Sept. 1, 1925. 1,552,178

F. SCHAFER ET AL

OIL BURNER

Filed Feb. 6, 1924

Fig. 1.

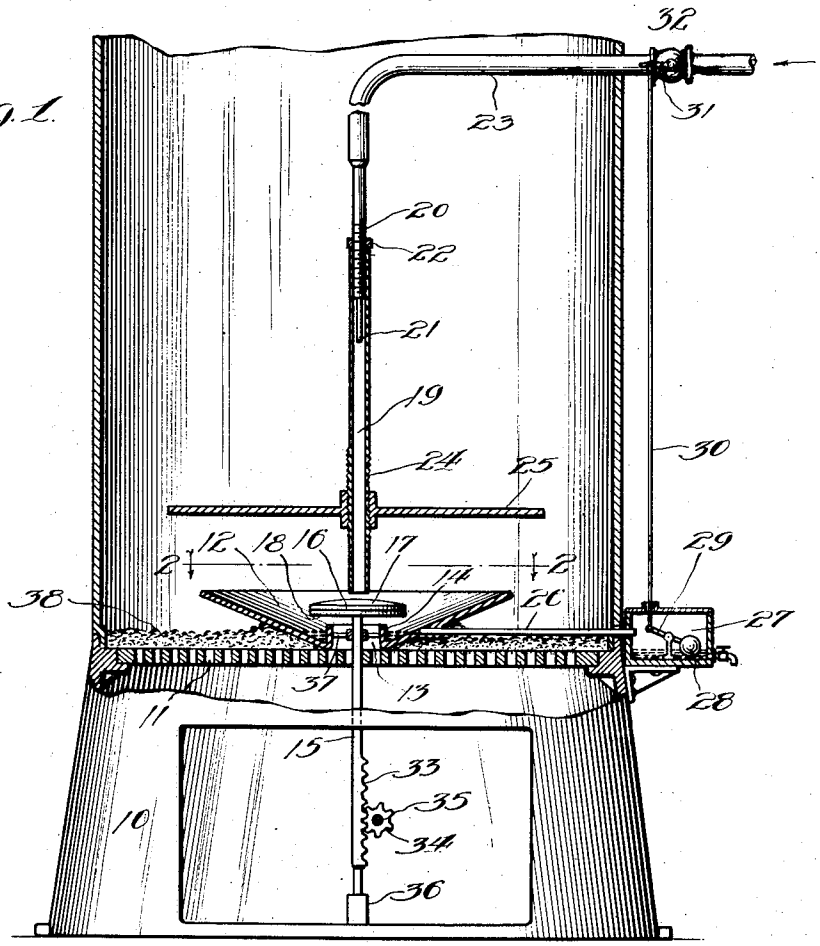


Fig. 2.

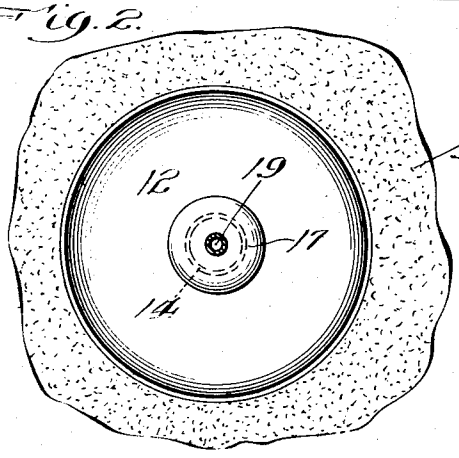
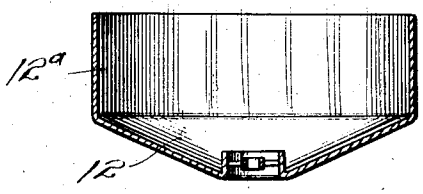


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANK SCHAFER, THOMAS E. PADDEN, AND OLAF G. SIEVERTSON, OF CHICAGO, ILLINOIS, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO SAID SCHAFER AND ONE-HALF TO FRANK M. PADDEN.

OIL BURNER.

Application filed February 6, 1924. Serial No. 690,990.

To all whom it may concern:

Be it known that we, FRANK SCHAFER, THOMAS E. PADDEN, and OLAF G. SIEVERTSON, all citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Oil Burners, of which the following is a specification.

This invention relates to an oil burner primarily adapted for use in connection with house heating furnaces, and the object of the invention is to provide a simplified type of burner which may be readily and quickly applied to the fire grate of any ordinary furnace, and which operates under gravity feed without objectionable noise and without the accumulation of soot which impairs the operation of such types of burners now in common use.

The invention also relates to the means provided for adjusting the relation of the various portions of the appliance toward and from one another in order to adapt the burner to the local conditions encountered, to the means provided for delivering air in such a way as to insure an adequate supply for purposes of combustion, to the means for so delivering the oil that it will remain in liquid form until it is delivered to the point of combustion, to the automatic means for guarding the burner against an overflow of liquid oil, and to the general combination and arrangement of parts hereinafter described and claimed.

In the drawing:

Figure 1 is a sectional elevation of a furnace of conventional type showing the burner of the present invention applied thereto;

Fig. 2 is a view taken on line 2—2 of Fig. 1; and

Fig. 3 is a sectional view of a modified form of burner bowl.

The burner of the present invention is applied to a furnace 10 having a grate 11 of any suitable form, upon the center of which grate is located a bowl 12 which may be of a straight conical form, as shown in Fig. 1, or may be additionally provided with upstanding sides 12^a, as shown in Fig. 3, or of other equivalent shape adapted to provide in its bottom an annular reservoir for a small supply of oil.

The bowl of whatsoever shape is provided in its center with an air supply opening 13 around which the edge of the bowl is upturned to form a lip 14, which lip in conjunction with the surrounding conical wall affords an annular channel within which a small supply of oil may accumulate. Through the air passage 13 is entered the stem 15 of a deflecting plate 16, which plate is spaced a short distance above the upper edge of the lip 14, the size of the plate being such that its outer edge projects beyond the lip and serves to deflect oil admitted from above outwardly against the heated walls of the bowl 12. It is preferred to have the upper surface 17 of the deflecting plate slightly rounded or of conical formation in order to better deflect the oil outwardly toward the surrounding walls of the bowl. It is also preferred to provide the under surface of the deflecting plate with a non-conducting facing 18 of asbestos or similar heat resisting material.

Immediately above the center of the deflecting plate is located the lower end of an oil discharge tube 19, which tube at its upper end is threaded onto an oil supply pipe 20 which terminates in a nipple 21 of suitable size, arranged to feed oil into the discharge tube 19. A jamb nut 22 is provided to hold the discharge tube 19 in adjusted relation with respect to the deflecting plate. The supply pipe 20 forms a continuation of a delivery pipe 23 which leads to any suitably located reservoir for the supply of oil.

The tube 19 at a point somewhat above the level of the deflecting plate 16 is provided with exterior screw threads 24 which furnish a mounting for a baffle plate 25 which preferably extends beyond the periphery of the oil bowl 12 and serves to deflect the flame outwardly and away from the discharge tube 19, so that the latter will not become excessively heated when in use. The baffle plate 25 is vertically adjustable upon the discharge tube, so that it may be positioned to co-act most effectively with the bowl 12.

In order to guard against a flooding of the bowl in case the flame is extinguished, the bowl has leading therefrom an overflow pipe 26 which leads to a float housing 27 within which is located a float 28 mounted upon a

lever 29 which connects with the rod 30 leading to an arm 31 secured to a valve 32, the arrangement being such that when the overflowing oil rises to a predetermined point within the float housing, the float will be raised and the valve closed against a further supply of oil.

The stem 15 near its lower end is provided with rack teeth 33 which mesh with a pinion 34 mounted upon an adjusting rod 35 which extends to any convenient point to permit the rod to be rotated and the baffle plate adjusted to the desired degree. The stem, as shown, is guided at its lower end within a socket 36 and at its upper end within a spider or bracket 37 which serves to guide the stem without interfering with the inflow of air.

In order to direct all of the air through the opening 13, the fire box, exterior of the oil bowl, is packed and closed by clay, cinders, or other suitable packing 38, so that all the air admitted to the fire chamber will pass through the center opening 13 and impinge against the under surface of the deflecting plate.

In use, after the oil has been turned into the pipe 23, it will fall through the nipple 21 and the discharge tube 19 and against the deflecting plate 16 over which it will run until a limited supply has accumulated within the oil bowl. Thereafter the oil is ignited either directly or by means of a small quantity of paper or waste laid within the oil bowl and ignited. As soon as the oil begins to burn it will tend to heat the flaring walls of the oil bowl to a high temperature and at the same time the flame will be directly outwardly, away from the deflecting plate and under the rim of the overhanging baffle plate. As soon as the walls of the oil bowl become heated, the oil flowing over the rim of the deflecting plate will impinge against the highly heated surface of the bowl, thereby volatilizing the oil at this point with the result that after the burner has gotten well started, the oil will be entirely volatilized at the point of combustion around and below the edge of the deflecting plate. The air rushing through the center opening 13 will impinge against the under surface of the deflecting plate, and will diverge outwardly to commingle with the volatilized oil, so that a thorough and complete combustion will be promoted.

The deflecting plate not only serves to deflect both the oil and the air outwardly, but also serves to prevent excessive heating of the oil discharge tube 19 which is further protected by the creation of a draft outwardly around the baffle plate 25, so that the oil supply tube will remain comparatively cool and prevent volatilization of the oil within the tube. At the same time the oil falling through the tube will be warmed sufficiently to promote volatilization when the proper point has been reached.

If, for any cause, the flame should be extinguished, or if the oil supply pipe should accidentally be left open, the oil will continue to accumulate within the bowl until the level of the overflow pipe 26 is reached after which a further accumulation of oil will quickly raise the float and close the automatic valve against further discharge.

The apparatus is one which may be readily installed in any furnace of standard construction, and the several parts being mutually adjustable, can be easily regulated to secure the best co-action. Experience has shown that the burner operates to produce a most complete and satisfactory combustion without the accumulation of carbon even though oils of very cheap grade are employed. In some cases, it may be found desirable to more closely confine the flame, in which case, a bowl of the general shape illustrated in Fig. 3 may be employed.

Although the invention has been described with particularity, it is not the intention to limit the invention to the use of a bowl of precisely the shape and form shown, since modifications thereof may be utilized without departing from the spirit of the invention.

We claim:

1. In an oil burner, in combination with a furnace grate, a bowl-like member provided with a central air discharge aperture and affording in its lower portion a surrounding oil reservoir, a deflecting plate adjustable mounted above said aperture and in spaced relation thereto and extending beyond the margin of said aperture and adapted to discharge oil against the walls of said bowl-like member at a point above the portion thereof which constitutes the reservoir, a centrally disposed oil discharge tube located above said deflecting plate in position to allow oil to impinge thereon, a baffle plate vertically adjustably mounted upon said oil discharge tube and having its rim extended beyond the rim of said bowl-like member in position to divert the flame outwardly and away from the oil discharge tube member, substantially as described.

2. In an oil burner, in combination with a furnace grate, a bowl-like member seated upon said grate and provided with a central aperture having an upturned lip to afford an annular oil reservoir, a deflecting plate located above said aperture and extending outwardly beyond the lip thereof, and adapted to deflect oil outwardly against the unsubmerged upper wall of the bowl-like member, an adjustable stem upon which said deflecting plate is mounted, said stem extending through the air aperture, an oil discharge tube located and terminating above the deflecting plate and adapted to

cause oil to impinge thereon, and a baffle plate adjustably mounted upon the oil discharge tube, substantially as described.

3. In an oil burner, the combination with a furnace grate, a bowl-like member provided with an upwardly opening air discharge aperture constituting the sole source of air supply, the bowl-like member affording in its lower portion a reservoir surrounding the air discharge aperture, a flattened deflecting plate mounted above said aperture and in spaced relation thereto and to the walls of the bowl-like member and extending beyond the margin of said aperture and adapted to discharge oil outwardly beyond its rim and against the walls of said bowl-like member at a point above the portion thereof which constitutes the reservoir, a centrally disposed oil discharge tube located above said deflecting plate in position to allow oil to impinge thereon, a baffle plate vertically adjustably mounted upon said oil discharge tube and having its rim extended beyond the rim of said bowl-like member in position to divert the flame outwardly and away from the oil discharge tube, substantially as described.

4. In an oil burner, the combination with a furnace grate, a bowl-like member provided with an upwardly opening air discharge aperture, the bowl-like member affording in its lower portion a reservoir surrounding the air discharge aperture, a flattened downwardly sloping deflecting plate mounted above said aperture and in spaced relation thereto and to the walls of the bowl-like member and extending beyond the margin of said aperture and adapted to discharge oil outwardly beyond its rim and against the walls of said bowl-like member at a point above the portion thereof which constitutes the reservoir, a centrally disposed oil discharge tube located above said deflecting plate in position to allow oil to impinge thereon, a baffle plate vertically adjustably mounted upon said oil discharge tube and having its rim extended beyond the rim of said bowl-like member in position to divert the flame outwardly and away from the oil discharge tube, substantially as described.

5. In an oil burner, the combination with a furnace grate, a bowl-like member provided with a central upwardly opening air discharge aperture constituting the sole source of air supply, the bowl-like member affording in its lower portion a reservoir surrounding the air discharge aperture, a flattened downwardly sloping deflecting plate mounted above said aperture and in spaced relation thereto and to the walls of the bowl-like member and extending beyond the margin of said aperture and adapted to discharge oil outwardly beyond its rim and against the walls of said bowl-like member at a point above the portion thereof which constitutes the reservoir, a centrally disposed oil discharge tube located above said deflecting plate in position to allow oil to impinge thereon, a baffle plate vertically adjustably mounted upon said oil discharge tube and having its rim extended beyond the rim of said bowl-like member in position to divert the flame outwardly and away from the oil discharge tube, substantially as described.

6. In an oil burner, the combination with a furnace grate, a bowl-like member provided with an upwardly opening air discharge aperture, the bowl-like member affording in its lower portion a reservoir surrounding the air discharge aperture, a flattened deflecting plate mounted above said aperture and in spaced relation thereto and to the walls of the bowl-like member and extending beyond the margin of said aperture and adapted to discharge oil outwardly beyond its rim and against the walls of said bowl-like member at a point above the portion thereof which constitutes the reservoir, an oil discharge tube located above said deflecting plate in position to allow oil to impinge thereon, a baffle plate surrounding said oil discharge tube and having its rim extended beyond the rim of said bowl-like member in position to divert the flame outwardly and away from the oil discharge tube, substantially as described.

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