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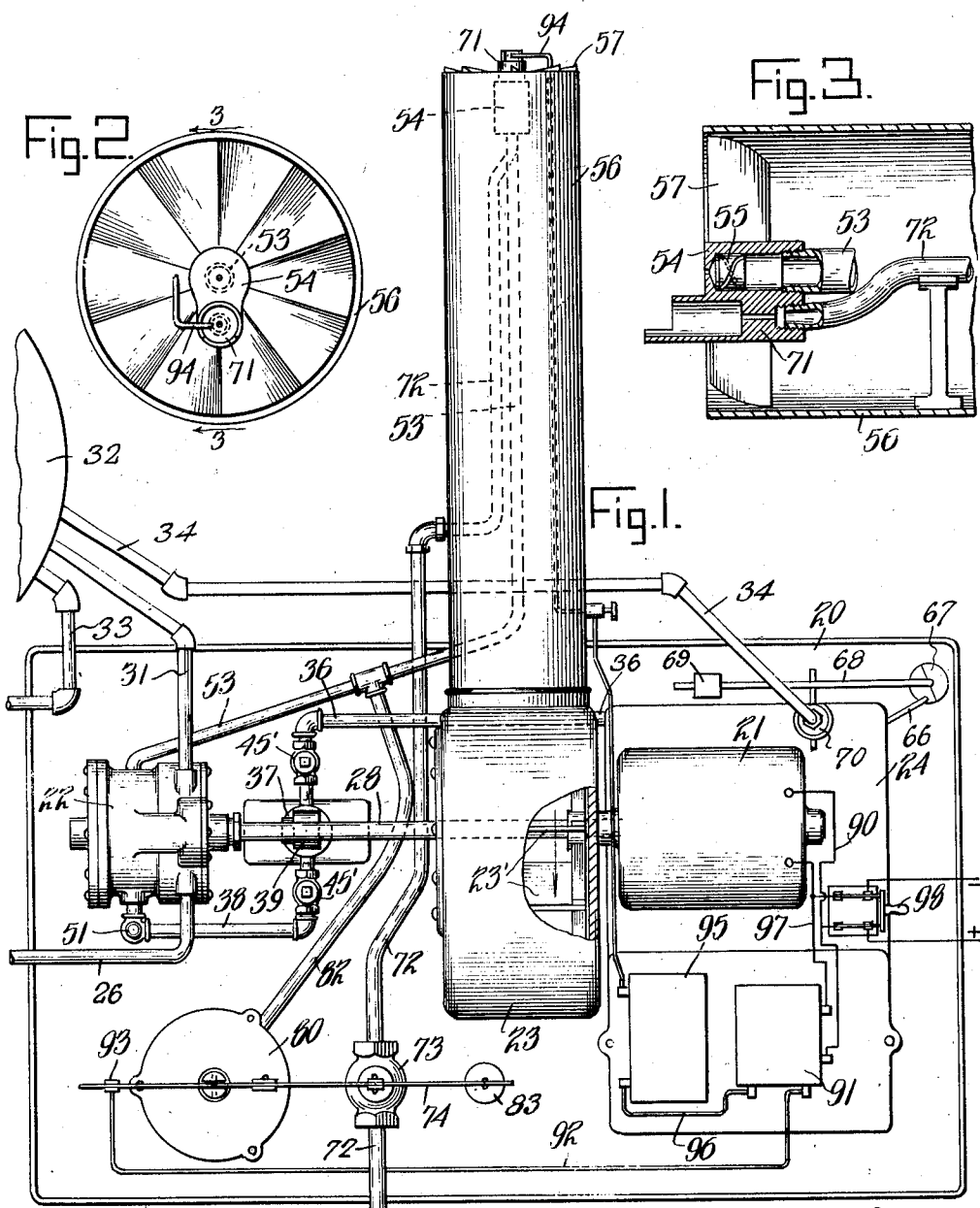
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OIL BURNER

Filed April 24, 1926

3 Sheets-Sheet 1



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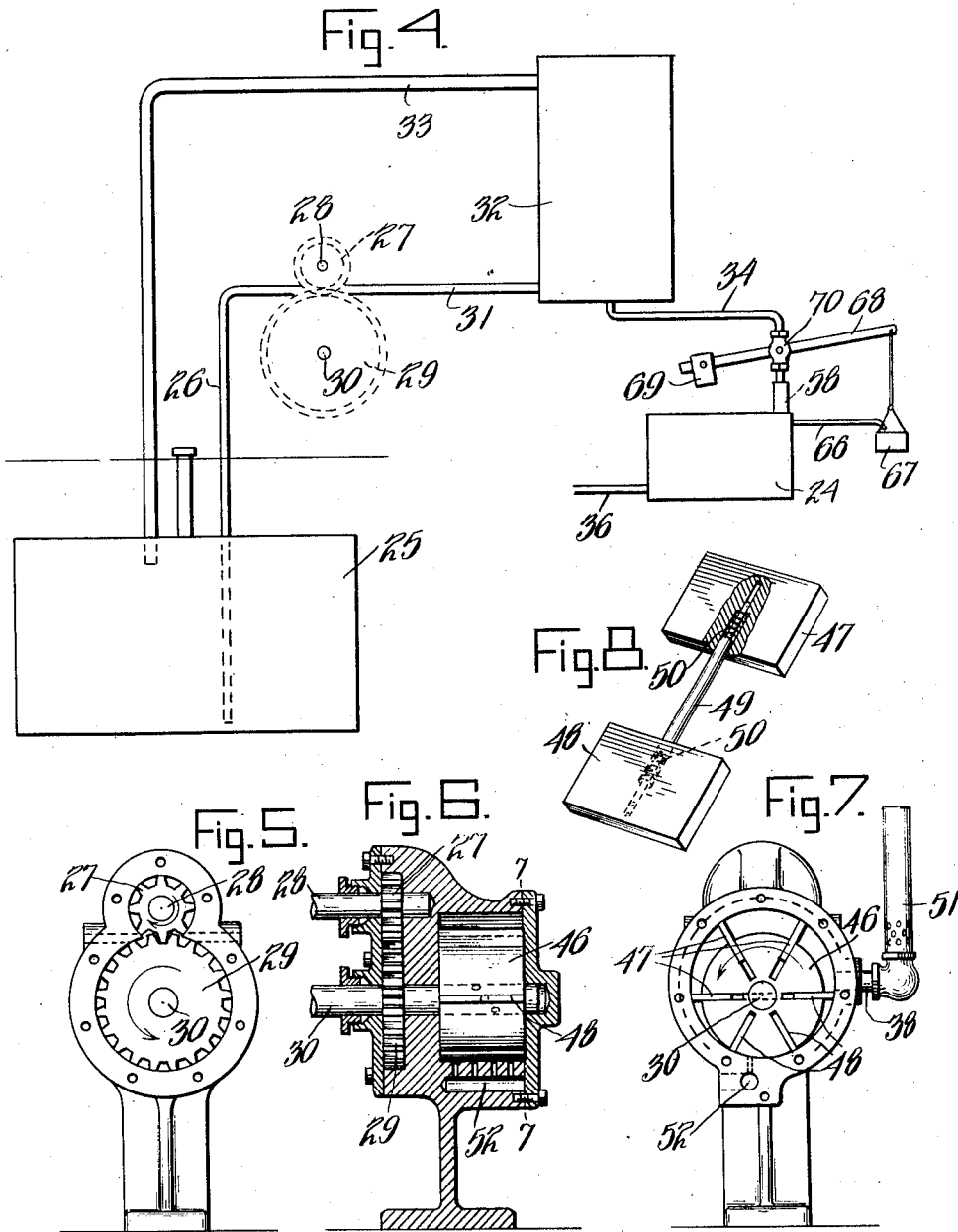
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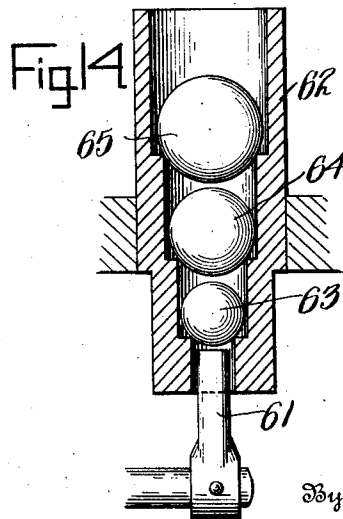
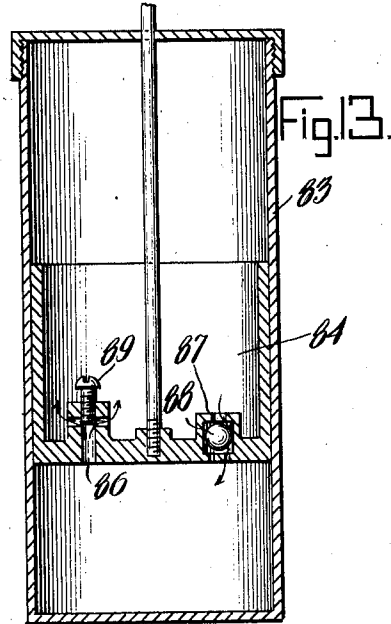
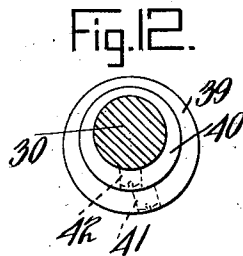
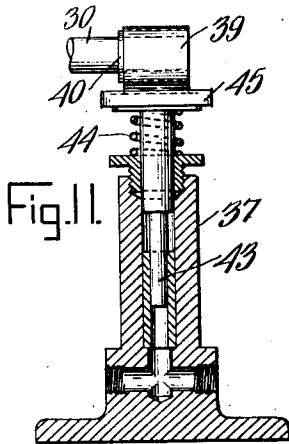
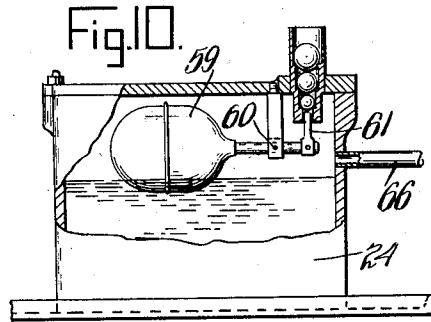
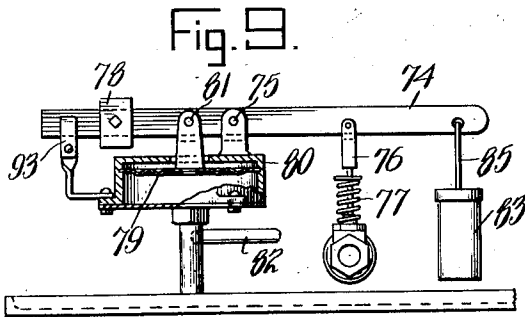
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OIL BURNER

Filed April 24, 1926

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

CHARLES A. MARTINDALE, OF ANDERSON, INDIANA, ASSIGNOR TO THE RELIABLE MACHINE COMPANY, OF ANDERSON, INDIANA, A CORPORATION OF INDIANA.

OIL BURNER.

Application filed April 24, 1926. Serial No. 104,485.

My said invention relates to an oil burner of an improved type and it is an object of the invention to provide simple and effective means for controlling the flow of fuel to the seat of combustion.

Another object is to provide convenient means for stopping the flow of fuel under certain conditions, which means shall be effective and certain in operation.

Another object is to provide a pilot light with an improved control therefor.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a plan of my improved device,

Figure 2, a detail end elevation of a burner illustrated in Figure 1,

Figure 3, a section on line 3—3 of Figure 2,

Figure 4, an elevation indicating the fuel containers and their connections,

Figure 5, an end elevation of a pump,

Figure 6, a central vertical section of the same,

Figure 7, a section of the pump on line 7—7 of Fig. 6,

Figure 8, a detail of atomizer blades,

Figure 9, a detail elevation of a fuel control for the pilot light, with the casing broken away.

Figure 10, an end elevation of a float chamber with a portion of the wall broken away,

Figure 11, a vertical section of a fuel pump, shown in Figure 1,

Figure 12, a detail of an eccentric shown in Figure 11,

Figure 13, a section of a dash-pot shown in Figure 9, and

Figure 14, a section of a valve mechanism shown in Figure 10.

In the drawings reference character 20 indicates a base on which the various other parts are supported, said parts including a motor 21, a gear pump 22 driven by the motor, a blower 23 also driven by the motor and a float chamber 24.

A storage tank 25 is buried under ground, as indicated in Figure 4 and this tank is connected by a pipe 26 to the pump 22 which comprises a small gear 27 on the motor shaft 28 and a larger gear 29 so that the gear pump serves also as a reducing gearing for the shaft 30 on which the gear 29 is secured.

A pipe 31 leads from the pump to the house supply tank 32 and this is connected by a

return pipe 33 to the storage tank 25 providing for return to the storage tank of any liquid that may overflow from tank 32. Another pipe 34 leads from the house supply tank to the float chamber 24. From the float chamber a pipe 36 leads to a pump 37 and another pipe 38 leads from said pump to an atomizer mounted in the same casing with the gear pump. The pump 37 is driven by a cam on the shaft 30, the cam consisting of two independent eccentric sleeves 39 and 40 adjustably secured in place by set screws 41 and 42 so that the throw of the cam can be varied quickly and within wide limits. A plunger 43 is moved up and down in the casing of the pump, the downward movement being a positive one caused by the cam and the upward movement being produced by a spring 44 interposed between the upper end of the pump casing and an enlargement 45 at the top of the plunger 43. This abutment is centrally reduced or indented to provide a recess for retaining lubricating oil for the cam. One-way valves 45' are located at opposite sides of the pump for controlling the flow of liquid through the pipes 36 and 38.

The atomizer is shown in detail in Figures 6 and 7 and comprises a rotor 46 on the shaft 30, said rotor being eccentrically positioned in a chamber in the pump casing. The rotor is provided with a plurality of pairs of blades 47 and 48 (Fig. 8), these blades being slidably mounted in slots in the rotor and being spaced apart by stems 49. Each stem 49 has a spring 50 interposed between it and the respective blades 47 and 48 whereby the blades are yieldingly forced outward so as to maintain both blades in contact with the wall of the chamber but yet permit a limited approach of one toward the other. As previously described the pipe 38 leads to the chamber of the atomizer and a vertical pipe 51 supplies air to the pipe 38 at the entrance to said chamber. The atomized fuel is forced out of the chamber by way of a passage 52 and a pipe 53. The pipe 53 leads to a nozzle 54 in which is located a swirl-producing device 55.

The nozzle is located at the outer end of a tubular extension 56 on the casing of the blower 23 and is surrounded by blades or deflectors 57 for acting on the air passing through the said extension in a manner to produce a swirling effect in the air current produced by the blower.

The feed from the house supply tank to the float chamber 24 through pipe 34 is controlled as follows: A gravity valve 58 (Figs. 4, 10 and 14) is controlled by the float 59, 5 pivoted at 60, through the medium of a finger 61 entering an opening at the lower end of the valve casing 62. The valve casing contains three balls 63, 64, 65 of graduated size, as shown, and each of the balls has a separate 10 seat of suitable size to hold the ball and thus shut off the flow of fuel by gravity from the house supply tank to the supply chamber. It will be seen that the float can move about its pivot so as to permit all the balls to move 15 off their seats and thus permit the flow of fuel by gravity until the liquid level in the float chamber is high enough so that the uppermost ball can seat itself when the flow will be cut off. If the seating of this ball 20 should be imperfect a certain amount of fuel can still enter lifting the float higher and permitting the second ball to seat and in similar manner the third ball can seat itself, thus insuring that the liquid level in the float 25 chamber shall not rise too high.

In case the gravity valve should become clogged for any reason I have made other provision to stop the flow of fuel. Such provision comprises an overflow pipe 66 (Fig. 30 4) draining into a receptacle 67 suspended from a lever 68 provided with a weight at 69 normally moving it in such a way as to open a valve in the casing 70. When the fuel overflows through pipe 66 and collects in receptacle 67 the weight is overbalanced and 35 the lever 68 turns in a direction to close the valve and shut off the flow of fuel. The weight may be set so that a very slight overflow of fuel will cause the valve to be closed.

A pilot light is provided in connection with the device of my invention for igniting the fuel at the burner and insuring that the combustion shall continue. This pilot light comprises a nozzle 71, and a supply pipe 72 which 45 pipe is provided with a control valve 73 to stop the flow of illuminating gas to the nozzle. The nozzle is protected by a shell as shown in Figure 3. The valve 73 is controlled by means comprising a lever 74 pivoted at 75 60 and connected to the valve by a link 76. A spring 77 tends to force the link and lever in a direction for opening the valve and this action is aided by a weight 78. A diaphragm 79 extends across a casing 80 and is connected 55 to the lever at 81. The casing is connected by a pipe 82 to the feed pipe 53 leading to the nozzle.

A dash-pot 83 controls the speed of movement of the lever and hence speed of closing 60 of the valve 73 for extinguishing the pilot light. The dash-pot is shown in detail in Figure 13 and comprises an outer casing with a piston 84 attached to the lever 74 by a connecting rod 85. The piston has passages 65 leading through it at 86 and 87. The passage at 87 is enlarged between its ends to form a chamber for a solid ball 88 providing a check valve adapted to float upward as the piston moves down and so close the upper end of the passage 87. It may be noted that the 70 passage out of the chamber below the ball is formed in several branches so as to prevent closing of such lower passage by the ball and consequent interference with the upward movement of the piston. The passage 86 75 branches at its upper end and screw 89 at this point serves to regulate the operative size of the passage so as to limit the speed of movement of the piston, whose movement is usually very slow thus rendering the movement of the lever 74 in a direction to break 80 the circuit a very slow movement also. The motor receives current through leads 90 connected to switch 98.

For igniting the pilot light I have provided electrical means including a circuit 85 comprising a transformer 91 having its primary circuit connected to the main line and a conductor 92 from the secondary terminating in a circuit closer 93 adapted to engage 90 lever 74 when the lever is in such a position that the valve 73 is open thus supplying fuel to the pilot light. The current passes from this point through the frame of the machine to a conductor or spark gap 94 terminating 95 close to the nozzle 71 (Fig. 2). This conductor leads to an inductive coil 95 connected by a conductor 96 to the secondary of the transformer 91 and thence by a conductor 97 100 back to the switch 98. It will be seen that the high tension current from the coil in this way causes a spark at the pilot light but this spark will be on only so long as the lever 74 is in contact with circuit-closer 93.

It is thought that the operation of the device 105 will be substantially understood from the foregoing description. The motor 21 revolves when the circuit to the main line is closed at 98 and turns the fan of the blower thus creating a strong draft of air which 110 moves through the extension 56 and out at the end through deflectors 57 which impart a twisting motion to the air current. The motor also turns the shaft 28 preferably 115 through a flexible connection such as a universal joint and so turns the gear 27 which turns the gear 29 thereby pumping the fuel from the underground tank to the house supply tank which fuel then passes by gravity 120 to the float chamber, as previously described. The shaft 30 driven by gear 29 carries the rotor 46 of the atomizer for the fuel which is drawn by the pump 37 from the float chamber 24, the pump being driven by the eccentric on shaft 30. The rotation of the 125 rotor causes the vanes or blades 47 to move in and out under the action of their springs 50. If one vane of a pair should stick the cam action of the other member of the pair bearing against the wall of the chamber will force 130

the first vane out of its groove and into contact with the wall of the chamber.

Air enters the atomizer by way of pipe 51 and it will be noted that air and oil on entering the atomizer are gradually compressed as the rotor moves in the direction of the arrow, the mixture being revolved, atomized, and highly compressed as the blade reaches the ports leading to the exit passage 52. As the blade passes these ports the compressed mixture in the chamber between this and the succeeding blade is released through the ports into the manifold 52 and then into the outlet pipe 53. It may be noted that the rotor of the atomizer runs at a lower speed than the motor by reason of the reducing gearing 27, 29.

When the drive is not operating, switch 98 is open, contacts 93 are closed and valve 73 is closed. Upon closing the switch 98, a circuit is completed causing a series of sparks at the ignition point 94 through contacts 93 and also starting the motor 21 generating pressure in the pipes 53 and 82 thus raising the diaphragm 79 rocking the lever 74 down at the right hand end. As soon as the lever 74 starts down the valve 73 starts to open admitting illuminating gas to the pilot 54 where it is ignited at the point 94. The continued movement of the lever 74 opens the switch 93 thus breaking the circuit to the spark gap 94. These elements remain in this position as long as the device is operating.

Upon opening the switch 98 the motor and all the pumps stop; the pressure falls in pipes 53 and 82 and the diaphragm in casing 80 closes the valve 73 thus shutting off the gas from the pilot and also closes the sparking switch 93. No sparks pass at gap 94, however, because switch 98 is now open. In actual practice the switch 98 would be left closed all winter and the current would be switched off and on by some automatic thermostatic switch (not shown).

The atomized fuel passing through pipe

53 to the nozzle 54 must pass through the spiral grooves around the exterior of the element 55. This produces a swirling movement of the atomized mixture which is in the contrary direction to the swirling of the air current due to the deflectors 57 and thus results in a very effective breaking up of the oil which produces a satisfactory combustion of the liquid fuel.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of the invention and therefore I do not limit myself to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. An oil burner comprising a fan, a motor at one side of the fan, a shaft carrying the rotor of the motor and said fan, a geared pump at the opposite side of the fan comprising a gear on said shaft, and a second gear in mesh therewith, a shaft offset from the first, the second gear being mounted on the offset shaft, a rotor also on the offset shaft forming one element of an atomizing pump, a pump underneath the second-named shaft, a plunger for said pump, and a cam on said offset shaft acting directly on said plunger, substantially as set forth.

2. An oil burner as in claim 1, said plunger being recessed at its upper end to provide a container for oil for lubricating said cam, substantially as set forth.

3. An oil burner as in claim 1, said cam comprising an eccentric sleeve on the shaft, a second eccentric sleeve mounted on the first, and means for securing said sleeves in adjusted position, substantially as set forth.

In witness whereof, I have hereunto set my hand at Anderson, Indiana, this 20th day of April, A. D. nineteen hundred and twenty-six.

CHARLES A. MARTINDALE.