

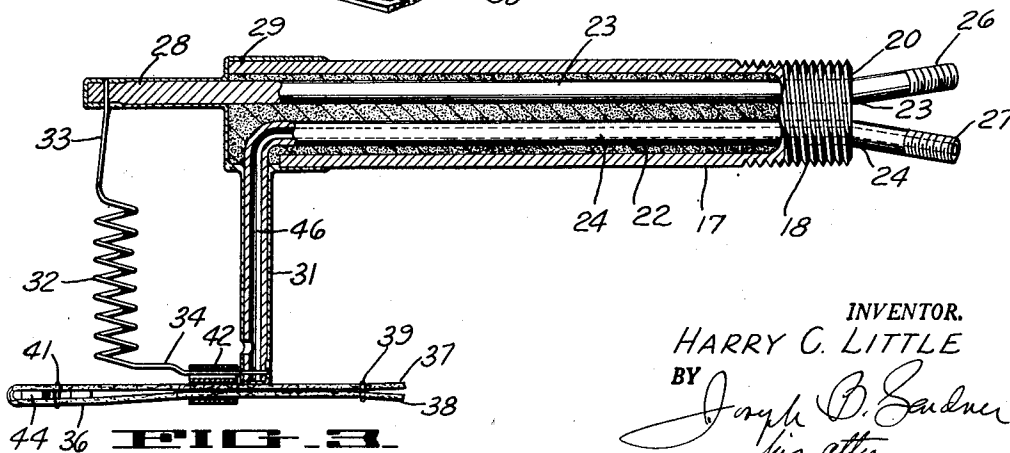
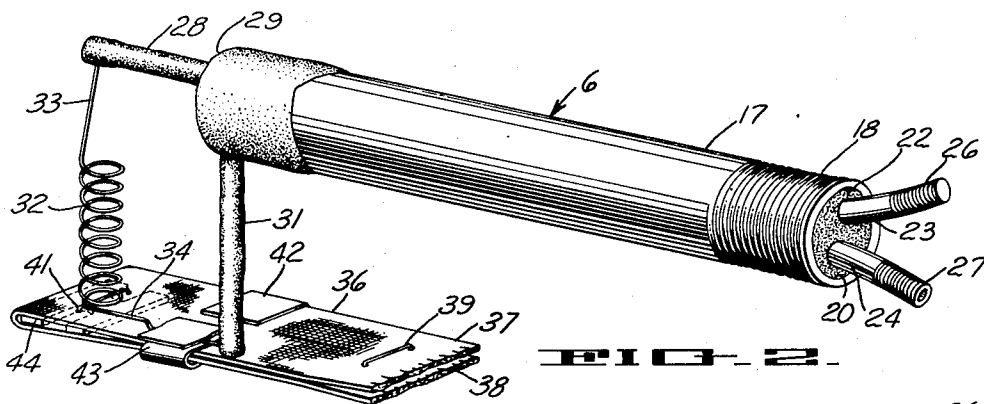
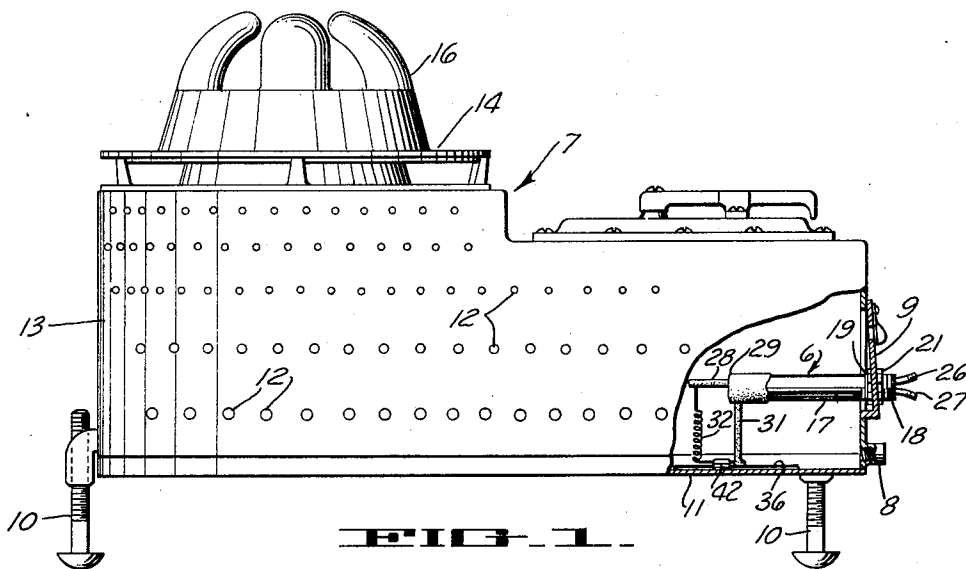
May 22, 1951

H. C. LITTLE

2,553,975

OIL BURNER IGNITION DEVICE

Filed June 14, 1948



INVENTOR.
HARRY C. LITTLE
BY *Joseph B. Gardner*
his atty.

UNITED STATES PATENT OFFICE

2,553,975

OIL BURNER IGNITION DEVICE

Harry C. Little, San Rafael, Calif.

Application June 14, 1948, Serial No. 32,755

3 Claims. (Cl. 175-115)

1

The invention relates to ignition devices for oil burners and to the general type of ignition device including an electrical heating element for vaporizing and igniting fuel oil deposited on the bottom of the burner.

A general form of ignition device to which the present invention pertains is illustrated and described in my earlier Patent No. 1,994,720 issued March 19, 1935, for Ignition Device wherein a helical coil of electrical heater wire is positioned vertically within the interior of an oil burner adjacent to the bottom thereof and functions when heated to produce oil vapor which is passed up through the interior of the coil for further heating, aeration and ignition. It has been proposed to add to a device of the character above a strip or sheet of wicking material which when immersed in the oil on the bottom of the burner will facilitate the initial vaporization desired for ignition. While the addition of such wicking material is beneficial, it is only so when a rather precise arrangement of the parts is provided so as to insure a proper coaction between the wicking material and the ignitor coil. In accordance with the present invention and as a principal object thereof I provide in an ignition device of the character above a structure insuring a proper and optimum relationship of the parts whereby the wicking material is properly immersed in the oil on the bottom of the burner and the ignition coil is supported in a precise spaced relation from the wicking material so as to provide an improved vaporization and ignition of the oil.

Another object of the invention is to provide an ignition device of the character described wherein a sheet of wicking material is used and is so mounted and arranged as to afford an automatic self-orientation of its plane into full engagement with the burner bottom over substantially the complete area of the sheet.

A further object of the invention is to provide an ignition device of the character above wherein the parts are arranged to produce a better radiation of heat from the ignition coil and the latter is removed from immediate contact with the dense oil vapor emanating from the wicking material whereby ignition of the vapor is accomplished with a minimum cracking or carbonizing of the coil, leaving the coil clean of carbonaceous material and therefore better able to repeatedly perform its heating and ignition functions over a substantially longer period of time.

Still another object of the invention is to provide in an ignition device of the character described an improved arrangement for introduc-

2

ing air into the immediate vicinity of the ignition device particularly on functioning thereof while the burner is in a heated condition.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a side elevation of an oil burner with a portion thereof cut away to show an ignition device constructed in accordance with the present invention.

Figure 2 is a perspective view on a somewhat enlarged scale of the ignition device illustrated in Figure 1.

Figure 3 is a longitudinal sectional view of the ignition device illustrated in Figures 1 and 2.

In the accompanying drawing the ignition device, generally denoted by numeral 6 is adapted for use and shown, in Figure 1, in conjunction with an oil burner 7. The latter is here illustrated as a more or less conventional natural draft type of burner wherein fuel oil is introduced through an inlet 8 at the front 9 of the burner for passage onto and over the burner bottom 11 where the oil is vaporized, mixed with "primary air" introduced through openings 12 in the sidewalls 13 of the burner, and passed up through a burner throat 14 for admixing with "secondary air" and burning. A flame spreader 16 is here shown mounted on the burner throat for shaping the flame. In normal operation of the burner sufficient heat is radiated from the flame back into the interior of the burner and particularly on to the bottom 11 thereof so as to provide the vaporizing of fuel to support the flame. Usually the burner throat is mounted in a combustion chamber connected in turn to a stack or chimney whereby a constant flow of primary and secondary air is induced through the burner for aerating and burning of the oil vapor. The bottom 11 of the burner should have a slight downward incline toward the rear of the burner, that is, under the burner throat, so that the oil will gravitate in a thin sheet over the burner bottom to afford maximum vaporization. For this purpose leveling screws 10 are commonly provided.

The ignition device 6, as will be best seen

3

from Figures 2 and 3, includes a rigid elongated tubular supporting member 17 which is formed adjacent one end 18 for attachment to the front wall 9 of the burner for general horizontal extension into the burner in spaced substantially parallel relation to the bottom 11. As here shown the end 18 of the tubular member is threaded and carries nuts 19 and 21 which may be threaded into clamped engagement with the opposite sides of wall 9 so as to rigidly support the tubular member 17 in a substantially perpendicular relation to the wall 9.

Mounted centrally through the tubular member 17 and rigidly supported therein in spaced insulated position as by means of a suitable ceramic insulation material 22, are a pair of electrical conductors 23 and 24. These conductors are preferably formed as rods of low resistance material such as copper or the like for the rigid support for the parts attached thereto and project from the forward end 20 of the tube to provide exposed ends 26 and 27 for connection to a source of electrical potential, usually 3 to 6 volts. As here shown ends 26 and 27 are threaded for receipt of electrical binder nuts, not shown, for securing the external electrical leads. The opposite end 28 of conductor 23 is preferably extended longitudinally from the opposite end 29 of the tubular member while the opposite end 31 of conductor 24 is bent at substantially right angles from the end 29 of the tubular member in the direction of the bottom 11 of the burner and extends to a position adjacent to but spaced from the burner bottom.

In accordance with the present construction and as above noted I utilize in the present device an ignitor coil 32 of relatively high resistance electrical heater wire which is connected between conductor ends 28 and 31 and supported thereby in a vertical position of the coil, that is, with its axis generally perpendicular to the axis of member 17 and to the burner bottom 11. This coil is formed from a length of wire having one end 33 connected to and depending from conductor end 28 with the opposite end 34 of the wire extending generally transversely from the lowermost turn of coil 32 and connected to the lower extremity of conductor end 31. As will be noted from Figure 3 the bottom of coil 32 is upset somewhat from the lower extremity of conductor end 31 so as to provide a positive location of the bottom of the coil in desired relation to the burner bottom and for this purpose the transverse extension 34 is offset intermediate the coil 32 and conductor end 31.

As noted in the foregoing there is also incorporated in the present ignition device a sheet or strip of wicking material 36 for assisting in the proper vaporization of oil, and means is provided for insuring the proper location of this wicking material below the lower end of coil 32 and particularly upon the bottom 11 of the burner so that the full area of the wicking sheet is immersed in the oil on the bottom. With reference to Figures 2 and 3 it will be noted that the sheet 36 of wicking material may be conveniently formed by folding an elongated strip of this material upon itself so as to provide upper and lower layers 37 and 38 which may be fastened together by staples 39 and 41. A sheet metal clip 42 is folded around the strip 36 transversely thereof at approximately the center of the length of the strip so as to securely hold the folds 37 and 38 together and is additionally pro-

4

vided with a folded or hooked end 43 which engages as a clasp over the transverse wire extension 34 so as to pivotally secure the sheet of wicking material along an axis generally longitudinally of the strip. In this manner, and as above described, the sheet of wicking material is permitted substantial relative pivotal movement with respect to its supporting parts whereby the wick will automatically seat upon the bottom 11 of the burner with the complete area of the underside of the strip in full engagement with the burner bottom. This self-orientation of the sheet of wicking material may be further accomplished by appropriate rotation of the tubular supporting member 17 so that the wicking strip is caused to forcibly bear upon the bottom 11 of the burner. Also desirably there is incorporated within the folds 37 and 38 of the strip a metallic weight 44, here of H shape, fastened by staple 41, so as to assist in holding down of the wick upon the burner bottom in a generally flat form of the wick.

By reason of the construction described in the foregoing, the wicking strip is automatically positioned upon the bottom of the burner in a plane generally underlying and perpendicular to the axis of coil 32, and by reason of the upset construction aforesaid the lower end of coil 32 is spaced somewhat from the top face of the wicking. This spacing is of considerable importance in removing the bottom of the coil from the rather dense oil vapor emanating from the wicking material. As will be understood the energizing of the coil upon initiation of burner operation produces a relatively hot spot or area on the top of the wicking material directly below the coil which in turn sends up a relatively dense oil vapor. Within a very short distance from the wick surface, the oil vapor is admixed with "primary air" necessary for combustion and the spacing of the coil from the wick as aforesaid places the coil in a zone where the oil vapor is at least partially aerated. In this manner cracking or carbonizing of the oil on ignition is greatly minimized and the undesirable deposit of carbonaceous material on the coil is avoided. As the aerated oil vapor passes up through the coil 32 additional air is admitted between the turns of the coil and the air and oil vapor mix is heated to a combustion temperature when ignition takes place.

The sheet of wicking material should be of sufficient thickness as to present the upper face of the wicking material above the oil level so that proper exposed area is present for vaporization. This is conveniently accomplished in the present design by the folded construction of the wicking material providing the upper and lower layers 37 and 38, the latter being generally immersed in the oil and the upper layer being generally exposed for escape of the oil vapor.

As another feature of the present invention, and as illustrated in Figure 3, I may increase the amount of air available at the wicking material and the coil by constructing one or both of the conductors 23 and/or 24 of tubular form so as to provide an air passage from the exterior of the burner directly to the vicinity of the ignitor. In the present showing such an air passage 45 is provided in conductor 24 and it will be noted that this passage terminates directly at the wick and adjacent to the lower end of coil 32. If desired a separate air tube could be used to introduce air directly to the ignition area. The air injection through passage 46 functions

best during a heated condition of the burner when a fairly strong natural draft is present for inducing an air flow through passage 46. It is during the ignition of the burner, while the burner is still hot from a previous operation, that this air entry is most needed and desired.

It will now be understood that the ignition device of the present invention may be constructed as a self-complete unit or complete subassembly and when so constructed and attached to the burner in the manner above described all of the parts of the ignitor will be properly and precisely located with respect to each other and the usual and customary fitting, adjustment, and realignment of parts may be avoided.

Preferably the portion of the front 9 of the burner to which the tubular member 17 is attached as above described is in the form of a removable closure or door for the burner so as to permit the ready insertion and removal of the ignition device into and from the burner as may be desired. In this manner the ignition device may be quickly and readily removed for inspection, cleaning or repair and the wicking strip 36 may be conveniently renewed or replaced as may be desired and when replaced will be precisely positioned as above discussed without further adjustment.

I claim:

1. An oil burner ignition device comprising, an elongated body including a pair of electrical conductors and being adapted for attachment adjacent one end to a wall of an oil burner for extension horizontally into the burner in spaced substantially parallel relation to the bottom thereof, one of said conductors projecting longitudinally beyond the inner end of said body, a second conductor being bent downwardly at substantially right angles to the length of said body adjacent said inner end thereof, a helical coil of electrical heater wire connected to and depending from said first conductor with the axis of said coil substantially perpendicular thereto, the lower end of said coil having a transverse generally horizontal extension connected to the lower end of said second conductor, a relatively flat sheet of wicking material, and means pivotally securing said sheet to said transverse extension so as to position said sheet adjacent to but spaced from the lower end of said coil for self-orientation on to the bottom of said burner in a plane underlying and generally perpendicular to the axis of said coil.

2. An ignition device for an oil burner adapted to receive oil on to the bottom thereof for vapor-

ization within the sidewalls of the burner comprising, an elongated tubular member formed for securing at one end to a sidewall of said burner for extension horizontally into the burner in spaced substantially parallel relation to the bottom thereof, a pair of electrical conductors mounted and insulated within said member and extending therethrough and projecting from said member end for connection to a source of electrical potential, a length of relatively high resistance heater wire providing a helical coil intermediate its ends and having one end connected to and depending from an inner end of one of said conductors so as to support said coil in a vertical position of its axis with the lower end of the coil adjacent to but spaced from the burner bottom, the lower end of said coil having a transverse wire connection to the inner end of the other of said conductors, and a sheet of wicking material pivotally secured to said transverse connection so as to position said sheet adjacent to but spaced from the lower end of said coil for self-orientation on to the bottom of said burner in a plane underlying and generally perpendicular to the axis of said coil.

3. In combination with an oil burner arranged to receive a pool of oil on the bottom surface thereof, an ignition device comprising, a helix of relatively high resistance heater wire, electrical conductors connected to the opposite ends of said helix for supporting said helix in a vertical axial position within an oil burner with the lower end of said helix spaced from the bottom of said burner, and wicking material mounted adjacent to but spaced from the lower end of said helix for engagement with the oil in the bottom of said burner in a plane underlying and generally perpendicular to the axis of said helix, one of said conductors being hollow to provide an air passage for introducing air adjacent to said helix and wicking.

HARRY C. LITTLE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,961,933	Irwin	June 5, 1934
1,994,720	Little	Mar. 19, 1935
2,025,074	Roe	Dec. 24, 1935
2,235,468	Vidalie	Mar. 18, 1941
2,239,175	Unser	Apr. 22, 1941