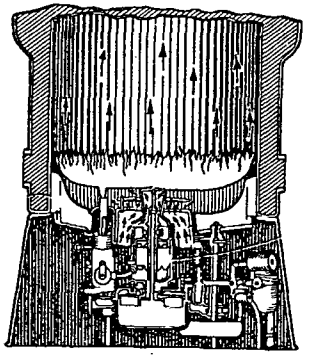

FIG. 13. CENTER FLAME VERTICAL ROTARY BURNER

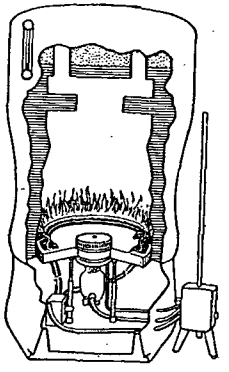

FIG. 14. WALL FLAME VERTICAL ROTARY BURNER

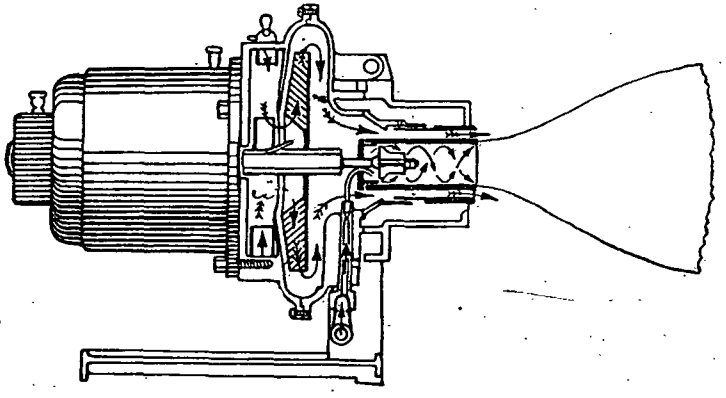

FIG. 15. HORIZONTAL ROTATING CUP OIL BURNER

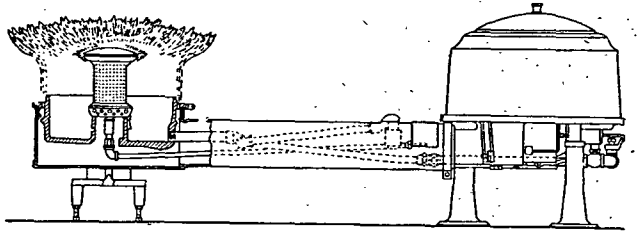

FIG. 16. VAPORIZING POT-TYPE BURNER

supplied by a blower, and secondary air, often introduced through a checkerwork in the combustion chamber, is controlled by chimney draft. These burners operate with a luminous flame, usually on high-low or continuous setting.

In larger installations, burners may be installed in multiple in a common combustion chamber. Because of the high viscosity oils used in these 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. As with pressure atomizing burners, a refractory combustion chamber, built within the boiler furnace, is a part of the installation.

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 restricted to the use of the lighter distillates.

These burners are designed for continuous or intermittent operation, with manual ignition, and the rate of burning is controlled by a metering valve. Flame may be luminous or non-luminous, dependent upon adjustment. A burner of this type is illustrated in Fig. 16.

Oil-Fired Boiler and Furnace Units

Boilers and furnaces especially designed for oil burners are available. This type of equipment usually has more heating surface, better flue proportions and gas travel, than conventional boilers or furnaces. Some of the better conversion installations, however, 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 tests[5].

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

[5]Automatic Mechanical Draft Oil Burners Designed for Domestic Installations (*U. S. Department of Commerce, National Bureau of Standards*, Commercial Standard No. CS75-42). Flue Connected Oil Burning Space Heaters Equipped with Vaporizing Pot Type Burners (*U. S. Department of Commerce, National Bureau of Standards*, Commercial Standard No. CS101-43). Warm-Air Furnaces Equipped with Vaporizing Pot-Type Oil Burners (*U. S. Department of Commerce, National Bureau of Standards*, Commercial Standard No. CS(E)104-43).