

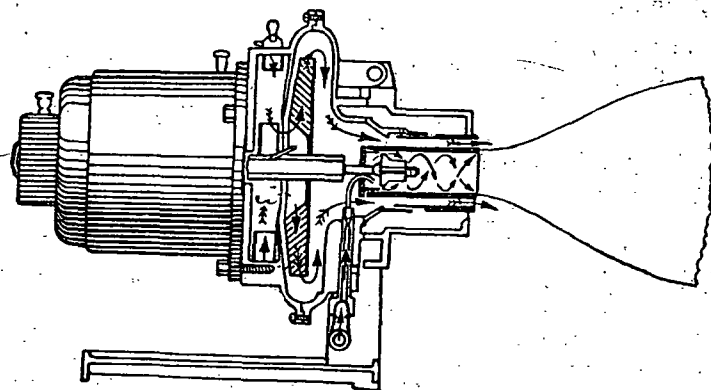


FIG. 16. HORIZONTAL ROTATING CUP OIL BURNER

burners, it is customary to preheat the oil between the tank and the burner. Preheating when delivering from tank car, or truck, is often required in cold weather.

Vaporizing Burners

This type burner transforms the oil into a combustible vapor by the application of heat from a plate, or cracking chamber. The class may be subdivided into burners supplying combustion air mechanically, and those utilizing the natural chimney draft. Vaporizing pot-type burners are generally restricted to the use of the lighter distillates but some will operate with No. 3 oil.

These burners are designed for continuous or intermittent operation, with manual ignition, and the rate of burning is controlled by a metering valve. They are also available with electric ignition and thermostatic controls. Flame may be luminous or non-luminous, dependent upon adjustment. A burner of this type is illustrated in Fig. 17.

Vaporizing burners of the natural draft type are used as the firing device in integral space heaters, water heaters, or furnace units. Some types have also been applied successfully to conversion installations.

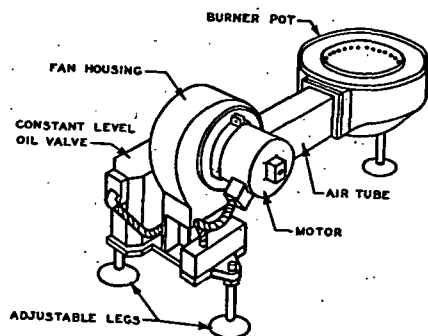


FIG. 17. VAPORIZING POT-TYPE BURNER

Oil-Fired Boiler and Furnace Units

A number of types of specially designed oil-fired boiler-burner and furnace-burner units are available. Various locations of burners will be noted in such units; some having the combustion chamber and burner at the top, some at the bottom, and some at the center of the appliance. One type of boiler-burner unit is shown in Fig. 18. The coordinated design of boiler (or furnace) and burner elements insures the optimum in operating characteristics, and the maintenance of balanced performance. This type of equipment usually has more heating surface, better flue proportions and gas travel than conventional boilers or furnaces. Some

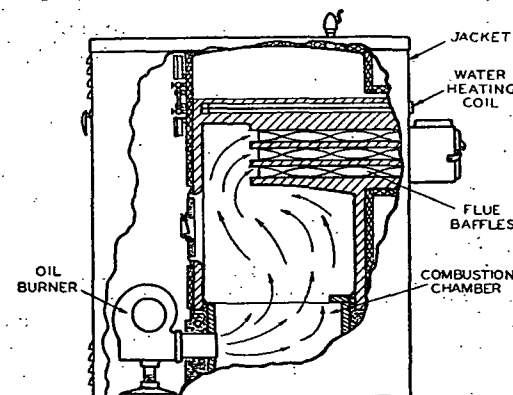


FIG. 18. TYPICAL BOILER-BURNER UNIT

of the better conversion installations, however, may equal the unit type in performance.

Operating Requirements for Mechanical Draft Oil Burners

The U. S. Department of Commerce in conjunction with the oil burner industry has established commercial standards for automatic mechanical draft oil burners for domestic installations which cover installation requirements and performance tests¹.

Combustion Process

Efficient combustion must produce a clean flame and use a relatively small excess of air, i.e., between 25 and 50 per cent. This can be done only by vaporizing the oil quickly and completely, and mixing it vigorously with air in a combustion chamber hot enough to support the combustion. A vaporizing burner prepares the oil, for combustion, by transforming the liquid fuel to the gaseous state by the application of heat. This is accomplished before the oil vapor mixes with air to any extent and, if the air and oil vapor temperatures are high and the fire pot hot, a clear blue flame is produced.

In an atomizing burner the oil is mechanically separated into very fine particles so that the surface exposure of the liquid to the radiant heat of the combustion chamber is vastly increased and vaporization proceeds quickly. The result is the ability to burn more and heavier oil within a given combustion space. Because the air enters the combustion chamber