Aug. 28, 1934. W. A. RAMSEUR 1,971,731

AUTOMATIC CUT-OFF

Filed April 14, 1932 2 Sheets-Sheet 1

Fig. 1.

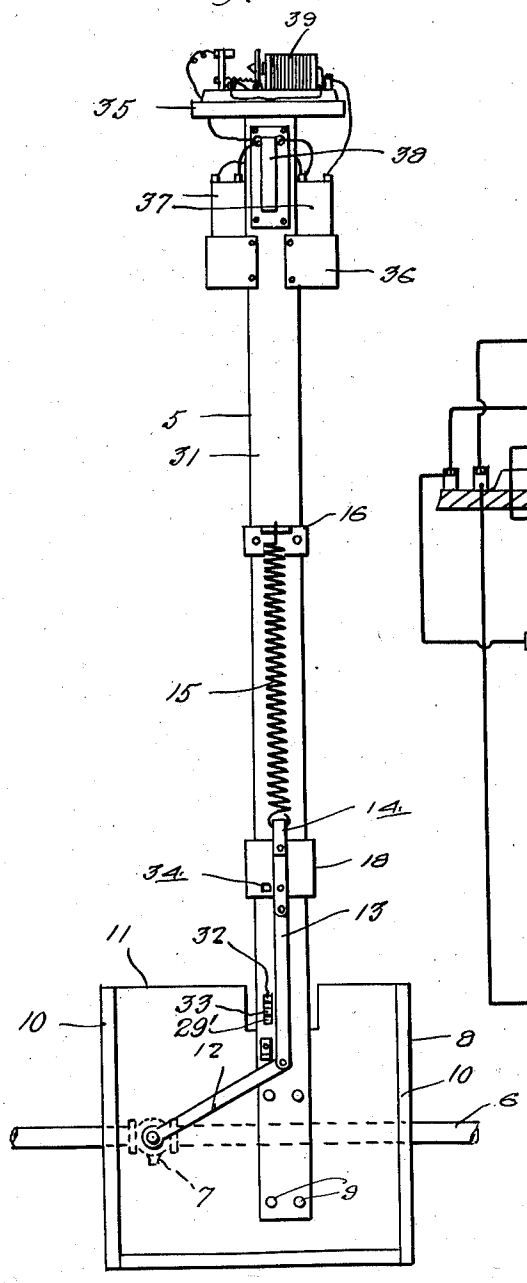
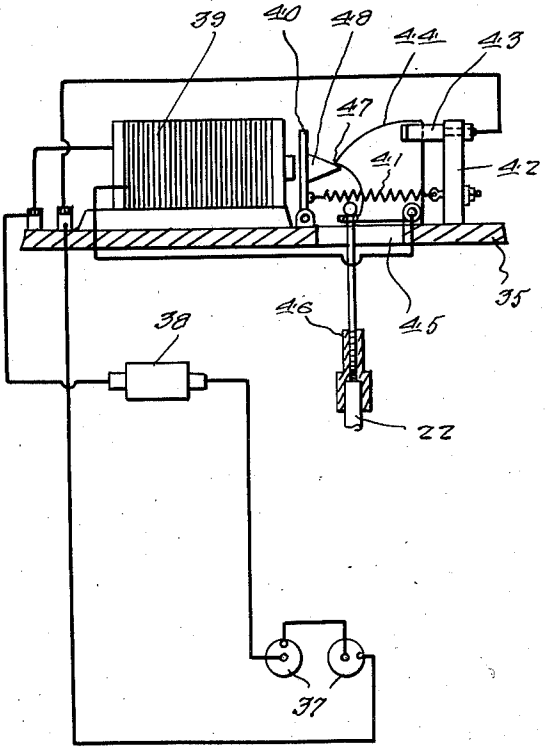


Fig. 4.



Inventor

W. A. Ramseur

By Clarence O'Brien

Attorney

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Fig. 2.

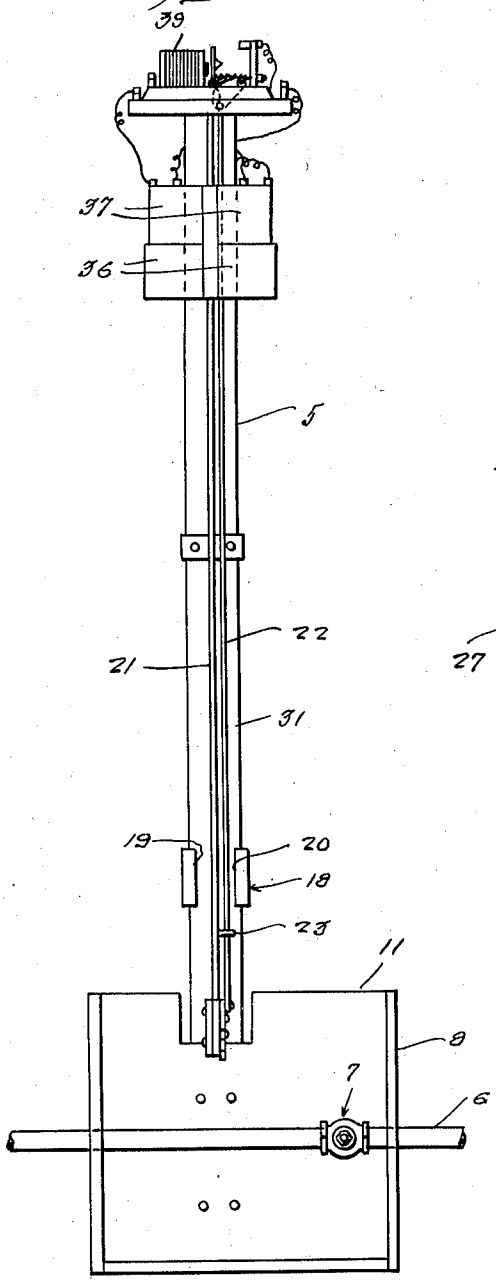
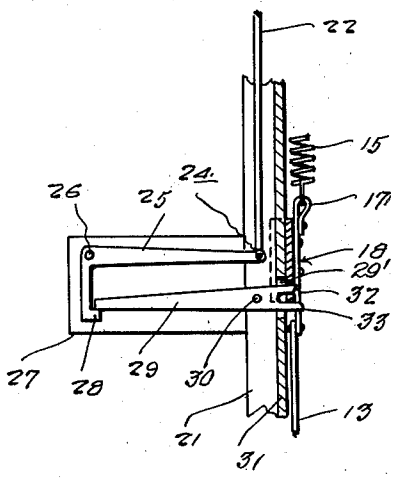


Fig. 3.



Inventor

W. A. Ramseur

By Clarence A. O'Brien

Attorney

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UNITED STATES PATENT OFFICE

1,971,731

AUTOMATIC CUT-OFF

Wellington A. Ramseur, Gainesville, Ga.

Application April 14, 1932, Serial No. 605,336

7 Claims. (Cl. 137—161)

My invention relates to an automatic cut-off for a fluid system, particularly to an automatic, thermostatically controlled valve for opening or closing fluid systems as predetermined levels of temperature are reached.

It is an important object of my invention to provide a structure of this class which is characterized by simplicity and inexpensiveness of parts, which is readily installed in a permanent and lasting manner, and which can be readily adjusted so as to operate automatically at different temperatures.

It is also an important object of my invention to provide a structure which may be installed at desired points in a fluid system, whereby the manual operations usually associated with the work of protecting valved fluid systems during temperature extremes or for other purposes, are eliminated and new convenience introduced into this work.

Other objects and advantages of my invention will be apparent from a reading of the following description and drawings, wherein for purposes of illustration I have shown a preferred embodiment of the invention.

In the drawings:—

Figure 1 is a front elevational view of the embodiment.

Figure 2 is a rear elevational view thereof.

Figure 3 is a transverse vertical sectional view taken at right angles to either Figure 1 or Figure 2.

Figure 4 is a diagrammatic view showing a part of the operating mechanism and the electrical connections.

Referring in detail to the drawings, wherein like numerals refer to like parts throughout the same, the numeral 5 generally designates a suitable vertically extended standard which is arranged to reach ground level or any other convenient position above the fluid conduit 6. About the valve 7 in the fluid conduit 6 there is adapted to be placed a protective casing 8 to which the lower end of the standard 5 is attached as indicated at 9. The casing is formed of transverse end pieces 10 connected by a centralized longitudinally arranged web 11 to which the standard 5 is secured. The conduit 6 passes longitudinally through the casing 8 behind the web or partition 11.

The valve 7 has an operating lever 12 which is pivotally connected to the lower end of a link structure 13 whose upper end is operatively connected as indicated at 14 to the lower end of a contracting coiled spring 15 whose upper end is anchored upon a suitable bracket 16 fastened to an intermediate part of the standard 5.

The lower end of the spring 15 is connected directly to a loop 17 fastened to a slide generally designated 18 which has inturned edges 19, 20 engaged about the sides of the T-iron of which the standard 5 is constructed, so that the slide 18 may have vertical sliding movement upon the standard. The spring 15 normally acts to draw the slide upwardly and either open or close the valve 7 according to the predetermined arrangement of the valve.

At one side of the transversely rearwardly projecting flange 21 of the T iron standard 5 there is disposed an operating rod 22 slidable in a guide 23 projecting from the adjacent side of the flange 21.

The lower end of the rod 22 is pivotally connected to the free end of the long arm 25 of a hook-shaped lever pivoted at 26 to a suitable support 27 projecting from the flange 21 in substantially the same plane. The lever 25 has the normally depending hook formation 28 for engaging under the free end of the long lever 29 which is pivoted near its other end as indicated at 30 on the flange 21 and works through an opening 29′ in the contiguous front side flange 31 of the standard. The end of the lever 29 which works through the opening in the flange 31 is provided with a pair of vertically spaced projections 32 and 33. It will be observed that the lower projection 33 is longer than the upper projection 32 and that the facing sides of the extremities of the projections are angularly reduced and slightly rounded for a purpose which will be obvious.

The slide 18, as shown in Figures 1 and 3, is provided with an opening 34 close to its lower edge to receive the upper projection 32. When the device is set for operation with the lever 29 caught by the hook of the lever 25, the lower projection 33 is positioned under the lower edge of the slide 18 while the upper projection 32 engages in the opening 34 so as to hold the slide down against the pull of the spring 15.

Temperature controlled means is provided by me for moving the rod 22 downwardly whereby to disengage the hooked formation 28 of the lever 25 from the free extremity of the lever 29, so that the lever 29 is disengaged from the slide 18 and the spring 15 permitted to pull the slide 18 and the linkage 13 carried thereby upwardly, so as to swing the valve operating lever 12 for opening or closing the valve 7 according to the predetermined arrangement of the valve.

The thermostatically controlled means for operating the rod 22 is supported on a suitable hori-

zontal base generally designated 35 mounted on the upper end of the standard 5. Suitable receptacles 36 are mounted on the upper part of the standard 5 below the base 35 to contain and support dry batteries or the like 37. A thermostat 38 is supported on the front face of the standard as indicated at 51 and has appropriate connections to the batteries 37. Electrically responsive means supported on the base 35 comprises the electro-magnetic coils 39 in the magnetic sphere of a pivotally mounted armature 40 which is normally drawn away from the electro-magnets by a spring 41 connected to a standard 42 at one end of the base 35. The standard 42 carries the spring contact member 43 which when the device is set for operation engages electrically a free swinging member 44 which is pivotally mounted on the base 35. The member 44 is mounted in such a way that when free to do so it may swing out of contact with the spring contact member 43 and into the opening 45 provided in the base 35, through which opening the upper end of the rod 22 is connected to the free swinging member 44 by means of a longitudinally adjustable connection 46.

The free swinging member 44 has a pointed bill 47 under which a conical or wedge-shaped neb 48 constructed on the armature 40 normally engages in a manner to hold the free swinging member 44 against being pulled into the opening 45 by the weight of the rod. This set relationship of the parts is maintained until thermostat operating temperature obtains, whereupon the magnet 39 will be energized and the armature 40 moved so as to release the free swinging member 44 and permit it to be pulled into the opening 45 by the weight of the rod 22. The falling of the rod 22 causes the disengagement of the hooked lever 25 from the long lever 29, which operates then to release the slide 18 so that the spring 15 may act through the linkage and the operating lever 12 for opening or closing the valve 7 according to the predetermined arrangement of the valve.

The thermostat 38 may be of any suitable normally open, circuit closing type. It is interposed between one side of the batteries 37 and one side of the magnet coil 39. The other side of the batteries 37 is connected to the spring contact member 43 while the remaining side of the coil 39 is connected to the swinging member 44. With the parts set for operation as shown in Figure 4, closing of the thermostat completes a circuit through the magnet coil 39. This circuit is automatically broken when the swinging member 44 is moved out of engagement with the spring contact member 43 as the device operates.

Though I have shown and described herein a preferred embodiment of the invention, it is to be definitely understood that I do not desire to limit the application thereto, and any change or changes may be made in material and structure and arrangement of parts, within the spirit of the invention and the scope of the subjoined claims.

It will be observed that no electrical energy is consumed by the device either before or after operating, but only at the moment of operation.

What is claimed is:—

1. In combination with a valve, a support adjacent the valve, spring means on the support and spaced above said valve and operatively connected to the valve, detent means on the support engageable with said spring means for holding it inoperative, gravity operated means on said support having a portion engageable with said detent means to hold it engaged with said spring means, latch means on said support for holding said gravity operated means ready to act, and electro-thermostatically controlled means on the support operable to disengage said latch means from said gravity operated means to permit said gravity operated means to fall and release said detent means thereby permitting said spring means to open said valve.

2. In combination with a normally closed valve having an operating lever, a support adjacent the valve, electro-thermostatically releasable latch means on the support, gravity operated means on the support arranged to be engaged by said latch means in a manner to be held in readiness to act, valve operating spring means on the support operatively connected to said operating lever, detent means on said support engageable with said spring means for holding said spring means in readiness to act, operating connection means connected to and between said gravity operated means and said detent means, said latch means being arranged to be released from said gravity operated means at a predetermined temperature in a manner to permit said gravity operated means to release said detent means thereby permitting said valve operating spring means to open said valve.

3. In combination with a normally closed valve having an operating lever, a support adjacent said valve, a member vertically movable on said support, a connection between said member and said operating lever, a spring stretched between said member and a point above said support for drawing said member upwardly from a depressed position thereby opening said valve, a movable detent carried by said support and engageable with said member to hold the same in said depressed position, gravity operated means having a lower end portion releasably engageable with said detent to hold said detent engaged with said member, an electro-magnetic latch carried by said support and engageable with an upper part of said gravity operated means to hold the same in an elevated position, said electro-magnetic latch means being arranged to release said upper part of said gravity operated means to permit the same to fall and disengage its said lower end portion from said movable detent thereby permitting said spring to draw said movable member upwardly in a manner to disengage said movable detent therefrom and open said valve.

4. In combination with a normally closed valve having an operating lever, a support adjacent said valve, a member vertically movable on said support, a connection between said member and said operating lever, a spring stretched between said member and a point above said support for drawing said member upwardly from a depressed position thereby opening said valve, a movable detent carried by said support and engageable with said member to hold the same in said depressed position, gravity operated means having a lower end portion releasably engageable with said detent to hold said detent engaged with said member, an electro-magnetic latch carried by said support and engageable with an upper part of said gravity operated means to hold the same in an elevated position, said electro-magnetic latch means being arranged to release said upper part of said gravity operated means to permit the same to fall and disengage its said lower end portion from said movable detent thereby permitting said spring to draw said movable member upwardly in a manner to disengage said movable detent therefrom and open said valve, said upper

part of said gravity operated means comprising a hingedly mounted element.

5. In combination with a normally closed valve having an operating lever, a support adjacent said valve, a member vertically movable on said support, a connection between said member and said operating lever, a spring stretched between said member and a point above said support for drawing said member upwardly from a depressed position thereby opening said valve, a movable detent carried by said support and engageable with said member to hold the same in said depressed position, gravity operated means having a lower end portion releasably engageable with said detent to hold said detent engaged with said member, an electro-magnetic latch carried by said support and engageable with an upper part of said gravity operated means to hold the same in an elevated position, said electro-magnetic latch means being arranged to release said upper part of said gravity operated means to permit the same to fall and disengage its said lower end portion from said movable detent thereby permitting said spring to draw said movable member upwardly in a manner to disengage said movable detent therefrom and open said valve, said lower end portion of said gravity operated means comprising a hingedly mounted arm having at one end a hook portion engageable with said detent.

6. In combination with a normally closed valve having an operating lever, a support adjacent said valve, a member vertically movable on said support, a connection between said member and said operating lever, a spring stretched between said member and a point above said support for drawing said member upwardly from a depressed position thereby opening said valve, a movable detent carried by said support and engageable with said member to hold the same in said depressed position, gravity operated means having a lower end portion releasably engageable with said detent to hold said detent engaged with said member, an electro-magnetic latch carried by said support and engageable with an upper part of said gravity operated means to hold the same in an elevated position, said electro-magnetic latch means being arranged to release said upper part of said gravity operated means to permit the same to fall and disengage its said lower end portion from said movable detent thereby permitting said spring to draw said movable member upwardly in a manner to disengage said movable detent therefrom and open said valve, said upper part of said gravity operated means comprising a hingedly mounted element, said lower end portion of said gravity operated means comprising a hingedly mounted arm having at one end a hook portion engageable with said detent, and said gravity operated means comprising further a vertical member extending between and connected to said hingedly mounted element and to the remaining end of said hingedly mounted arm.

7. In combination with a normally closed valve having an operating lever, a support adjacent said valve, a member vertically movable on said support, a connection between said member and said operating lever, a spring stretched between said member and a point above said support for drawing said member upwardly from a depressed position thereby opening said valve, a movable detent carried by said support and engageable with said member to hold the same in said depressed position, gravity operated means having a lower end portion releasably engageable with said detent to hold said detent engaged with said member, an electro-magnetic latch carried by said support and engageable with an upper part of said gravity operated means to hold the same in an elevated position, said electro-magnetic latch means being arranged to release said upper part of said gravity operated means to permit the same to fall and disengage its said lower end portion from said movable detent thereby permitting said spring to draw said movable member upwardly in a manner to disengage said movable detent therefrom and open said valve, and a conductor with which said upper part engages in its elevated position to close the circuit of said electro-magnetic latch and from which said upper part is disengaged in its depressed position so as to deenergize said electro-magnetic latch.

WELLINGTON A. RAMSEUR.