

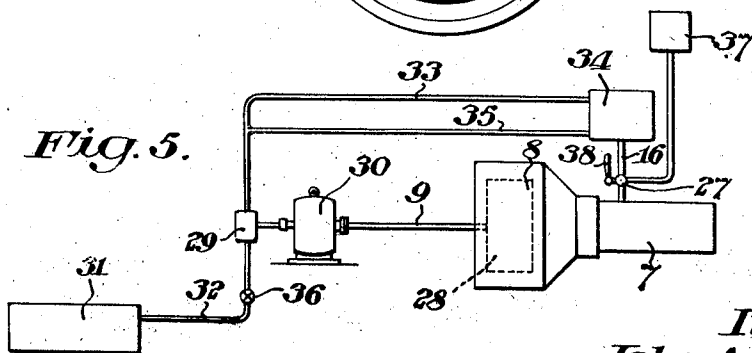
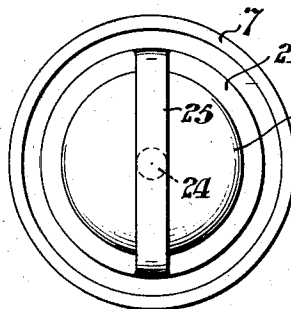
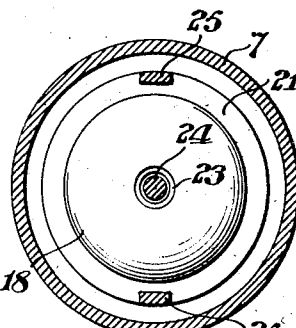
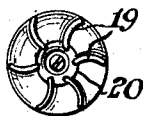
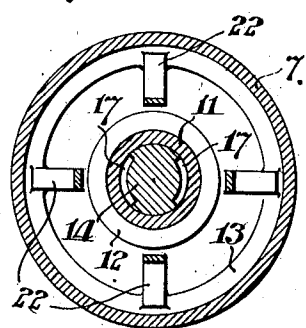
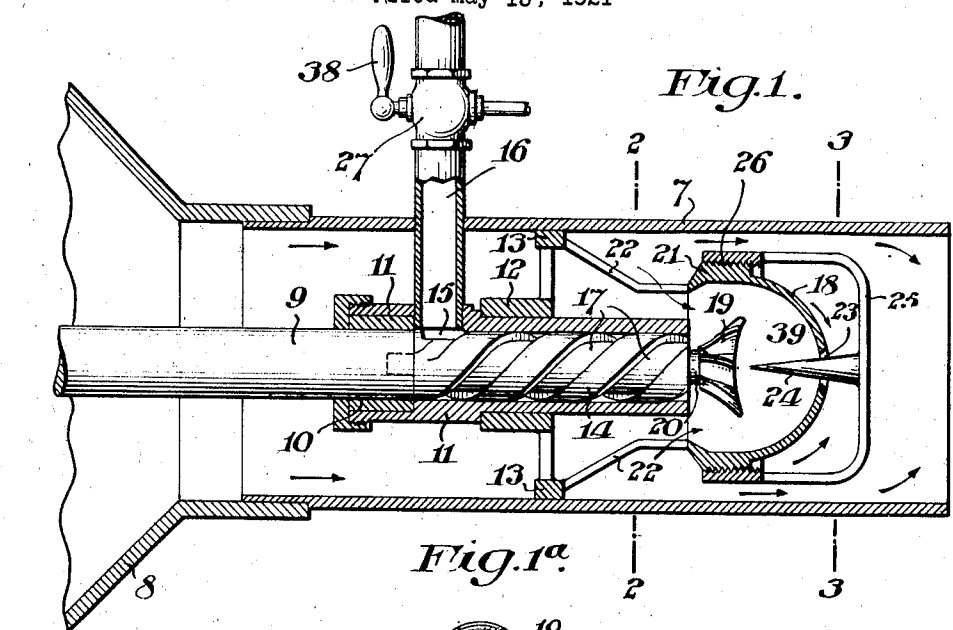
June 1, 1926.

1,587,263

J. A. WILLNERS

OIL BURNER

Filed May 13, 1921



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UNITED STATES PATENT OFFICE.

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OIL BURNER.

Application filed May 13, 1921. Serial No. 469,105.

My invention relates to improvements in oil burners and is especially adapted for low pressure oil burners for domestic uses. The object is to provide simple and efficient method and means for utilizing heavy oils in producing and burning combustible vapors. My invention comprises means for providing a constant and regulatable supply of oil at required pressure and mixing the same with the required proportion of air at required pressure to secure the combustion of the resulting vapor in producing the heat desired.

The invention also provides method and means readily adapted for automatic control.

Referring to the drawings, which illustrate merely by way of example, suitable means for effecting my invention:—

Fig. 1 is a longitudinal section through the burner device.

Fig. 1^a is a rear elevation of diffuser 19.

Fig. 2 is a cross-section on line 2—2 of Fig. 1.

Fig. 3 is a cross-section on line 3—3 of Fig. 1.

Fig. 4 is a front elevation.

Fig. 5 is a diagrammatic view, on a reduced scale, showing a general arrangement with respect to the burner, oil and air supply and air control.

Similar numerals refer to similar parts throughout the several views.

The burner proper comprises the tube 7 in communication with the funnel shaped housing 8 for the fan or blower 28. Within the tube 7 is supported one end of the shaft 9 having a suitable bearing at 10. This bearing being supported in the sleeve 11 which in turn is supported by the ring structure 12, 13 fitted within the pipe 7. On the end of shaft 9 is provided the screw or threaded structure 14, also housed within the sleeve 11. At the left-hand end of this screw is provided the channel 15 communicating with the oil tube 16. The channel 15 communicates with the helical channels 17 which deliver oil from the tube 16 into the chamber 39 formed by the nozzle structure 18. On the delivery end of the screw formation 14 is provided the cone structure 19 which by means of spiral vanes on its periphery, is adapted to diffuse the

oil which is delivered by the channels 17 into annular channel 20.

The nozzle formation 18 is preferably integral with the ring member 21 which is supported by the arms 22 connected with the ring formation 13. The formations 18 and 21 provide a semi-spherical chamber into which the oil is discharged by the rotating screw 14. The formation 18 is provided with the vent 23 having an axis corresponding substantially with the axis of the screw and having its margin flaring outwardly, as shown in Fig. 1. The cone 24 projects into this vent 23 and is adjustable for varying the size of the effective opening of said vent. This adjustment is secured by mounting the cone 24 on the frame 25 which is in threaded engagement as at 26 with the ring 21.

The passage of oil through pipe 16 is controlled by the valve 27.

As shown in the diagram Fig. 5, I have provided the common shaft 9 for rotating the screw 14, the blower element 28 and the oil pump 29, said shaft 9 being coupled directly with the motor 30. In this diagram I have shown the main oil supply tank as at 31 connected by the pipe 32 with the pump 29. The pump 29 is connected by the pipe 33 to the auxiliary tank 34. The auxiliary tank 34 is connected to the pipe 16 leading to the burner structure already described. A return pipe 35 connects the auxiliary tank 34 with the pump 29 to keep the pump primed. The check valve 36 prevents the oil from returning from the pump 29 to the main supply tank 31. 37 indicates a thermostat device for the automatic control of valve 27. This valve 27 may also be arbitrarily controlled by the handle 38.

In operation.—Upon rotation of motor 30 oil is pumped from main supply or reservoir 31 to auxiliary tank 34 and from tank 34 flows by gravity through pipe 16 to channel 15 within sleeve 11. The rapid rotation of screw 14 carries the oil along the helical channels 17 to annular channel 20 and thence to the rapidly rotating vanes of the diffuser 19. Meanwhile air is introduced from the funnel shaped housing 8 through pipe 7, in the direction of the arrows; a portion passing into the chamber 39 of nozzle member 18 to mix with and

facilitate the vaporization of the oil sprayed therein; another part or the balance of the air passes around the nozzle 18 and furnishes additional oxygen for the combustion of the gas or vapor issuing from the vent 23. By a proper proportioning of the fan or blower elements, with the pitch and capacity of the screw I secure a proper mixture of air and oil sprayed for the desired vaporization, and also the proper air supply and pressure adjacent the nozzle vent for the support of combustion. Further adjustment is secured by the valve 27 and also by the cone 24 controlling vent 23, so that any desired richness of vapor may be secured. This valve in the oil supply pipe forms a convenient means in connection with a thermostat for automatic control. By the use of any well known form of thermostat control for this valve, the richness of the mixture of oil and air is controlled and thus the amount of heat generated is automatically controlled.

What I claim is:—

1. The method of forming and delivering a combustible vapor, which consists in moving oil in a rotating elongated spiral path of travel from a stream delivered at right angles thereto, delivering the oil into an enclosed space of greater diameter than that of the helix of the said path of travel, diffusing the oil delivered into said space and delivering to the outer circumference of said space a surrounding current of air for mingling with the diffusing oil, and discharging the resulting vapor from said enclosed space through a restricted vent.

2. In an oil burner, the combination of a rotating shaft provided with an elongated helical channel, a sleeve surrounding said shaft, an oil supply pipe delivering to said channel at right angles to the axis of the rotating shaft, means forming a chamber at the discharge end of the sleeve of diameter greater than that of the sleeve, said chamber provided with a centrally disposed discharge vent, a diffusing element secured to the end of the rotating shaft outside the sleeve and within the chamber, and means delivering a current of air around the end of said sleeve into said chamber.

3. In an oil burner, the combination of a rotating shaft provided with an elongated helical channel, a sleeve surrounding said shaft, an oil supply pipe delivering to said

channel at right angles to the axis of the rotating shaft, means forming a chamber at the discharge end of the sleeve of diameter greater than that of the sleeve, said chamber provided with a centrally disposed discharge vent, a diffusing element secured to the end of the rotating shaft outside the sleeve and within the chamber, means delivering a current of air around the end of said sleeve into said chamber, and means for delivering a current of air to the space outside of said chamber around the said vent.

4. In an oil burner, the combination of a rotating shaft provided with an elongated helical channel, a sleeve surrounding said shaft, an oil supply pipe delivering to said channel at right angles to the axis of the rotating shaft, means forming a chamber at the discharge end of the sleeve of diameter greater than that of the sleeve, said chamber provided with a centrally disposed discharge vent, the diffusing element secured to the end of the rotating shaft outside the sleeve and within the chamber and means delivering a current of air around the end of said sleeve into said chamber.

5. In an oil burner, the combination of a rotating shaft provided with an elongated helical channel, a sleeve surrounding said shaft, an oil supply pipe delivering to said channel at right angles to the axis of the rotating shaft, means forming a chamber at the discharge end of the sleeve of diameter greater than that of the sleeve, said chamber provided with an outwardly flaring discharge vent and a cooperating, adjustably supported conical formation for controlling the discharge through the vent.

6. In an oil burner, the combination of a motor, an oil pump, a blower and a rotatable element provided with a helical channel, the axes of said elements all being in substantial alinement, means delivering oil to the helical channel, means forming a space for receiving a discharge from the helical channel and for receiving air delivered by the blower for facilitating the vaporization of the oil, means forming a vent for said vapor, adjustable means for varying the effective vent opening, and means for supplying an air current to the space adjacent the discharge of said vent.

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