

APH OIL BOILER

by

AMERICAN-Standard

INSTALLATION-OPERATION AND MAINTENANCE MANUAL

FOR PACKAGED
OIL HEATING UNITS

ATTENTION INSTALLER!

THIS MANUAL IS TO BE LEFT WITH
BOILER FOR THE HOMEOWNER

AMERICAN-Standard

First in heating . . . first in plumbing

BP-7864-APH
REV. 5-65

13083

PLAINTIFF'S
EXHIBIT

To the homeowner:

The American-Standard boiler which has been installed for you is the heart of your hydronic heating system. Since the performance of your system depends upon the boiler, it has been designed to operate at maximum efficiency. Advanced design, precision engineering, and modern manufacturing techniques are combined in this product to provide you with comfort at a low operating cost and with a minimum of maintenance.

The boiler sections are cast in iron--a metal resistant to corrosion, especially in a closed system. If this boiler is part of a new installation, it is joined in a closed system--i.e., normally water is neither lost nor added--and should not be drained. The replacement of water adds oxygen to the system; corrosive action continues until that oxygen is consumed; but, certainly, the boiler should not be fired without an adequate supply of water. On the other hand, if the boiler is not used during the winter months, it must be drained to prevent damage caused by freezing.

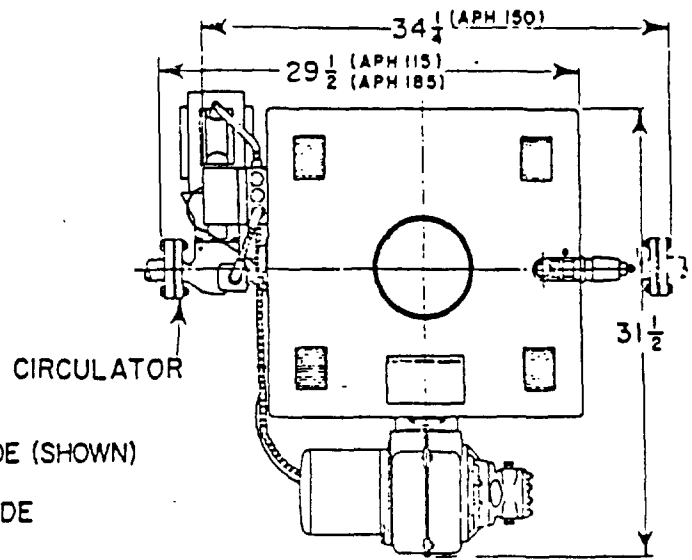
By following the suggestions contained in this manual, you can assume your boiler will function properly for many years. Should any problem arise, contact your nearest American-Standard contractor, whose name can be found in the "yellow pages" of your telephone directory.

AMERICAN-STANDARD

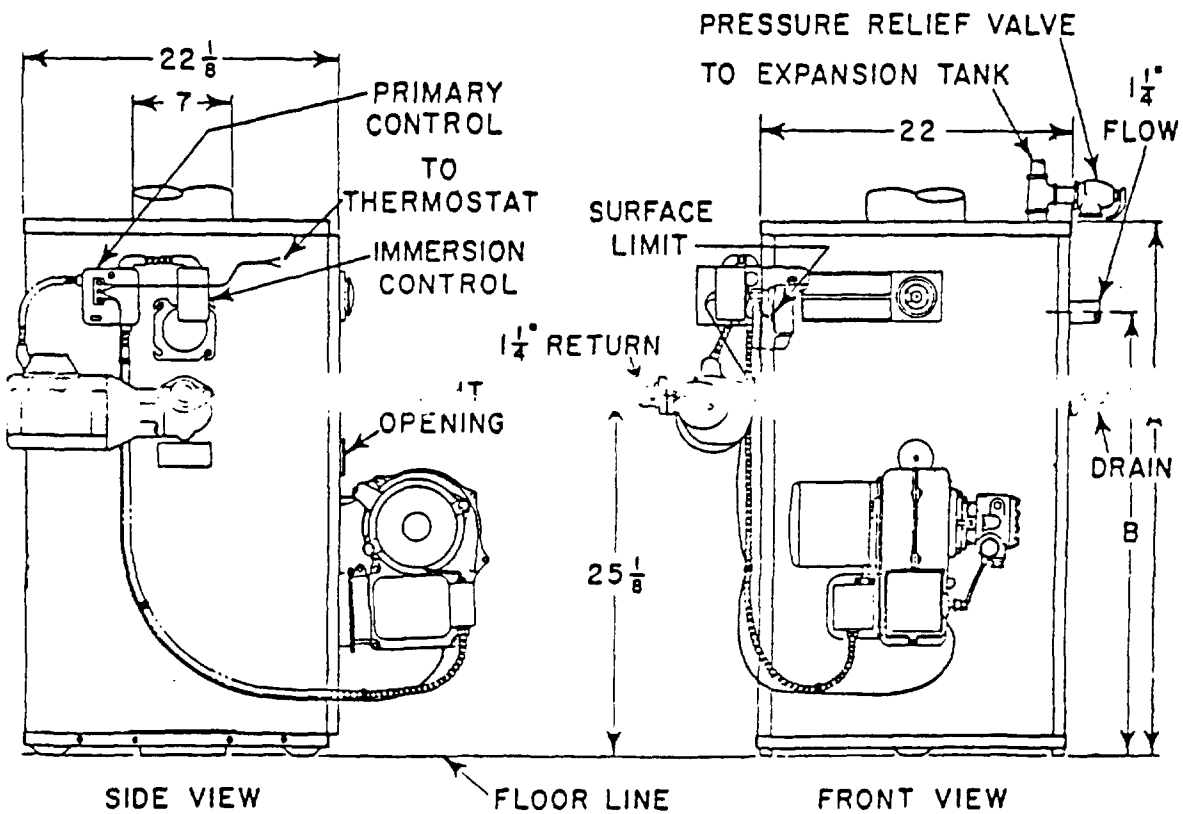
APH OIL BOILER

BOILER NUMBER	A	B
APH-115	37	$31\frac{1}{8}$
APH-150	40	$34\frac{1}{8}$
APH-185	43	$37\frac{1}{8}$

NOTE:
 FOR APH-115 AND APH-185
 CIRCULATOR LOCATED ON LEFT SIDE (SHOWN)
 FOR APH-150
 CIRCULATOR LOCATED ON RIGHT SIDE



TOP VIEW



SIDE VIEW

FLOOR LINE

FRONT VIEW

Fig. 1

GENERAL

The APH boiler has been tested and approved by I-B-R as an oil-fired unit only; it is NOT adaptable for stoker or hand firing.

PACKAGING

The APH boiler has been preassembled at the factory and is shipped to you ready to install, except for the burner unit which is packaged separately to prevent possible damage. An accessory box within the boiler crate contains the relief valve, the oil burner nozzle, draft stabilizer, and miscellaneous fittings necessary to complete final installation.

Prior to unpacking the boiler from its crate, it should be located as near its installation site as possible, preferably close to the chimney. When unpacking, care should be taken not to damage the boiler jacket or any connection therefrom.

INSTALLATION

Provisions must be made for combustion air where normal infiltration is not adequate. Full basements should normally provide adequate ventilation. If necessary, either of two methods may be employed to assure proper combustion air:

a. Two openings (one near the floor and one near the ceiling) to an adjacent interior space with a normal source of infiltration, each with a minimum area of 150 sq. inches for the APH 115, 200 sq. inches for the APH 150, and 250 sq. inches for the APH 185.

b. If going to the outside, the following openings are required: 30 sq. inches for the APH 115, 40 sq. inches for the APH 150, and 50 sq. inches for the APH 185.

After the boiler is finally placed, the burner is attached by placing its hanger over the hanger mounting bracket. No additional fasteners are required.

The oil line(s) should be connected to the burner, using the instructions in the Arcoflame Oil Burner Manual, which is packed in the burner box.

The supply to the heating system must be connected to the boiler at the upper right-hand side or top (see Page 5 for recommended hook-ups). The water return is connected to the circulator on the lower left-hand side (right-hand side for APH-150).

Installation of a conventional-type expansion tank is recommended since the APH boiler includes the "Eliminaire Principle" which directs air, released by the heating of water, out the top of the boiler. No air removing or separating device need be added to the heating system because the released air is directed into the expansion tank. The expansion tank must be installed with its connecting opening aligned vertically with the tapping on top of the boiler. The pressure relief valve must be put in the branch of the pipe tee. In locating the tank, particularly cold or exposed places should not be utilized, to avoid the possible serious damage resulting from freezing. A closed valve in the pipe to the expansion tank during operation of the boiler may cause equal damage.

A pre-pressured diaphragm-type tank may be installed in lieu of the conventional tank. If employed, it is important that an automatic air vent be installed to relieve air from the system.

Recommended and alternate methods of expansion tank hook-ups are shown on Page 5.

A gate valve (for purging) should be installed as close as practical to the boiler outlet (see "Fill Procedure" on Page 3).

If an automatic fill valve is installed, it is recommended that a bypass (with shut-off valve) be piped around the valve so that full water flow rates may be used to adequately purge the system of air on initial fill.

30 psi relief valves are standard equipment on APH boilers. However, the 30 psi relief valve is not suitable for use with 50 psi relief valves, if required.

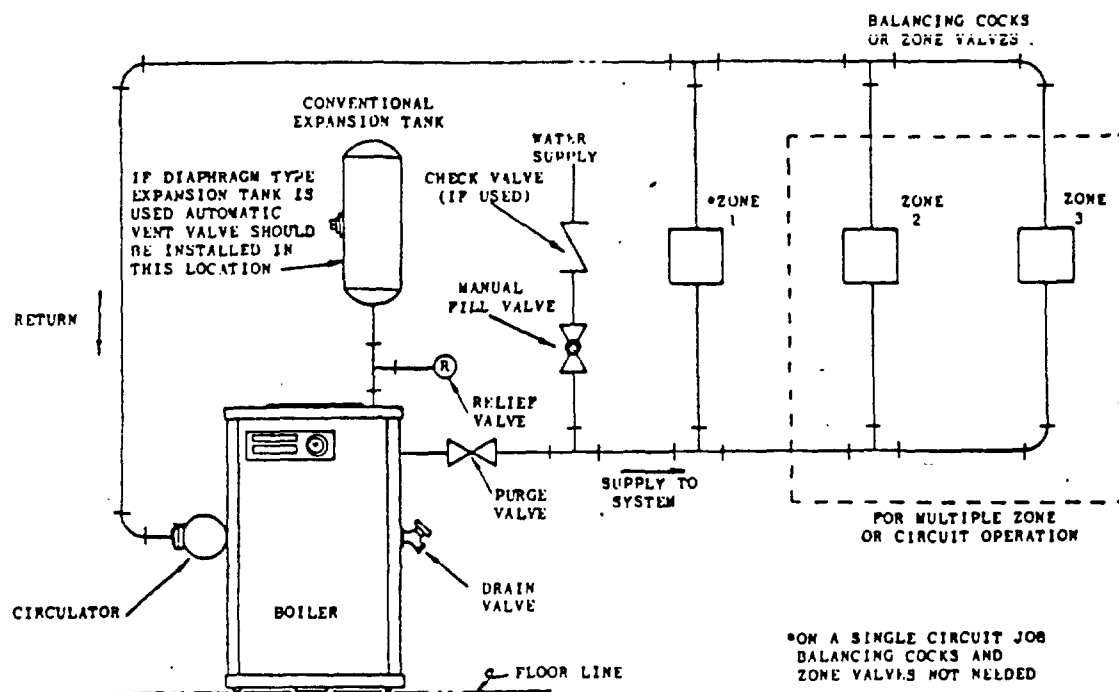


Fig. 2

FILLING

The following procedure should be used to fill a series loop Heatrim System (See Figure 2).

1. Close all zone valves except the one for the zone to be filled with water and purged of air.
2. Open the drain valve on the boiler.
3. Open the fill valve.
4. Close the purge valve.
5. Open the relief valve.
6. Open the valve to the second zone to be purged; then close the first. Repeat this step until all zones have been purged of air and filled with water; but always have one zone open. (Zones are purged and filled when water can be felt in the pipe at the end of the zone).
7. Close the drain valve.
8. When water appears, release the lever on the relief valve, allowing it to close.
9. Continue filling the system until the pressure gauge reads 12 psi without heat; close the fill valve.
10. Open the purge valve.

11. For quietest operation, check the gauge pressure with the system at 200 F. Adjust the pressure to 25 psi if a 30 psi relief valve is employed and 40 psi when a 50 psi relief valve is used. If an automatic fill valve is used, it may be necessary to readjust the setting of the valve to allow a higher fill pressure with the system cold to obtain desired pressure with the system at 200 F.

Following the completion of the installation, a thorough check should be made of the entire hydronic system to locate possible leaks.

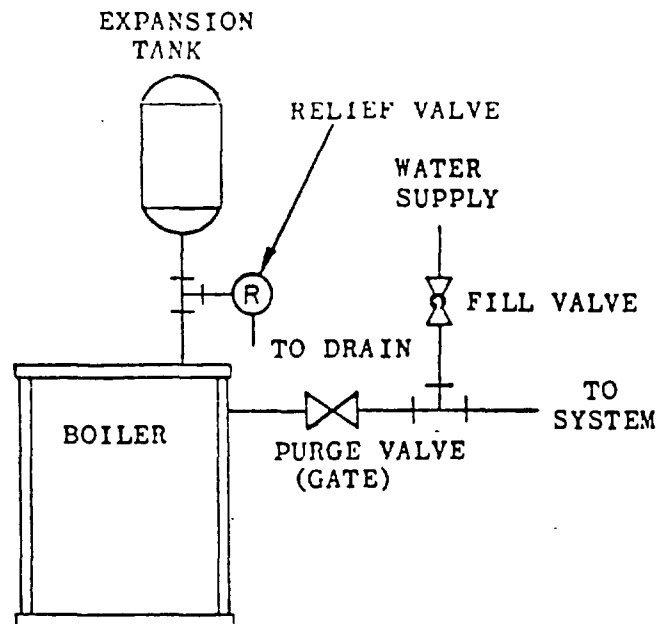
If a diaphragm-type expansion tank is used, it may be necessary to increase the initial air pressure in the tank with the system cold to insure adequate expansion volume. These tanks are usually fitted with a tire valve for this purpose.

The flue should be installed with a minimum of 1/4" pitch per foot of horizontal run (lengths of the flue should be kept as short as possible). The flue should not block the chimney by extending beyond the chimney wall. The draft stabilizer should be installed between the boiler and the chimney as close as possible to the boiler. Instructions accompanying the draft stabilizer should be followed.

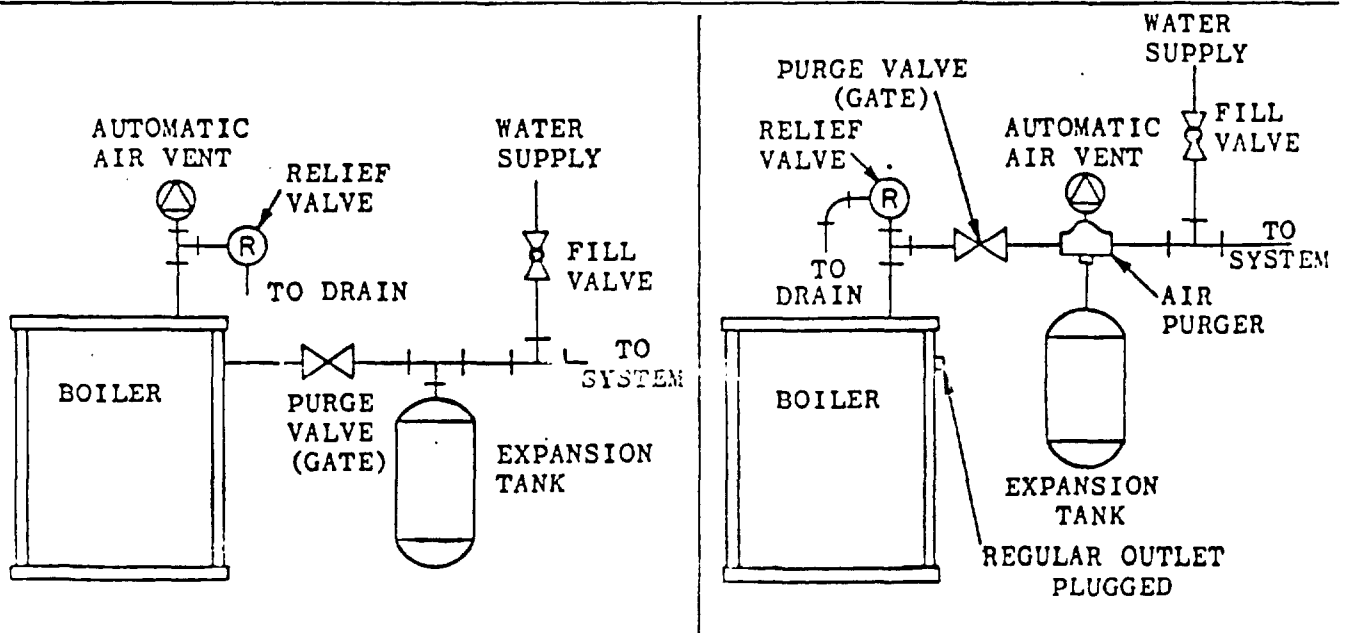
WIRING

The electric service line should be run to the junction box on the boiler. On a single zone installation, the thermostat must be wired according to the wiring diagram (See Figure 3). For multiple zone installation, the wiring instructions accompanying the zone control valve set should be followed. The cable hanging from the junction box on the boiler should be connected to the oil burner junction box and wired according to the wiring diagram. The low voltage wire from the oil burner must be connected to the oil burner primary control per the wiring diagram, and taped to adjacent BX cable.

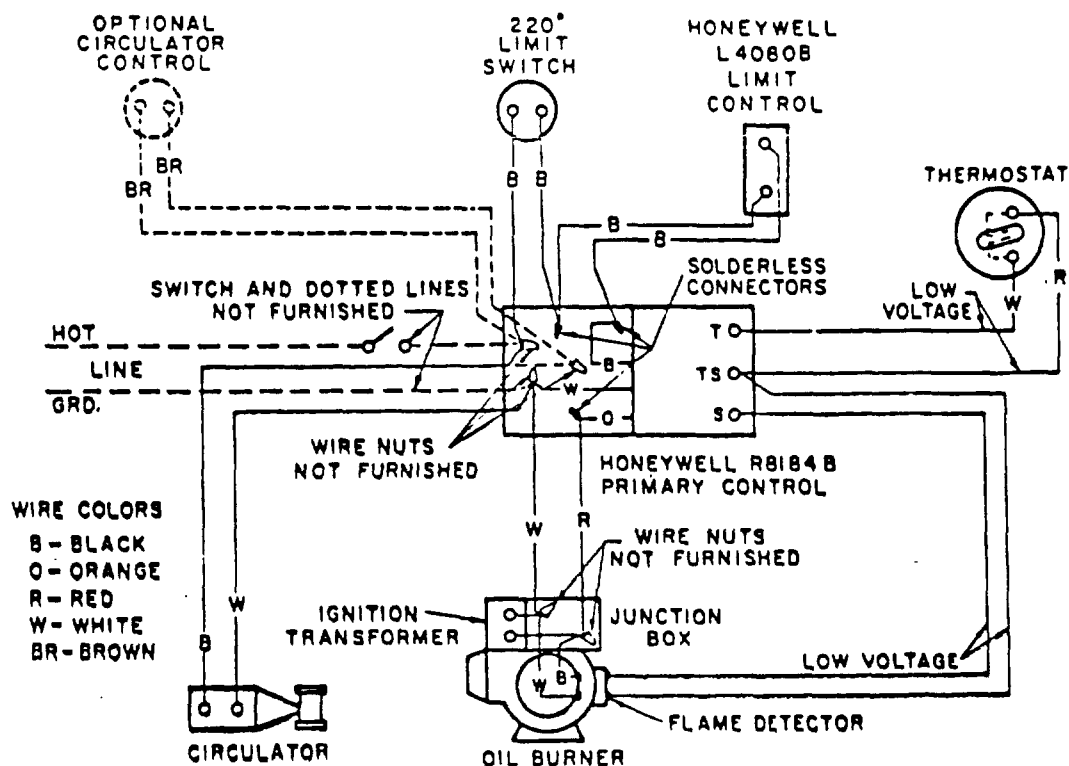
At the beginning of the heating season, the manual switch in the electric service line must be closed to start the circulator pump which will then constantly circulate water of varying temperatures, depending upon the heat requirements. At the end of the heating season, the manual switch should be opened.



RECOMMENDED HOOK-UP USING CONVENTIONAL EXPANSION TANK



ALTERNATE HOOK-UPS USING DIAPHRAGM-TYPE EXPANSION TANKS



APH OIL BOILER WIRING DIAGRAM - CONSTANT IGNITION

Fig. 3

BOILER CARE**Cleaning**

It is advisable to clean the flue gas passages of the boiler section whenever any deposit reaches a depth that might interfere with heat absorption or the free passage of flue products.

The diagram in Figure 4 shows flue gas passages and access opening for cleaning. The APH-115 and -150, in order to clean, require the removal of the flue baffle plate which is accessible following removal of the canopy. The plate may be correctly replaced by aligning the holes with the pins.

Care should be taken NOT to extend the flue brush too far into the boiler, as this can cause damage to the combustion chamber. A mark on the handle of the flue brush will prevent such an occurrence. The following insertion distances apply:

APH-115	Brush should not be inserted more than 10".
APH-150	Brush should not be inserted more than 13".
APH-185	Brush should not be inserted more than 16".

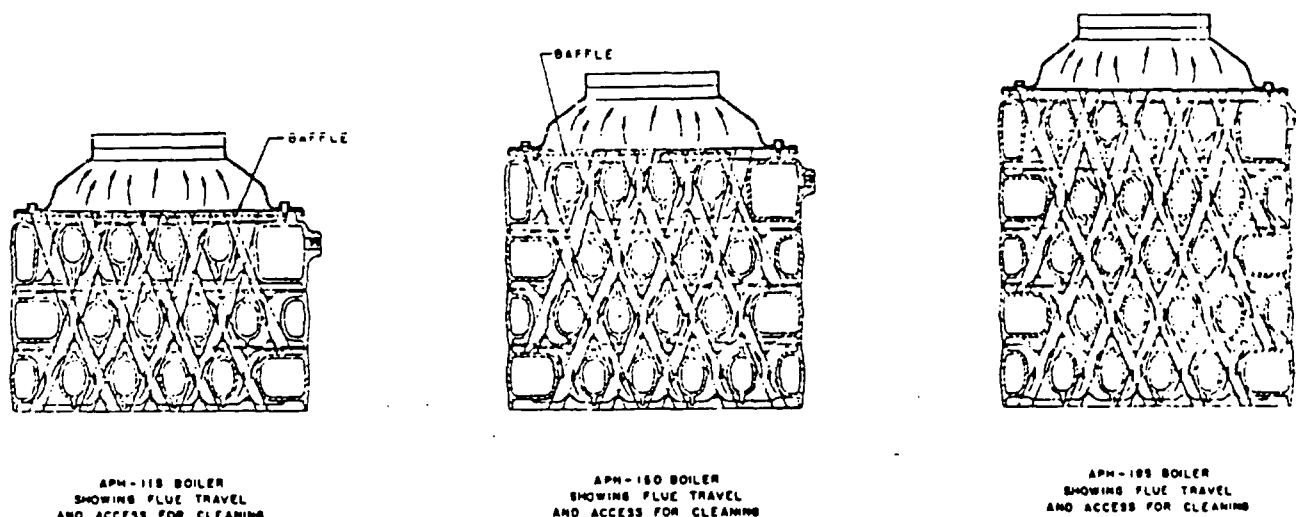


Fig. 4

Combustion Chamber Removal

The following steps constitute the ONLY method for removing the combustion chamber unit from the boiler assembly: the procedure for reassembling the boiler is the exact reverse (See Fig. 5 & 6)

1. Turn off the electrical supply.
2. Close the valves in the oil line(s); disconnect the line(s) from the burner.
3. Lift out the burner and set it aside (it is not necessary to disconnect the wiring).
4. Remove the flue pipe.
5. Remove the screw near the relief valve; lift off the top panel.
6. Remove the draft-sleeve air adjustment and pressure ring.
7. Remove the front panel by pulling it forward and lifting it out of the jacket base.
8. Disengage the combustion chamber from the sections by removing the two retaining bolts, indicated on the Jacket Assembly Drawing.
9. Lift out the entire combustion chamber assembly; this unit must remain intact, since the chamber itself cannot be replaced satisfactorily except at the factory.

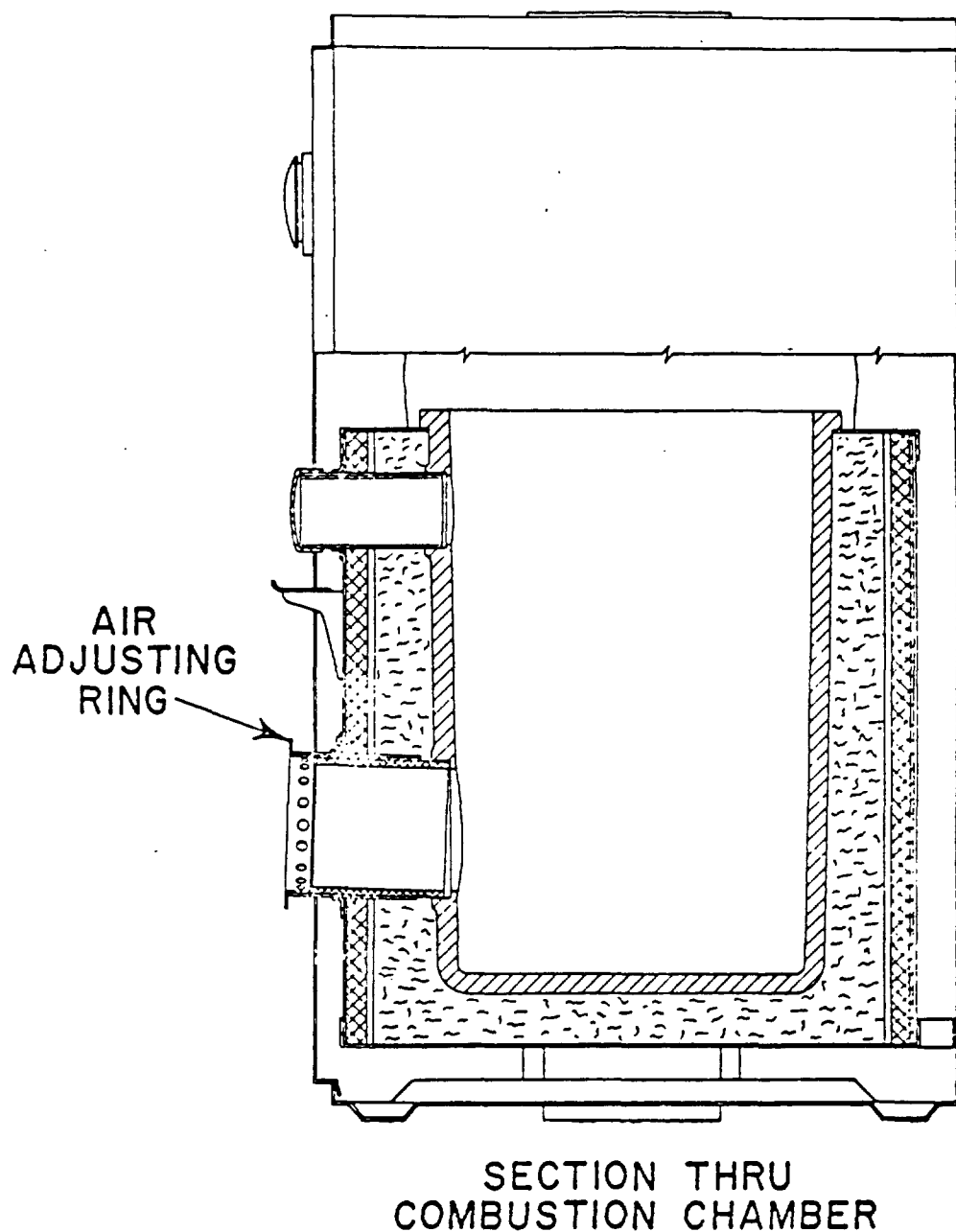
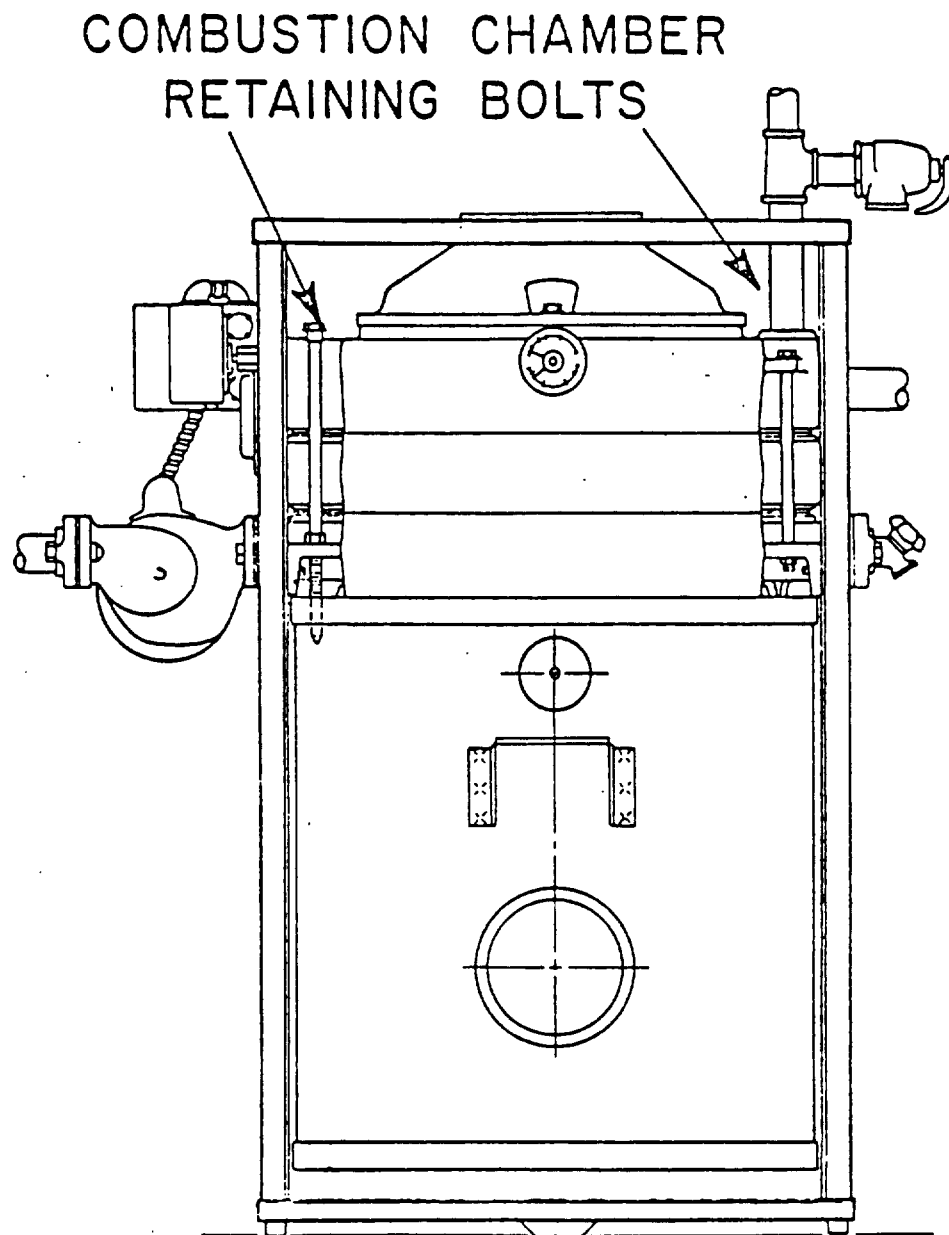


Fig. 5



FRONT VIEW
FRONT PANEL REMOVED

Fig. 6

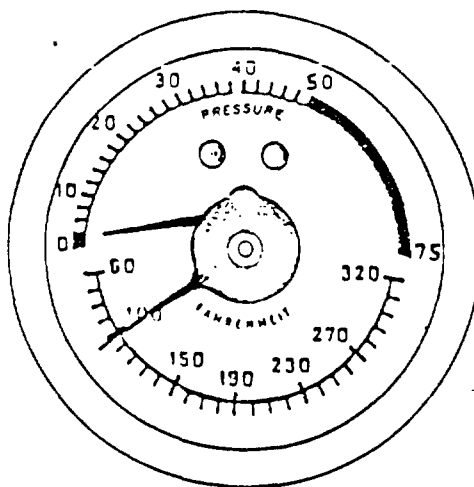


Fig. 7

OPERATION

The homeowner should occasionally check the readings on the gauge located on the front of the boiler. The lower scale indicates the water temperature within the boiler; and, should the water exceed 250 F, operation must be discontinued until the system is checked and the fault corrected. The upper scale indicates the pressure within the system and should not exceed 30 lbs (50 lbs with 50-lb relief valve).

In a closed system the boiler and piping are entirely filled with water except for a cushion of air in the upper portion of the expansion tank. When the water is heated, it expands, compressing the air. If, for any reason, this air were completely displaced from the tank, there would no longer be a cushion. In that event an increase in water temperatures would cause a corresponding increase in volume and pressure would force the relief valve open to discharge the excess volume. To correct such a condition, the expansion tank must be drained enough to permit the tank to fill with air.

The boiler is equipped with an adjustable limit control with a mechanical stop at 220 F. This setting can be reduced for lower system design temperatures.