Jan. 2, 1945. K. R. D. WOLFE 2,366,585

REGULATOR CONTROL DEVICE

Filed July 14, 1943

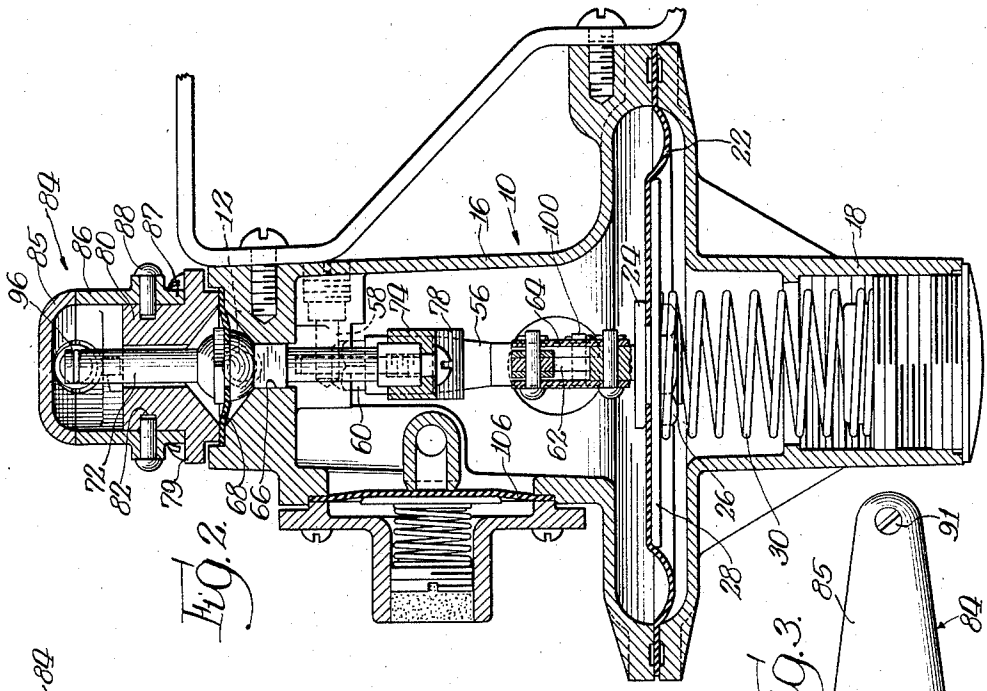


FIG. 2.

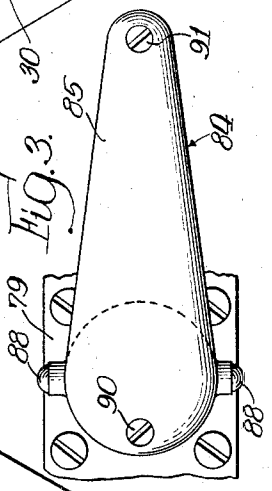


FIG. 3.

FIG. 1.

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REGULATOR CONTROL DEVICE

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5 Claims. (Cl. 74—549)

My invention relates to a control device whereby an operating member, such as a post mounted for universal movement, may be actuated, for instance, to selectively control a pair of valves, by means of a handle mounted to swing around the member.

I will refer to a particular environment in which my control device may be used. In systems using compressed gas in cylinders for heating and lighting purposes and the like, it is customary to provide two tanks or cylinders of gas in the installation, the second tank being a standby or reserve tank which can be connected to the distribution system when the first has become exhausted. This assures continuity of service with a minimum of inconvenience. In such systems, gas is furnished from one tank until it is empty and then the other tank can be connected for use.

For putting the reserve tank into use, a change-over device is provided. This may include means for closing the valve to the used tank and opening the valve to the reserve tank.

My invention has to do particularly with the change-over device for shutting off the used tank and connecting the reserve tank to the service line.

Particularly my invention involves an operating member, for controlling such valves; mounted for rocking, and preferably for universal movement. For actuating the member, I provide a handle mounted at one end to swing around the member. To impart movement from the handle to the operating member without jar or likelihood of injury under any circumstances, I use a spring, entirely protected on the inside of the handle and connected respectively to the handle and the member.

With the objects thus indicated, and with other objects which will become apparent as the description proceeds, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing, in which:

Figure 1 is a vertical sectional view of my improved control device assembled in connection with the change-over valves of a system of the kind mentioned.

Figure 2 is a vertical sectional view taken at a right angle to that of Figure 1, and

Figure 3 is a top plan view of the handle with parts of the system structure broken away.

I will first describe a change-over structure of the kind with which my control device is used.

My present application is a continuation-in-part of my application Serial No. 374,711, filed January 16, 1941.

In the accompanying drawing I have used the reference numeral 10 to indicate generally a housing. In Figure 1 the housing 10 is shown as connected to lengths of tubing 12, which are intended to convey gas from suitable tanks. The housing 10 consists of two principal parts which I have designated as the casing portion 16 and the bonnet portion 18. These two members are connected together by screws 20, and clamped between them is a flexible diaphragm 22. A threaded stud 24 passes through the diaphragm, and a nut 26 on the stud clamps a disk 28 against the diaphragm. A coil spring 30 bears against the disk 28 and is supported by a member 32 which is threaded into the bonnet 18. It will be seen that the member 32 can be rotated to vary the pressure exerted by the spring 30 against the disk 28 and thus against the diaphragm 22.

In the interior of the casing 16 at the top are passages 40 which communicate with the tubes 12. At the inner end of each passage 40 is formed a valve seat 44.

Inside the casing 16 valve levers 56 are supported on pivots 58. The ends of the valve levers may be provided with removable valve tips 60 carrying any suitable type of material for effecting a tight fit with the valve seat portion 44. The valve levers 56 are coupled by toggle links 62 to the third link 64, the latter being pivotally connected also to the stud 24, and thus to the diaphragm 22.

Centrally located in the top of the casing 16 is a bore 66. At the top of the bore 66 is a diaphragm 68, and flexibly supported thereby is an operating member or post 72. At the lower end of the post is a foot member 74 having laterally projecting arms 76 and 78.

The diaphragm seal 68 allows flexibility for free movement of the post 72, constituting in effect a pivot for it, but eliminates the problems associated with the stuffing box or gland such as normally used in connection with the operating means for a valve or control device.

The head plate 79 has a part which grips the outer edge of the diaphragm 68 and a part which extends upwardly in the form of a boss 80 having an annular groove 82 formed therein.

I now turn to the part of the structure to which my present invention relates. A hollow handle 84 may be made in two halves 85, 86,

and has at one end a projecting sleeve portion 87 which fits over the boss 80, and is retained thereon by pins 88 which pass through the sleeve 87 and extend into the groove 82 in the boss 80. The handle 84 is thus retained on the boss but may be swivelled around it. The handle parts 85, 86 are held together by screws 90, 91. The parts are suitably cut away to receive one end of the coil spring 94 which is anchored to the outer end of the handle 84 by the screw 91. The other end of the spring encircles the top end of the post 72, and is retained thereon by a groove 96. The tension of the spring 94 on the post 72 causes the latter to tip about its flexible mounting in the diaphragm 68, to the inclined position indicated in Figure 1, where the lateral projection 76 bears against the left hand valve member 56. The pressure thus exerted against the valve member holds its tip 60 in tight engagement with the valve seat 44.

Assuming that a tank of gas is connected to each of the tubes 12 so that gas pressure exsists therein, gas will flow into the casing 16 through the valve seat 44 of the right hand inlet tube 12, when the parts are in the positions shown in Figure 1. As gas continues to flow into the chamber 16, the pressure therein will increase, and the diaphragm 22 and its associated disk 28 and stud 24 will move downwardly against the force of the spring 30. Under the pressure exerted by the arm 76, the left hand valve member 56 is held in fixed position against the nozzle 44 of the connection member, and therefore the lower pivot 98 of the valve member may be considered as a fixed point for the time being. As the stud 24 moves downwardly, then, it will tend to straighten out the toggle links 62, and thus move the pivot 100 toward the right, which will swing the right hand valve lever 56 against its pivot 58 and ultimately will close off the flow of gas from the right hand inlet. When this condition has been reached, no further action will take place until some of the gas within the casing 16 is consumed through the outlet passage 102, to which the distribution pipe 104 is connected.

When gas is thus used, the pressure in the casing 16 will fall, the spring 30 will cause the diaphragm 22, and hence the stud 24, to rise; the toggle action of the links 62 will draw the pivot 100 toward the left, will open the right hand valve, and will allow more gas to flow in from the supply cylinder, until the pressure within the casing is such to cause the valve to close once more.

It will thus be seen that gas is drawn only from the cylinder connected to the right hand supply tube 12 of Figure 1.

When that cylinder is exhausted, however, the handle 84 may be swung from the position shown in Figure 1, to a point 180° from that position. It will be apparent from Figure 1 that when the handle is thus reversed the pull of the spring 94 on the operating member or post 72 will also be reversed. The post will also therefore be tipped in its flexible diaphragm mounting 68 to the position where its laterally extending arm 78 will engage the right hand valve lever 56, holding the latter in closed position. The pivot 100 will then for the time being be a fixed point, and the diaphragm and lever system will cause gas to be admitted from the left hand inlet, as viewed in Figure 1. As in the case first described, a regulating or pressure reducing action occurs, the pressure in the casing 16 being determined by the adjustment of the member 32 in conjunction with the spring 30.

Pressure relief means may be provided to vent excess pressure from the casing 16 in case one of the valve tips 60 should fail to seat perfectly on the coacting seat 44 due to the presence of foreign matter, or for any other reason. The pressure relief device consists of a diaphragm 106 and other parts described in my application Serial No. 374,711.

The control device which is the subject of the present application, is such that the spring 94 is entirely protected. The accuracy of its control of the operating member 72 is the same whenever the handle is moved.

My handle never sticks. It never jams the operating member, or jerks it. The spring can be easily replaced.

I claim as my invention:

1. In a control device, an operating member mounted for universal movement, a hollow handle mounted at one end to swing around said member, with one end of the member projected into the handle, and a spring in the hollow handle connected to the member at one end and fixed to the handle at the other end, whereby the movement of the handle may be transmitted to the member through the spring.

2. In a control device, an operating member mounted for rocking movement, a hollow handle rotatably but non-slidably mounted at one end to swing around said member, with one end of the member projected into the handle, and a spring in the hollow handle connected to the member at one end and fixed to the handle at the other end, whereby the movement of the handle may be transmitted to the member through the spring.

3. In a control device, an operating member mounted for rocking movement having at one end oppositely projecting arms for cooperating with spaced valves, a hollow handle rotatably but non-slidably mounted at one end to swing around said member, with one end of the member projected into the handle, and a spring in the hollow handle connected to the member at one end and fixed to the handle at the other end, whereby the movement of the handle may be transmitted to the member through the spring.

4. In a control device, an operating member mounted between its ends for rocking movement, a hollow handle rotatably but non-slidably mounted at one end to swing around said member, a spring in the handle connected at one end to the handle and having at the other end a swivel connection with the member, whereby the swinging movement of the handle will transmit rocking movement to the member through the spring.

5. In a control device, an operating member mounted for rocking movement, a hollow handle rotatably but non-slidably mounted at one end to swing around said member, with one end of the member projected into the handle, and a spring in the hollow handle connected to the member at one end and fixed to the handle at the other end, whereby the movement of the handle may be transmitted to the member through the spring, the upper end of the handle being removable for permitting access to the spring, and means for securing the parts of the handle together, said means comprising the means by which one end of the spring is fixed to the handle.

KENNETH R. D. WOLFE.