May 10, 1932. L. W. EGGLESTON 1,858,005

CONTROL MEANS

Filed April 11, 1927

Fig. 1.

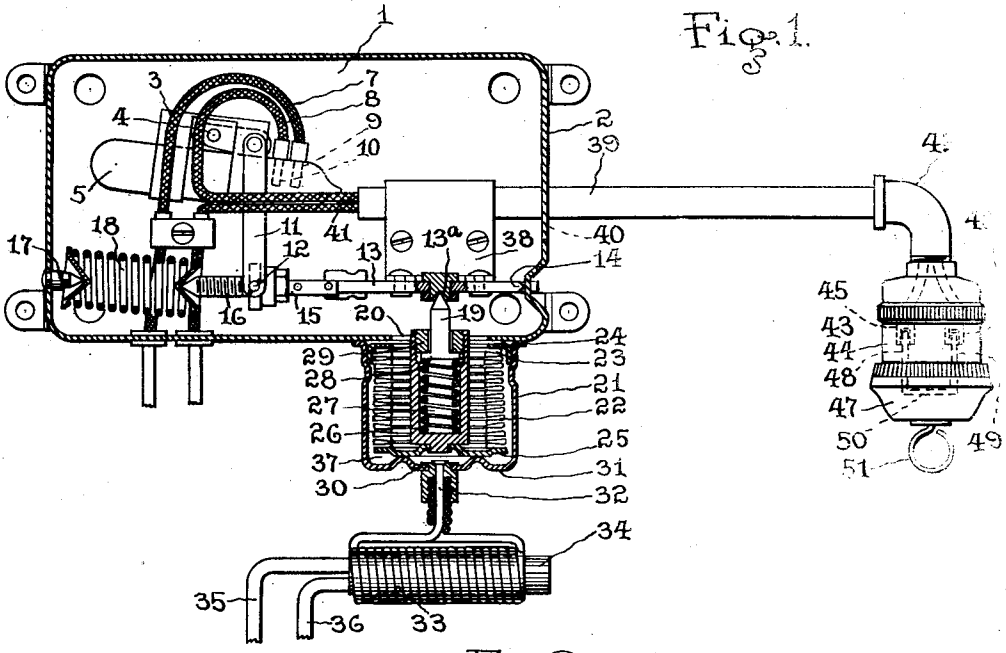
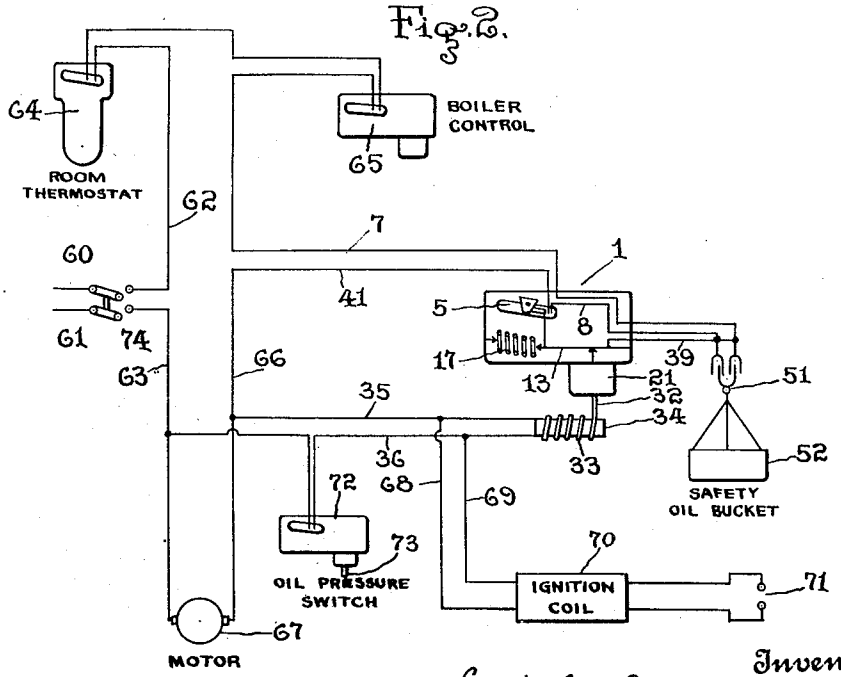


Fig. 2.



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Patented May 10, 1932 1,858,005

UNITED STATES PATENT OFFICE

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CONTROL MEANS

Application filed April 11, 1927. Serial No. 182,882.

My invention relates to new and useful improvements in control means, and more particularly to means for controlling oil burners.

An object of my invention is to provide an efficient control of simple construction.

Another object is to provide a control which eliminates danger of fire or explosion.

The invention consists in the improved construction and combination of parts, to be more fully described hereinafter, and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawings I have fully and clearly illustrated a preferred embodiment of my invention, to be taken as a part of this specification, and wherein—

Figure 1 is an elevational view of my device shown in longitudinal central section, and

Fig. 2 is a diagrammatic view of a system embodying my element or device.

Referring to the drawings by characters of reference, 1 designates a control switch, preferably of the mercury tube type, having a casing or supporting means 2. Within the casing 2 is a tilting bracket 3 pivoted on a fixed pin 4. Carried by the bracket 3 is a contactor tube 5, preferably of glass and containing mercury which makes and breaks the circuit through lead wires 7, 8 at contact points 9, 10 in the tube 5, when the latter is tipped on its pivot 4. Fixed on the bracket 3 is a push rod 11 which is operatively connected at its free end 12 to a lever 13, which is fulcrumed in the casing 2, as at 14. The free end 15 of lever 13 has an adjustment which may be in the form of a screw 16 threaded into the lever. Between the screw 16 and an abutment 17 on the casing 2, is a snap spring 18.

Supported by and external to the casing 2 near the fulcrum end of lever 13, is a container 21, preferably cup-shaped and having a base 31. The container 21 surrounds an opening 20 through the wall of casing 2. Within the container 21 is a resilient expansible-collapsible element 22, preferably a metallic cylindrical bellows. The top or upper end 23 of the bellows is hermetically sealed to a ring 24, and it in turn is sealed to the inner side wall of the container 21. The bottom or other end of the cylindrical bellows 22 is sealed by a head 25. Mounted on head 25 is a tubular support 26 in which is a coil spring 27 and plunger 19 having a head 28 against which spring 27 acts. The plunger 19 projects beyond support 26 and through opening 20 to fit in socket 13^a and contact lever 13. A guide collar or apertured plug 29 surrounds the plunger 19, and is threaded into the tubular support 26 to retain the plunger 19 therein by engagement of head 28 with collar 29. Sealed in an opening 30 in the base 31 of the container 21, is a conduit or tube 32, which is preferably wound or formed in a coil 33. Through the coil 33 is an electrical heating element 34 having lead wires 35, 36. The tube 32 and the space 37 between the bellows 22 and the container 21 is filled with a volatile, such, for example, as kerosene. Further description of the control switch 1 is not deemed necessary, as it is fully and clearly shown and described in my copending application, Serial No. 32,401, filed May 23, 1925.

Carried by and fixed to the lever 13 is a supporting member 38 for an arm 39 which projects through a slot or opening 40 in the side wall of casing 2. The arm is preferably hollow to receive the lead wire 8 and a second lead wire 41. Supported on the end 42 of arm 39 is a switch 43, including a socket 44 with terminals 45, 46 for the lead wires 8 and 41, respectively, and a plug 47 with contacts 48, 49 joined by an electrical connector 50. When the plug 47 and socket 44 are united, as in Fig. 1, then the circuit through switch 43 is complete through the medium of wire 8, terminal 45, contact 48, connector 50, contact 49, terminal 46 and wire 41. Fixed to the plug 46 is a supporting member in the form of a ring 51, to which is secured the bail of an oil catch-bucket or receptacle 52 (see Fig. 2), such as is employed in well known forms of oil burner controls. The socket and plug members may be of any well known type which will serve to break the circuit when said members are disconnected.

The above described mechanism is adapted for insertion in an oil burner system, and I

have shown it embodied in a general system, Fig. 2, but it is to be understood that it is so shown only for facility of explanation of its mode of operation, and it is not limited to use in the hereinafter described system.

In Fig. 2 is an oil burner system having electric power lines 60, 61, from which run leads 62, 63. Connected in series in the lead 62 are a room thermostat 64, a boiler control 65, a control switch 1 (such as is above described in detail) having lead wire 7 connected to lead 62 and lead wire 41 connected to another lead 66 to a motor 67. The lead 63 connects to the free terminal of the motor 67 and completes the motor circuit. The room thermostat 64 may be of any desired construction, though it is preferably of the Mercoid type, adapted to make and break the circuit through the motor 67 at desired predetermined room temperatures. The boiler control 65 may be and preferably is also of the Mercoid type, which is constructed to cut the motor 67 in or out, according to either the temperature or the pressure in the room-heating boiler (not shown). It is of course understood that the motor 67 controls the oil-feeding means to a burner which heats the boiler. Connected between the leads 63, 66 are the leads 35, 36, respectively, of the heater 34, so that the motor 67 and heater 34 are in parallel. From the lead wires 35, 36, respectively, are lead wires 68, 69 to an ignition coil 70 having a spark gap 71 for ignition of the fuel oil fed by motor 67 to the heating burner. In one of the lead wires 35, 36 is an oil pressure switch 72 connected to the burner oil line by a conduit 73, and which I have shown as of the Mercoid type, though any other type which would open and close the ignition circuit in response to oil pressure would serve the purpose.

The operation is as follows: Assuming that the circuit is closed through the thermostat 64, boiler control 65 and control switch 1, and that the ignition circuit is closed through oil pressure switch 72, the motor is started by closing the line switch 74. Current will also flow through the ignition coil 70 to cause sparks at the gap 71. The ignition coil 70 will continue to operate until a predetermined pressure has been built up in the oil feed line to the burner, when the oil line pressure will throw the switch 72 to cut out the ignition coil and cut off the spark. If the spark should fail to ignite the oil fuel, it would drain by a suitable pipe or conduit into the bucket 52, and when a sufficient quantity had collected, the weight of the collected oil would rotate the lever 13 to tilt tube 5 to break the motor circuit at the contact points 9, 10. The bucket would then have to be emptied before the motor could be again started. My novel safety means prevents the motor being restarted without placing the bucket 52 in position on arm 39. This is accomplished by the switch 43. The bucket 52 is preferably fast on the plug 47, and removal of the bucket for emptying necessitates the breaking of the motor circuit at the terminals 45, 46 by withdrawing the plug 47. When the plug 47 and socket 44 are reunited, the circuit is again closed through the terminals 45, 46, and the spring 18 will tilt the lever 13 carrying the empty bucket 52 to again close contact between points 9 and 10. If the pressure means, such as a pump (not shown), fails to create the required pressure in the oil line necessary for combustion, so that the oil pressure switch 72 will not operate, then the circuit through the motor 67 and the ignition coil 70 is broken by the control switch 1, as follows: When the current flowing through the ignition coil 70, and therefore the heater 34, has been on for a predetermined time, the volatile in coil 33 will be expanded by the heat of heater 34 and the expanded volatile will exert pressure on head 25 of bellows 22 to raise lever 13 and tilt tube 5 to break the motor circuit at contact points 9, 10. When the heater has cooled and the volatile contracted, the spring 18 will tilt the tube 5 back to the position of Fig. 1 and turn on the current through the motor. The heater 34 will continue to periodically break the circuit until oil pressure builds up in the feed line to operate switch 72 to cut out the heater, or until the main line switch 74 is opened. The thermostat 64 will cut the motor 67 and ignition coil 70 in and out at the desired minimum and maximum room temperatures, respectively, for which it is set, as is well known in the art. The boiler control 65, as above defined, may operate either in response to temperature or pressure to cut the motor 67 and ignition coil 70 in and out at predetermined boiler temperatures or pressures.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A control switch comprising a make-and-break device adapted to control a circuit, means to actuate said device, a catch receptacle associated with said device, and means whereby disassociation of said receptacle from said device breaks the circuit through said device.

2. A control switch comprising a make-and-break device adapted to control a circuit means to actuate said device, a catch receptacle adapted to be supported by said means, and means whereby disassociation of said receptacle from said actuating means renders said device inoperative to control the circuit.

3. A control switch comprising circuit members having disconnected terminals, detachable means to bridge said terminals to make and break a circuit, and a catch receptacle carried by said detachable means.

4. A control comprising a movable switch

adapted to make and break a circuit, an actuating member for said switch, a detachable bucket support on said actuating member, circuit terminals carried by said actuating member and connected to said switch, said bucket support when attached to said actuating member acting to bridge said terminals.

5. A control switch comprising a supporting arm, circuit leads having disconnected terminals supported by said arm, means to bridge said terminals to complete said circuit, and bucket means carried by said first-named means.

6. A control switch comprising a support, a lever pivoted on said support, an arm carried by said lever, circuit leads having disconnected terminals supported by said arm, and means to bridge said terminals to connect said terminals.

7. A control switch comprising a support, a lever pivoted on said support, said lever having an arm, circuit leads having disconnected terminals supported by said arm, circuit closing means to make and break the circuit at said terminals, and a receptacle carried by said circuit closing means.

8. A control switch comprising a support, a lever fulcrumed on said support, circuit control means on said support, means operatively connecting said lever and control means, said lever having an arm, circuit leads connected to said control means and having disconnected terminals carried by said arm, means to open and close the circuit at said terminals, and a catch receptacle carried by said last-named means.

9. A control switch comprising a support, a lever fulcrumed on said support, circuit control means on said support, means operatively connecting said lever and control means, circut leads connected to said control means, and having disconnected terminals carried by said lever, means to open and close the circuit at said terminals, and a catch receptacle carried by said last-named means.

10. A control comprising a switch member adapted to open and close a circuit, a member to actuate said switch member, circuit leads connected to said switch member and having disconnected terminals on said actuating member, a detachable member adapted to connect said terminals, and a catch receptacle supported by said detachable member.

11. A control switch comprising a support having circuit control means, a lever on said support adapted to operate said control means, said lever having an arm, circuit leads extending from said control means and having disconnected terminals supported by said arm, means to make and break a circuit at said terminals, thermostatic means operatively connected to said lever to move the same, and heater means for said thermostat.

12. A control switch comprising a support, a closed tube fulcrumed on said support, circuit leads extending into said tube, means in said tube to make and break contact between said leads when said tube is tilted on its fulcrum, a lever operatively connected to said tube, means to actuate said lever to tilt said tube, circuit terminals, one of which is connected to one of said leads, detachable means to make and break contact between said terminals, and a catch receptacle carried by said detachable means.

In testimony whereof I have hereunto signed my name.

LEWIS W. EGGLESTON.