

July 12, 1960

F. H. HUNTLEY ET AL

2,944,598

IGNITION MEANS FOR VAPORIZING TYPE OF OIL BURNER

Filed Feb. 9, 1953

2 Sheets-Sheet 1

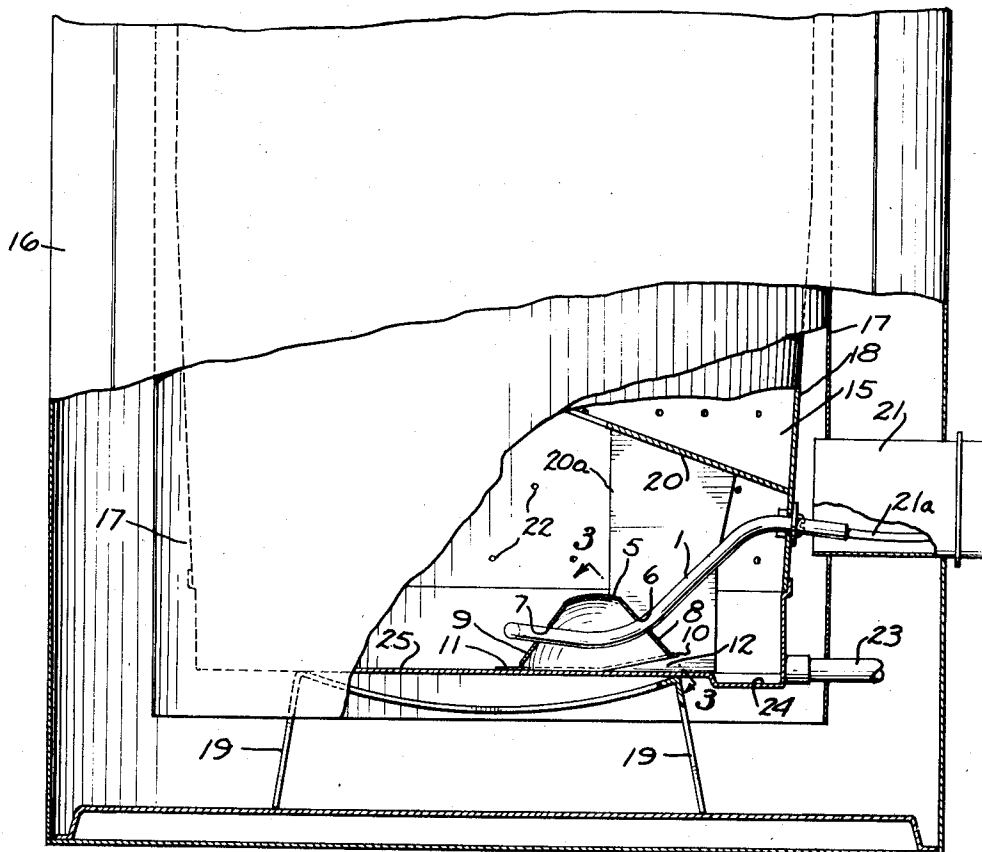


FIG. 1

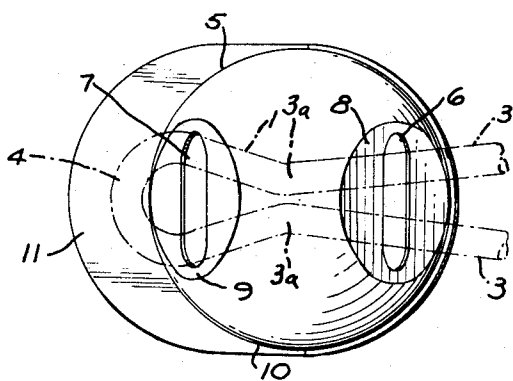


FIG. 2

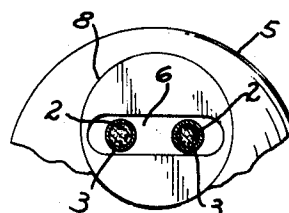


FIG. 3

INVENTORS
FREDERICK H. HUNTLEY &
CLINTON W. FRAM
BY *Barney Kinsella, Laughlin & Raich*
ATTORNEYS.

July 12, 1960

F. H. HUNTLEY ET AL

2,944,598

IGNITION MEANS FOR VAPORIZING TYPE OF OIL BURNER

Filed Feb. 9, 1953

2 Sheets-Sheet 2

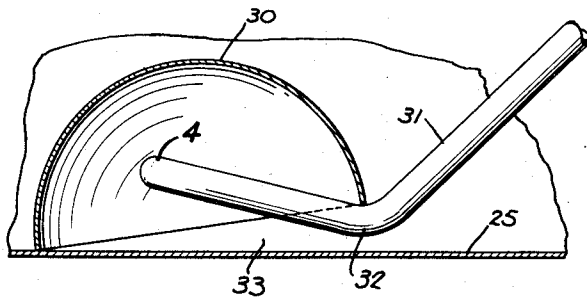


FIG. 4

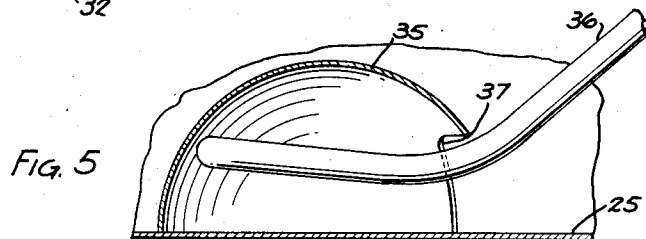


FIG. 5

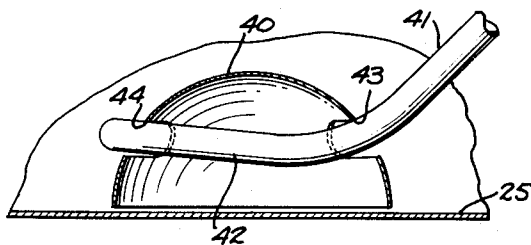


FIG. 6

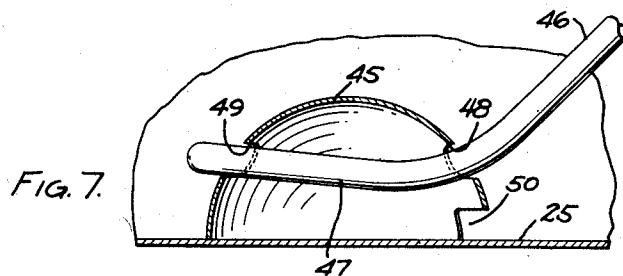


FIG. 7

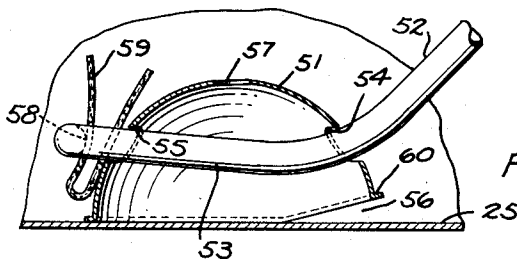


FIG. 8

INVENTORS
FREDERICK H. HUNTLEY &
CLINTON W. FRAM.

BY *Barner, Kinsell, Laughlin & Raiser*
ATTORNEYS.

1

2,944,598

IGNITION MEANS FOR VAPORIZING TYPE OF OIL BURNER

Frederick H. Huntley and Clinton W. Frain, Lansing, Mich., assignors to Motor Wheel Corporation, Lansing, Mich., a corporation of Michigan

Filed Feb. 9, 1953, Ser. No. 335,936

8 Claims. (Cl. 158—91)

This invention relates to a device for igniting fluid type of fuel by means of an electrical resistance heater and which is especially adapted for use in the vaporizing pot type of oil burner.

In the vaporizing pot type of oil burner, fuel oil is delivered to the burner and the oil spreads out over the floor of the pot of the burner. When the burner is in operation this oil is vaporized by the heat of combustion in the burner, is mixed with air and ignited by the flame in the combustion chamber. However, when it is desired to initially start combustion some form of ignition means must be provided for vaporizing and igniting the oil.

This invention provides an improved ignition means for a pot type oil burner which has overall high efficiency characteristics including positiveness of action, increase in the speed of ignition, cleanliness of the combustion, and one which will maintain its high efficient characteristics over a long period of use. In accordance with the invention an electrical heating and igniting element is employed in conjunction with a hood device or intensifier disposed over the heating element or part thereof and which defines an enclosed space, relatively small as compared to the pot of the burner as a whole, and which is arranged to cover a portion of the film of oil on the floor of the pot of the burner and to allow entrance of air into the enclosed space. The hood is shaped to reflect the heat of the ignition element onto the floor of the pot. The oil under the hood thus becomes quickly vaporized, mixes with the air which enters the enclosed space and the vapor mixture is quickly raised to ignition temperature.

Structures made in accordance with the invention are shown in the accompanying drawings:

Fig. 1 is a view partly in section showing a pot type burner with the ignition device of this invention.

Fig. 2 is a plan view of the intensifier hood with the ignition element shown in dotted lines.

Fig. 3 is a fragmentary sectional view taken on line 3—3 of Fig. 1 showing hood structure and the ignition element.

Fig. 4 is a view partly in section showing a modified form of hood and igniter structure.

Fig. 5 is a view partly in section showing another form of hood and igniter structure.

Fig. 6 is a view partly in section illustrating still another form of hood and igniter structure.

Fig. 7 is a view similar to Fig. 6 illustrating still another form of hood construction.

Fig. 8 is a view partly in section illustrating a still further form of hood structure and illustrating a means for temporarily holding the hood and ignition element in assembly.

The invention comprises a combined heating and ignition element 1 and an intensifier hood 5. The element consists of an electrical heating element, preferably of the "Calrod" type, in which an electrical resistance wire 2 is enclosed within an outer metal tube which presents

2

the actual heating surface and is insulated therefrom by a suitable insulating material such as magnesium oxide. The element may further be of the type in which the tube is bent into U shape to form legs 3 and a bight 4 as shown in Fig. 2. Adjacent the bight 4 each leg 3 is formed with an inwardly bent portion 3a as is clearly shown in Fig. 2. The intensifier hood or the igniter hood 5 is generally dome or cup shaped with an edge portion adjacent the base formed angularly to extend away from the floor of the pot to provide an opening 12. The hood is disposed in inverted position and retains heat which is radiated from the heating element 1. The dome shape of the hood assists in reflecting heat onto the floor of the fire pot. By forming the heating element so that the portion of the two legs 3 beneath the hood is closely spaced as at 3a, the temperature effect of the ignition element is intensified and it is possible to obtain the necessary heating of the oil with a lower watt intensity than if the legs were not so formed. Two generally oppositely disposed slot-like openings 6 and 7 are provided in the hood. The portions of the walls of the hood containing these openings may be flattened as shown at 8 and 9. The hood has a peripheral flange 10 which is extended outwardly on one side of the hood thus forming what may be termed a base plate indicated at 11 for resting upon the floor of the pot.

In the assembled relation of the parts, the heating element is extended through the slots 6 and 7 so that portions 3a of the heating element are enclosed by the hood as shown in Fig. 2. The openings 6 and 7 are large enough both to accommodate the heating element and to permit the escape of heated gases therethrough. The parts are also so adapted that in the operational position thereof the base plate 11 will rest upon a horizontal floor or surface while the opposite edge of the dome is elevated above the floor or surface thereby providing the opening indicated at 12 in Fig. 1. Base plate 11 further operates to limit the movement of the hood on the heating element toward the burner side wall. As the hood moves back on the heating element 1 slot 6 in the hood is raised and the hood tilts on the end of the base plate 11, which in conjunction with slot 7 limits the hood movement on the ignition unit.

The parts thus assembled are disposed within the burner 15 which may be disposed in a structure with an exterior casing 16 and an inner casing 17. The ignition element 1 is removably mounted on the side wall 18 of burner 15 and the electrical conductor leads 21a therefor extend through a tubular housing 21 to suitable electrical connections as shown in Fig. 1. The combustion chamber, not shown, may be provided by the upper portion of the casing 17. The burner is supported within the casing 16 by means of supports 19. The burner may be provided with a centrally apertured, horizontally inclined partition 20 and a pair of radially extending pilot stabilizing baffles 20a as shown in U.S. Patent No. 2,448,148. Wall 18 has holes 22 therein to admit primary air into the burner. Fuel is admitted into the burner through the fuel line 23 and the burner may have a well or reservoir 24 in which fuel may initially collect and from where it may flow in a film over the floor 25 of the burner.

When it is desired to start the heater the valve controlling the flow of oil to the burner is opened and an electrical circuit through igniter 1 is closed. Fuel oil is thus delivered through inlet pipe 23 to the reservoir 24 and from reservoir 24 the oil spreads out in a thin film over the floor 25, including that portion of the floor which is covered by the dome-like hood 5. The igniter 1 is heated by electrical current flowing through the heating element 2 therein. Igniter 1 is operated at a temperature sufficient to cause the oil on the floor of the burner below hood 5 to vaporize and mix with air which enters the hood through the opening 12 and which passes out

through the slots 6 and 7. The portions 3a of the igniter are closely spaced and thus each of these portions is heated not only by reason of the enclosed resistance element but also by radiation from the other closely spaced portion 3a. Thus, there is developed between the closely spaced portions 3a of the igniter a hot spot, the temperature of which is sufficient to cause ignition of the fuel mixture vaporized by reason of the heat concentrated within the hood. In due course, the heat of combustion vaporizes the oil overlying all portions of the floor of the pot and such vaporization continues from the heat of combustion. It has been found over a series of extended tests that the failure of ignition is practically nil and that ignition is efficient even when the floor of the burner is at a low temperature. Tests have further shown that ignition will take place on an average of within approximately two minutes.

In the modification shown in Fig. 4, the hood is of semi-spherical shape as indicated at 30. The ignition element 31 may be formed with a bend 32, and an edge portion of the hood merely rests upon the ignition element while another edge portion rests upon the floor of the burner to thus provide an opening 33. With this form of hood the bight 4 of igniter 31 lies within the concentrated space defined by the hood, and combustion is obtained by reason of oil and air entering the space through the opening 33.

Fig. 5 shows a modification of the invention utilizing a hood 35 similar to the hood 30 of Fig. 4 except that an opening 37 is provided in one side thereof. Opening 37 may extend generally upwardly from the base of the hood. The ignition element 36 is adapted to extend through the opening 37 and into the interior of the hood. The base of the hood 35 rests flatly on the floor 25. The opening 37 is adapted to receive the ignition element 36 and to permit the flow of air and fuel vapors there-through.

In the modification of the invention shown in Fig. 6 the hood is shaped as a semi-spherical dome 40 with diametrically oppositely disposed slots 43 and 44 through which an end 42 of the ignition element 41 may extend. The dome 40 hangs suspended from the heating element with its lower edge slightly raised from the floor 25 for entrance of oil. The ignition element 41 is shaped to permit its end 42 to extend through both of the openings 43 and 44.

In the modified form shown in Fig. 7, the dome-shaped hood 45 has openings 48 and 49 through which the end portion 47 of the ignition element 46 is disposed. The hood 45 may rest upon the floor 25 and is cut away to provide an opening 50 for the entrance of oil into the confined space.

In the modification of the invention shown in Fig. 8 a hood 51 has openings 54 and 55 adapted to permit an end 53 of the ignition element 52 to extend there-through. One edge of the hood 51 is angularly disposed to provide an opening 56, and the hood may have an opening 57 substantially at its top for the passage of oil vapor and air from within the dome. The ignition element 52 is similar to the heating element 1 shown in Figs. 1 and 2 in that it has a bight 58 similar to the bight 4 of the heating element 1. If it is desired to hold the dome and the heating element in subassembly in the burner, a member, such as clip 59 made of cardboard or metallic material, may be passed through the extended bight portion of the ignition element. As indicated clip 59 is of U shape and when pushed in position, as indicated in Fig. 8, it engages between the bight portion 58 of element 52 and the adjacent wall portion of the hood to hold the hood in a relatively fixed position on the ignition element. If clip 59 is made of cardboard, it is quickly consumed in use. If clip 59 is made of a metallic material, it becomes a permanent part of the assembly.

We claim:

1. In an oil burner construction wherein oil is delivered to the floor of the burner pot, means for igniting said oil comprising a heating element having a pair of spaced apart legs connected by a return bent portion, said heating element being supported on said burner pot with said return bent portion spaced above and adjacent the floor of the pot, the legs of said heating element being bent inwardly towards each other adjacent said return bent portion of said heating element so that said inwardly bent portions are spaced closely adjacent one another whereby a high concentration of heat is obtained between said inwardly bent portions of said heating element, the space between said inwardly bent portions being unobstructed in a generally vertical direction so that oil vapors ascending from the floor of said burner pot may pass freely between said inwardly bent portions for ignition.

2. Ignition means for a vaporizing type oil burner having a burner body with a floor and an upstanding wall extending therefrom and wherein oil is supplied to the burner in the form of a film on the floor, comprising a relatively rigid U-shaped electrical heating element supported on said upstanding wall and projecting into the burner such that the bight portion at the free end thereof is spaced above and adjacent to the floor of the burner, a hood overlying at least a portion of said heating element adjacent said bight portion and defining a relatively small confined space over a portion of the floor of the burner in which heat from said heating element is adapted to be concentrated, the portions of the legs of the heating element enclosed by said hood being bent towards each other at a point spaced from the bight portion of the heating element to provide a pair of closely, generally horizontally spaced portions of the heating element between which oil vapors from the floor of the burner are adapted to rise.

3. The combination called for in claim 2 wherein said hood is shaped so that the heat radiated from the heating element is reflected down against the portion of the floor which the hood overlies.

4. The combination set forth in claim 3 wherein said closely spaced portions of said heating element are disposed generally centrally of said hood.

5. In an oil burner construction wherein oil is delivered to the floor of a burner pot, means for igniting the oil comprising a heating element supported on said burner pot, said element having two sections disposed above and generally adjacent the floor of the burner pot so that said element vaporizes oil on said floor beneath said element, said sections having portions spaced relatively widely apart in a generally horizontal direction, said sections having other portions intermediate their ends which are closely adjacent to form a relatively small, generally vertical passageway through which oil vapors ascending from said floor may pass so that vapors passing through said passageway are subjected to a high concentration of heat to facilitate ignition.

6. In an oil burner construction wherein oil is delivered to the floor of a burner pot, means for igniting the oil comprising a heating element supported on said burner pot, said element having two sections disposed above and generally adjacent the floor of the burner pot so that said element vaporizes oil on said floor beneath said element, said sections having portions spaced relatively widely apart in a generally horizontal direction, said sections having other portions intermediate their ends which are closely adjacent to form a relatively small, generally vertical passageway through which oil vapors ascending from said floor may pass so that vapors passing through said passageway are subjected to a high concentration of heat to facilitate ignition, and means forming a shield over said element operative to reflect heat radiating from said element downwardly to the portion of said floor underlying said element.

5

7. In an oil burner construction wherein oil is delivered to the floor of a burner pot, means for igniting the oil comprising a heating element supported on said burner pot, said element having two sections disposed above and generally adjacent the floor of the pot, said sections being disposed generally in a plane parallel to said floor and having portions spaced relatively widely apart so that said element may vaporize oil on said floor beneath said element, said sections having other portions intermediate their ends which are closely adjacent to form a relatively small, generally vertical passageway through which oil vapors ascending from said floor may pass so that vapors passing through said passageway are subjected to a high concentration of heat to facilitate ignition, said passageway being disposed above a generally central portion of the area of said floor heated by said element.

6

8. The combination defined in claim 5 and in addition, a substantially hemispherical hood disposed over said element for reflecting heat radiating from said element downwardly to the portion of said floor underlying said element, said passageway being disposed generally at the central portion of said hood.

References Cited in the file of this patent

UNITED STATES PATENTS

2,010,460	McKinley	Aug. 6, 1935
2,025,074	Roe	Dec. 24, 1935
2,448,142	Fell et al.	Aug. 31, 1948
2,693,849	Resek et al.	Nov. 9, 1954

FOREIGN PATENTS

477,076	Canada	Sept. 18, 1951
---------	--------	----------------