Dec. 22, 1931. R. W. DE LANCEY 1,837,763

OIL BURNER

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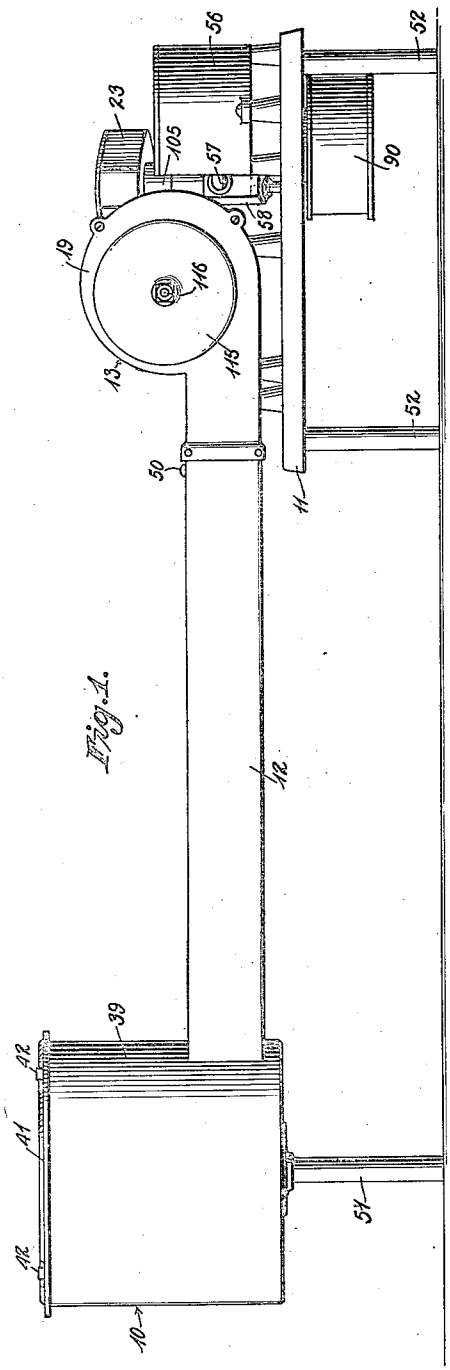


Fig. 1.

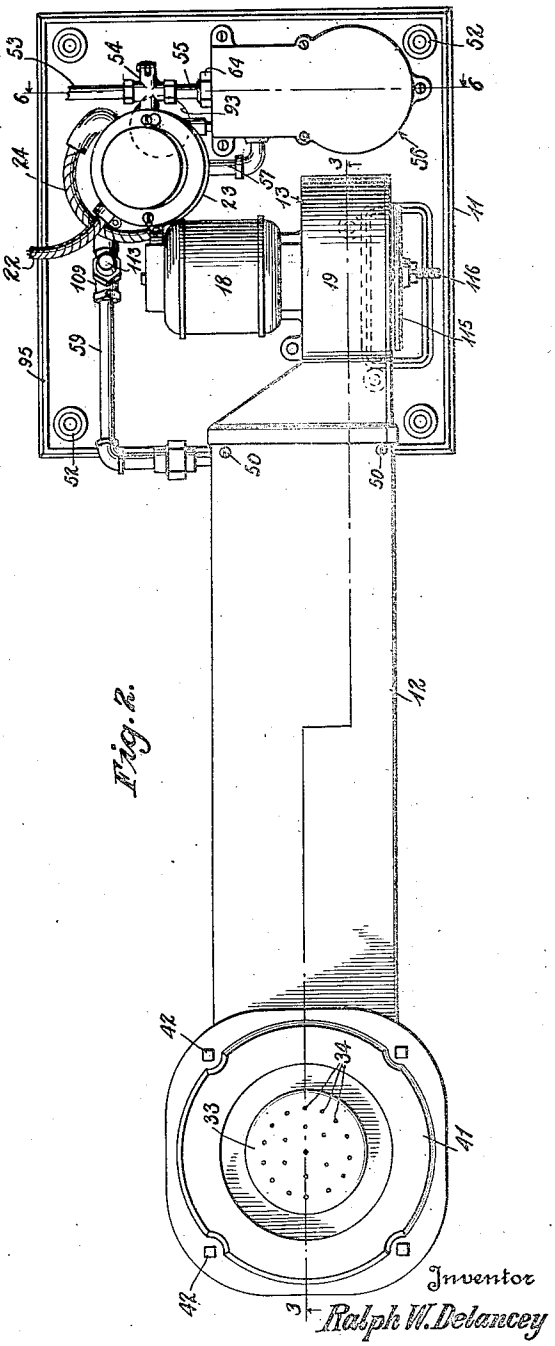


Fig. 2.

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OIL BURNER

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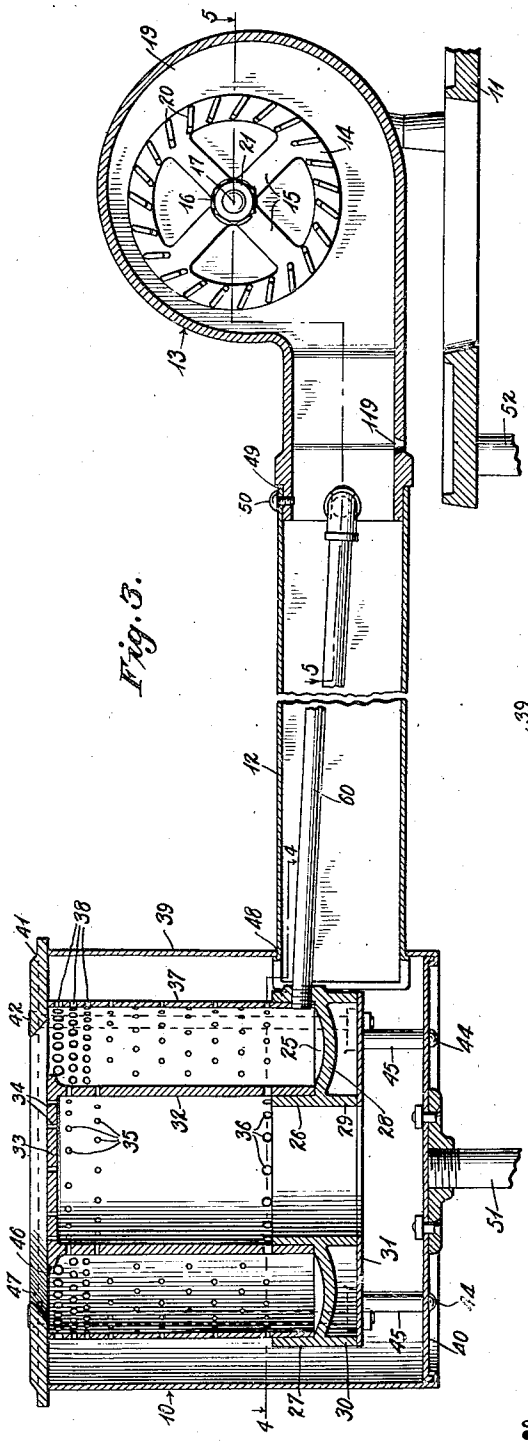


Fig. 3.

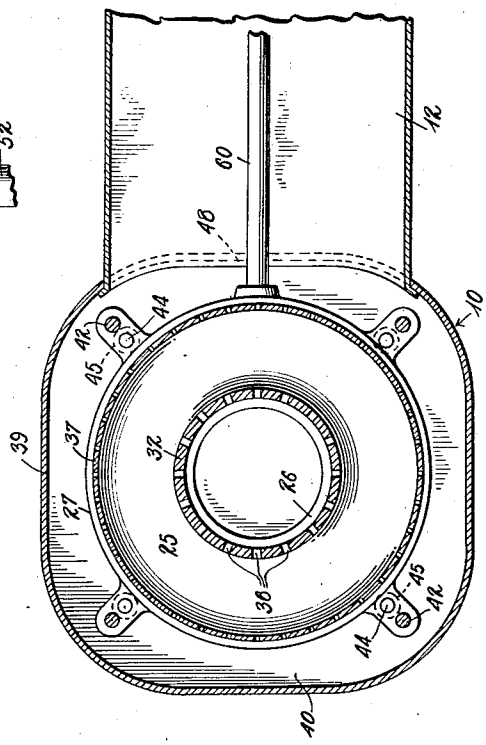


Fig. 4.

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OIL BURNER

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Fig. 4.

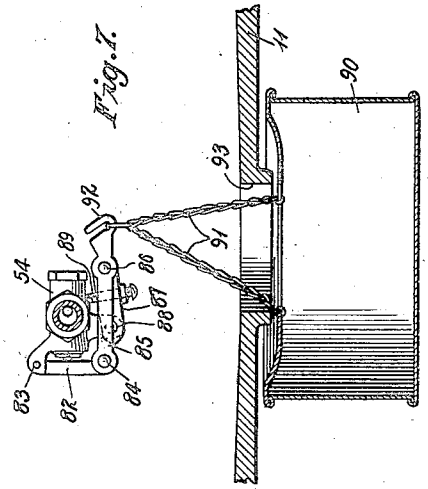
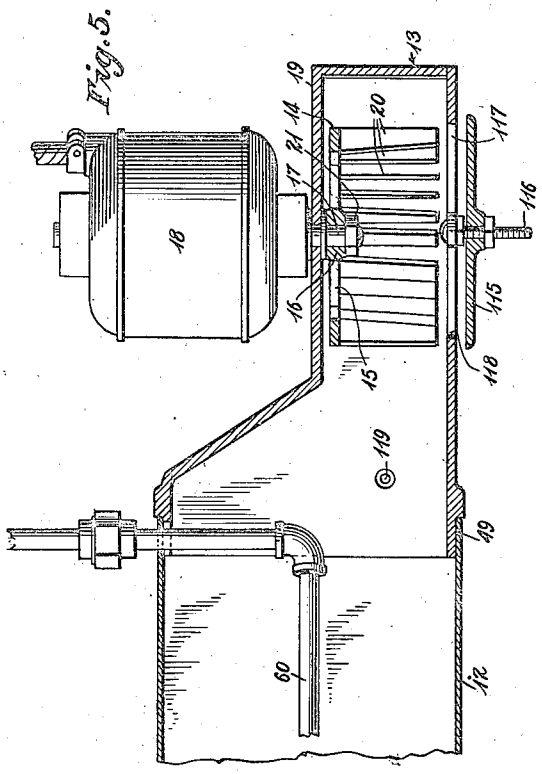


Fig. 5.



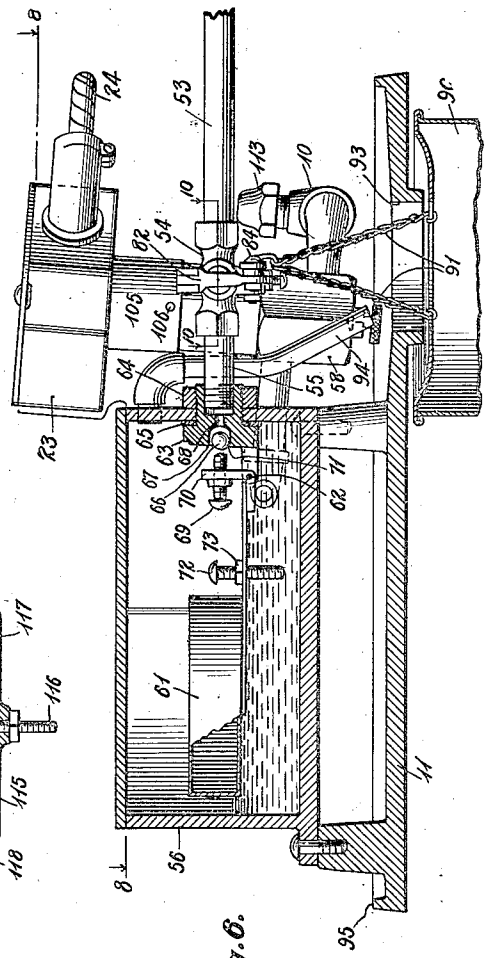


Fig. 6.

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OIL BURNER

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Fig. 8.

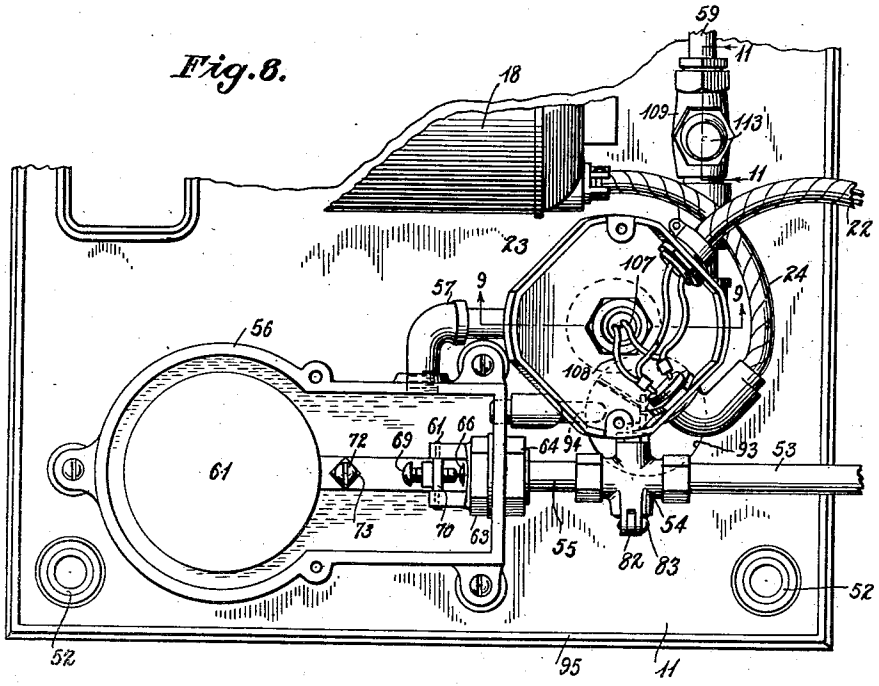


Fig. 9.

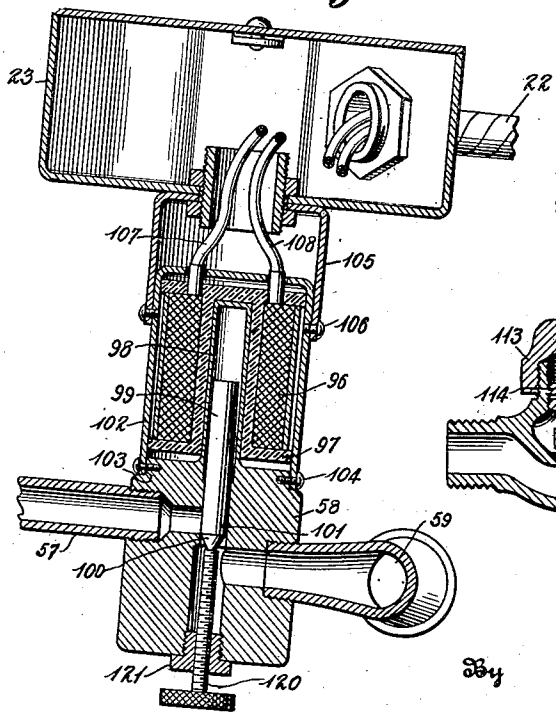
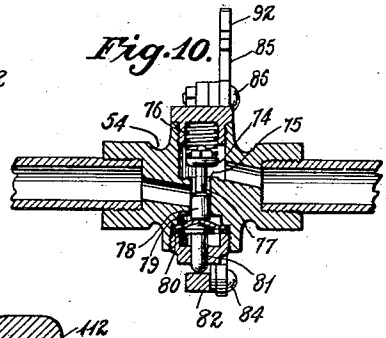


Fig. 10.



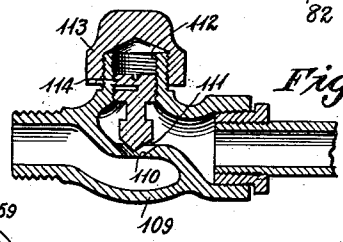


Fig. 11.

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UNITED STATES PATENT OFFICE

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OIL BURNER

Application filed September 14, 1928. Serial No. 305,960.

The invention relates to oil burners of a type adapted to be used with hot air furnaces, hot water furnaces, or steam heaters particularly adapted for use in residences.

It is an object of the invention to provide a gravity feed burner having a novel form of burner for the purpose described.

It is a further object of the invention to provide a burner which may be used with either natural or forced draft.

It is a further object of the invention to provide a float regulated gravity burner having means for cutting off the fuel supply to prevent flooding in case the burner should become extinguished.

It is a further object of the invention to provide an oil burner having means to shut off the fuel supply should the current to the forced draft be interrupted.

It is a further object of the invention to improve generally upon this type of burner.

Further objects of the invention will appear from the following description when read in connection with the accompanying drawings showing an illustrative embodiment of the invention, and wherein:—

Fig. 1 is a side elevation;

Fig. 2 is a plan view;

Fig. 3 is a detail vertical section upon an enlarged scale through the burner and fan taken on line 3—3 of Fig. 2;

Fig. 4 is a detail horizontal section on line 4—4 of Fig. 3;

Fig. 5 is a detail horizontal section on line 5—5 of Fig. 3;

Fig. 6 is a vertical section on line 6—6 of Fig. 2 upon an enlarged scale;

Fig. 7 is a detail vertical section through the base of the control plate showing the safety valve in elevation;

Fig. 8 is a detail plan view of the control plate having the cover plates of the junction box and float valve casing removed;

Fig. 9 is a detail vertical section on line 9—9 of Fig. 8;

Fig. 10 is a detail vertical section on line 10—10 of Fig. 6; and

Fig. 11 is a detail vertical section on line 11—11 of Fig. 8.

As shown the device comprises a burner 10, a control plate 11 carrying the control and feed mechanisms for the burner and an air conduit 12 connecting the fan casing 13 carried by the control plate 11 with the burner 10. To provide a force draft for the burner, there is shown a fan housed in casing 13 comprising a ring 14, Figs. 3 and 5, mounted upon spokes 15 supported from the hub 16 carried by stub shaft 17 of an electric motor 18, said stub shaft journalled in the wall 19 of the fan housing. The fan also comprises plates 20 projecting from the ring 14, each plate being mounted thereon at an angle to radii of the ring 14. The fan is shown as secured upon the shaft 17 by means of a nut 21.

To supply current to the motor there is shown a cable 22 leading to a junction box 23 and in electrical connection with a cable 24 leading to a motor.

As shown the burner comprises a fuel receptacle 25 of annular form having an inner wall 26 and an outer wall 27 connected by an annular bottom 28, the walls 26, 27 being projected below the bottom 28 as shown at 29, 30 and the annular space thus provided being downwardly closed by means of an annular plate 21 to provide a dead air space below the fuel receptacle to prevent undue cooling of the burning fuel in the receptacle.

Extending upwardly from the wall 26 of the fuel receptacle there is shown a cylinder 32 telescopically fitting over said wall, the cylinder being closed at its upper end as shown at 33. The closure 33 is shown as perforated at 34 and perforations 35 are provided adjacent the upper end of the cylinder. Also a row of perforations 36 is shown immediately above the upper edge of wall 26. The cylinder 32 provides one wall of a combustion chamber, the remaining wall of which is shown in the form of a cylinder 37 seating within the wall 27 of the fuel receptacle and being perforated throughout its height and periphery, the perforations at 38 near the upper edge of cylinder 37 being larger and more closely spaced than those lower down therein.

The fuel receptacle and combustion chamber are shown as housed in an air jacket in

wardly enclosed by the cylinder 37 and outwardly enclosed by means of a casing 39, the casing 39 being downwardly closed by a bottom plate 40 and the space about the combustion chamber is upwardly closed by means of an annular plate 41 seating upon the upper edge of the casing 39 and of the cylinder 37 and retained in position by means of bolts 42 passing through lugs 43 projecting from the plate 31.

The plate 31 is shown as supported within the housing 10 in spaced relation to the bottom closure 40 thereof by means of bolts 44 provided with bushings 45 which support the lugs 43.

The top surface of plate 33 is shown as substantially flush with the bottom surface of top plate 41 and also is shown as provided with an annular lip 46 flaring outwardly from the outer surface of cylinder 32 whereby the flame is caused to flare outwardly toward the inner edge of annular plate 41, which edge is also shown at 47 to be frustro-conical and whereby the flame is finally directed inwardly into the path of air passing through perforations 34.

The air conduit 12 is shown as secured into an opening 48 in the outer wall 39 of burner 10 and as telescopically seated at 49 upon the outlet of fan casing 13 being retained thereon by means of a screw 50.

A leg 51 is shown as supporting the burner and legs 52 for supporting the control plate 11, which legs have screw threaded engagement with the burner housing and with the control plate whereby the device may be leveled during installation. To convey fuel to the burner there is shown a fuel supply pipe 53 leading through a safety valve 54, to be described, and by means of a short nipple 55 communicating with a float chamber 56 from which the fuel is conveyed by means of a conduit 57 through an electro-magnetically controlled valve 58 whence the fuel is conducted by conduit 59 to a conduit 60 carried within the air conduit 12 to deliver fuel to the receptacle 25.

Within the float chamber 56 there is shown a float 61 pivotally mounted at 62 upon an arm carried by a valve body 63 having screw threaded connection with the short nipple 55 and retained within an opening in the valve casing by means of a nut 64, a gasket being provided at 65 to prevent leakage. To shut off the flow of fuel into the float valve casing 56 when the level reaches a predetermined height there is shown a ball valve 66 seating in a recess 67 in valve body 63, which ball may be pressed against a port 68 by means of a cap screw 69 carried by an upwardly projecting arm 70 of the float device 61, the screw 69 admitting of adjustment of the play of the ball valve. Desirably the recess 67 is sloped upwardly as shown at 71 to prevent the ball from rolling out. The downward movement of float 61 may be adjusted by means of a set screw 72 provided with a lock nut 73.

To shut off the supply of fuel to the float chamber in case the float valve fails to work, a safety valve 54 is provided, illustrated in detail in elevation in Fig. 7 and in section in Fig. 10. As there shown the safety valve comprises a valve 74 spring pressed toward a port 75 by means of a spring 76, the valve stem 77 bearing a head 78 pressing against a diaphragm 79 retained by means of a gland ring 80 and normally pressed to open position by means of a pin 81 impinging against an arm 82, Fig. 7, which arm is pivoted at 83 at one end and has pivotal connection at 84 at its remaining end with a lever 85, the lever 85 being pivotally connected at 86 intermediate of its length to a second lever 87 pivoted at 88 to a lug carried by the valve body. The movement of the lever 87 toward the valve body may be adjusted by means of a set screw 89. In the position of the device shown in Fig. 7, the pressure of spring 76 will act lengthwise of levers 85 and 87 which being past centers will cause the screw 89 to press against the valve body but if the lever 85 is moved so as to bring the pivots 86, 88 at the opposite side of the centers, the spring 76 will snap the valve 78 closed. To cause such movement there is shown a receptacle 90 suspended as by means of chains 91 from a hook 92 carried by the end of lever 85. The receptacle 90 is shown as normally suspended directly below an opening 93 in the plate 11 and an overflow pipe 94 leads from the upper portion of the float valve casing 56 to a position above the opening 93, the weight of the fuel which the receptacle 90 may contain being sufficient to operate the safety valve to shut off the fuel.

The plate 11 is shown as provided with a marginal flange 95 to hold fuel which can only escape through the opening 93.

To shut off the flow of fuel when using forced draft in the event that current to the motor 18 is interrupted, the valve 58 comprises a solenoid 96 carried by spool 97 seating over a cylinder 98 preferably of non-magnetic material such as brass and telescopically housing a core 99 of magnetic material freely reciprocable therein. The lower end of core 99 comprises a valve 100 adapted to close a port 101 controlling the flow of oil from the short nipple 55 to the conduit 59 and when current is flowing through the solenoid the core will be lifted to permit flow of fuel. The solenoid 96 is shown as housed in a casing 102 telescoping over a shoulder 103 upon valve body 58 and secured thereto by means of screws 104. A support 105 is shown secured by screws 106 to the casing 102 to carry the junction box 23 and wires 107, 108 are shown which may be connected

in parallel with the motor 18 to receive current from the cable 22.

If it be desired to operate the burner under natural draft there will be no current flowing to the motor 18 and hence none to solenoid 96. To hold the valve 100 open under these circumstances there is shown a screw 120 passing through a bushing 121, the end of the screw adapted to impinge against the end of core 99 and to lift the valve 100 from its seat.

A positive control of the speed of flow to the burner whereby the maximum flame of the burner may be controlled is shown in the form of a valve 109 having a port 110 controlled by means of a valve 111, the stem of which has screw threaded engagement with the valve casing at 112, a cap 113 being shown to cover the screw. Desirably the screw head of valve 111 is slotted as shown at 114 whereby the head may be deformed after it is initially engaged with the screw threads to provide a lock for the screw to hold the same in adjustment.

To control the flow of air to the fan casing 13, there is shown a plate 115 having screw threaded engagement with a screw 116 carried by arms 117 projecting across the openings 118 in the fan casing and when using natural draft the supply of air to the burner may be adjusted by means of the damper effect of plate 115. In the event that the safety devices fail to work and fuel collects in the fuel receptacle 25 to overflow through the perforations 36 into the bottom of the burner casing 10 and into air conduit 12, the said fuel may escape through an opening 119 to fall upon the plate 11 and thereby gain access to the receptacle 90 to operate the safety valve 54.

Minor changes may be made in the physical embodiment of the invention within the scope of the appended claims without departing from the spirit thereof.

I claim:

1. An oil burner comprising, in combination, an annular fuel receptacle, an enclosed air jacket surrounding said receptacle having an inner perforated wall extending upwardly from the outer wall of said receptacle, the outer wall of said jacket extending below said receptacle, a lower closure for said jacket spaced below the bottom of said receptacle, means enclosing an annular dead air space beneath said receptacle, an upwardly closed, perforated, cylindrical air chamber, its wall extending upwardly from the inner wall of said receptacle and communicating at its lower end with said bottom space, and means to admit air to said bottom space.

2. An oil burner comprising, in combination, an annular fuel receptacle comprising inner and outer walls and an annular bottom, a combustion chamber enclosed by an outer cylindrical wall and an inner cylinder closed at its upper end, the upper end of said closure lying substantially flush with the upper end of said outer cylinder and an air jacket surrounding said combustion chamber closed at its upper portion by means of an annular plate, the lower surface thereof substantially in the plane of the upper surface of said closure, said plate having an inwardly sloping frustro-conical surface and said inner cylinder having an outwardly sloping annular lip, the walls of said combustion chamber being perforated, and means to admit air to said inner cylinder and to said air jacket.

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