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INDICATOR FOR MANUAL RESET VALVES

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Fig. 1

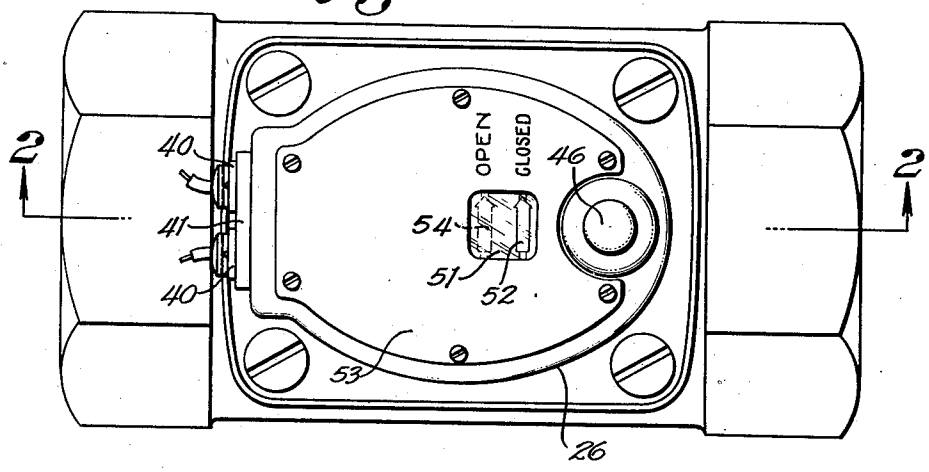
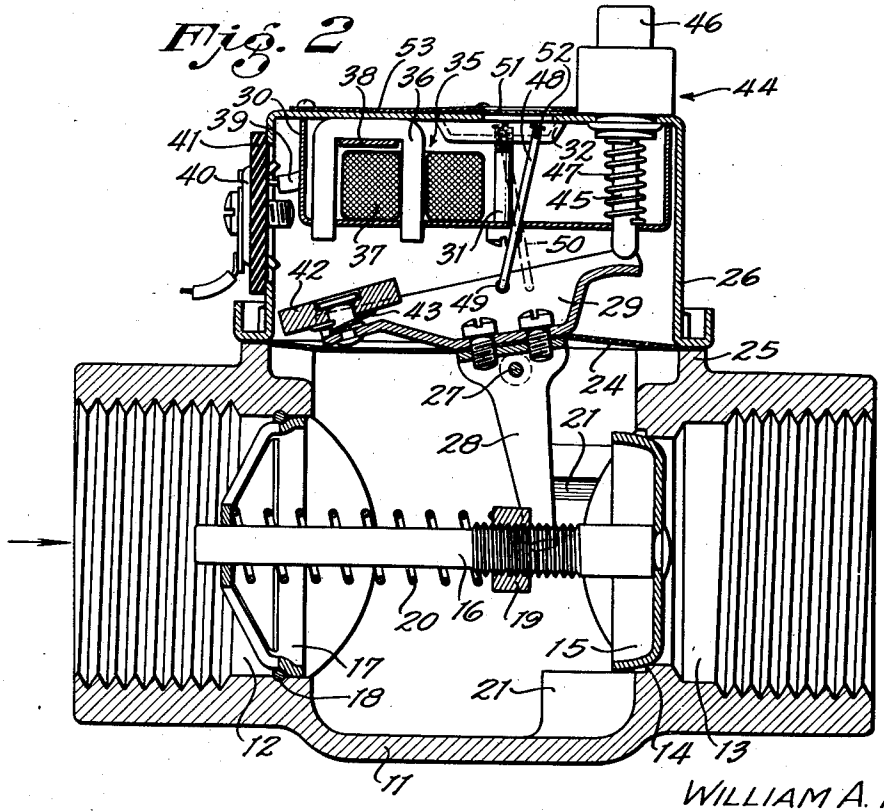


Fig. 2



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INDICATOR FOR MANUAL RESET VALVES

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3 Claims. (Cl. 116—125)

My present invention relates to fluid control valves, and particularly to those of the manual-reset type wherein a closure member, biased toward closed position, is moved to its open position by manual means, in which open position it is adapted to be retained by means responsive to a controlling condition, such as, for example, temperature or pressure within a predetermined range, or the existence of flame at a pilot burner.

Manual-reset valves of the type indicated have particular utility as safety valves in the control of fuel supply to a main burner for which a constantly burning pilot burner is provided, means responsive to the flame of the pilot burner then being provided for controlling the means by which the closure member is retained in its open position. Such retaining means may consist of a latch mechanism operated by a pilot-burner-heated thermostatic device, or an electromagnet energized by a thermoelectric generator heated by the pilot flame; upon extinction of that flame the retaining means becomes ineffective and the valve closes, manual-resetting then being necessary for subsequent operation of the burner system.

Should the burner system fail to function, it is desirable to immediately ascertain the condition of the safety valve. However, in prior art devices there is no way in which that can readily be done, which makes it necessary for the operator to examine the pilot burner, or other means to which the safety valve is responsive. To obviate the necessity for such procedure, it is an object of my invention to provide. in a valve of the type indicated, means whereby its condition can be readily and positively determined by inspection.

In manually resetting the valve, it is desirable to be able to readily determine the point at which the retaining means becomes effective to perform its function—i. e., for example, when the means responsive to the pilot burner flame has become sufficiently heated—to avoid premature release of the resetting means. It is therefore another object of this invention to provide simple means for indicating that condition and effective in trial initial movement of the resetting means from its manually-held position.

Another object is to provide indicating means of the character described which is contained entirely within the housing of the valve where it is protected from injury, dirt, etc.; a window being provided through which the indicator can be observed.

Other objects and advantages of this invention will be found in the description, the drawing and the appended claims; and for complete understanding of the invention reference may be had to the following detailed description and accompanying drawing, wherein:

Figure 1 is a plan of a manual reset valve embodying my invention; and

Figure 2 is a section taken along the line 2—2 of Fig. 1.

In the drawing, the numeral 11 indicates a valve casing having an inlet 12 and an outlet 13, the inner end of the outlet being reduced in diameter to provide an annular valve seat 14. Cooperable with the seat 14 is a closure member 15 secured on one end of a reciprocable valve stem 16; the other end of the stem extending loosely through a central opening in an apertured cup-shaped washer 17 positioned in the inlet 12 and restrained from outward movement therethrough by a wire ring 18 snapped into a groove formed in the inlet wall. Encircling the stem 16, and compressed between the washer 17 and a nut 19 threaded on an intermediate portion of the stem, is a helical spring 20 constantly urging the closure member toward its seat, and the washer 17 against the snap-ring 18. The closure member 15 is guided at its periphery by a plurality of spaced vanes 21 projecting from the inner surface of the casing wall.

Closing an opening in the upper wall of the casing 11 is a flexible diaphragm 24, held at its margin between a raised, annular portion 25 of the casing and the flanged lower end of a housing 26 secured thereto. Pivoted on a pin 27, secured at its ends in openings in bosses (not shown) projecting inwardly from the upper side walls of the casing 11, is a U-shaped member 28, the end portions of the arms of which straddle the stem 16 between the closure member 15 and the nut 19. The cross bar of the member 28 is widened to provide a base on which a channelled lever arm 29 is mounted with the adjacent portion of the diaphragm clamped therebetween. The arm 29 and member 28 rock as a unit about the pin 27 to operate the closure member 15, and the pin 27 is positioned as near as is practicable to the plane of the diaphragm to minimize flexure of the same.

A sub-housing 30 is positioned within the housing 26 and is secured thereto by a pair of screws 31 threaded into a pair of depressed portions 32 of the top wall of the housing. Within the sub-housing 30 is an electromagnet, generally indicated at 35, comprising a U-shaped core 36 and a coil 37 therefor. The core 36 is

secured to the underside of the top wall of the housing **26** by a U-shaped metal strap **38** riveted to the housing wall, and the lower ends of the core arms extend through openings in the bottom wall of the sub-housing **30**. The coil **37** encircles one leg of the core **36** and is connected by leads **39** to terminals **40** secured in an insulating plate **41** covering an opening in the side wall of the housing **26**. Cooperable with the pole faces of the core **36** is a rectangular armature **42**, rockably mounted on one end of the arm **29** and restrained from rotation by the side walls thereof. A light coil spring **43** is compressed between the armature and the arm so that the armature, upon clockwise movement of the arm, is resiliently pressed into engagement with the pole faces of the core **36**, the rockable mounting permitting accurate alignment of the upper surface of the armature with the pole faces.

Secured in an opening in the top wall of the housing **26** is a sleeve assembly, generally indicated at **44**, in which a rod **45** is slidable. The upper end portion of this rod is enlarged to form a push-button **46**, and its lower end extends through the bottom wall of the sub-housing **30** so that in its downward movement it can engage the right-hand end of the arm **29** to rock the same. Encircling the rod **45**, and urging the same upward, is a helical spring **47** compressed between an enlarged medial portion of the rod and the bottom wall of the sub-housing.

Extending loosely through a transverse slot in the bottom wall of the sub-housing **30** are the arms of a U-shaped indicator wire **48**, the lower ends of the arms being outwardly bent and sprung into openings **49** in the sidewalls of the arm **29**. The sides of the slot in the sub-housing bottom wall provide a fulcrum about which the indicator arm is adapted to rock, upon movement of the pivoted arm **29**, to the position indicated by the broken line **50**. Closing an opening through the top wall of the housing **26** adjacent the upper or free end of the indicator wire **48**, is a window **51**, preferably of Celluloid or other non-breakable transparent material, through which a pointer **52**, secured on the cross-piece of the indicator wire **48**, is visible. The window is clamped in position between the top wall of the housing **26** and a cover plate **53**, mounted thereon, which carries the legends "open" and "closed" by which, and in accordance with the position of the pointer **52**, the position of the closure member is shown.

With the parts in the positions shown in the drawing, if pressure is applied on the push-button **46** the rod **45** will move downward and contact the arm **29**, causing it to turn in a clockwise direction. Such movement of the arm causes the closure member to move to its open position and the pointer **52** likewise to move to its "open" position shown at **54**. In this movement, the armature **42** is brought into engagement with the pole faces of the core **36**, in which position it will be magnetically held, against the opposing force of spring **20** acting on the closure member, when the electromagnet is sufficiently energized, which condition can be ascertained by gradually decreasing the pressure on the push-button **46** and watching for any return movement of the pointer. Removal of pressure on the push-button permits the rod **45** to return to its normal, or unactuated, position under the force of spring **47**. Should the electromagnet become deenergized, the armature is released and the closure member returns to its seat, the pointer **52** moving to the position wherein the "closed" condition of the valve is plainly indicated.

Having herein shown and described, by way of illustration, a specific embodiment of my invention, I wish it to be understood that modifications may be made without departing from the spirit of the invention, and that I intend therefore to be limited only by the scope of the appended claims.

I claim as my invention:

1. In combination: a pivoted actuating arm; means for rocking said arm between limiting positions; and means for indicating the position of said arm, comprising a member pivotally connected at one end to said arm and having at its other end an indicating device, and stationary means providing a fulcrum for an intermediate portion of said member and on which the member can slide, said fulcrum and the pivot points of said member and of said arm being substantially in alignment when the arm is between its limiting positions.

2. In combination: an actuating arm pivotally supported intermediate its ends; means engageable with one end of said arm for rocking the arm between limiting positions; and means for indicating the position of said arm, comprising a member pivotally connected at one end to said arm adjacent the pivot thereof and having at its other end an indicating device, and stationary means having an opening therethrough encompassing an intermediate portion of said member and wherein the member can rock in the movement of said arm, said opening and the pivot points of the member and the arm being substantially in alignment when the arm is midway between its limiting positions.

3. In combination: an actuating arm pivotally supported intermediate its ends; said arm having a longitudinal channel, the side walls of which are at right-angles to the pivotal axis of the arm; means engageable with one end of said arm for rocking the arm between limiting positions; and means for indicating the position of said arm, comprising a member one end of which is disposed in said channel and pivotally connected to the opposite side walls thereof, an indicating device on the other end of said member, and stationary means having an opening therethrough encompassing an intermediate portion of the member and wherein the same can rock in the movement of said arm, said opening and the pivot points of the member and the arm being substantially in alignment when the arm is midway between its limiting positions.

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