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PRESSURE ACTUATED SWITCH

Fig. 1.

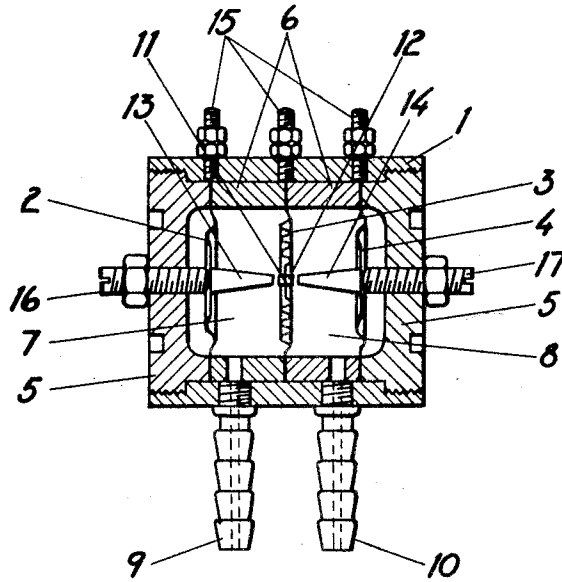
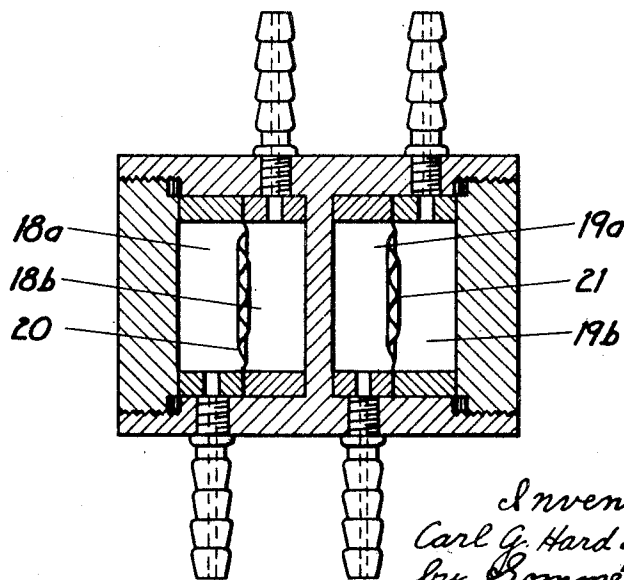


Fig. 2.



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UNITED STATES PATENT OFFICE

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PRESSURE ACTUATED SWITCH

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5 Claims. (Cl. 200—81.4)

1

This invention relates to electric switch devices adapted to be operated by fluid pressure. More particularly it relates to switch devices adapted to be controlled by differences of pressures or degrees of vacuum at two different points. The fluid or fluids at the said two points may consist of gas only, liquid only or of a gas and a liquid. The term "pressure" as hereinafter used includes all pressures down to absolute vacuum.

It is an object of this invention to provide a device of the above kind of particularly simple and rugged construction.

Another object is to provide a pressure-operated switch device the contacts of which are enclosed within a protective casing.

Another object is to provide a pressure-operated switch device the contacts of which are immersed in a protective liquid or gas.

Another object is to provide a pressure-operated switch device in which the pressure at which a circuit controlled by said switch device is opened or closed may be adjusted at will.

Still another object of the invention is to produce a differential pressure operated switch device adapted to respond to any deviation from a predetermined pressure difference or from a predetermined range of pressure differences.

Further objects of the invention will appear from the following specification and claims.

In the accompanying drawings illustrating the invention,

Fig. 1 is a sectional view of an embodiment of the invention, and

Fig. 2 is a sectional view of a device designed to transmit the operating pressures to a differential pressure operated switch device according to the invention while preventing any exchange of fluid between said last-mentioned device and the source of fluid.

The device shown in Fig. 1 has a cylindrical casing 1 of an electrically insulating material, in which three metallic diaphragms 2, 3, 4 are mounted by means of end pieces 5 and distance rings 6, the latter being of electrically insulating material. The space between the diaphragms 2 and 3 forms one pressure chamber 7, and the space between the diaphragms 3 and 4 forms another pressure chamber 8. Each chamber is designed to be connected to a pressure conduit through a nipple 9, 10. The central diaphragm 3 is provided with two contacts 11, 12 adapted to cooperate with stationary contacts 13 and 14, respectively, which are supported by the outer diaphragms 2, 4. Terminals 15 are provided for

2

connecting the contacts to the circuits to be controlled. The spacing of the contacts can be adjusted by means of the setting screws 16, 17.

The manner of action of the device is obvious. When the pressures in the chambers 7, 8 are equal, the central diaphragm 3 will occupy the middle position shown in the figure. If the pressures are not equal, the diaphragm will be deflected to the right or to the left, as the case may be. The factors determining the sensibility of the device are the stiffness of the diaphragm and the spacing between the movable and the stationary contacts.

If the fluid in which the pressure differences acting upon the switch are produced is electrically conducting or will produce a chemical action on the contact surfaces or has other properties which render it undesirable to introduce said fluid into the chambers 7, 8, said chambers may be filled with a special protective fluid to which the pressure variations of the operative fluid are transmitted. Said protective fluid may be a gas, e. g., nitrogen, or a liquid, e. g., toluene or oil. For transmitting the pressure from the operative fluid to the protective fluid any known device may be used. The device shown by way of example in Fig. 2 comprises two pairs of chambers 18a, 18b and 19a, 19b, the chambers of each pair being separated by a diaphragm 20, 21, respectively. The chambers 18a, 19a are designed to be connected to the pressure conduits, while the chambers 18b, 19b are designed to be connected to the chambers 7, 8 by suitable conduits provided with means for filling the chambers 18b, 19b, 7, 8 with the protective fluid.

The contacts of the switch device according to the invention may be connected to an electrical indicating or recording device or to an electrical device adapted to control directly or indirectly the pressure difference acting upon the switch device.

While I have described and illustrated one form of my invention, I wish it to be understood that the invention may be embodied in a variety of other specific forms without departing from the essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

3

1. An electric switch device comprising, a casing, means dividing said casing into two pressure chambers within said casing, connections for subjecting each of said chambers to a fluid pressure, the dividing means comprising a movable wall separating said two chambers from each other, a second movable wall adjoining one of said chambers only, an adjusting member engaging the outside of said second movable wall, a pair of contacts within said last-mentioned chamber comprising a movable contact operatively connected to said first-mentioned movable wall and a stationary contact operatively connected to said second movable wall, and means for electrically connecting said pair of contacts to an external circuit.

2. An electric switch device comprising, a casing, means dividing said casing into two pressure chambers within said casing, connections for subjecting each of said chambers to a fluid pressure, the dividing means comprising a movable wall separating said two chambers from each other, a second movable wall adjoining one of said chambers only, an adjusting member engaging the outside of said second movable wall, a pair of contacts within said last-mentioned chamber comprising a movable contact supported by said first-mentioned movable wall and a stationary contact supported by said second movable wall, and external circuit connection means connected with said pair of contacts.

3. An electric switch device comprising, a casing, two movable walls arranged within said casing so as to enclose a space therein, two adjusting members engaging the outside of each of said movable walls, respectively, a third movable wall arranged between said first-mentioned movable walls so as to divide the space therebetween into two pressure chambers, means for subjecting each of said pressure chambers to a fluid pressure, a pair of contacts within one of said pressure chambers, a pair of contacts within the other pressure chamber, each of said pairs of contacts comprising a contact supported by the movable wall separating said chambers and a contact supported by the other movable wall adjoining the chamber, and external circuit connection means electrically connected with said contacts.

4. An electric switch device comprising, a casing, two movable walls arranged within said casing so as to enclose a space therein, two adjusting

4

members engaging the outside of each of said movable walls, respectively, a third movable wall arranged between said first-mentioned movable walls so as to divide the space therebetween into two pressure chambers, means for subjecting each of said pressure chambers to a fluid pressure, while preventing any interchange of fluid between the pressure chambers and the respective sources of fluid pressure, a pair of contacts within one of said pressure chambers, a pair of contacts within the other pressure chamber, each of said pairs of contacts comprising a contact supported by the movable wall separating said chambers and a contact supported by the other movable wall adjoining the chamber, and external circuit connection means connected with said contacts.

5. An electric switch device comprising, a casing, two movable walls arranged within said casing so as to enclose a space therein, two adjusting members engaging the outside of each of said movable walls, respectively, a third movable wall arranged between said first-mentioned movable walls so as to divide the space therebetween into two pressure chambers, a pair of contacts within one of said pressure chambers, a pair of contacts within the other pressure chamber, each of said pairs of contacts comprising a contact supported by the movable wall separating said chambers and a contact supported by the other movable wall adjoining the respective chamber, means for electrically connecting said contacts to external circuits, and means for subjecting each of the aforesaid chambers to a fluid pressure, said last-mentioned means comprising two chambers, a movable wall in each chamber dividing the same into two compartments, means for connecting one compartment of each chamber to a source of fluid pressure, and means for connecting one of the other compartments to one of the pressure chambers and the other compartment to the other pressure chamber.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,444,403	Varley	Feb. 6, 1923
2,116,960	Brown et al.	May 10, 1938