Oct. 11, 1932. M. A. LASWELL 1,881,710

GAS OPERATED SWITCH

Filed May 20, 1929

Fig.1.

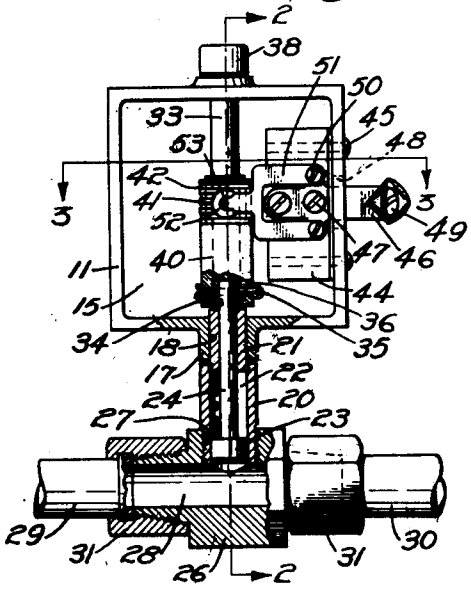


Fig.2.

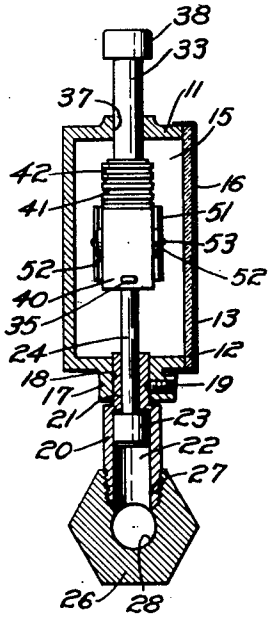


Fig.3.

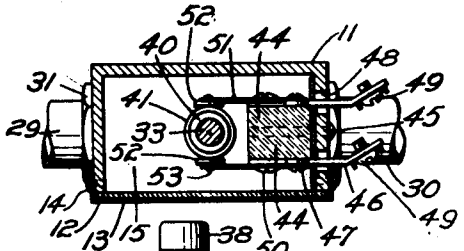
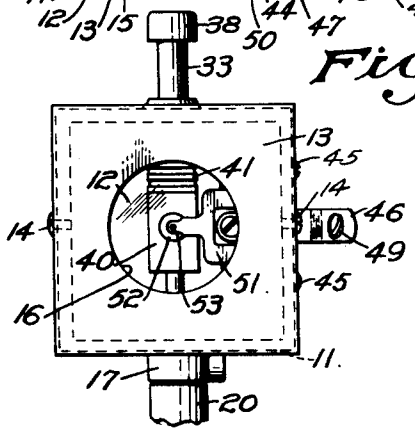


Fig.4.



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UNITED STATES PATENT OFFICE

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GAS OPERATED SWITCH

Application filed May 20, 1929. Serial No. 364,676.

My invention relates to a new and novel type of electrical switch which is operated by a fluid pressure.

My device is particularly adapted for use with fire extinguishing apparatus, although it is not confined to this use alone, as it may be used in other ways. It is particularly adapted for use with fire extinguishing apparatus of the type installed in buildings or other structures where the fire extinguishing fluid or gas is supplied under pressure to distributing points in the buildings or structures.

In the operation of this type of fire extinguishing apparatus, it is often desirable to have the release of the extinguishing fluid accompanied by the switching of an electrical circuit, which may be used to open an electrical circuit breaker so as to de-energize the power lines to the building, to close a circuit and sound an alarm, or for similar operations.

It is an object of my invention to provide an electrical switch having sufficient capacity to switch the pilot circuit of an electrical device and which will be automatically operated by the pressure of the extinguishing fluid when the latter is supplied to extinguish a fire.

In the operation of this switch, it is desirable to have the switch stay in the operated position until reset by hand, so that the operator may ascertain whether or not the electrical circuit is in the proper condition before resetting the switch. This is known as the hand-reset type of switch.

It is another object of my invention to provide a switch which will have the hand-reset features.

In order to reduce the cost of manufacturing a switch of the above type, it is desirable to have a simple means whereby the switch may be changed to make it open or to make it close an electrical circuit when it is operated. In other words, the switch must be readily convertible into a circuit-opening or circuit-closing type.

It is a further object of my invention to produce a switch which may be readily converted into the circuit-opening or circuit-closing type.

When such a switch is installed so as to operate with fire extinguishing equipment, as mentioned above, the installation and operation of the switch must not interfere with the release of the fluid in the building, as it would impair the efficiency of the fire extinguishing system.

It is another object of my invention to provide a switch whereby the installation and operation of such will not interfere with the efficiency of the apparatus to which it is attached.

Further objects of my invention will appear in the following description.

In this description and in the accompanying drawing I show a preferred form of my switch attached in a pipe line of a fire extinguishing system of the type before mentioned. The pipe line illustrated is a line supplying extinguishing fluid under pressure to distributing outlets. The switch is operable by the pressure of the fluid in the line. As mentioned before, my device may be used with other apparatus than that illustrated.

In the accompanying drawing:

Fig. 1 is a side elevation of my invention showing a partial section thereof.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a side elevation showing the appearance of the switch.

Referring to the drawing, my invention consists of a box-shaped housing 11 having an open front which is covered by a glass 12. The glass 12 is retained in place by a cover 13 secured to the housing 11 by suitable means such as screws 14. In order to

permit a view of an enclosure 15 formed by the walls of the housing 11, a circular opening 16 is formed in the cover 13. The opening 16 with the glass 12 form a window which permits a view of the interior.

On the lower side of the housing 11 there is formed an annular flange 17 having a central opening 18 which extends through the walls of the housing 11 and communicates with the enclosure 15. A cylinder 20 is secured to the housing 11 by a sleeve 21 formed thereon which is adapted to fit into the opening 18 in the flange 17 and which is secured therein by a set-screw 19 threadedly inserted through the walls of the flange 17. The walls of the cylinder 20 form an axial opening 22 in which a piston 23 is movably positioned. Secured to the piston 23 is a piston rod 24 which passes axially upward through the opening 22, through the opening formed by the walls of the sleeve 21, and into the enclosure 15. The walls of the sleeve 21 have a smaller inside diameter than the walls of the cylinder 20 and form a guide bearing for the piston rod 24. The piston 23 and the piston rod 24 form the operating means of my invention.

The lower end of the cylinder 20 is threadedly secured to a thick-walled pipe 26 so that the axial opening 22 in the cylinder 20 is at right angles to the axis of the pipe 26 and communicates with an axial opening 28 formed by the walls thereof. To the ends of the pipe 26 are secured a supply pipe 29 and an outlet pipe 30 by unions 31 in the usual manner. This arrangement provides a passage for a fluid from the supply pipe 26 through the opening 28 to the outlet pipe 30 and through the side opening 22 to the piston 23. This allows the fluid in the pipe 26 to be transmitted to the piston 23 without interfering with the flow thereof.

To the upper end of the piston rod 24, which extends into the enclosure 15, is secured a switch mechanism, which consists of a rod 33 having a bore 34 at its lower end adapted to accommodate the upper end of the piston rod 24, the piston rod 24 being retained in the bore 34 by a pin 35 which passes through a hole 36 formed through the walls of the rod 33 and through the piston rod 24. The rod 33 forms an extension of the piston rod and extends upwardly through the enclosure 15, through an opening 37 formed in the upper wall of the housing 11 and outside of the housing 11. To the upper end of the rod 33 a handle 38 is threadedly attached, which handle 38 provides a means for manually operating the switch mechanism. To the lower end of the rod 33 a cylinder 40 of insulating material is secured by the pin 35 which passes through holes in the walls thereof.

The cylinder 40 has a reduced diameter at its upper end for receiving thereon the walls of a tight-fitting cylinder 41 of conducting material which has an outside diameter equal to that of the insulating cylinder 40 and which is provided with annular grooves 42 in the surface thereof. The rod 33, cylinders 40 and 41, the piston rod 24, and the piston 23 are movable vertically in the housing 11. Fig. 1 shows a position occupied thereby when at the lower limit of travel, and Figs. 2 and 4 show the position occupied thereby when at the upper limit of travel.

A contact-making mechanism is disposed in the enclosure 15 so as to make contact with the cylinders 40 and 41 and consists of a block 44 of insulating material secured to an inside wall of the housing 11 by suitable means, such as screws 45. Secured to the blocks 44 are conductors 46, which extend through openings 48 formed in the housing 11, of sufficient size to permit the conductors 46 to pass therethrough without contacting the walls thereof. At the outer end of the conductors 46 are screws 49 for the purpose of attaching electrical wires thereto. Secured to the conductors 46 at a point near the inner wall of the housing 11 are horizontal springs 51, to the movable ends of which are secured disc-shaped contacts 52 by swedged pins 53. The springs 51 with the attached contacts 52 are positioned so that the contacts 52 contact the conducting cylinder 41 and complete an electrical circuit between the conductors 46 when the mechanism is moved downwardly, as shown in Fig. 1, and contact the insulating cylinder 40 and open the electric circuit when the mechanism is moved upwardly, as shown in Figs. 2 and 4.

The switch is in the normal position when the mechanism is moved downwardly, as shown in Fig. 1, in which position the electrical circuit is closed between the conductors 46, and an operation of the mechanism upward to the position shown in Fig. 2 opens the switch. This constitutes a circuit-opening switch. In case a circuit-closing switch is desired, the relative positions of the cylinders 40 and 41 are transposed so that the electric circuit is open when the mechanism is in the normal position and closed when the mechanism is in the operated position.

When the device of my invention is used with fire extinguishing equipment, electrical connections are made to the conductors 46 by means of screws 49, and the mechanism is moved to the normal position shown in Fig. 1. When the fire extinguishing fluid is supplied to the pipe 26, the pressure of the fluid acting on the piston 23 moves the mechanism upwardly, and the electrical circuit between the conductors 46 is opened as explained before. The mechanism is maintained in this position by the friction of the contacts 52 with the cylinder 40 until it is manually reset by moving the mechanism downwardly.

It will be noted that my device may be

operated by hand or by any suitable pressure means applied to the piston 23. It is therefore adaptable to other apparatus than that specified herein.

I claim as my invention:

1. In a switch of the character described, a fitting for connection in a fluid conduit, a cylinder in communication with the fitting, a piston operable in the cylinder, a housing supported by the cylinder and having a sight opening at one side, a stem on the piston extending through the housing and projecting from the housing for manual operation, a stationary contact in the housing, and a contact on the stem to cooperate with the stationary contact, the contact being visible through the sight opening.

2. In a switch of the character described, a fitting for connection in a fluid conduit, a part connected with the fitting to project laterally therefrom, said part having a large bore communicating with the fitting and a small bore in its outer portion, a piston operable in the large bore, a housing mounted on the outer portion of the said part and having a sight opening with a transparent closure, a stem on the piston slidably fitting the small bore and extending through the housing and projecting from the housing, a stationary contact in the housing, and a contact on the stem to cooperate with the stationary contact, the contacts being visible through the sight opening.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 14th day of May, 1929.

MAYNARD A. LASWELL.