT
1,546,000 to 21,855,000 Btuh
15 lb steam or 30 lb water 250° max.

28813



Fuel from the tank enters at the suction connection (A), passes to the pump and out the upper hinge to the relief valve (B), which allows the excess oil delivered by the pump to return to the tank. The oil to be burned is delivered first to the steam or hot water heater (C), then back to the upper hinge, through the electric heater (D) and over the ignition control to the magnetic oil valve (E). This valve being closed at this stage, the oil passes over its seat and returns through the back pressure valve (F) to the pump inlet for recirculating through the heaters. When the circulating oil reaches the proper temperature for burning, the ignition control closes, energizing the ignition system. The magnetic oil valve then opens, oil flows to the atomizing cup and firing begins.

Fuel mixes intimately with air in the venturi combustion throat (G). Throat and chamber are factory-lined. Flame shape is accurately controlled, with adjustable vanes imparting correct rotation to match furnace configuration.

Ample combustion air is provided by the forced-draft fan (H)—with no need for high stack to induce draft. Low-speed ball-bearing motor drives fan directly. Fan is easily accessible.

All combustion controls are completely assembled, wired and tested at the factory, then fully enclosed in a complete control panel (I) for protection against dust and damage. All wiring from panel to motors and instruments is installed and tested.

Flame swirls through furnace tube (J), corrugated on high pressure units to provide greater strength and increased heating surface. Also, expansion and contraction of corrugations crack off scale on water side for continued fast heat transfer . . . high boiler efficiency.

INSET: Low pressure unit has plain furnace tube, welded to flanged openings in tube sheet for greater flexibility and strength.

Rear combustion chamber (K) in high pressure units is heavily lined with insulating-type refractory (shipped in place) to aid combustion, retain heat . . . maintain efficiency. INSET: Low pressure unit features wet-back design, with water completely surrounding rear combustion chamber. Refractory is not required. Both high pressure and low pressure units feature access opening in rear combustion plate.

Hot gases enter fire tubes (L) of heavy gage steel, 3" o.d. diameter, set into tapered holes in head by roller expander with ends firmly rolled and beaded.

Spinner blades (M) in all tubes swirl hot gases against tube surfaces for longer gas travel and maximum heat transfer.

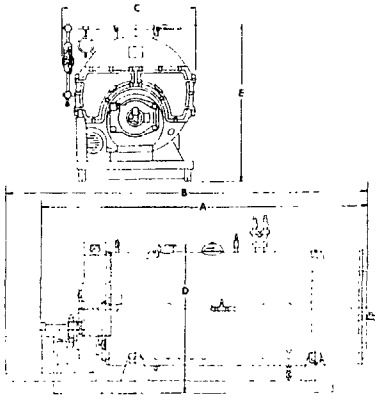
Gases exit through welded, gas-tight smokebox equipped with quadrant lock damper (N).

Water circulates rapidly around furnace tube and through wide spacing between fire tubes (O). Steam bubbles rise freely to water surface to disengage quietly. Low water line provides larger—and therefore less turbulent—disengaging area. . . . also provides larger steam space (P) for ample reserve of dry steam.

Head braces (Q) are secured by exclusive one-piece, forged ends extending through boiler shell and heads. This eliminates hidden welds and assures positive dependability.

Welded shell (R) is of flange steel . . . heads and furnace tube are of firebox quality. Insulated metal jacket is optional at extra cost.

Boiler construction meets or exceeds A.S.M.E. code requirements. Complete boiler-burner unit is approved by Underwriters Laboratories, Inc.



ratings

unit number	K-P	78-4†	79-4†	80-4	81-4	82-5	83-5	84-6	85-6	86-7	87-7	88-8	89-8½	90-8½	91-9	92-10	93-10
High Pressure Units SBI rating—horsepower				52	61	74	87	109	130	152	174	217	261	304	347	390	434
—steam	sq ft			7290	8500	10330	12150	15180	18220	21250	24290	30360	36430	42500	48570	54640	60710
—water	sq ft			11660	13600	16520	19440	24280	29150	34000	38860	48570	58280	68000	77710	87420	97140
MBtuh				1750	2040	2479	2916	3643	4373	5100	5830	7286	8743	10200	11657	13114	14570
—steam per hour—212° F.	lb			1790	2100	2550	3000	3760	4490	5240	6000	7490	9000	10490	11970	13460	14970
Low Pressure Units net rating—steam	sq ft	6440	7160	8580	10000	12160	14300	17860	21440	25000	28580	35720	42860	50000	57140	64280	71420
—water	sq ft	10300	11460	13730	16000	19460	22880	28580	34300	40000	45730	57150	68580	80000	91420	102850	114270
—MBtuh		1546	1718	2059	2400	2918	3432	4286	5146	6000	6859	8573	10286	12000	13714	15427	17141
All Units certified output—horsepower		59	66	78	92	111	131	164	195	228	261	326	392	456	521	585	651
—MBtuh		1969	2188	2625	3060	3718	4374	5464	6559	7650	8745	10929	13114	15300	17485	19671	21855
firing rate—oil***	gph	16	18	22	26	31	37	46	54	64	73	91	110	127	146	164	182
—gas	MBtuh	2460	2740	3280	3830	4650	5460	6840	8200	9560	10920	13670	16400	19120	21900	24600	27300

dimensions

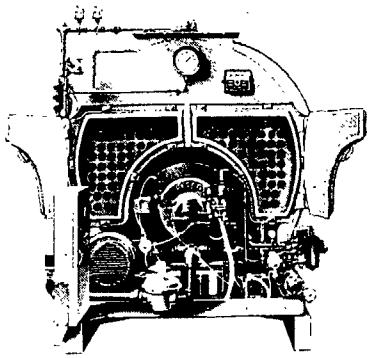
A—length overall*	ft-in.	12-11	13-10	13-10	15-0½	15-8	17-4	18-6	18-11½	20-11½	20-0½	21-6	22-9½	22-9½	25-9	26-5	27-1
B—length overall**	ft-in	15-0	15-11	15-11	17-1½	17-5	19-1	20-6½	21-0	23-0	22-1	24-7½	25-7½	25-7½			
C—width overall	ft-in.	5-10	5-10	6-1	6-1	6-7	6-7	7-1	7-8	7-8	8-2	8-8	9-2	9-8	10-0	10-4	10-8
D—steam supply height	ft-in	6-7	6-7	7-0	7-0	7-6½	7-6½	8-1	8-6	8-6	8-11½	9-6½	10-1½	10-7½	11-0	11-4	11-8
E—smoke outlet height	ft-in.	6-9	6-9	7-1½	7-1½	7-7	7-7	8-1½	8-6	8-6	8-11½	9-5	10-0	10-5½	10-9	11-1	11-5

*Control panel at side **Control panel in front. ***150,000 Btu oil. †78-4 and 79-4 for low pressure only.

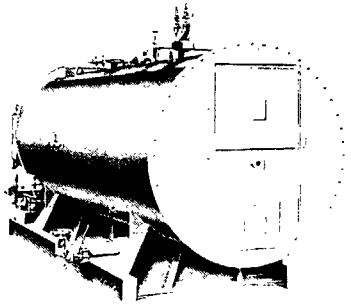
Dimensions are approximately correct for low pressure unit. Above dimensions and drawings are for high pressure and represent the maximum for all units

For complete specifications, see Catalog Bulletins 3304-3 and 3305-3

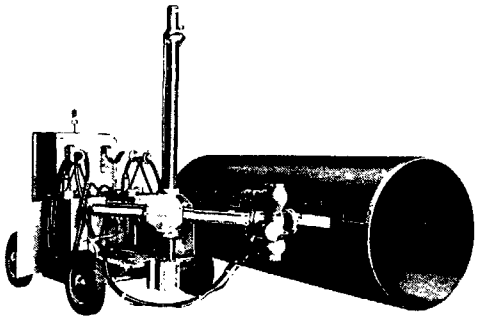
28814



1



2



3

1.

2.

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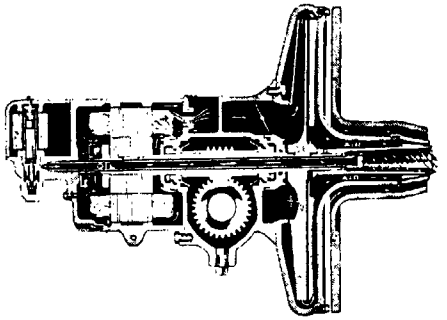
KEWANEE

ENGINEERED

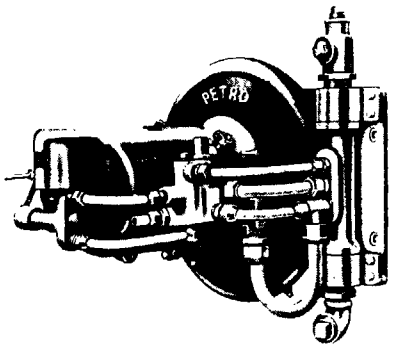
BOILER ADVANTAGES

28815

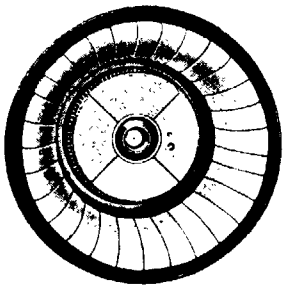
Kewanee has become a leading manufacturer of steel boilers because of one fact: outstanding quality of product. Kewanee puts more into each boiler . . . more designing skill and experience, more materials, more workmanship. And Kewanee bases certified ratings on an ample ratio of approximately 5.5 square feet of heating surface per boiler horsepower —with S.B.I. ratings based on 8.2 square feet for 50% reserve capacity whenever needed.



1



2



3

1. PETRO MODEL W horizontal rotary oil burner owes its reputation for reliability and fuel economy to a simple design. The burner is built around an integral direct drive motor. Fuel and air passages are large and unrestricted.

2. HEAVY OIL is kept correctly fluid for optimum burning conditions. Petro's exclusive Thermal Viscosity System includes both steam (or hot water) heating and thermostatically controlled electric preheating of oil for cold starts. The system keeps oil flowing to the atomizing cup at an even rate, even though the oil has a natural tendency to flow more freely when hot. Key to the system is the magnetic valve through which oil flows from the heaters. If oil is at correct temperature, this valve releases it to the atomizing cup. If oil is *not* yet warm enough, the valve stays closed, forcing oil to recirculate through the tubing to the heaters again. In effect, Petro's Thermal Viscosity System provides constant, automatic control over oil temperature and fluidity—actually preventing the burner from firing until the oil is in condition for trouble-free, efficient combustion.

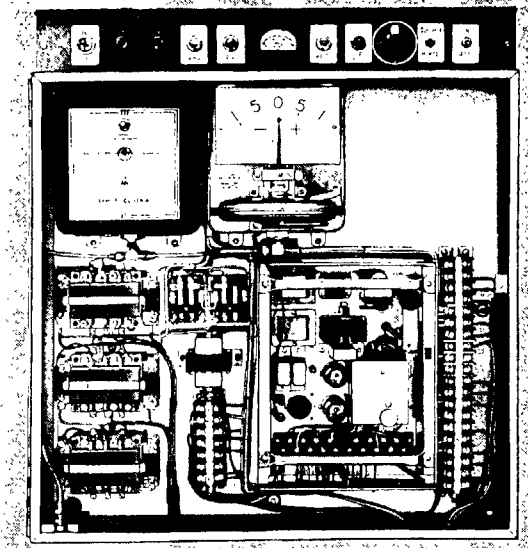
3. ALL TYPES OF GAS, both high and low pressure, can be fired efficiently by Petro's ring-type gas burner. Circular arrangement of the multiple gas jets provides thorough mixing of gas and air in the burner throat ahead of the combustion zone. A simple and ingenious system of air vanes at the throat entrance regulates the air volume and distribution, and rate of flame rotation. For alternate oil and gas firing, the oil burner is placed in the center of the gas ring.

Petro engineers aimed at producing a burner that was as accurate as a precision instrument—yet uncomplicated in design and dependable in operation. The Petro rotary oil burner is the successful result. All grades of oil are burned smoothly, quietly and efficiently—even the heavier oils that become a sluggish non-fluid when cool (although offering more heat per gallon at less cost per gallon). Petro regulates the preheating of these oils automatically with the exclusive Thermal Viscosity system shown above.

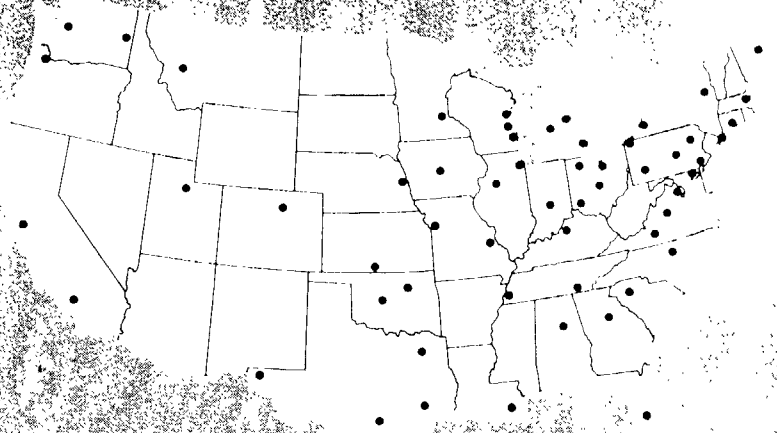
PETRO BURNER

FUEL-SAVING FEATURES

28816



The "brain" of a Kewanee Petro Unit is a heavy-duty, totally enclosed control panel—assembled, wired and tested at the factory. This center automatically proportions the supply of oil and air to fit the load . . . stops burner instantly if water is low, or if pressure or temperature is too high, or if flame fails. Safety shutdown, in case of flame failure, is indicated by a signal lamp.



Regardless of where, in the 48 states, a Kewanee-Petro Boiler-Burner Unit is installed, there is an available service representative. The Petro service organization has been growing for over 50 years . . . Kewanee's for 90 years. Today there are Petro and Kewanee men everywhere—skilled specialists in their fields—always ready to guarantee the reputation of the famous products they represent.

American-Standard

KEWANEE BOILER DIVISION

101 FRANKLIN STREET, KEWANEE, ILLINOIS

PETRO

PETRO

3170 W. 106th Street

Cleveland, Ohio

28817