July 1, 1941. F. M. POOR 2,247,848

BURNER

Filed April 18, 1939

Fig. 1

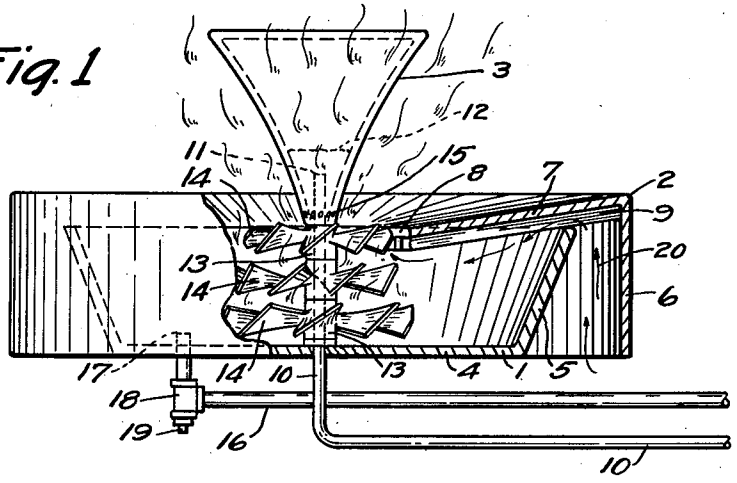


Fig. 2

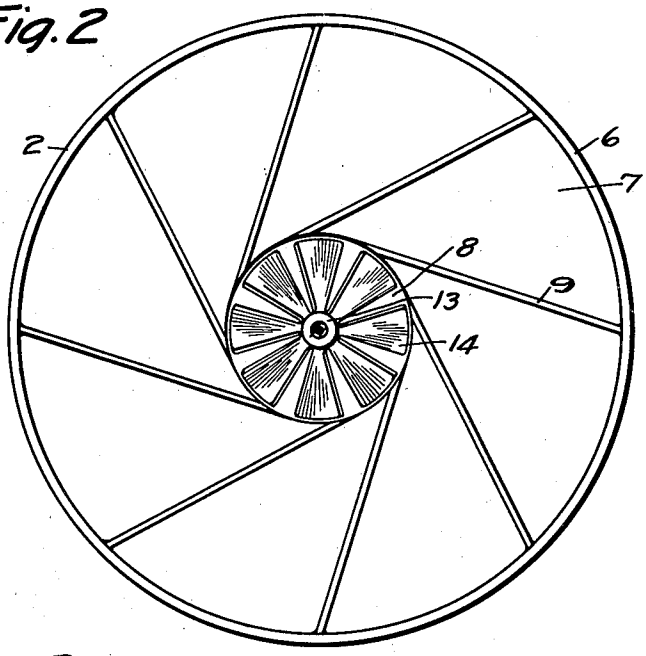


Fig. 3

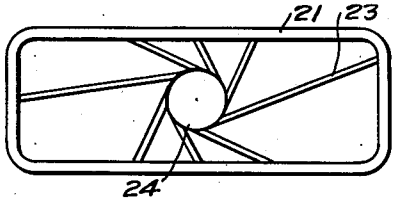
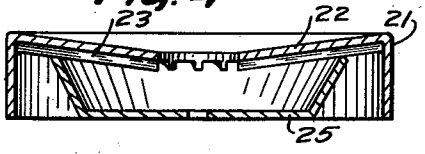


Fig. 4



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BURNER

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6 Claims. (Cl. 158—91)

The purpose of this invention is to provide a gravity feed burner without moving parts which burns fuel oil and the like with the greatest possible efficiency, and in which the operation and construction thereof are comparatively simple and economical.

Oil burners have been formed of many different types and designs, and many devices have been used for burning oil by gravity; however, in burning oil by gravity, it is necessary to volatilize the oil, and, at the same time, supply air at a relatively high velocity in order to obtain the greatest or most efficient combustion. In this construction, the fuel flows to the cone, the level of which is below that of a supply tank, and the cone, being in the flame, heats the oil substantially to a vapor, and this is passed downward over a plurality of baffles, each of which is larger than the one above, and, at the same time, crowds the air by spiral vanes in toward the center so that it causes a swirling motion as it combines with the oil vapors in combustion.

The object of the invention is, therefore, to provide means for obtaining substantially complete combustion of fuel, such as oil, without forced feed.

Another object is to provide a casing for fuel burners, the shape of which crowds air through gradually reducing areas increasing the velocity thereof.

Another object is to provide a method of burning liquid fuel by gravity feed, in which the fuel is subjected to combustion through a plurality of stages, thereby making drip substantially impossible.

A further object is to provide a liquid fuel burner in which fuel is burned by natural draft, in which the fuel is preheated in the center of the fire before passing into the fire.

And a still further object is to provide a natural feed liquid fuel burner which is of a simple and economical construction.

With these ends in view the invention embodies a liquid fuel burner having a base forming a collecting pan with a preheating fuel reservoir positioned directly above the pan, deflecting pins or vanes between the reservoir and pan, and with means crowding air in toward the fins and base of the reservoir with a swirling motion.

Other features and advantages of the invention will appear from the following description taken in connection with the drawing, wherein:

Figure 1 is a view showing a side elevation of the burner with part broken away, showing a cross section through the burner with the baffle shown in full.

Figure 2 is a plan view showing the under side of the cover.

Figure 3 is a view similar to that shown in Figure 2, showing a burner cover of an alternate design.

Figure 4 is a cross section through the cover shown in Figure 3.

In the drawing the burner is shown as it may be made, wherein numeral 1 indicates the base, numeral 2, the cover, and numeral 3, the oil reservoir or cone.

The base 1 is preferably made with a flat bottom 4 having upward inclined sides 5, forming a circular member representing an inverted frustrum of a cone, and the cover 2 has an outer cylindrical wall 6, with the lower end open and with the top 7 sloping downward toward an opening 8 in the center. The under side of the cover is provided with a plurality of vanes 9 positioned as shown in Figure 2 so that they will cause a swirling action of air passing therethrough, and it will be noted that, as the top of the cover slopes downward toward the center the area is decreased, and this causes a movement of air contrary to a natural movement and as the hot air is forced to pass downward, and through a restricted area the velocity thereof is increased so that, as it passes out of the ends of the vanes, it has the appearance of passing out of a jet. As the air passes upward into the cover 2, it strikes the heated surface on the under side of the top 7, and this with the hot vanes 9 raises the temperature and volume of the air, and with the slanting surface crowding it downward causing it to pass through the restricted openings at the ends of the vanes with relatively high velocity.

The baffle is formed around a fuel supply pipe 10 which extends upward through the center of the base, and the upper end 11 extends into the vertex of the cone 3 slightly below the normal oil level, as indicated at 12. Hubs 13, having radially extending fins 14 forming baffles, are placed on the pipe 10, as shown in Figure 3, which not only hold the fins 14, but also protect the pipe 10, and it will be noted that the diameter of the fins 14 gradually decreases so that the fins at the top are considerably smaller than those at the bottom. The cone 3 is substantially closed, so that, as the oil flows upward therein to the point 12, it will become heated and will then pass outward through openings 15 in the lower part of the cone and trickle downward over

the fins 14, being distributed thereover in a thin film and, consequently, readily ignited.

The base may also be provided with an overflow connection 16 which extends upward to the point 17, and this is provided with a fitting 18 having a clean out plug 19 therein. It will be understood, however, that an overflow connection of any type may be provided, and this may be arranged in any manner.

The device may be placed upon a grate in a furnace, and, with the fuel supplied through the pipe 10, it will pass upward into the cone 3, and then drop downward through openings 15 upon the upper one of the fins 14, and then will continue to drop downward from fin to fin until it is entirely ignited. The air rushing in toward the center from the cover, as indicated by the arrows 20, as hereinbefore described, will pick up this fuel and combine with it, forming complete combustion.

This burner may be made to fit a stove or furnace of any type or design, and, in Figures 3 and 4, a rectangular design is illustrated, in which the cover 21, similar to the cover 2, is provided with a sloping top 22 having vanes 23 on the underside thereof which lead the air to a central opening 24. The base 25, may also be of the same shape, if necessary, and the baffles or fins may be placed in the center as shown in Figure 1.

It will be understood that changes may be made in the construction without departing from the spirit of the invention. One of which changes may be in the use of other means for forming the cover, another may be in the shape or design of the member 3, and still another may be in the use of other means for mounting or forming horizontal fins or baffles.

The construction will be readily understood from the foregoing description. In use the device may be provided as shown and described, and may be installed as a unit in a furnace or upon a grate in a stove, furnace, or the like, although it will be understood that it may be used for any purpose. The pipe 10 may be connected to a supply tank which may be located at any point preferably slightly above the burner, and the valve of this pipe may be set so that a very small amount of fuel will be fed to the burner, and the fire may readily be controlled by the amount of fuel supplied. This device is adapted to operate with substantially any crude or Diesel oil, or the like, and it will be noted that substantially all of the fuel will be burned.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent, is:

1. An oil burning device comprising a vertically positioned central member having a plurality of slanting horizontally positioned radially extending fins thereon, a preheating fuel reservoir above said fins adapted to drip oil upon said fins, a surrounding chamber having a cover which slopes downward toward the center with an opening at the center, arranged to direct the flow of air therethrough toward the said fins, and a base upon which the said fins are mounted.

2. An oil burning device as described in claim 1, characterized by spirally positioned vanes on the under surface of the cover of said surrounding chamber.

3. An oil burning device as described in claim 1, characterized in that the fins are provided in layers, with each layer on an independent hub forming a section of said central member.

4. An oil burning device as described in claim 1, characterized in that the fins are in layers with each superimposed layer smaller in diameter than the layer below.

5. An oil burning device as described in claim 1, characterized in that the base is provided with an outwardly sloping wall, the upper edge of which is spaced from the under surface of the cover of the surrounding chamber.

6. An oil burning device as described in claim 1, characterized in that the fuel reservoir comprises an inverted hollow conical member with outlet openings around the lower end.

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