In most localities it may be installed in basements without being enclosed. Where a greater storage capacity is necessary, local regulations usually permit inside installation of two tanks of 275 gal each in accordance with *NBFU* Standards Pamphlet No. 31.

GAS-FIRED HEATING EQUIPMENT

A gas burner is defined by the *American Gas Association* as "a device for the final conveyance of the gas, or a mixture of gas and air, to the combustion zone." Burners used for domestic heating are of the atmospheric injection, luminous flame, or power burner types.

Because of the ease with which gas fuel may be controlled, automatic gas-fired heating equipment has become very widely used, and is available

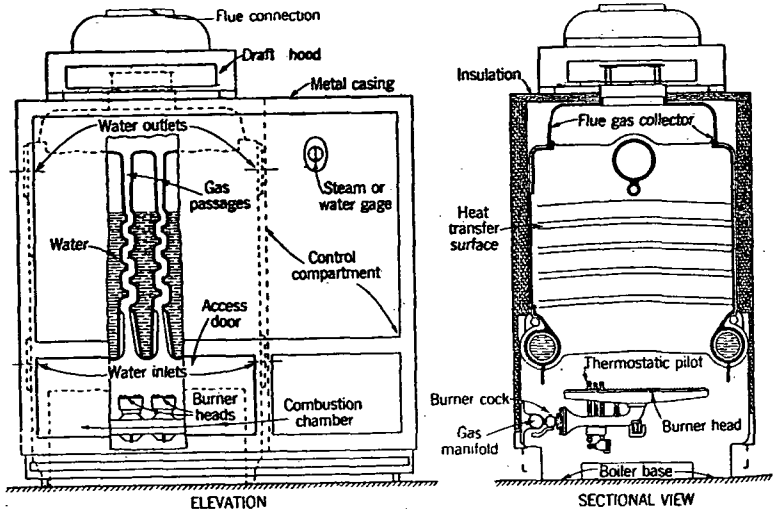


FIG. 19. GAS-FIRED BOILER

in a number of types of domestic gas heating appliances and systems. These may be classified in types designed for central heating plants and those for unit application. Gas designed units and conversion burners are available for the several kinds of central systems in which gravity and forced warm air furnaces or steam and hot water boilers are used, and for other applications where warm air floor furnaces and room heaters are installed in the space being heated.

Central Heating Systems

Boilers and furnaces specially designed for gas-firing incorporate design features for obtaining maximum efficiency and performance. Small flue passes to secure good heat transfer, the use of materials resistant to the corrosive effects of products of combustion, and draft hoods are notable features. Control equipment includes gas pressure regulators, automatic pilots, and limit controls designed to protect the appliance and to insure safety of operation. A boiler designed for gas-burning is illustrated in Fig. 19.

Gas designed boilers for hot water or steam heating are available in

cast-iron, steel, and non-ferrous metals. The burners are located beneath the sections, and the flue gases pass upwards between the sections to the flue collector. Some boilers are designed to provide domestic hot water through the use of tankless or instantaneous heaters.

Warm air furnaces are of two types, gravity and forced air. The former depends upon a thermal head to provide circulation of air over the heat exchanger and thence directly to the space to be heated, usually through ducts. Most gravity furnaces can be equipped with humidifiers. Forced warm air furnaces utilize a motor-driven blower to circulate air over the heat exchanger and through the ducts. A common type is quite similar to Fig. 18 except that gas burners, pilots, controls, and gas pressure regulator are substituted for the oil burner, and a draft hood is attached to the outlet of the furnace. Due to the pressure developed by the blower, ductwork becomes smaller and the location of the furnace less critical than in gravity systems. Designs of forced air furnaces vary from the conventional types that deliver heated air to overhead ductwork to the downblow types wherein the heated air is delivered at the bottom of the furnace, this

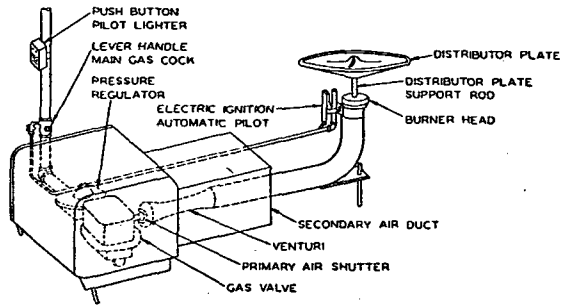


FIG. 20. TYPICAL SINGLE PORT GAS CONVERSION BURNER

latter type being designed for perimeter or radiant panel heating. Several types of low height horizontal furnaces are available for installation in attics or under floors of unexcavated houses. These furnaces are designed for compactness. The *A.G.A.* listed output at the boiler nozzle or at the bonnet for forced air and gravity furnaces is 80 and 75 percent, respectively, of the approved input to the burners.

Conversion Burners

Conversion burners are usually complete burner and control units designed for installation in existing boilers and furnaces. A typical gas conversion burner is shown in Fig. 20. Atmospheric conversion burners may have drilled port, slotted port, or single port burner heads. Single port types have become increasingly popular in the last few years due to their simplicity of construction and ease of installation. In rectangular or round, drilled and slotted port burners baffles of clay or metal are usually used to direct the products of combustion toward the side walls of the combustion chamber. In single port burners the flame usually impinges against a horizontal cast-iron, stainless steel, or ceramic distributor plate which directs the products of combustion toward the side walls. For certain applications, particularly wet base boilers, a horizontal single port burner