May 23, 1939. S. C. SHIPLEY 2,159,624

VALVE SYSTEM

Filed Nov. 19, 1934 3 Sheets-Sheet 1

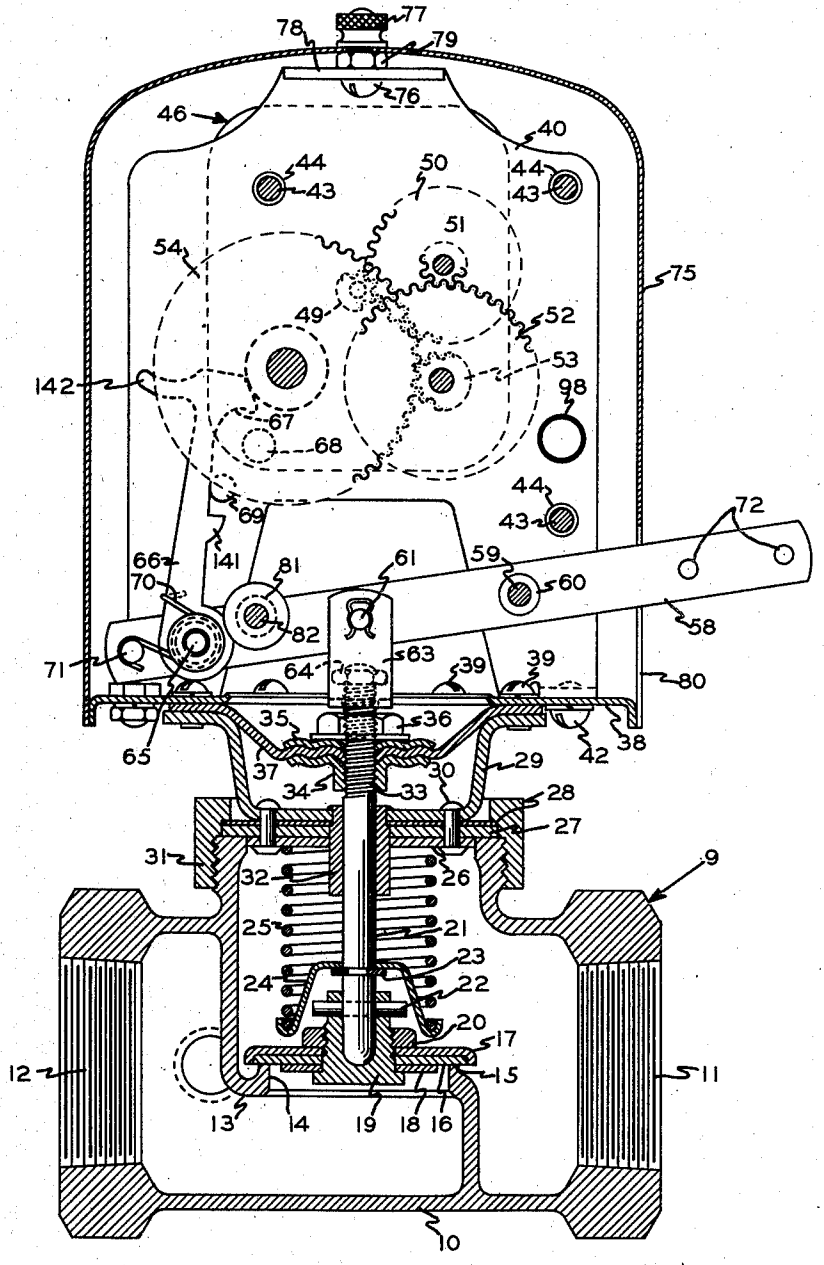

Fig. I

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VALVE SYSTEM

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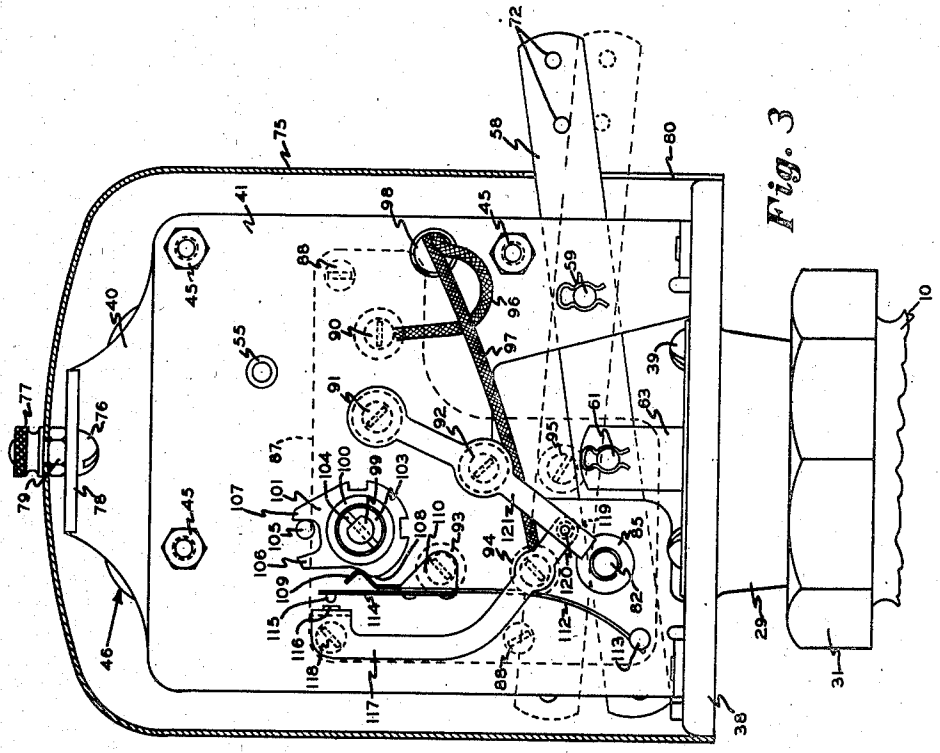

Fig. 3

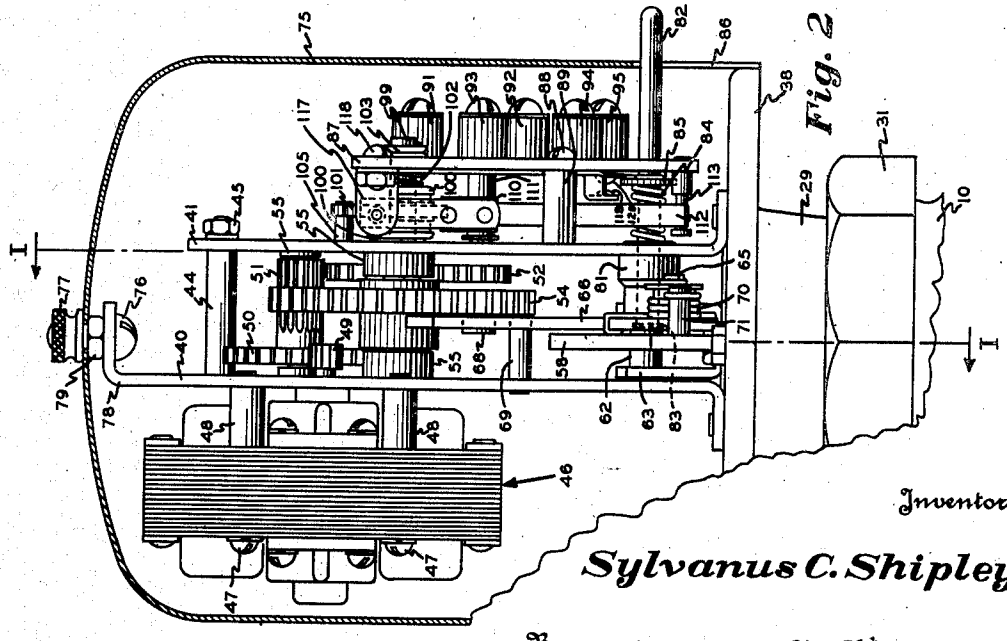

Fig. 2

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VALVE SYSTEM

Filed Nov. 19, 1934 3 Sheets-Sheet 3

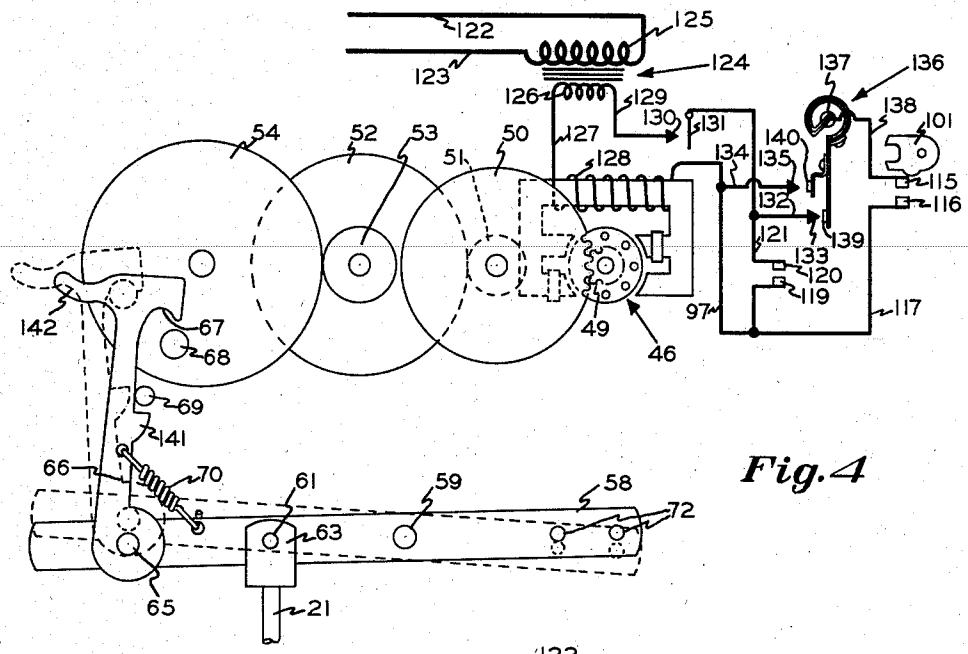

Fig. 4

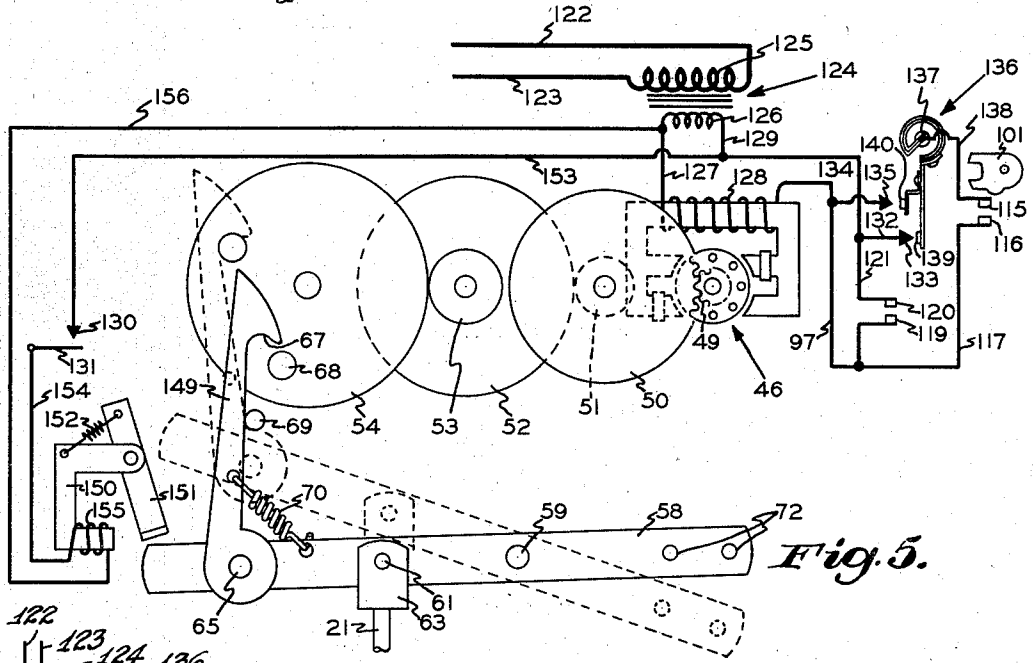

Fig. 5.

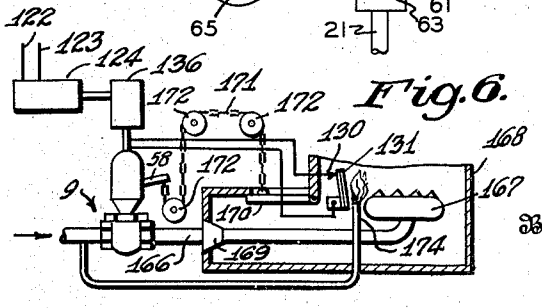

Fig. 6.

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2,159,624

UNITED STATES PATENT OFFICE

2,159,624

VALVE SYSTEM

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Application November 19, 1934, Serial No. 753,557

14 Claims. (Cl. 158—117.1)

This invention relates to valve systems for heaters wherein a control valve is operated by an electric motor which is responsive to a condition such as temperature.

There are in existence at the present time, heating systems that employ a heater delivering heat to a space and having a main heating burner, a pilot burner and a safety pilot control cooperating with the pilot burner. It is usual to control the main burner by means of a control valve which is operated by an electric motor in response to change in a condition such as temperature as reflected by a room thermostat. The motor receives its energy in such systems from an electrical power line. In some systems, it is usual to have a secondary air controlling device including a lever extending outwardly through the control valve casing which is operated by the electric motor by being operatively connected with the control valve for the main burner. In the above systems, when the thermostat calls for heat, the motor is energized to open the control valve to supply fluid to the main burner which is ignited by the pilot burner. Provision is made by means of the safety pilot control whereby the motor may not be energized to open the control valve when the pilot burner is extinguished. In the above described systems, the power lines which deliver energy to the electric motor are subject to power failure and when the thermostat calls for heat during this period of power failure, the motor cannot be energized to open the control valve.

It often happens that heat is required during this period of power failure and some means must be provided to open the control valve to deliver fluid to the main burner. In the case of the system utilizing a secondary air control mechanism, the means for controlling the secondary air control mechanism, which is operatively connected to the main control valve and which extends outwardly through the casing thereof, forms a convenient means whereby the control valve may be manually opened. In the case where no such secondary air control mechanism is used, manual means are provided exteriorly of the casing of the control valve assembly to open the control valve during this period of power failure. In both instances, latching means are also provided to latch the control valve in open position when the control valve has been so manually opened. Users of such systems have been properly instructed how to open the control valve manually during the period of power failure and they have become so accustomed to do so that it has become practically automatic on their part.

In many instances, the failure of the control valve to open at the command of the thermostat is due to extinguishment of the pilot burner as reflected by the safety pilot control. Under such circumstances, if the control valve should be manually opened in the manner pointed out above, the main burner would not ignite due to the pilot burner being extinguished, causing large amounts of combustible fluid to accumulate in the heater.

Since the user has been properly instructed to manually open the control valve during periods of power failure in the manner pointed out above, it is entirely possible that he would attempt to open the control valve in the same manner during the period of extinguishment of the pilot burner and in the past such manual operation has occurred. Having thus opened the control valve and seeing that the main burner was not ignited, he would probably determine that the pilot was not burning. The chances are that he would attempt to light the pilot burner and in so doing, he would unconsciously ignite the large amounts of combustible fluid accumulated in the heater caused by the previous opening of the control valve. Under such conditions, explosions of no mean proportion are liable to occur much to the damage of the heater and possible injury to the user.

Therefore, an object of this invention is to provide a manual means for opening the control valve which is not readily accessible to the user thereof and which requires the manual opening of the valve to be made by a properly instructed service man or prevents the haphazard opening thereof by the user.

Another object is to provide a motorized control valve having a cover enclosing the same and requiring the cover to be removed before said control valve may be manually opened.

Still another object is to provide a motorized control valve having a cover enclosing the same and an auxiliary control element extending outwardly therefrom forming a convenient means for manually opening the valve with means located within the cover preventing manual opening of the valve without first removing the cover.

A further object is to provide a motorized control valve having a pawl connecting said motor and said control valve whereby said control valve is opened by energization of said motor and to provide means on said pawl to permit manual opening of said valve.

Another object of the invention is to provide a latching mechanism controlled by a safety pilot control whereby a control valve may not be automatically or manually opened while the pilot is extinguished except by releasing said latching mechanism.

A further object is to provide a manual control means for a valve in combination with the system to be disclosed hereafter.

Further objects and advantages will become apparent to those skilled in the art by reference to the accompanying description and drawings in which:

Fig. 1 is a vertical sectional view of the control valve assembly taken substantially on the line I—I of Fig. 2,

Fig. 2 is an end elevational view of the same looking from the left in Fig. 1 and showing the cover in section,

Fig. 3 is a side elevational view looking from the right in Fig. 2, the cover being shown in section and the terminal block and binding posts being shown in broken lines as if transparent,

Fig. 4 is a diagrammatic view of the structure shown in Figs. 1 to 3 and including the electrical control system therefor,

Fig. 5 is a diagrammatic view similar to Fig. 4 but showing a modified form of the invention,

Fig. 6 is a schematic view of a system including the present invention associated with a gas burner.

The invention contemplates the use of the after-described control system in combination with a heater, preferably a gas heater, having a main burner, a pilot burner combined with a safety pilot control and a secondary air control which are old in the art and need not be specifically shown and described, it being sufficient to state that the control valve 9 controls the main burner, that the safety pilot control operates the safety pilot switch arm 131 and that the lever 58 controls the secondary air supply.

Referring now to Figs. 1 to 4, the control valve generally designated at 9 has a valve casing 10 having inlet and outlet openings 11 and 12 respectively. The valve casing 10 has a transverse wall 13 having a port opening 14 therein which is encompassed by an annular shoulder to form a valve seat 15. The valve member comprises a valve disc 16 adapted to seat on the annular seat 15, reinforcing washers 17 and 18 flanking the valve disc 16, said valve disc 16 and said reinforcing washers 17 and 18 being securely clamped together by means of a plug 19 and a nut 20 screwed thereon.

Extending into the plug 19 of the valve member is a valve stem 21, the plug 19 and the valve stem 21 having holes to receive a pin 22 to secure the valve stem 21 and plug 19 together in fixed relation. Mounted in an annular groove in the valve stem 21 is a split ring 23 which supports a spring retainer member 24. A spring 25 rests in the spring retainer member 24 and abuts against an abutment plate 26 to normally urge the valve member toward its seat. Located adjacent the upper portion of the valve casing 10 are a disc 27, a packing washer 28 and a support 29 which are secured together and to the abutment disc 26 by means of rivets 30. 31 designates a clamping nut, screw-threaded on the upper portion of the valve casing 10 to hold the support 29 in fixed relation to the valve casing 10.

Extending through the abutment disc 26, the disc 27, the washer 28 and the support 29 and secured thereto is a sleeve guide member 32 through which the valve stem 21 slidably extends outwardly from the valve casing 10. In order to effectively seal the valve 10 against leakage of fluid therefrom, a diaphragm 37 is secured to the outer end of the valve stem 21 by clamping the diaphragm 37 between a nut 34 and a washer 35, the clamping action being effected by a nut 36 screwed on the screw-threaded portion 33 of the valve stem 21. The outer edge of the diaphragm 37 is clamped between the support 29 and a base 38 by means of screws 39.

Mounted on the base 38 by means of screws 42 are two upright, spaced parallel plates 40 and 41, the plates 40 and 41 being held in spaced relation by bolts 43 cooperating with nuts 45 to clamp the plates 40 and 41 against spacer members 44.

A motor of any known type, generally designated at 46, is secured to and spaced from the vertical plate 40 by means of screws 47 and spacers 48. The motor shaft extends through the plate 40 and has a motor pinion 49 located on the end thereof. Located between the plates 40 and 41 and driven by the motor pinion 49 is a reduction gear train, comprising a gear 50 engaging the motor pinion 49, a gear 52 engaging a pinion 51 integral with the gear 50 and a gear 54 engaging a pinion 53 integral with the gear 52. The gears and pinions are suitably mounted and spaced between the upright parallel plates 40 and 41 by means of bearings 55.

By means of a pivot pin 59 and spacers 60, a lever 58 is pivoted between the plates 40 and 41 and by means of a pivot pin 61 and spacers 62 the lever 58 is pivoted to a U-shaped bracket 63, which bracket 63 is secured to the valve stem 21 by a nut 64 screwed on the screw-threaded portion 33 of the valve stem 21 whereby movement of the lever 58 in a clockwise direction about its pivot pin 59 causes opening of the valve 9.

Pivoted to the lever 58 by means of a pin 65 is an upwardly extending pawl 66, having a concave portion 67 to engage and coact with a pin 68 secured to the gear 54. The pawl 66 is urged inwardly by means of a spring 70 engaging the pawl 66 and a pin 71 located on the lever 58 and inward movement of the pawl 66 is limited by means of a stop pin 69. The outer end of the lever 58 is provided with holes 72 in which there may be attached means for controlling a secondary air supply to the heater.

The upright plate 40, has an inwardly extending flange 78 to which is secured a screw 76 by means of a nut 79. A cover 75 encloses the moving mechanism and is held in place by a knurled nut 77 screw-threaded on the screw 76. The cover 75 has a slot 80 through which the lever 58 extends outwardly so that the lever 58 may actuate the secondary air control.

A sleeve 81 is suitably secured to the upright plate 41 and has slidably mounted therein a latch pin 82, having an annular flange 83 at the inner end thereof and a fibre disc 85 secured intermediate the ends thereof to be engaged by a spring 84 to maintain the latch pin 82 in its outward position, the latch pin 82 extends outwardly through a slot 86 in the cover 75 for external manual manipulation.

From the above description of the structure, it will be seen that when the motor 46 is energized, it operates through the gear train to angularly move the pin 68 to engage the concave surface 67 of the pawl 66 to raise the pawl 66 and thereby pivot the lever 58 about its pivot 59 to

open the control valve 9. Upward movement of the valve member and the pivoted lever 58 is arrested by the lever 58 engaging against the stop pin 69 whereupon the motor is stalled and the valve 9 is maintained in open position as long as the motor 46 is energized. When the motor 46 is deenergized, the spring 25 closes the valve 9 and returns the parts to their original positions.

87 designates an insulating terminal block which is secured to and spaced from the vertical plate 41 by means of screws 88 and spacers 89. Mounted on the terminal block 87 are binding posts 90, 91, 92, 93, 94 and 95. The binding posts 90 and 91 are the power terminals and are normally connected to the secondary terminals of a step-down transformer, not forming part of the valve structure per se. The binding post 92 is connected to a contact 130 of a safety pilot control and the binding post 93 is connected to an upper stationary binding post 137 of a room thermostat 136. The binding post 94 is connected to an upper contact 135 of a room thermostat 136 and the binding post 95 is connected to a lower contact 133 of a room thermostat 136 and to a switch arm 131 of the safety pilot control. 96 and 97 designate motor lead wires which are connected respectively to binding posts 90 and 94, these motor lead wires being extended through a conduit tube 98 located between the spaced upright plates 40 and 41.

The shaft of the large gear 54 has an outwardly extending extension 99 which is flattened to slidably receive two friction discs 100 so that when the shaft extension 99 is rotated, the friction discs are also rotated. Rotatably mounted on the extension 99 and located between the discs 100 is a friction cam 101 which is held in frictional engagement with the friction discs 100 by means of a spring 102 abutting against the outer friction disc 100 and a collar 103 secured to the extension 99 by means of a pin 104. 105 designates a stop pin secured to the upright plate 41 which coacts with abutments 106 and 107 of friction cam 101 to limit the angular movement of the friction cam 101.

The friction cam 101 has a cam surface 108 which coacts with a cam follower 109 secured to a rocker 110 which is pivoted to the binding post 93 and spaced from the terminal block 87 by means of a spacer 111. Secured to the rocker 110 is a leaf spring 112 which engages a stationary pin 113 secured to the terminal block 87 to urge the rocker 110 in a clockwise direction to maintain the cam follower 109 against the cam surface 108 of the friction cam 101. Also secured to the rocker 110 is a contact arm 114 having a contact 115 which engages at certain times with a coacting stationary contact 116 secured to a bus bar 117 which bus bar 117 is secured to the terminal block 87 by means of a screw 118.

The bus bar 117 is connected to the binding post 94 and its lower end is bent inwardly and it has a stationary recycling contact 119 on this end which engages at predetermined times with a coacting movable recycling contact 120 located on a spring bus bar 121. The spring bus bar 121 connects the binding post 91 and 92 and normally urges the contact 120 against contact 119. The fibre disc 85 of the latching pin 82 being spring pressed outwardly normally separates the contacts 119 and 120 as is clearly shown in Fig. 2.

Located midway of the pawl 66 is a lug 141 which, under certain conditions of operation, coacts with the stationary stop pin 69 to prevent upward movement of the lever 58 as will be more fully pointed out hereafter. A handle 142 is formed on the upper end of the pawl 66.

Fig. 4 is a diagrammatic showing of the essential elements of this invention, along with a wiring diagram showing the complete system. In Fig. 4, it has been attempted to use the same reference characters as in Figs. 1 to 3 wherever possible. 122 and 123 are line wires carrying a supply of electrical energy which are connected to the primary 125 of a step down transformer 124. One end of the secondary 126 of the step down transformer 124 is connected by a wire 127 to the field coil 128 of the motor, generally designated at 46, and the other end of the secondary 126 is connected by a wire 129 to a stationary contact 130 of the safety pilot control. The contact 130 is engaged by a switch arm 131 of the safety pilot control when the pilot burner is burning and the switch arm 131 is connected by bus 121 to the movable recycling contact 120 and to a wire 132 connected to the lower stationary contact 133 of the room thermostat 136. A wire 97 connects the field coil 128 of the motor 46 to a wire 134 connected to the upper contact 135 of the room thermostat 136 and to the movable recycling contact 119. The movable recycling contact 119 is connected by means of bus 117 to the stationary contact 116 and the movable contact 115 is connected by a line wire 138 to the stationary binding post 137 of the room thermostat 136. Stationary contacts 133 and 135 are engaged sequentially by movable contacts 139 and 140 secured to the room thermostat 136 since the distance between contacts 133 and 139 is less than the distance between contacts 135 and 140.

Assume that the control valve 9 is closed and the parts are in the position shown in Figs. 1 to 3 and that the pilot burner is burning whereby the safety pilot control causes the switch arm 131 to engage the contact 130. The room thermostat calls for heat moving the contacts 139 and 140 to the left but since the distance between contacts 133 and 139 is less than the distance between contacts 135 and 140, contact 139 will first engage contact 133. Since the contacts 115 and 116 are open, the circuit to the motor is not completed. Upon further drop in temperature, contact 140 engages contact 135 completing a circuit from the secondary 126 through wire 129, contact 130 and switch arm 131 of the pilot safety control, bus 121, wire 132, contacts 133 and 139, contacts 140 and 135, wire 134, wire 97, coil 128, and wire 127 back to the secondary 126 of the transformer 124, thereby energizing the motor 46 to begin its movement to open the valve 9. Upon this movenet of the valve, cam 101 is rotated in a clockwise direction and causes the cam surface 108 to engage the cam follower 109 to close contacts 115 and 116 thereby completing a second and holding circuit from the secondary 126 of the transformer 124, through the wire 129, contact 130 and switch arm 131 of the pilot safety control, bus 121, wire 132, contacts 133 and 139, thermostat 136, binding post 137, wire 138, contacts 115 and 116, bus 117, wire 97, field coil 128 and wire 127 back to the secondary 126 of the transformer 124. Continued movement of the motor 46 caused by this circuit raises the arm 58 about its pivot 59 to completely open the valve thereby delivering fluid to the heater which is ignited by the pilot burner. When the valve is completely opened, the arm 58 engages the stop pin 69 to prevent further movement and to stall the motor. As long as the room thermostat 136 calls for heat, the motor will be energized and

will remain in this stalled position and maintain the valve 9 fully opened. When the temperature of the room rises sufficiently, the thermostat 136 moves the contacts 140 and 139 to the right, breaking the above mentioned circuits to de-energize the motor and allows the spring 25 to move the valve 9 to its closed position and to restore the parts to the position shown in Figs. 1 and 3.

If the pilot burner is extinguished, the safety pilot control moves the switch arm 131 away from the stationary contact 130 and prevents the above circuits from being completed. Therefore, when the pilot burner is extinguished, automatic opening of the valve by means of the motor 46 is entirely prevented.

Assume that there is a power failure in the lines 122 and 123 and the room thermostat calls for heat, the valve 9 cannot be opened by the motor 46. Since the lever 58 extends outwardly through the slot 80 in the cover 75 to control secondary air to the heater, this extension of the lever 58 affords a convenient means for manually opening the valve by pressing down on the outward end of the lever 58 which swings the lever 58 about its pivot 59 to open the valve 9. In order to maintain this valve 9 in its open position, the latch pin 82 is thrust inwardly and engages under the lever 58 to hold the lever 58 in this shifted position and maintain the valve partially open such position being shown in broken lines in Fig. 3. Latch pin 82 is prevented from being forced outwardly by the spring 84 by means of the flange 83 of the pin 82 engaging the lever 58. By so moving the pin 82 inwardly, the fibre disc 85 also moves inwardly allowing the recycling contact 120 to engage contact 119 whereby a circuit is completed from the secondary 126 of the transformer 124, wire 129, contact 130 and switch arm 131 of the safety pilot control, wire 121, recycling contacts 120 and 119, wire 97, field coil 128 and wire 127 back to the secondary 126 of the transformer 124. When the power failure period ends and power is again restored to the lines 122 and 123, current will flow through this circuit to energize the motor to move the lever 58 in clockwise direction about its pivot 59 which permits the annular flange of the latch pin 82 to disengage from the lever 58 to permit the spring 84 to return the latch pin 82 to its outer position. When the latch pin 82 is so returned to its outer position, the fibre disc 85 separates the contacts 119 and 120 to break the above circuit and if the room thermostat 136 is not calling for heat in the manner outlined above, no other circuits will be completed and the spring 25 will then close the valve 16 and return the parts to their relative positions as shown in Figs. 1 and 3.

As pointed out above, great danger occurs from manually opening the control valve when the pilot burner is extinguished because of the permitting of large amounts of explosive fluid to flow into and accumulate in the heater. In order to prevent the haphazard manual opening of the valve 9 by the user of the heater without thought on his part in determining the cause of the failure of the control valve 9 to open whether it be power failure or the action of the safety pilot control, the lug 141 is provided on the pawl 66. This lug is so located with relation to the stationary stop pin 69 that when the pin 68 of the gear 54 engages the concave surface 67 of the pawl 66, the pawl 66 is angularly moved so that the lug 141 will not engage the stationary pin 69 which allows free easy opening movement of the valve 16 by the motor 46 as shown in broken lines in Fig. 4. However, manual manipulation of the lever 58 in the manner pointed out above is prevented because the pawl 66 is urged inwardly by means of spring 70 and by pushing down on the outward end of the lever 58 in the manner pointed out above, lug 141 of the pawl 66 engages the pin 69 which prevents movement of the lever 58 and consequent opening of the control valve 9. Therefore, in order to manually open the control valve 9, the cover 75 must be removed and the handle 142 of the pawl 66 must be grasped to first swing the lug 141 to the left against the action of the spring 70 to clear the pin 69 to permit upward movement of the pawl 66 and consequent opening of the valve 9.

By use of this construction, it is impossible for the user of the heater and this system of control to manually open the valve in a haphazard manner. The user must do one of two things either call a properly instructed service man who will be instructed to determine whether or not the pilot burner is burning before he attempts to open the main control valve 9 or he must remove the cover 75 himself which will make him think twice of what he is doing which will invariably make him look to see if the pilot burner is burning before he attempts to manually open the valve.

From the above, it will be seen that I have provided a control system wherein there are manual means for opening the control valve which are not easily accessible to the user of the system which requires the manual opening to be made by a properly instructed service man or by preventing the haphazard opening thereof by the user of the system by providing several operations to be accomplished before the control valve may be opened.

Referring now to Fig. 5 in which there is shown diagrammatically a modified form of my invention wherein like parts are indicated by like references. This modification employs the same motor 46, the same gear train, the same lever 58 and the same valve 9. The control system comprises the same transformer 124, the same room thermostat 136, the same friction cam 101 and the same recycling contacts 119 and 120. However, in this modification, the safety pilot control having the contact 130 and the switch arm 131 is not placed in series as above but is placed in parallel to operate a latching mechanism 151 which is secured to a stationary bracket 150. The pilot safety control embodying the contact 130 and the switch arm 131 and the coil 155 is connected in parallel to the rest of the control system by a wire 153 connecting contact 130 with the wire 129 by a wire 154 connecting the switch arm 131 with a coil 155 and by a wire 156 connecting the coil 155 with the wire 127. Bracket 150 is adapted to receive a solenoid coil 155 so that when the coil 155 is energized, the latch arm 151 is attracted thereby in a clockwise direction to remove it from the path of lever 58. A spring 152, located between the latch arm 151 and the support bracket 152, normally urges the latch arm 151 in the path of movement of the lever 58.

The manner of operation of this modification is identical to the operation above when the room thermostat 136 calls for heat so a detailed description is not considered necessary at this point. In this modification, when the pilot burner is burning, the pilot safety control moves switch arm 131 into engagement with contact 130 and permits both manual or automatic opening of the

control valve 9 because the latch arm 151 is drawn out of the path of movement of the lever 58 by the coil 155. However, when the pilot light is extinguished, switch arm 131 disengages contact 130 to break the magnetic effect of coil 155 and the spring 152 urges the latch arm 151 into the path of movement of the lever 58, preventing manual opening of the control valve 9 and also preventing automatic opening of the control valve 9. Further, this modification contemplates the use of a pawl 149 which is not provided with the lug 141 and the handle 142 described above since the latching action is taken care of by the latch arm 151.

From the above, it is seen that in this modification I have devised means whereby it is impossible to manually open the control valve 9 or to automatically open it by means of the motor 46 when the pilot burner is extinguished unless the cover 75 is removed and the latch arm 151 is manually manipulated to remove it from the path of movement of the lever 58.

In Fig. 6 the valve system of the present invention has been shown in connection with a gas burning furnace. The valve 9 is shown in this figure as controlling the flow of gas through a pipe 166 to a gas burner 167, this gas burner being located in a furnace generally designated by the reference numeral 168. Primary air is admitted to the gas in the conventional manner by a suitable mixing chamber 169. A secondary air damper 170 is provided which permits the closing off of the secondary air upon the termination of burner operation to conserve heat in the furnace. This secondary air damper is pivotally mounted and biased inwardly. Connected to the damper is a chain 171, or other similar device, which extends over pulleys 172 to the secondary air damper arm 58. It will be obvious that upon the valve being operated, as previously explained, so that the damper arm 58 is moved downwardly the secondary air damper 170 is permitted to move downwardly through the action of gravity.

Located adjacent the main burner 167 is a pilot burner 174 which is connected to the gas line 166 behind the valve 9 so that it is normally constantly supplied with gas and hence constantly lighted. The pilot burner previously referred to and shown in highly schematic form is illustrated here. The pilot burner is shown as comprising the bimetallic contact member 131 exposed to the heat of the pilot flame and which cooperates with the contact 130. The room thermostat 136 and the transformer 124 are shown in schematic form, such a showing being considered to be adequate in view of the more detailed showing in Figs. 4 and 5.

As many changes could be made in the above construction, installation and mechanism and as many apparent widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the drawings or described in the specification shall be interpreted as illustrative only and not in a limiting sense.

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

1. In a device of the character described, a normally closed valve, automatic means associated with said valve for opening said valve, a cover enclosing said automatic means, means associated with said automatic means and extending outwardly through said cover whereby said valve may be manually opened, and latch means within said cover to prevent manual opening of said valve, said latch means being ineffective to restrain manual opening of said valve after a predetermined initial opening movement thereof.

2. In a device of the character described, a normally closed valve, means mounting on said valve and including an electric motor for opening said valve, a cover enclosing said means, means connected to said means and extending outwardly through said cover providing manual means for opening said valve, and releasable latch means within said cover to prevent manual opening of said valve when said cover is in place, said latch means being ineffective to restrain manual opening of said valve after a predetermined initial opening movement thereof.

3. In a device of the character described, a normally closed valve automatic means associated with said valve for opening said valve including a movable pin, a pawl associated therewith and a lever connected between said pawl and said valve, and means associated with said pawl to prevent manual opening of said valve by manual manipulation of said lever, said last named means having no effect on the opening of said valve by said automatic means.

4. In a device of the character described, a normally closed valve, automatic means associated with said valve for opening said valve including a movable pin, a pawl associated therewith and a lever connected between said pawl and said valve, and means associated with said pawl to prevent manual opening of said valve by manual manipulation of said lever but permitting manual opening of said valve by manual manipulation of said pawl, said last named means having no effect on the opening of said valve by said automatic means.

5. In a device of the character described, a normally closed valve, a lever connected to said valve for operating the same, a pawl carried by said lever and having a lug thereon, an abutment in the path of movement of said lug to prevent opening of said valve by manipulation of said lever, and a pin for engaging said pawl to swing said lug clear of said abutment to move said lever to open said valve.

6. In a device of the character described, a normally closed valve, automatic means associated with said valve for opening said valve including a movable pin, a pawl associated therewith and a lever connected between said pawl and said valve, and releasable latch means associated with said lever to prevent manual opening of said valve by manual manipulation of said lever, said latch means being ineffective to restrain manual opening of said valve after a predetermined initial opening movement thereof.

7. In a device of the character described, a normally closed valve, automatic means associated with said valve for opening said valve including a movable pin, a pawl associated therewith and a lever connected between said pawl and said valve, releasable latch means associated with said lever to prevent automatic opening of said valve by said automatic means and to prevent manual opening of said valve by manual manipulation of said lever, and means to release said releasable means to permit automatic or manual opening of said valve, said latch means being ineffective to restrain manual opening of said valve after a predetermined initial opening movement thereof.

8. In a control system comprising a heater having a fuel inlet and a secondary air damper, a valve biased to closed position for controlling said fuel inlet, power means associated with said valve for automatically opening said valve in response to a condition indicative of a demand for heat, means associated with said power means and operatively connected to said secondary air damper to control the position of the same in accordance with the position of the valve. and forming a convenient means for manually opening said valve, and releasable means to prevent manual opening of said valve by manual manipulation of said last named means, said releasable means having no effect upon the opening of said valve by said power means.

9. In a control system comprising a heater having a fuel inlet and a secondary air damper, a valve biased to closed position for controlling said fuel inlet, power means associated with said valve for automatically opening said valve in response to a condition indicative of a demand for heat, a cover enclosing said power means, means positively connected to said valve and extending through said cover and operatively connected to said secondary air damper to control the position of the same in accordance with the position of the valve, said last named means forming a convenient means for manually opening said valve, and means to prevent manual opening of said valve by manual manipulation of said last named means without removing said cover.

10. In a control system comprising a heater having a fuel inlet and a secondary air damper, a valve biased to closed position for controlling said fuel inlet, power means associated with said valve for automatically opening said valve in response to a condition indicative of a demand for heat, said power means including a movable pin, a pawl associated therewith and a lever connected between said pawl and said valve, said lever being operatively connected to said secondary air damper and providing a convenient means for manually opening said valve and means associated with said pawl to prevent manual opening of said valve by manual manipulation of said lever but permitting manual opening of said valve by manual manipulation of said pawl.

11. In a control system comprising a heater having a fuel inlet and a secondary air damper, a valve biased to closed position for controlling said fuel inlet, power means associated with said valve for automatically opening said valve in response to a condition indicative of a demand for heat including a lever connected to said valve, said lever being operatively connected to said secondary air damper and providing a convenient means for manually opening said valve, releasable means to prevent opening of said valve by said power means or by manual manipulation of said lever and means to release said releasable means to permit opening of said valve, said releasable means being ineffective to restrain opening movement of said valve after an initial opening movement thereof.

12. In a device of the class described, a normally closed valve, operating mechanism for said valve including a motor and connecting means between said motor and said valve, a housing inclosing said operating mechanism, a member operatively connected and movable with said connecting means and extending through said housing to provide for the operation of auxiliary apparatus, said member providing manual means for opening said valve, and a releasable latch effective to prevent opening movement of said valve by actuation of said member but ineffective to prevent opening movement of said valve by said operating mechanism.

13. In a control system comprising a heater having a fuel inlet and a secondary air damper, a valve biased to closed position for controlling said fuel inlet, power means associated with said valve for automatically opening said valve in response to a condition indicative of a demand for heat, a cover enclosing said power means, means operatively connected to said valve and extending through said cover and connected to said secondary air damper to control the position of the same in accordance with the position of the valve, said last named means forming means for manually opening said valve, means to prevent opening of said valve by manual manipulation without first removing said cover, said last named means having no effect upon the opening of said valve by said motor means.

14. In a control system comprising a heater having a fuel inlet and a secondary air damper, a valve biased to closed position for controlling said fuel inlet, power means associated with said valve for automatically opening said valve in response to a condition indicative of a demand for heat, a cover enclosing said power means, lever means associated with the connections between said valve and said power means, said lever means extending through said cover and being connected to said secondary air damper to control the position of the same in accordance with the position of the valve, said lever means also forming a means for manual operation of said valve, means within said cover to normally prevent opening of said valve by manual manipulation of said lever means, said last named means having no effect upon the opening of said valve by said motor means.

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