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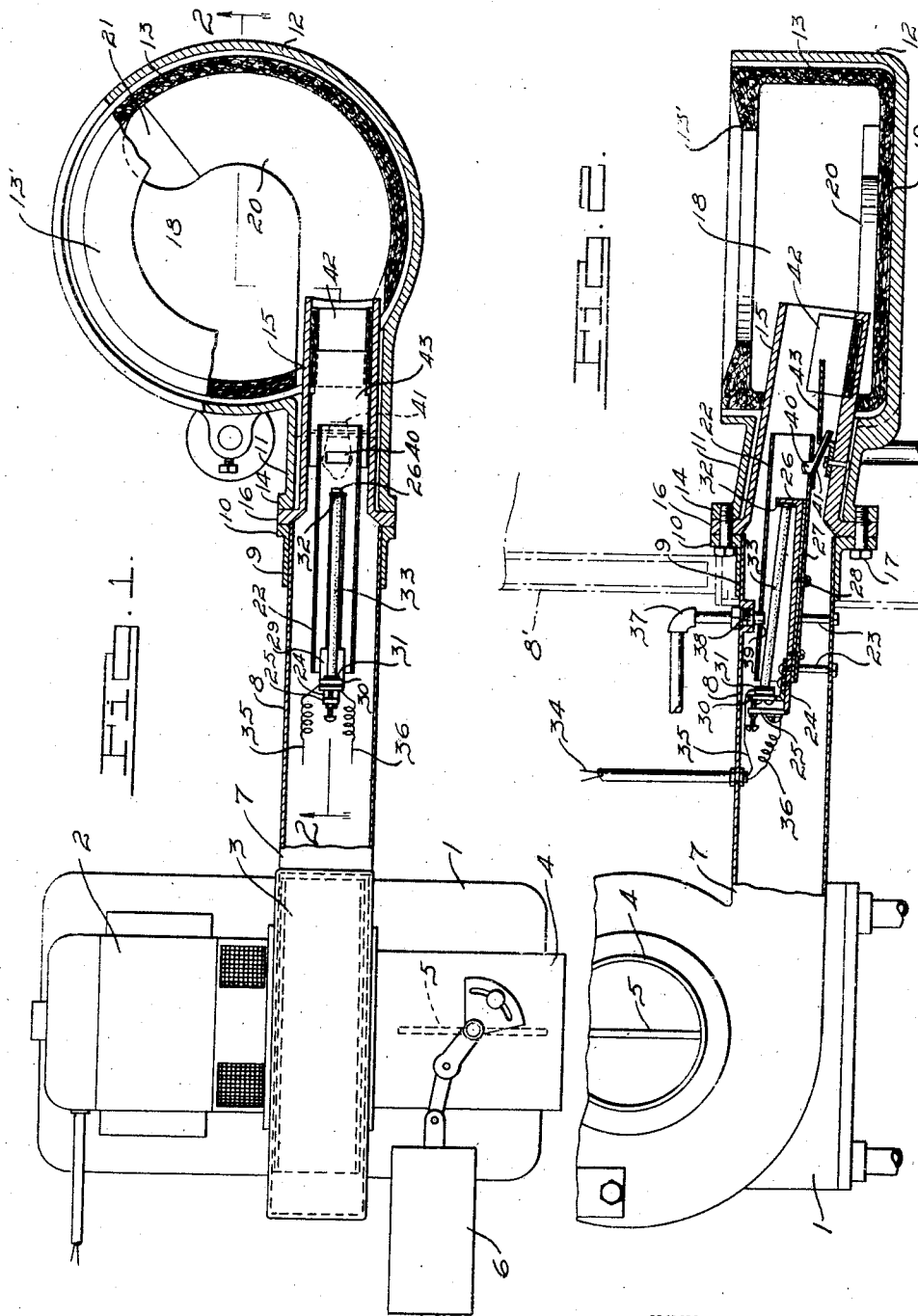
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OIL BURNER

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2 Sheets-Sheet 1



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FIG. 3.

FIG. 4.

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OIL BURNER

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This invention relates to an improved oil burner and particularly to fuel igniting and fuel feeding apparatus thereof.

The main objects of the invention are to provide igniting apparatus which is located in a duct through which air is drawn to a combustion chamber; to provide apparatus of this kind which is spaced substantially from the combustion chamber and subjected to an air current so as to protect the apparatus against excessive temperatures; and to provide a fuel inlet in an air duct of this kind for feeding fuel to the igniting apparatus.

Other objects of the invention are to provide a separate, replaceable nozzle in the inlet of an oil burner fire pot which extends into the combustion chamber thereof; to provide a nozzle of this kind which extends through the passage of the inlet of the fire pot in spaced relation to the walls thereof and which is attached to an air supply conduit at the junction of these two elements of the burner; to provide fuel igniting apparatus in the adjacent ends of the nozzle and air blast conduit at a somewhat remote location from the combustion chamber of the burner and where the apparatus is subjected to a substantial cooling effect by the air blast; and to provide igniting means of this kind enclosed in a tubular shield.

Further objects of the invention are to provide a fuel feeding system which normally discharges fuel in a liquid state into the tubular shield of the igniting apparatus and directly upon the heating element so as to initially ignite some of the fuel at the inlet end of the nozzle when the fire is being started; to provide means for conveying that portion of the fuel which is not taken up by the forced air current in the tubular shield, or ignited, to a foraminous element or pad by which it is absorbed and again presented to the forced air current at the outlet end of the nozzle; to provide a shield of this kind which is adapted to direct the flame resulting

from the initial ignition of the fuel onto the absorbent pad so as to, in turn, ignite the fuel that is vaporized from the pores of the pad and the fuel which is blown from the latter by the air flow in the air conduit and carried into the combustion chamber; to provide a baffle which extends into the body of the pad for shielding the lower portion of the foraminous element from the air current so as to allow the fuel supplied thereto to be thoroughly distributed throughout the foraminous structure of the pad by absorption; to provide a baffle of this kind which permits the fuel to flow by absorption into close proximity of the flame exposed region of the path before the fuel is subjected to the direct action of the forced air current, thereby igniting the fuel in the path prior to its discharge into the fire pot; and to provide an absorbing pad of this kind which is spaced from the discharged end of the tubular igniting apparatus shield sufficiently to obviate combustion of the fuel in the shield after the heating element is de-energized.

An illustrative embodiment of our invention is shown in the accompanying drawings, in which:

Fig. 1 is a plan view, partly in section, of an oil burner embodying our invention.

Fig. 2 is a vertical central section taken on the line 2—2 of Fig. 1 and showing the blower or fan of the oil burner in fragmentary side elevation.

Fig. 3 is an enlarged, fragmentary section of the discharge end of the air supply conduit showing the fire pot, fuel nozzle and fuel igniting apparatus in detail.

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3.

In the form shown, our improved oil burner includes a support or base 1 on which a motor 2 and fan or blower 3 are mounted. The fan 3 includes a casing which has an air inlet tube 4 having a throttle valve 5 therein which is provided with actuating mechanism includ-

ing a solenoid 6. This last detail may vary as desired and forms no part or essential element of the present invention. Communicating with the outlet 7 of a blower is an air supply tube 8 which has a sleeve 9 on its outlet end on which is formed a flange 10.

The outlet end of the air supply conduit 8 registers with an inlet spout 11 of a fire pot which includes a cylindrical body part 12 having a lining 13 therein which is preferably formed of refractory material such as fire clay that is adapted to withstand high temperatures. Provided around the outer periphery of the lining is a diaphragm 13' which, together with the bowl shaped fire pot and tangential feeding of fuel and air thereto, prevents unburned liquid fuel from escaping from the fire pot, and also causes discharge of the flame from the pot in a direction normal to the axis of the pot. The spout 11 of the fire pot has a peripheral flange 14 on its outer extremity which registers with the flange 10 of the air supply conduit 8. The fire pot is located in a furnace having a front wall 8' and is provided with a nozzle 15 having an outer end which registers with the outlet end of the air supply conduit 8 and on which is provided a flange 16, registering with the flanges 10 and 14 of the conduit 8 and spout 11. These flanges are firmly clamped together with screws 17 which extend through registering apertures therein as shown in Fig. 2. With this construction, the fire pot, nozzle and air blast conduit are detachably held together and the nozzle 15 is supported so that its sides are spaced from the inner periphery of the spout 11 and its discharge end is located in the combustion chamber 18 of the fire pot.

The bottom wall 19 of the lining 13 of the fire pot is provided with an arcuately shaped recess 20 which leads from the discharge end of the nozzle, substantially half way around the inner periphery of the lining, as shown in Fig. 1. This recess has an upwardly inclined extremity 21 and an upstanding inner arcuate side edge. The discharge end of the nozzle 15 extends into the recess 20 so as to discharge both air and fuel thereinto when the blower 3 is in operation. The incoming fuel and air is projected against the wall of the fire pot from which some of the fuel rebounds and strikes against the upstanding side of the recess. This action augments the turbulence of the mixture and the side wall reflects the heavy particles of unvaporized fuel back towards the side wall of the fire pot preventing escapement of the unvaporized fuel from beneath the flanges 13'.

Mounted in the interior of the air supply conduit 8 is a metal tube or shield 22 which is supported by bolts 23 mounted on the lower side of the conduit 8, the axis of the tube 22 being inclined downwardly toward the fire pot. Fuel igniting apparatus including a

support 24 having end flanges 25 and 26 extends into the tube 22 and is spaced therefrom by insulating material 27, the support 24 being rigidly secured to the tube 22 by screws 28. Shiftably mounted on the support 24 is a bracket 29 having a resilient upright arm 30 on which a contact element 31 is provided. The flange 26 on the right end of the support 24, as viewed in Fig. 2, is provided with a contact element 32.

Extending between the contact elements 31 and 32 is a resistant heating element 33 that is electrically connected in series with an electric circuit 34 by terminal wires 35 and 36. The wire 35 is attached to the contact element 31 which is insulated from the resilient arm 30 and the terminal wire 36 is attached to the support 24 which is electrically connected with the contact element 32. With this construction, an electrical current is passed through the heating element 33, thereby causing it to become hot and possibly incandescent.

A fuel inlet pipe 37 extends through registering apertures 38 and 39 in the conduit 8 and tube 22 respectively and has a discharge end directly over the heating element 33 so as to discharge fuel thereon. The tube 22 is provided with an outlet aperture 40 which registers with a trough 41 that is mounted on the tube 22 and extended downwardly toward the fire pot for receiving the fuel in excess of the amount which is ignited by the heating element 33 and driven into the fire pot by the air current during starting of a fire. Mounted at the discharge end of the nozzle 15 is an absorbent pad 42, preferably comprising non-combustible, foraminous material such as an asbestos matrix. A baffle 43 mounted on the lower side of the nozzle 15 having an aperture for receiving the trough 41 is imbedded at its outer end in the material of the pad 42. The baffle 43 shields the lower portion of the pad from the direct action of the air current which is created in the registering passages of the conduit 8 and nozzle 15 by the blower. The trough 41 conveys the liquid fuel in excess of that amount which is either ignited in the tube 22 or carried therefrom by the air current, to the pad 42.

In operation, when the circuit 34 is closed the resistance element 33 is heated and fuel dripping thereon from the inlet 37 is ignited. Some of the fuel introduced into the tube 22 is blown directly into the fire pot by the air current and some of the fuel drips through the opening 40 in the tube and is conveyed by the trough 41 to the pad 42 where it is absorbed and again presented to the air current.

The ignited fuel in the tube 22 forms a flame which is directed by the discharge end of the tube onto the pad 42, thereby igniting the fuel in the latter. After the fuel which

is accumulated by the pad 42 is ignited, the circuit 34 is opened and the element 33 is rapidly cooled by the air current. The flame is thus extinguished and further burning, during a high fire, occurs at the pad 42 and in the combustion chamber 18 of the fire pot, but with a low fire the entire fuel supply is absorbed by the pad 42 and substantially all burning occurs at the latter.

The above igniting apparatus may be located in any suitable duct through which air is supplied to the combustion chamber and in all cases it is preferable to position apparatus of this kind at a substantial distance from the combustion chamber so as to protect the heating element and other parts from the excessively high temperatures of combustion. The continuous draft of air passing through the duct is also a material factor in retaining the igniting apparatus at a suitable temperature when the latter is inoperative.

Formal changes may be made in the specific embodiment of the invention described without departing from the spirit and substance of the broad invention, the scope of which is commensurate with the appended claims.

What we claim is:

1. An oil burner including a fire pot and an air supply conduit, a fuel nozzle communicating with said fire pot and conduit respectively, for supplying a current of air to said fire pot, an absorbent pad at the discharge end of said nozzle, igniting apparatus located in the path of said air current, a fuel inlet for feeding fuel to said igniting apparatus, means associated with said igniting apparatus for collecting the excess fuel supplied thereto and conveying the same to said pad, said means being adapted to discharge ignited fuel upon said pad when said igniting apparatus is energized.

2. An oil burner including a fire pot and an air supply conduit, a fuel nozzle communicating with said fire pot and conduit respectively, for supplying a current of air to said fire pot, an absorbent pad at the discharge end of said nozzle, igniting apparatus located in the path of said air current, a fuel inlet for feeding fuel to said igniting apparatus, a tube surrounding said igniting apparatus for collecting the excess fuel supplied to the latter, and a duct at the outlet end of said tube for conveying fuel to said pad.

3. An oil burner including an air supply tube and a communicating nozzle, an absorbent pad at the discharge end of said nozzle, fuel igniting apparatus in the path of said air current, a fuel inlet for feeding fuel to said apparatus, and means surrounding said apparatus for collecting fuel supplied thereto and conveying it to said pad.

4. An oil burner including an air supply tube and a communicating nozzle, an ab-

sorbent pad at the discharge end of said nozzle, fuel igniting apparatus in the path of said air current, a fuel inlet for feeding fuel to said apparatus, means associated with said heating apparatus for collecting fuel, and a duct at the outlet end of said means for conveying fuel to said pad, said fuel collecting means being adapted to direct ignited fuel towards said pad when said igniting apparatus is energized.

5. An oil burner including an air supply tube and a communicating nozzle, an absorbent pad at the discharge end of said nozzle, fuel igniting apparatus in the path of said air current, a fuel inlet for feeding fuel to said apparatus, a tube surrounding said apparatus for collecting fuel, a baffle in said nozzle shielding a portion of said pad from said air current and duct at the end of said tube projecting through an opening in said baffle for conveying fuel to said pad.

6. An oil burner including an air supply conduit and a communicating nozzle, a fuel accumulating member at the discharge end of said nozzle, fuel igniting apparatus in the path of said air current, a tube surrounding said apparatus having a fuel outlet, a fuel inlet communicating with said tube adapted to feed fuel to said igniting apparatus, and means communicating with said outlet for conveying fuel therefrom to said accumulating member.

7. An oil burner including an air supply conduit and a fire pot, a nozzle communicating with said conduit and extending into said fire pot, a fuel accumulating member in said nozzle, fuel igniting apparatus in the path of said air current, a tube surrounding said apparatus having a fuel outlet, a fuel inlet communicating with said tube adapted to feed fuel to said igniting apparatus, and means communicating with said outlet for conveying fuel therefrom to said accumulating member.

8. An oil burner including an air supply conduit, a fire pot attached thereto having an inlet passage, a separate nozzle extending through said passage and secured to said conduit and fire pot at the junction thereof, an absorbent pad at the discharge end of said nozzle, fuel igniting apparatus in the path of said air current, a fuel inlet for feeding fuel to said apparatus, and means surrounding said apparatus for collecting fuel supplied thereto and conveying it to said pad.

9. An oil burner including a fire pot and a communicating air supply conduit, a nozzle communicating with said conduit and extending into said fire pot, an absorbent pad in the discharge end of said nozzle and located in said fire pot, a heating element in said conduit having an electrical energizing circuit, a tube surrounding said heating element, a fuel inlet communicating with said tube, a baffle for shielding a portion of said

pad from the air circuit in said nozzle, and a duct at the end of said tube for conveying fuel therefrom to said pad.

10. An oil burner including a fire pot, having an opening in one side thereof, a refractory lining having an arcuate recess in the bottom wall thereof bounded by an inner upstanding side wall and extending substantially half way around said lining adjacent the side wall thereof, a nozzle extending through said opening and into said fire pot having its discharge end in said recess, and means for feeding a forced supply of fuel and air through said nozzle.

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