

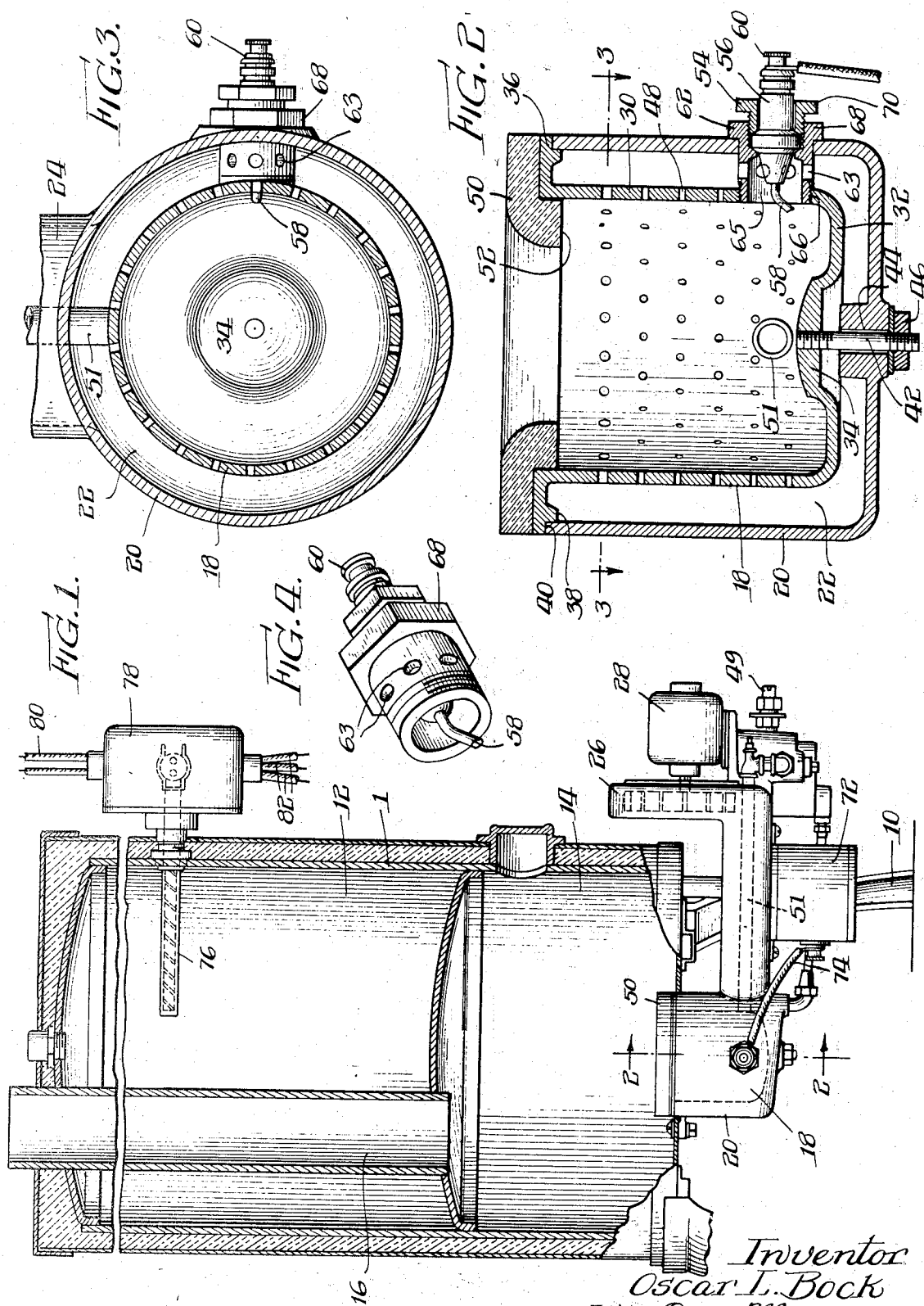
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OIL BURNER IGNITION DEVICE

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OIL BURNER IGNITION DEVICE

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3 Claims. (Cl. 158—91)

The present invention relates to oil burners and more particularly to an ignition device therefor.

An object of this invention is to provide in conjunction with a burner generally known as a pot type, an ignition device which obviates the difficulty of fouling.

It is an additional object of this invention to provide an ignition device for a burner of the pot type which normally extends into the combustion chamber but is so constructed and arranged as to resist the formation of carbon deposits thereon.

A further object of this invention is to provide an electrical device for the ignition of a hydrocarbon fuel in a burner of the pot type, said device being provided with means to prevent fouling or short circuiting thereof by the decomposition products of the fuel.

Yet another object of this invention is to provide an ignition device having an electrode extending directly into the combustion chamber which nevertheless is provided with means to resist formation of excess carbon thereon or short circuiting by formation of carbon in the neighborhood of the spark gap.

Numerous other objects and advantages will be apparent from a consideration of the following specification and drawing which disclose a device constructed in accordance with the principles of the present invention and in which

Fig. 1 is a fragmentary cross-sectional elevation of an ignition device constructed in accordance with the present invention;

Fig. 2 is a sectional elevation through the burner pot;

Fig. 3 is a top sectional view taken on the line 3—3 in Fig. 2; and

Fig. 4 is a perspective view of the ignition device shown in disassembled relationship.

Referring to the present device which shows the arrangement and structure of a burner in accordance with the present invention, there is shown a water heater having legs 10 upon which there is mounted an upright storage tank 12 having a heating chamber 14 (see Fig. 1). A flue 16 extends upwardly from the heating chamber to a point above the top of the device for conducting the gases therefrom.

A burner 18 in Fig. 1 is positioned centrally of the storage tank 12 having its interior in communication with the chamber 14. This burner 18 is operatively fastened to a surrounding wall or jacket 20 which is rigidly carried by the part of the tank supporting structure, as clearly shown in Fig. 1.

The jacket 20 is spaced from the burner 18 to

provide a surrounding air space or chamber 22. This space 22 is in communication with a passage 24 leading to a blower 26 which is operated by an electric motor 28. Operation of the motor, therefore, supplies draft to the air chamber which surrounds the pot or bowl 18.

The burner pot or bowl 18 comprises a vertical, annular wall 30 and a bottom 32 forming a curved annular channel and having a central raised or boss portion 34. An upper supporting rim or flange 36 is integrally connected with the side wall 18 of the pot at the upper end thereof, extending radially outward to a point spaced from said wall 18. The flange is provided on its lower surface with a downwardly projecting ridge 38, as indicated in Fig. 2. The flange 36 rests upon the upper edge of the jacket or casing 20, as indicated at 40 in Fig. 2, and is positioned against side movement thereon by the annular ridge 38 which is of such dimension as to fit readily into the mouth of the jacket 20.

The lower part of the pot or bowl is operatively connected to the lower part of the pot or jacket by a stud 42 which is threaded snugly into the raised portion 34 formed centrally of the bottom of the pot or bowl. This stud passes freely through an aperture 44 formed in the base of the jacket and is positioned therein by a nut 46 which engages corresponding threads upon the lower end of the stud and tends to force the pot downwardly in the jacket with the flange 36 securely bearing against the upper edge of the jacket 20.

The wall 18 of the burner pot is provided with a series of spaced openings 48 drilled to admit air therein. The openings adjacent the lower portion thereof supply air in sufficient quantities to initiate combustion near the bottom where the fuel is vaporized. The area where vapor occurs, is, therefore, maintained at a temperature beyond the end point of the fuel being supplied, actual burning being initiated in this area. As the burning mixture rises in the center of the pot, additional air is supplied progressively by the spaced rows of openings 48 in the side wall of the pot. The method of burning oil, as embodied in this case, is clearly disclosed and claimed in applicant's co-pending application, Serial No. 752,035, filed November 8, 1934.

Oil is supplied from an exterior source through a coupling 49 and thence through an appropriate control valve through the pipe 51 which leads directly into the burner pot, as shown in Fig. 2.

A ceramic choke ring 50 rests on the upper flange 36 of the pot and has an annular, down-

wardly extending portion 52 which is received in the recess formed by the upper inner edges of the burner pot. The choke ring is thus positioned, as shown in Fig. 2, and extends inwardly a predetermined distance from the interior peripheral side walls of the pot.

The ignition device comprises an electrode fitting 54 and a porcelain insulating core 56. An electrode 58 extends centrally through the porcelain core 56 and terminates at its inner end at a point extending into the burner pot but spaced therefrom a distance suitable for formation of the desired spark gap. The other end of the electrode terminates in a binding post or conductor 60. An electrode holder 62 surrounds the body of the electrode and passes through an aperture 64 in the side wall of the jacket 20 threadedly engaging with an opposed opening 66 in the wall of the burner pot. This holder is provided with a series of spaced, radially directed openings 63 arranged generally intermediate of the ends of the electrode holder. During assembly the electrode holder is drawn up in the threaded opening 66 until the flange 68 thereon engages against the outer wall of the jacket.

The porcelain core is tapered in the vicinity of the apertures 63 with the result that the electrode 58 is separated by an air space 65 in direct communication with and forming a continuation of the combustion chamber. Thus the apertures 63 admit the air under pressure from the air space 22 to sweep radially into space 65 and then axially of the electrode into the burner pot. The apertures 63 are positioned preferably to direct the fresh air upon the end of the porcelain core 56. One of the great sources of fouling in the prior art devices was the formation of a combustion deposit adjacent the surface of this insulating material until a conducting bridge was formed which prevented proper function of the spark gap. The maintenance of a blanket of relatively fresh air upon the surface of this insulator continually during operation serves to eliminate this difficulty.

The porcelain core 56 is maintained in position in the electrode holder 62 by a sleeve 70 threaded into the holder, as shown in Fig. 2. The electrode is supplied from a source of high tension electricity 72 by means of an electrical cable 74 passing from a high tension terminal on the said device 72 to the binding post 60 upon the electrode. The high tension device will comprise preferably a transformer controlled in any suitable manner.

In accordance with the present embodiment, the device is controlled electrically by an aquastat 76 described more fully in the parent case, application Serial No. 61,570, filed January 30, 1936, of which this application is a continuation in part. The claims in the parent case are directed to the burner and to the feed and control means therefor; the claims in the present case are directed to the electrode and its associated structure.

In operation, fuel is supplied through the pipe 51 and at the same time the motor 28 is in operation, driving the blower 26 with the result that a draft of air is supplied through the passage 24 to the space 22 surrounding the burner pot 78. These actions may all be initiated by the aquastat 76 controlling the mercury switch 78; that is, upon reaching a predetermined minimum temperature, the switch will be actuated in such a manner as to close the contacts, thereby connecting the various means with a source of cur-

rent. At the same time the transformer 72 will be supplied with current, thereby creating a high tension current in the secondary which is conveyed along the electrical cable 74 to the binding post 60 on the electrode. The other side of the transformer secondary being grounded to the device, a spark will pass continuously from the end of the electrode 58 to the wall of the burner pot or to the electrode supporter at its point of nearest approach thereto.

The draft of air entering the air space 22 will not only pass into the pot through the apertures 48, but will enter the openings 63, being impelled radially of the electrode by the pressure of the air draft and, being constrained, will flow axially of the electrode into the burner pot. This action will tend to blow the spark out through the open end of the electrode holder and into the pot. The spark causes heating adjacent its contact with the pot and, as the oil supplied by the pipe 51 accumulates, it creeps up the lower walls of the pot until it comes into contact with this heated area where it is ignited, causing a flame to occur. This flame is rapidly propagated by the air being fed through the various holes 48.

The temperature interiorly of the pot rapidly rises until normal burning occurs over the entire vaporizing area. All during operation, however, it will be apparent that the draft of air forced through the openings 63 will play over the exposed portions of the electrode and the electrode holder.

It has been found that this arrangement does away with normal fouling of igniting devices which communicate with the interior of the combustion chamber, while at the same time preventing short circuiting between the anode and any portion of the pot or holder. This is conceived to be due to the function of the structure in preventing the contact of any rich gaseous or partly burned mixtures with the igniter mechanism. Thus during burning the parts of the igniter mechanism exposed to the actual combustion are bathed in a moving column of relatively fresh air.

It is, moreover, preferred that, when ceasing operation, the spark and air draft be permitted to function for a period after the shutting off of the oil supply. This is easily done by means of the structure described in the parent application, Serial No. 61,570 mentioned above.

It will be apparent that the electrode may be extended into the burner pot in any suitable manner and any desired length in order to properly space it with respect to any predetermined portion of the pot whereby to form a suitable spark gap. Preferably, in accordance with the above disclosure, the gap will be alined with the issuing air draft from the holder so that fresh air will at all times pass therethrough. The intermediate portions, however, must obviously be spaced sufficiently from the walls of the pot to prevent intermediate sparking.

A wire of any length extending inwardly into a burner pot, particularly one of the instant type, is always subject to considerable carbon formations which gather thereon in a relatively short period of time and which ultimately tend to short circuit the electrode. It has been found, however, in operating in accordance with the present invention, that by providing a suitable air supply adjacent the electrode and insulator, this difficulty is almost completely obviated and that the ignition will be reliable and efficient in

operation even though exposed to actual combustion in the pot.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing description and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the form herein described being a preferred embodiment for the purpose of illustrating the invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is as follows:

1. In an oil burner of the type comprising a pot having a fuel supply conduit for supplying liquid fuel adjacent the lower portion thereof, a plurality of apertures in the wall of said pot, and a jacket exteriorly of said wall providing a combustion air supplying reservoir for continually causing vaporization of the liquid body of fuel at the lower portion in the pot to provide a volatilized supply of fuel throughout the pot and for continuously supporting combustion of said fuel vapor, the improvement which comprises an ignition electrode extending through the wall of the pot and to a point adjacent a fuel-wetted portion of the pot to form a gap therewith, said electrode being mounted in an electrode holder and spaced therefrom, and means admitting fresh air from said reservoir to said space substantially longitudinally and axially of the electrode and into the pot, whereby to continually bathe a portion at least of the electrode in a column of fresh air.

2. In an oil burner of the type comprising a pot having a fuel supply conduit for supplying liquid fuel adjacent the lower portion thereof, a plurality of apertures in the wall of said pot, and a jacket exteriorly of said wall providing a combustion air supplying reservoir for continu-

ally causing vaporization of the liquid body of fuel at the lower portion in the pot to provide a volatilized supply of fuel throughout the pot and for continuously supporting combustion of said fuel vapor, the improvement which comprises an ignition electrode extending through the wall of the pot and to a point adjacent a fuel-wetted portion of the pot wall to form a gap therewith, said electrode being mounted in an electrode holder and spaced therefrom, and means admitting fresh air from said air-supplying reservoir to said space substantially longitudinally and axially of the electrode and into the pot, said electrode having its end spaced a predetermined distance from the wall of the pot to provide a spark gap, said spark gap being arranged directly in line with said draft of fresh air axially and longitudinally of the electrode, whereby the air free from fuel admixture is caused to bathe the electrode and a portion at least of the associated spark released thereby.

3. In an oil burner of the type comprising a pot having a fuel supply conduit for supplying liquid fuel adjacent the lower portion thereof, a plurality of apertures in the wall of said pot, and a combustion air supplying reservoir for continually causing vaporization of the liquid body of fuel at the lower portion in the pot to provide a volatilized supply of fuel throughout the pot and for continuously supporting combustion of said fuel vapor, the improvement which comprises an ignition electrode extending through the wall of the pot and to a point adjacent a fuel-wetted portion of the pot wall to form a gap therewith, said electrode being mounted in an electrode holder, and means admitting fresh air from said reservoir substantially longitudinally and axially of the electrode and into the pot, whereby to continually bathe a portion at least of the electrode in a column of fresh air.

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