May 3, 1949. J. T. STONE 2,469,135

TRAY TYPE FUEL OIL BURNER

Filed Nov. 18, 1944

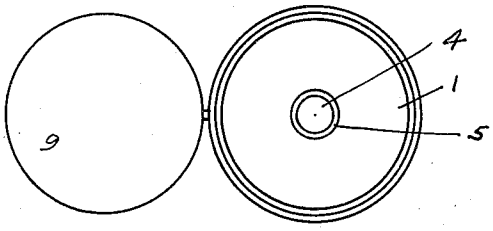


FIG. 1.

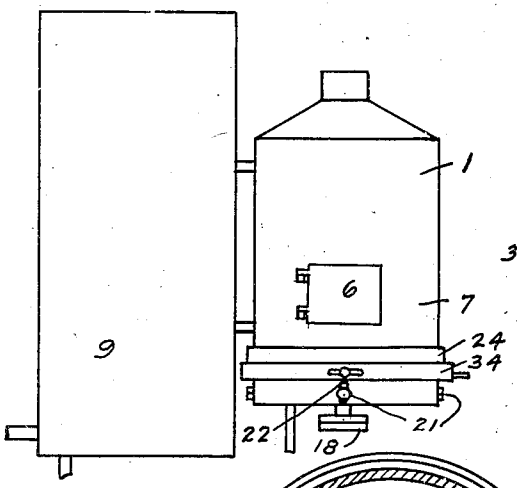


FIG. 2.

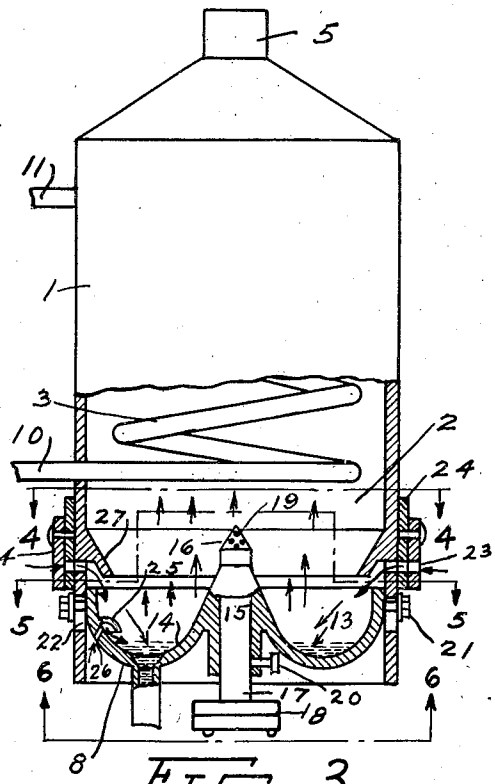


FIG. 3.

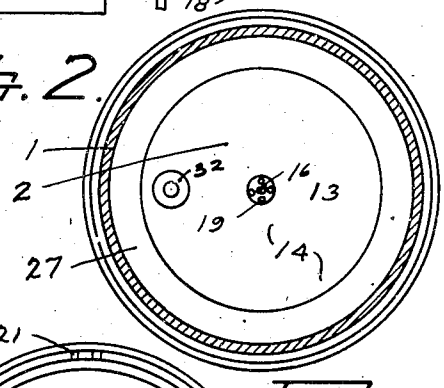


FIG. 4.

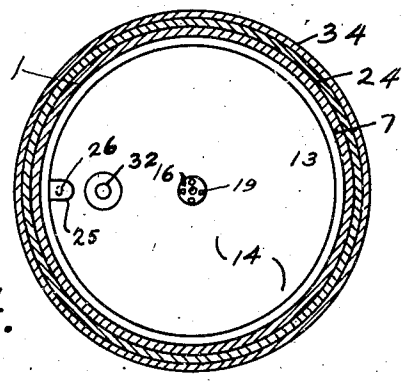


FIG. 5.

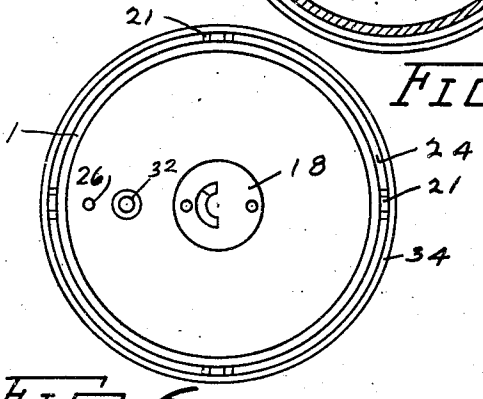


FIG. 6.

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Patented May 3, 1949 2,469,135

UNITED STATES PATENT OFFICE

2,469,135

TRAY TYPE FUEL OIL BURNER

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Application November 18, 1944, Serial No. 564,149

2 Claims. (Cl. 158—91)

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This invention pertains to furnaces and especially those employing liquid fuel and used for domestic purposes. It has among its objects to provide an efficient and compact structure of this type, that may be manufactured and used economically. A further object is to provide a device of this type that will be operated by natural draft without the use of motors and other moving parts.

Other objects will become apparent as the invention is more fully set forth.

In order to illustrate a form of this invention, reference is made to the following description and the appended drawings in which:

Figure 1 is a plan view of a heater embodying this invention, attached to a hot water tank;

Figure 2 is a side elevation of Figure 1;

Figure 3 is an enlarged side elevation partly in section of the heater shown in Figure 2;

Figure 4 is a sectional plan view taken along line 4—4 of Figure 3, looking in the direction of the arrows and showing the air deflecting plate;

Figure 5 is a sectional plan view taken along line 5—5 of Figure 3 looking in the direction of the arrows and showing the construction of the pan, pilot light and secondary air inlet, and

Figure 6 is a view taken looking up at the bottom of the heater in the directions of arrows 6—6 of Figure 3.

Similar reference characters refer to similar parts throughout the drawings.

In the structure illustrated, 1 represents a heater casing designed to enclose the combustion space 2, and hold in the flames or combustion so they can be used for heating water in coils 3, and other general purposes. An outlet 4, leads to a chimney 5 for conveying the exhausted gases away. A conventional door 6 is provided in the wall 7 of the casing for permitting access to the burner 8 and combustion space 2, in the heater casing. The arrangement of the coils 3 is provided in the casing and adapted to be heated by the flames or heated gases from the burner 8. The coils have connections 10 and 11, for supplying and taking the water from the coils as well as connecting them with the storage tank 9. The burner 8 consists of a circular cupped ring 13, having curved inside surfaces 14. A central stem 15 is located within the ring and is removable and adjustable therein and provided with an apexed head 16 which has openings or holes 19 to supply air through the hollow tubing 17 which is equipped with a control valve 18 for controlling air flow therethrough to the burning fuel in the combustion space.

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This air supply is termed the secondary combustion air and flows above the main plane of the flames to ignite any fuel that may have escaped combustion below. This stem is made adjustable in the passage through the use of a holding screw 20. The cupped ring 13 closes off the bottom of the furnace so that all the fuel will have to burn within the same. The cupped ring is adjustable on the casing through the use of bolts 21 that extend from it and pass through slots 22 in the wall of the casing. Openings 23 are provided above the level of the cupped ring to allow air to enter through the casing to the combustion space above the liquid fuel. The fuel is preferably a petroleum oil. These openings are adjustably covered by a movable shutter plate 24 which is set for the required mixture and enables the supply of air to be controlled to this portion. A collar 34 is used to turn on or off the combustion air supply. Internally mounted on the wall 7 of the casing is an anguluar baffle 27 for directing the incoming air down across the wall of the cupped ring as indicated and towards the central stem. This is to force the flame towards the central zone of the combustion chamber and keep it from heating the walls of the casing directly. A pilot cap 25 and air intake 26 provide the necessary air to the fuel ring 13 when the burner is not burning normally. The pilot cap 25 and vent 26 provides sufficient air to the oil well 32 at the bottom of the cupped ring to keep the pilot burning slightly ready to be actuated fully when the fuel oil is increased in the burner. No wick is employed.

The operation of the device is substantially as follows. The liquid fuel is supplied to the cupped ring of the burner structure and the pilot lighted. As more fuel is supplied and its level raised in the ring, the combustion increases. The round form of the ring of the burner enables the area of burning to increase as the level of the fuel is raised. The air comes through the openings 23 and by reason of the angular baffle 27 flows down into the cupped ring space and carries the fuel burning and non-burning towards the central zone and up the stem 15. The air coming through the stem flows out of holes 19 and completes the combustion of any unburned fuel suspended over the cupped ring, and more efficiently burns the oil. The baffle or baffleplate 27 is integrally connected with casing so as to be peripherally disposed over the burner structure and its inverted arcuate section, forming the cupped ring. This plate 27 directs the

air flow from the openings or slots 23 into the casing so the combustion of the fuel will be towards the central area and away from the casing, towards the stem.

While but one general form of the invention is shown in the drawings and described in the specification, it is not desired to limit this application for patent to this particular form or in any other way otherwise than limited by the scope thereof, as it is appreciated that other forms of construction could be made that would use the same principles and come within the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. A liquid fuel burner unit of the class described comprising in combination, a fuel well structure for burning the fuel therein, including an inverted arcuate section of circular form open at the top, the central portion of the structure including a hollow stem having a conical apex and perforations through said apex to permit air for combustion purposes to flow therethrough from an extraneous source into the central portion of the structure above the flames induced by burning said fuel in said section portion, said structure including an orifice for the supply of fuel to the bottom of said section, a casing about the structure having openings for the supply of air to the area above the structure and along the periphery thereof, an angular baffle plate mounted on said casing and disposed peripherally above said structure and said openings and spaced closely thereto so as to divert the incoming air down along the wall of the structure to the fuel conained therein, the flow of flames induced by the burning of said fuel and the air together being directed by the air passing under said plate towards the central area of the structure and away from the peripheral portions thereof and into the path of the air flowing out of the apex portion of said stem, means on said casing for controlling the size of said openings and the flow of air therethrough from the outside of said unit, and means for vertically adjusting the position of the stem in the structure, the annular walls of said fuel well structure being upwardly divergent so as to widen the area of the fuel exposed for burning purposes as to increase the amount of flames generated in the combustion of the fuel and air as more fuel is raised in depth therein.

2. A liquid fuel burner unit of the class described comprising in combination, a fuel well structure for burning the fuel therein, including an inverted arcuate section of circular form open at the top, the central portion of the structure including a hollow stem having a conical apex and perforations through said apex to permit air for combustion purposes to flow therethrough from an extraneous source into the central portion of the structure above the flames induced by burning said fuel in said section portion, said structure including an orifice for the supply of fuel to the bottom of said section, a casing about the structure having openings for the supply of air to the area above the structure and along the periphery thereof, an angular baffle plate mounted on said casing and disposed peripherally above said structure and said openings and spaced closely thereto so as to divert the incoming air down along the wall of the structure to the fuel contained therein, the flow of flames induced by the burning of said fuel and the air together being directed by the air passing under said plate towards the central area of the structure and away from the peripheral portions thereof and into the path of the air flowing out of the apex portion of said stem, means on said casing for controlling the size of said openings and the flow of air therethrough from the outside of said unit, means for vertically adjusting the position of the stem in the structure, the annular walls of said fuel well structure being upwardly divergent so as to widen the area of the fuel exposed for burning purposes as to increase the amount of flames generated in the combustion of the fuel and air as more fuel is raised in depth therein, and a relatively small pilot cap inside the structure adjacent fuel level covering one of said openings whereby a sufficient supply of air is supplied to the fuel in the well when the level of the fuel is low and the combustion required is of limited extent.

JOHN T. STONE.

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