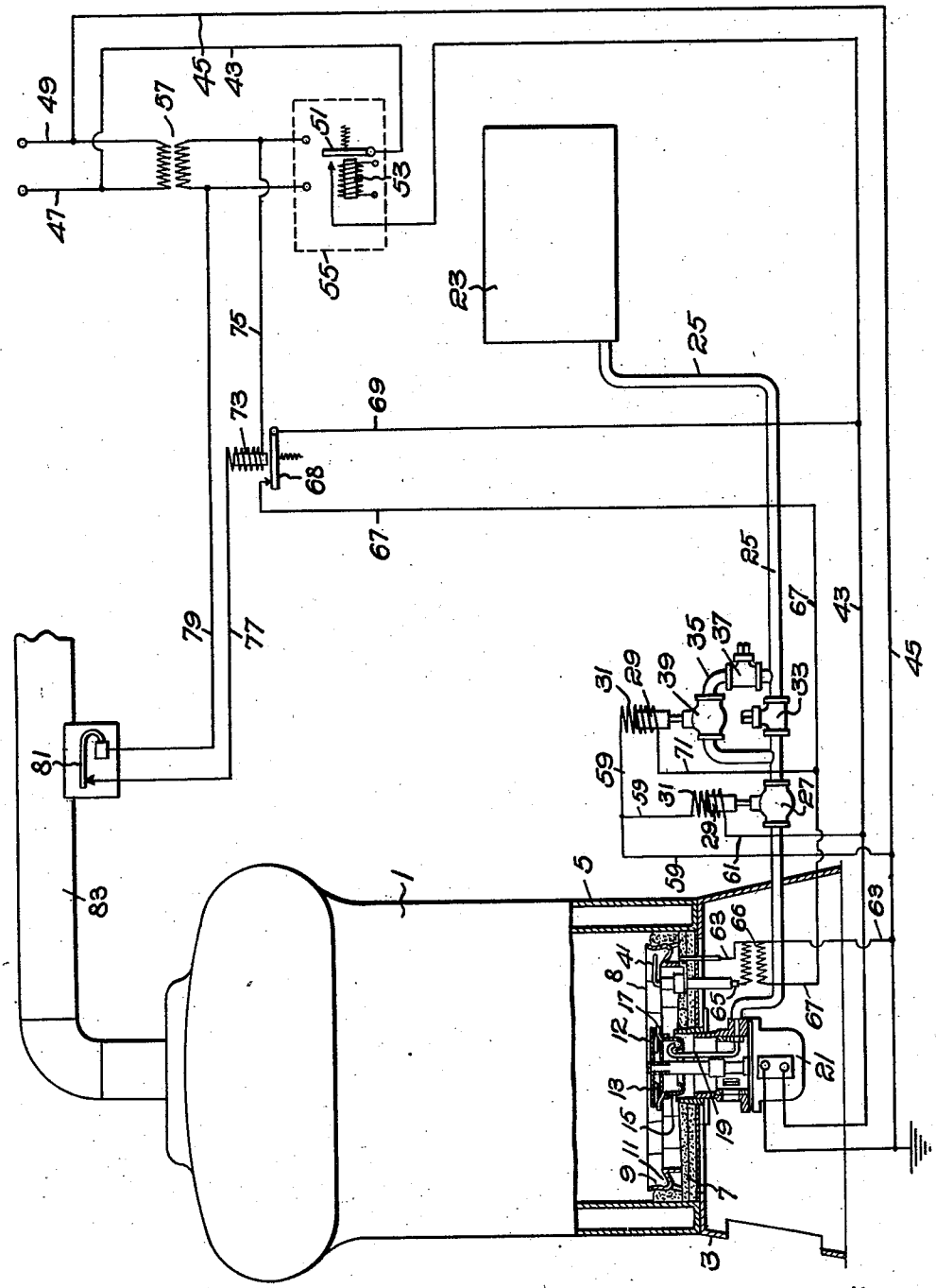
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OIL BURNER

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OIL BURNER

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9 Claims. (Cl. 158—28)

Our invention relates to oil burners for house heating systems and the like, and particularly, but not exclusively, to oil burners of the so-called wall flame type wherein air and oil are discharged toward the wall of a combustion chamber, adjacent which wall is an oil vaporizing surface with associated ignition means. Commonly in this type of burner the air and oil are discharged across a hearth from a centrally positioned rotary head toward a so-called combustion ring positioned adjacent the wall of the combustion chamber, this ring providing the surface for vaporizing the oil.

Burners of the above mentioned type are commonly very efficient in respect to fuel consumption, and require a supply of oil during the normal operation of the burner insufficient to secure quick starting of the burner, it being understood that when the burner is initially put into operation the oil collects on the combustion ring or other vaporizing surface and burns until at the end of the starting period of the burner the ring is heated to a sufficiently high temperature substantially immediately to vaporize the oil as it strikes said ring, whereupon the burner operates with a blue flame adjacent the wall of the combustion chamber. The present invention has among its objects to secure automatically an increased amount of oil during the starting period so that the duration of that period will be reduced.

The drawing schematically shows a burner and associated part according to the invention.

Referring to the drawing, the furnace 1 comprises a base 3 on which is mounted the water heating or steam generating sections of a boiler, these sections comprising a lower or water-leg section 5 at the bottom of which is a hearth 7. Adjacent the walls of the combustion chamber is a combustion ring 8 having a generally vertical wall 9 in the path of the oil projected against the ring and having a gutter 11 below the wall 9, in which gutter the oil collects during the starting period of the burner. Above the central portion of the hearth is a rotary head 12 comprising a horizontal fan 13 for projecting air across the hearth toward the combustion ring and comprising an annular cup 15 with associated discharge nozzles 17 for projecting oil toward the combustion ring. The rotating cup 15 during the operation of the burner is continuously supplied with fuel oil by a stationary tube 19 so that oil will be continuously discharged by centrifugal force from the cup through the nozzles 17. Below the hearth is a motor 21 for driving the rotary head.

As illustrated, fuel oil is supplied by gravity to the tube 19 from an oil storage tank 23 through a conduit 25. As shown, a stop valve 27 of common construction is provided for controlling the flow of oil through the conduit 25 during the normal operation of the burner, the projecting stem of this valve fixedly carrying a weight 29 which forms an armature adapted to be actuated by a solenoid 31. When the solenoid is deenergized the weight 29 closes the valve, but when the solenoid is energized the weight acts as an armature to move the stem of the valve upwardly and open the valve. Also in the conduit 25 is a metering valve 33 of common construction, this valve being of the needle type and capable of manual adjustment for regulating the amount of oil flowing through the conduit when the stop valve 27 is open.

As illustrated, around the metering valve 33 is a by-pass conduit 35 in which is a second metering valve 37 and a second stop valve 39, the latter being controlled by a weight 29 and a solenoid 31 in the same way as the stop valve 27. In each case the capacity of the stop valve for flow of fuel oil is in excess of the flow permitted by the associated metering valve, and the capacity of the stop valve 27 is in excess of the total flow permitted by the two metering valves.

The metering valve 33 may be adjusted manually to cause the proper flow of oil to the burner when the stop valve 27 is open and the stop valve 39 closed during normal operation of the burner. The metering valve 37 may be adjusted to cause an additional flow of oil to the burner during the starting period of the burner when both stop valves 27 and 39 are open.

Any suitable form of ignition may be employed, that illustrated comprising an electrode 41 for causing a spark between it and the metal combustion ring.

The burner may be controlled in any of the ways commonly employed in a house heating system or the like. Such a system, as will be understood by those skilled in the art, comprises a house circuit having a thermostatically controlled switch and suitable relays for energizing the motor to put the burner into operation when the room temperature falls to a predetermined degree and for deenergizing the motor to put the burner out of operation when the room temperature sufficiently rises. The circuit therefore will not be described in any greater detail than is necessary to show how it is applied to the present invention.

As illustrated, the motor is connected by leads 43, 45 to a line 47, 49. In the lead 43 is a relay

switch having an armature 51, the coil 53 of the switch, it will be understood, being energized by the house circuit and its safety devices indicated schematically by the dotted rectangle 55, this house circuit being energized by the transformer 57 the primary of which is connected across the line 47, 49. As shown, the solenoid 31 for the stop valve 27 is connected by conductors 59 and 61 across the motor energizing leads 43, 45 so that while the motor is in operation the stop valve 27 will be in open condition.

As shown, the combustion ring 9 is connected by a lead 63 to the grounded motor energizing lead 45, while the electrode 41 is connected by a lead 65 to the high potential end of the secondary winding of a step-up transformer 66, the primary winding of this transformer being connected by a lead 67 to a relay switch having the armature 68, which armature is connected by a lead 69 to the motor energizing lead 43 so that when the motor is energized, and the relay switch is closed, the ignition will operate while the motor is causing oil to be supplied to the combustion ring. The solenoid 31 for the stop valve 39 is connected by the conductor 59 to the motor energizing lead 45 and by the lead 71 to the lead 67 connected to the secondary of the transformer 66 so that when the relay switch having the armature 68 is closed to cause the ignition to operate the solenoid 31 for the stop valve 39 will be energized and that valve will be opened.

As shown, the coil 73 of the relay switch having the armature 68 is connected across the secondary of the transformer 57 by the leads 75, 77 and 79 through the thermostatic switch 81, which may be of the tilting mercury type, associated with the stack 83 of the furnace so that after the burner is started and the stack is heated to a predetermined temperature the thermostatic switch 81 will open and cause the coil 73 of the relay to be deenergized permitting the armature 68 to open the relay switch and deenergize the ignition circuit while the motor is operating. The deenergization of the ignition circuit deenergizes the solenoid 31 of the stop valve 39 permitting that valve to close so that when the burner is started and the ignition interrupted the extra supply of oil to the burner during its starting period will be interrupted.

It will be understood that, within the scope of the appended claims, wide deviations may be made from the form of the invention herein described without departing from the spirit of the invention.

We claim:

1. In an oil burner of the wall flame type wherein air and oil are discharged toward the wall of a combustion chamber from an electric motor driven centrally positioned rotary head adjacent which wall are a combustion ring and associated electric ignition means, a conduit for supplying oil to said head, a stop valve and a metering valve in said conduit, a by-pass conduit about said metering valve, a second stop valve and a second metering valve in said by-pass conduit, solenoids for opening said stop valves when said solenoids are energized, means for causing said stop valves to close when said solenoids are deenergized, a motor energizing circuit across which the solenoid for opening the first mentioned stop valve is connected whereby when said motor is energized said solenoid will open said valve, an ignition circuit across which the solenoid for opening the second stop valve is connected whereby when said ignition means is energized said solenoid will open said second stop valve, and a stack temperature controlled means for breaking said ignition circuit for interrupting the operation of said ignition means and causing closure of said second stop valve upon starting of the burner.

2. In an oil burner of the wall flame type wherein air and oil are discharged toward the wall of a combustion chamber from an electric motor driven centrally positioned rotary head adjacent which wall are a combustion ring and associated electric ignition means, a conduit for supplying oil to said head, a stop valve and a metering valve in said conduit, a by-pass conduit about said metering valve, a second stop valve and a second metering valve in said by-pass conduit, electrically operated means for causing the first mentioned stop valve to open when the motor for rotating said head is energized and for causing the second mentioned stop valve to open when said ignition means is energized, and a stack temperature controlled means for interrupting operation of said ignition means and causing closure of said second stop valve upon starting of the burner and while said motor is energized and said first stop valve is open.

3. In an oil burner of the wall flame type wherein air and oil are discharged toward the wall of a combustion chamber from an electric motor driven centrally positioned rotary head adjacent which wall are a combustion ring and associated electric ignition means, a conduit for supplying oil to said head, a stop valve and a metering valve in said conduit, a by-pass conduit about said metering valve, a second stop valve and a second metering valve in said by-pass conduit, a circuit for energizing the motor, a circuit for energizing the ignition means, means for opening the first mentioned stop valve when the first mentioned circuit energizes the motor and maintaining it open while said motor is energized and causing it to close when said motor is deenergized, and means for opening the second mentioned stop valve when the second mentioned circuit energizes the ignition means and maintaining it open while said ignition means is energized and causing it to close when said ignition means is deenergized.

4. In an oil burner of the wall flame type wherein air and oil are discharged toward the wall of a combustion chamber from an electric motor driven centrally positioned rotary head adjacent which wall are a combustion ring and associated electric ignition means, a conduit for supplying oil to said head, a stop valve and a metering valve in said conduit, a by-pass conduit about said metering valve, a second stop valve and a second metering valve in said by-pass conduit, means for simultaneously placing the motor and ignition means in operation and opening both of said stop valves and, while said motor is operating and the first mentioned stop valve is open, simultaneously discontinuing operation of the ignition means and causing the second mentioned stop valve to close.

5. In an oil burner of the wall flame type wherein air and oil are discharged toward the wall of a combustion chamber from an electric motor driven centrally positioned rotary head adjacent which wall are a combustion ring and associated ignition means, a conduit for supplying oil to said head, a stop valve and a metering valve in said conduit, a by-pass conduit about said metering valve, a second stop valve and a second metering valve in said by-pass conduit, a circuit

for energizing the motor, means operated when said circuit energizes said motor for opening both of said stop valves, and means responsive to stack temperature for causing the second mentioned stop valve to close while said motor is energized and the first mentioned stop valve is open.

6. In an oil burner of the wall flame type wherein air and oil are discharged toward the wall of a combustion chamber from an electric motor driven centrally positioned rotary head adjacent which wall are a combustion ring and associated ignition means, a conduit for supplying oil to said head, a stop valve and a metering valve in said conduit, a by-pass conduit about said metering valve, a second stop valve and a second metering valve in said by-pass conduit, means for simultaneously placing the motor in operation and opening both of said stop valves, and means responsive to stack temperature for causing the second mentioned stop valve to close while said motor is operating and the first mentioned stop valve is open.

7. In an oil burner of the type having an electric motor operated means for discharging oil into a combustion chamber and ignition means for the oil, means including a stop valve and a metering valve for establishing and interrupting a normal flow of oil to said electric motor operated means from a source of oil supply, means including a second stop valve and a second metering valve for establishing and interrupting an extra flow of oil to said electric motor operated means from a source of oil supply, and electrically controlled means for said stop valves operative to open both automatically upon the motor being placed in operation for establishing said normal and extra flow of oil during the starting period of the burner, which electrically controlled means includes temperature responsive means for causing said second stop valve to interrupt said extra flow of oil upon the expiration of the starting period of the burner while said motor is in operation and the first mentioned stop valve is open.

8. In an oil burner of the type having an electric motor operated means for discharging oil into a combustion chamber and ignition means for the oil, means for supplying said electric motor operated means with oil from a source of oil supply comprising oil conducting passage means having a stop valve and a metering valve and oil conducting passage means acting to by-pass oil from said source about said metering valve, a second stop valve and a second metering valve in said second mentioned passage means, means for simultaneously placing the motor in operation and opening both of said stop valves, and thermostatically controlled means responsive to heat generated by the burner for causing the second mentioned stop valve to close while said motor is operating and the first mentioned stop valve is open.

9. In an oil burner of the type having an electric motor operated means for discharging oil into a combustion chamber and electrically operated ignition means for the oil, means for supplying said electric motor operated means with oil from a source of oil supply comprising oil conducting passage means having a stop valve and a metering valve and oil conducting passage means acting to by-pass oil from said source about said metering valve, a second stop valve and a second metering valve in said second mentioned passage means, means for simultaneously placing the motor and ignition means in operation and opening both of said stop valves, and thermostatically controlled means responsive to heat generated by the burner for causing the second mentioned stop valve to close and the ignition means to cease operating while said motor is operating and the first mentioned stop valve is open.

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