Jan. 3, 1961 J. L. BREESE 2,966,943

ELECTRIC IGNITION ASSEMBLY FOR LIQUID FUEL BURNERS

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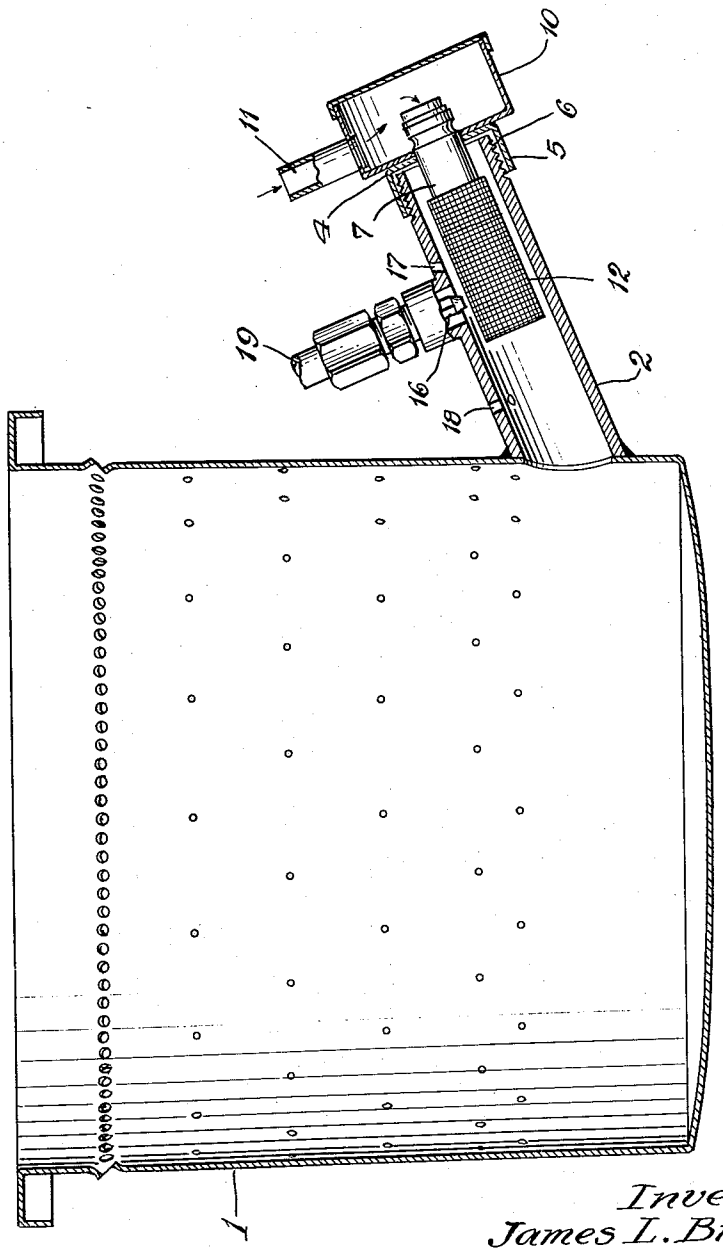

Fig. 1

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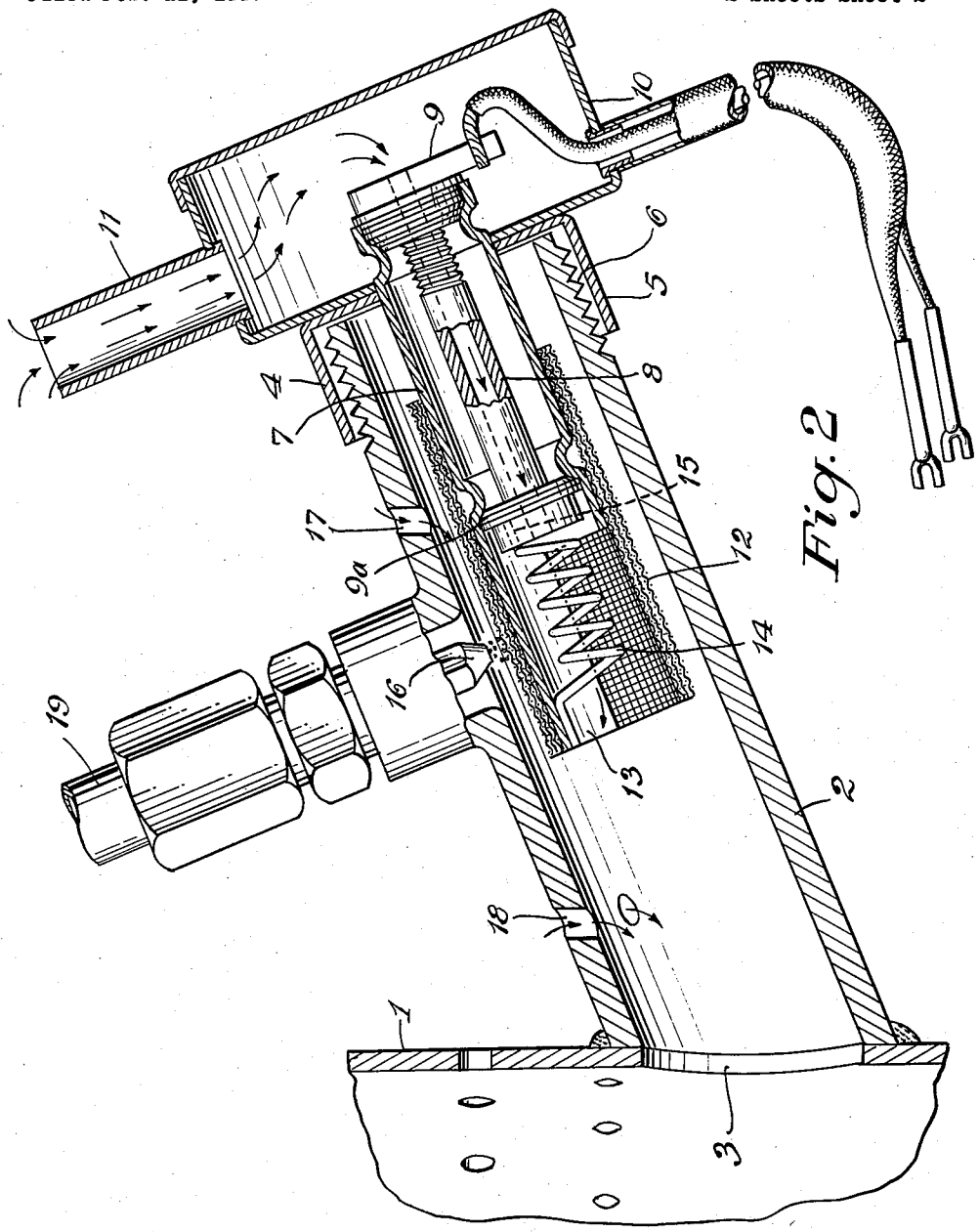

Fig. 2

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2,966,943

ELECTRIC IGNITION ASSEMBLY FOR LIQUID FUEL BURNERS

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3 Claims. (Cl. 158—91)

This invention is directed to an improved electrical ignition assembly for hydroxylating pot-type liquid fuel-type burners. A major purpose of the present invention is the provision of an improved electrical ignition assembly which resists the formation of carbon-like tar on a resistance heating element in this type of burner ignition assembly.

Another purpose of the present invention is the provision of an improved ignition assembly which generates a balanced mixture of combustible gas for ignition.

Another purpose of the present invention is the provision of improved electrical ignition means for pot-type liquid fuel burners which is so formed as to allow the location of a gasifying device at a location remote from the base of the burner pot.

Another purpose of the present invention is the provision of an improved burner pot electrical ignition assembly that may be readily serviced and which also provides for lighting the burner manually in the event of a power failure.

Another purpose of the present invention is to provide a combined liquid fuel delivery and electric ignition assembly for use with hydroxylating pot-type liquid fuel burners, which can be used as the fuel supply of liquid fuel to the interior of the pot, both at the time of ignition and at all subsequent stages of combustion.

Other purposes will appear in the ensuing specification and claims.

Referring generally now to the drawings:

Figure 1 is a side elevational view of the improved burner pot and ignition assembly constituting the present invention; and

Figure 2 is an enlarged detail view in section of the improved ignition assembly constituting the present invention.

Like elements are designated by like characters throughout the specification and drawings.

Referring specifically now to the drawing and in the first instance to Fig. 1, 1 designates a more or less conventional pot-type liquid fuel burner It may have a plurality of vertically spaced rows of primary and secondary air inlet apertures in the wall thereof as is well known to the art. According to the present invention, an ignition tube 2 is affixed to the wall of the burner pot as by welding and communicates through an aperture 3 in the pot with the interior of the burner pot. It should be noted that the tube 2 is inclined to the horizontal.

The outer end of the tube is closed by a cap 4 that fits over the end of the tube and has a rim 5 embracing the outer wall of the tube. The outer wall of the tube may be screw threaded as at 6 so as to provide a passageway for exterior air into the interior of the tube in response to a draft imposed on the burner pot. Positioned centrally of the end of cap 4 is a support 7 which may be cylindrically formed. A hollow tube 8 is positioned centrally of the support 7 and is mounted thereon as by spacers 9 and 9*a*. The hollow tube 8 serves to conduct

exterior air from a generally cylindrical chamber 10 to the interior of the ignitor. Chamber 10 may be defined by a closed cylinder on the end of cap 4. An air inlet 11 supplies air to the chamber 10.

A generally cylindrical gasifier 12 is affixed to the support 7. The gasifier 12 is preferably formed from three super-imposed wraps of wire mesh screen. The lower end of the gasifier 12 is affixed to an extension 13 from the support 7. The upper end of the gasifier 12 is supported on the body of the support proper. The extension 13 may be formed as a partly cylindrical member extending from the body of the cylindrical support 7.

A resistance heating element 14 has one end affixed to the extension 13 and the other end is supplied with electrical energy through any suitable lead (not shown). The lead may, for example, be brought through the spacer 9*a* for connection to the inner end 15 of the heating element 14. The electrical connections do not form part of the present invention and for this reason, they are not shown in the drawing. The arrangement shown permits a variety of electrical connections which will be known to those skilled in the art.

A fuel inlet nozzle 16 is mounted on the upper portion of the tube 2 and is adapted to supply liquid fuel from a conduit 19 and source (not shown) to the gasifier 12. The nozzle 16 directs liquid fuel in the form of a jet stream against the gasifier 12. It should be noted that the extension 13 is opposed to the nozzle 16 so as to prevent a direct passage of fuel through the heating element 14. The extension 13 acts to divert fuel sprayed on to the gasifier in a generally circumferentially extending direction around the gasifier, thus protecting the heating element 14 from direct exposure to the fuel stream.

An air inlet is formed in the tube 2 as at 17. The air inlet 17 may take the form of several holes located at various positions in the upper portion of the tube 2 between the nozzle 16 and the end cap 4. If desired, one or more additional air inlets 18 may be formed in the tube 2 at a position between the burner pot 1 and the nozzle 16.

Whereas I have shown and described the operation of my invention, I wish it to be understood that this showing and description thereof should be taken in an illustrative or diagrammatic sense only. There are many modifications to the invention which will fall within the scope and spirit of the invention and which will be apparent to those skilled in the art. The illustration and description of the invention should be taken in an illustrative or diagrammatic sense only and not in any limiting sense. The scope of the invention should be limited only by the scope of the hereinafter appended claims.

The use and operation of my invention is as follows:

I illustrate an electrical ignition assembly for hydroxylating liquid fuel pot-type burners. The assembly is so formed that the gasifier 12 is located at a remote position with respect to the base of the burner pot which, during use of the pot, may contain a body of fuel. The gasifier 12 is positioned upwardly and away from this body of fuel in the base of the burner pot. This tends to eliminate the carbon and coking condition that exists in a wick and heating element when the ignitor dips into the fuel pool at the base of a burner pot.

When ignition is desired, resistance heating element 14 is energized and a jet stream of oil is delivered against the gasifier 12. Air for combustion is supplied through the tube 2 and towards the burner pot 1, both on the inside of the gasifier 12 and the outside thereof. Air is supplied through the tube 8 and through the interior of the gasifier. At the same time air is supplied along the exterior of the gasifier from the inlet 17 and from

the spaces between end cap 4 and the outer end of the tube 2, if desired. This tends to form a gas mixture that is too rich for ready ignition on that side of the gasifier adjacent the nozzle and too lean on the interior of the coil. Somewhere between these extremes there is a place in which the gas air mixture is perfect for low temperature ignition.

When ignition is initiated the flame is directed downwardly into the burner pot. Any excess fuel from the nozzle 16 runs down the tube 2 into the pot where it is vaporized during the combustion process. The same assembly may be employed for delivering fuel to the pot both during ignition and during normal combustion. After ignition and when the combustion process takes place within the burner pot, the nozzle 16 may continue to deliver fuel against the gasifier 12 from whence it proceeds to the base of the burner pot. Thus the nozzle 16, with suitable flow control means, not herein shown, may be employed to supply all the liquid fuel necessary to maintain combustion within the pot at all stages, from ignition to high fire.

By using three wraps of screen wire for the gasifier I provide an optimum amount of screen mesh for the gasification of the fuel.

By using the jet stream of oil against the screen mesh gasifier the resistance heating element 14 can operate at or near the theoretical ignition temperature of a dry gas which is several hundred degrees lower than the softening temperature of ordinary Nichrome coils. Thus with this type of ignition ordinary changes in line voltages will hold the ignitor coil safely between the lowest ignition temperature and the highest melting temperature of the coil.

In the event power fails, ignition of the pot may be initiated manually by merely removing the cap 4 from the end of tube 2, initiating the jet stream of oil and lighting the same with a lighted wad of paper which may be dropped into the tube 2. The end cap 4 and ignition assembly may then again be placed over the end of the tube 2 after combustion is thus initiated. The tube 2 is threaded as at 6 to receive a cap where electric ignition is not desired and normal ignition with a torch is to be used (not shown in the drawing).

The jet stream delivered against the gasifier provides instant ignition for the burner and this tends to provide a faster burner warmup.

I claim:

1. In a combined liquid fuel delivery and electric ignition assembly adapted for use with hydroxylating pot type liquid fuel burners, a downwardly inclined tube having an open lower end, a cylindrical pervious vaporizing screen element spaced in said tube above said open lower end, supporting means for the screen element including a tubular structure extending along the axis of the tube from the outer end of the tube, an electric heating means spaced within said screen element and means for energizing it for and thereby increasing the temperature adjacent said screen element, a liquid fuel nozzle positioned on the side of said tube and formed and adapted to direct a jet of liquid fuel into the interior of said tube and against the exterior of said vaporizing screen element, a shield means interposed between the electric heating means and the liquid fuel nozzle, an axial air inlet duct positioned to deliver air to the space surrounded by the vaporizing screen at a zone adjacent the electric heating means, and a partial closure for the upper end of the tube formed and adapted to permit air leakage into the interior of the tube.

2. The structure of claim 1 further characterized in that said shield means shields the electric heating means from impingement of the fuel jet, while permitting such jet to contact the vaporizing screen element.

3. The structure of claim 2 further characterized by a plurality of air inlet apertures in said tube generally adjacent the ends of said screen.

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