

quantities. The air and oil vapor must be vigorously mixed to get a rapid and complete chemical reaction. The better the mixing, the less excess air that will be needed. The combustion must take place in a space that maintains the temperatures high so the reaction will not be stopped before completion. When equipped with a means of igniting the oil and safety devices to guard against mishaps, the oil burner possesses all of the elements to be efficient and automatic.

The number of combinations of the characteristic elements of domestic oil burners is rather large and accounts for the variety of burners found in actual practice. Domestic oil burners may be classified as follows:

### 1. AIR SUPPLY FOR COMBUSTION

- a. *Atmospheric*—by natural chimney draft.
- b. *Mechanical*—electric-motor-driven fan or blower.
- c. *Combination of (a) and (b)*—primary air supply by fan or blower and secondary air supply by natural chimney draft.

### 2. METHOD OF OIL PREPARATION

- a. *Vaporizing*—oil distills on hot surface or in hot cracking chamber.
- b. *Atomizing*—oil broken up into minute globules.
  - (1) *Centrifugal*—by means of rotating cup or disc.
  - (2) *Pressure*—by means of forcing oil under pressure through a small nozzle or orifice.
  - (3) *Air or steam*—by high velocity air or steam jet in a special type of nozzle.
  - (4) *Combination air and pressure*—by air entrained with oil under pressure and forced through a nozzle.
- c. *Combination of (a) and (b)*.

### 3. TYPE OF FLAME

- a. *Luminous*—a relatively bright flame. An orange-colored flame is usually best if no smoke is present.
- b. *Non-luminous*—Bunsen-type flame (*i.e.*, blue flame).

### 4. METHODS OF IGNITION

- a. *Electric*.
  - (1) *Spark*—by transformer producing high-voltage sparks. Usually shielded to avoid radio interference. May take place continuously while the burner is operating or just at the beginning of operation.
  - (2) *Resistance*—by means of hot wires or plates.
- b. *Gas*.
  - (1) *Continuous*—pilot light of constant size.
  - (2) *Expanding*—size of pilot light expanded temporarily at the beginning of burner operation.
- c. *Combination*—electric sparks light the gas and the gas flame ignites the oil.
- d. *Manual*—by manually-operated gas torch for continuously operating burners.

### 5. MANNER OF OPERATION

- a. *On and off*—burner operates only a portion of the time (intermittent).
- b. *High and low*—burner operates continuously but varies from a high to a low flame.
- c. *Graduated*—burner operates continuously but flame is graduated according to needs by regulating both air and oil supply.

A trade classification of oil burners consists of the following general types: (a) gun or pressure atomizing, (b) rotary and (c) pot or vaporizing.

The gun type, illustrated in Fig. 10 is characterized by an air tube, usually horizontal, with oil supply pipe centrally located in the tube and arranged so that a spray of atomized oil is introduced and mixed in the combustion chamber with the air stream emerging from the air tube. A variety of patented shapes are employed at the end of the air tube to influence the direction and speed of the air and thus the effectiveness of the mixing process.

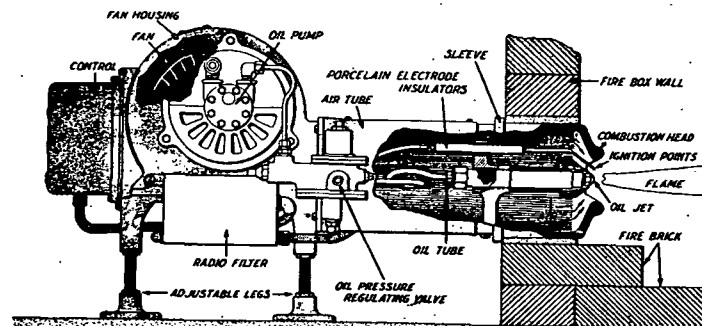


FIG. 10. GUN TYPE PRESSURE ATOMIZING OIL BURNER

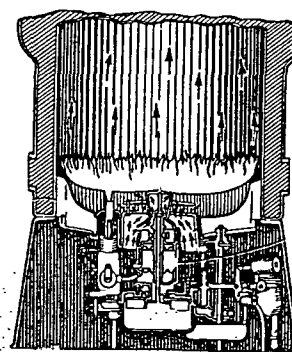


FIG. 11. CENTER FLAME VERTICAL ROTARY BURNER

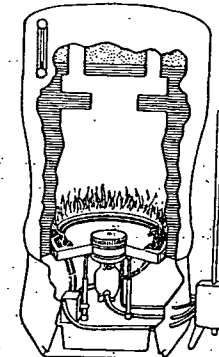


FIG. 12. WALL FLAME VERTICAL ROTARY BURNER

The most distinguishing feature of vertical rotary burners is the principle of flame application. These burners are of two general types; the center flame and wall flame. In the former type, (Fig. 11) the oil is atomized by being thrown from the rim of a revolving disc or cup and the flame burns in suspension with a characteristic yellow color. Combustion is supported by means of a bowl-shaped chamber or hearth. The wall flame burner (Fig. 12) differs in that combustion takes place in a ring of