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H. L. DOBRIKIN
SINGLE THROW SWITCH

2,935,581

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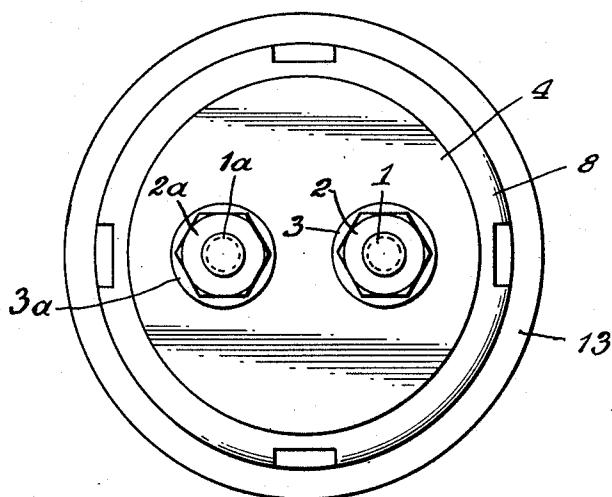


Fig. 2

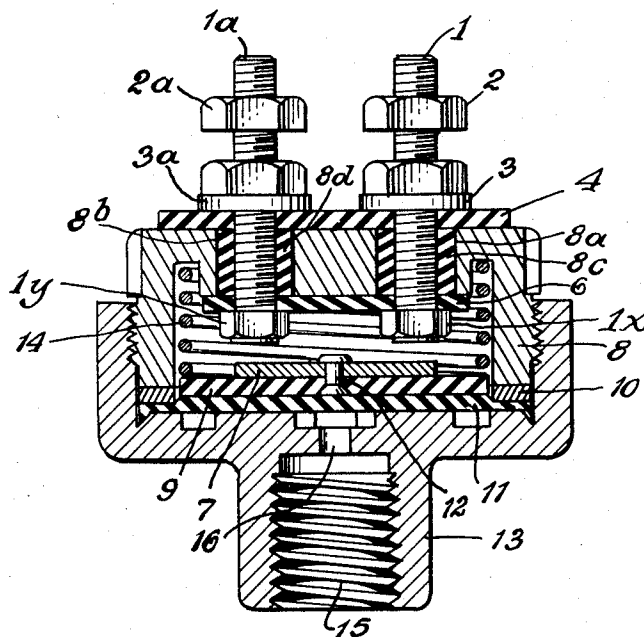


Fig. 1

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2,935,581

SINGLE THROW SWITCH

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4 Claims. (Cl. 200—83)

This invention relates to switches and has particular relation to an air operated switch.

One purpose is to provide an air operated switch of maximum simplicity in manufacture and operation.

Another purpose is to provide an effective air operated switch operable in one direction in response to air pressure and in another direction in response to mechanical pressure.

Another purpose is to provide a switch mechanism employing a yielding member through which electric current is not required to be directed.

Another purpose is to provide a switch having an increased operating life.

Other purposes will appear from time to time during the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is a side elevation in cross-section and

Figure 2 is an end view.

Like parts are indicated by like numerals throughout the specification and claims.

Referring now to the drawings and particularly to Figure 1 thereof, the numeral 1 indicates a connector post. A second contact or connector post is shown at 1a. Pairs 2 and 2a of nut elements are respectively threaded on posts 1 and 1a to provide connection with suitable electrical conductors. Washers 3, 3a are held against a cover disc 4 by the inner nut members of the sets 2, 2a it being understood that the disc or cover 4 is formed of a suitable insulating material.

A switch housing includes telescoped or threadably engaged housing elements 8, 13. Together the members 8, 13 form a switch body. The housing element 8 has a set of apertures 8a, 8b. The post 1 extends through the aperture 8a and the post 1a extends through the aperture 8b. Positioned within the aperture 8a is a bushing 8c formed of insulating material and surrounding the post portion within the aperture 8a. A similar bushing 8d surrounds the post portion within the opening or aperture 8b. Clamped against the inner surface of the housing 8, as by the nut elements or connectors 1x, 1y, is an inner insulating disc or member 6 formed of insulating material. It will be understood that the inner ends of the post 1, 1a constitute switch contact points positioned within the chamber formed by the switch body elements 8, 13.

A movable switch contact element 7 is secured, as by the rivet 12, to a movable disc element 9 formed of insulating material and urged in a direction away from the contacts points 1x, 1y by a spring 14 positioned within the housing 8, 13 and having its opposite ends in engagement with the body portion 8 and the disc 9. A seal ring 10 is pressed against a circumferential or peripheral edge surface of a diaphragm member 11 and serves to clamp said edge against an inner portion of the switch body element 13 as a result of the telescoping of the members 8, 13. The switch cap or housing portion 13 has an internally threaded pipe-receiving sleeve 15.

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An air passage 16 places the portion 15 in communication with the surface of the diaphragm opposite to that engaged by the movable disc 9.

Whereas I have described and claimed a practical and operative device, nevertheless, many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I, therefore, wish my description and drawings to be taken as, in a broad sense, illustrative or diagrammatic, rather than as limiting me to my precise showing.

The use and operation of my invention are as follows:

It will be understood that an air pressure line is normally threadably engaged in the sleeve or well 15 and that air pressure may thereby be delivered through the passage 16 to one face of the diaphragm 11. The disc 9, being of substantially equal diameter with the movable, relatively free portion of the diaphragm 11, prevents undue distortion or bulging of the diaphragm 11 in response to delivery of air pressure initially to essentially the center thereof. Movement of the diaphragm 11 in response to air pressure so delivered thus results in movement of the disc 9 and contact 7, against the action of spring 14, to bring the contact 7 into electrical energy-transmitting contact with the posts 1, 1a thus providing a circuit across or through the posts 1, 1a. When the air pressure delivered against the rear or right hand face of the disc 11, as the parts are shown in the drawings, falls below a predetermined quantity, the spring 14 is effective to move the disc 9 and contact 7 as well as the diaphragm 11 in a direction away from the posts 1, 1a, or to the right as the parts are shown in the drawings. It will be understood that the amount of air pressure in the system with which the switch of my invention is employed may thus be automatically correlated in relation to the predetermined strength of the spring 14. For example, the switch of my invention may be employed as an automatic control in the air brake system of trailer trucks and the like.

It will be observed that current is not directed at any time through the spring 14. The spring 14 is thus protected from a gradual destruction of the temper and effectiveness of the spring resulting from the passage of current therethrough and the life of the switch is thereby lengthened. Similarly the back-up member 9 provides for smooth and dispersed application of air-pressure to the diaphragm 11 while leaving the diaphragm free from the direct attachment of a switch element such as the element 7 thereto.

I claim:

1. In an air pressure switch, a housing defining a chamber, a flexible diaphragm dividing said chamber, means for delivering air within said housing under pressure on one side of said diaphragm, a diaphragm-supporting disc of insulating material having substantially the diameter of said diaphragm and chamber within said chamber and yieldingly urged at its peripheral portion against and into contact with substantially the entire opposite side of said diaphragm, a contact element secured to said disc and a pair of spaced terminal elements extending into said chamber through a wall of said housing on the side of said diaphragm opposite from that to which said air pressure is delivered and positioned to be contacted by said contact element in response to movement of said diaphragm, disc and contact element.

2. A switch comprising a housing defining a chamber, a pair of spaced switch terminals insulated from and extending through a wall of said housing into said chamber, said chamber having a substantially flat inner end wall opposite that penetrated by said terminals, a flexible diaphragm having its peripheral portion secured to the side wall of said chamber and having a central operative portion lying normally along and against said flat end

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wall, means for delivering air under pressure to the side of said diaphragm normally lying against said flat end wall, a supporting disc of insulating material and yieldingly-urged at its peripheral portion against substantially the entire opposite surface of said diaphragm within said chamber, said flat end wall, diaphragm operative portion and disc having substantially the same diameter, a contact element secured to and movable with said disc and positioned to engage the inner ends of said terminals within said chamber in response to movement of said diaphragm under the influence of said air under pressure.

3. In a switch, a housing defining a chamber having a flat end wall, a diaphragm a passage in said end wall adapted to deliver fluid pressure to said chamber, a pair of terminals extending through said housing and into said chamber opposite said flat end wall, said diaphragm having its peripheral portion clamped against said flat end wall and having one surface of its remaining central, operative portion lying normally along and against said flat end wall, a supporting disc of insulating material held yieldingly against the opposite surface of said diaphragm central portion by a spring in said chamber, said diaphragm central portion, disc, spring and chamber having substantially equal diameters, said disc being disconnected from said diaphragm and a contact element secured to said disc and positioned to contact said elements in response to movement of said diaphragm and disc in a direction away from said flat end wall.

4. In an air pressure switch, a housing, a flexible diaphragm dividing said housing, means for delivering air within said housing under pressure on one side of said diaphragm, a diaphragm-supporting disc having substantially the diameter of said diaphragm within said housing

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and yieldingly urged against substantially the entire opposite side of said diaphragm, said disc being formed of insulating material and connected with said diaphragm, a pair of spaced contact elements extending through a wall of said housing on the side of said diaphragm opposite from that to which said air pressure is delivered, a connector element secured to said disc and positioned to be brought into energy-transmitting contact with said spaced contact elements in response to movement of said diaphragm, disc and connector element, said housing having a substantially flat wall adjacent said air delivering means and effective to support said diaphragm in a single plane between said wall and said yieldingly-urged disc when said diaphragm is in non-operating position and a spring in said housing having a diameter substantially equal to that of said disc and having its opposite ends respectively in contact with said housing and a peripheral portion of said disc.

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