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ACTUATOR

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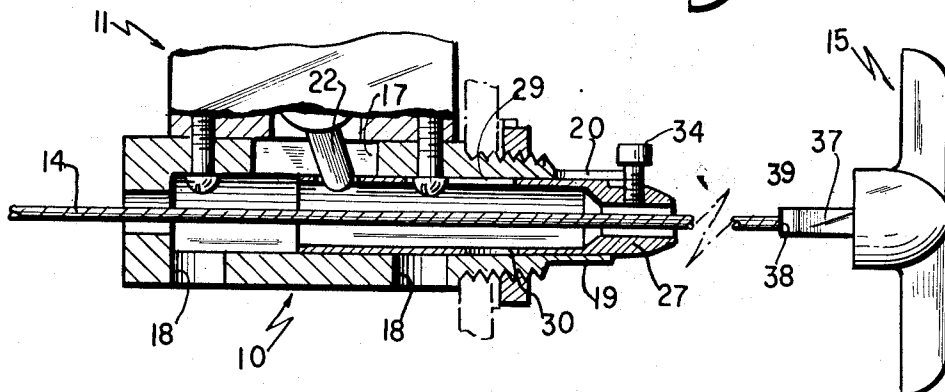
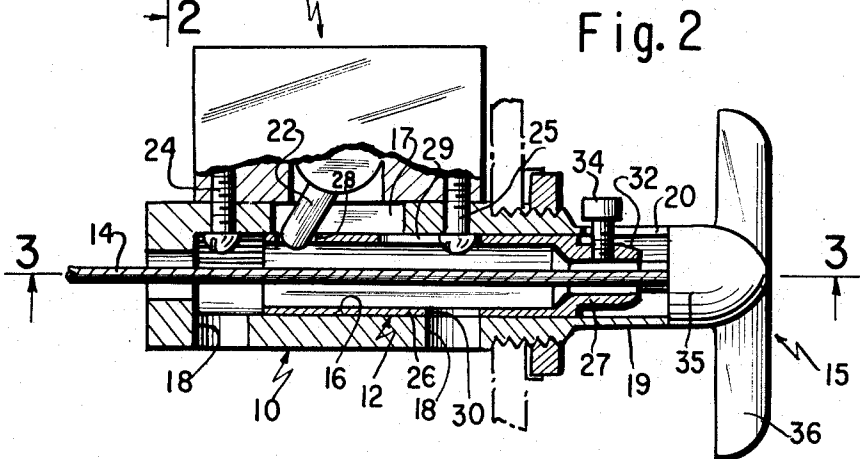
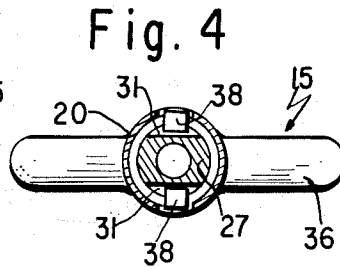
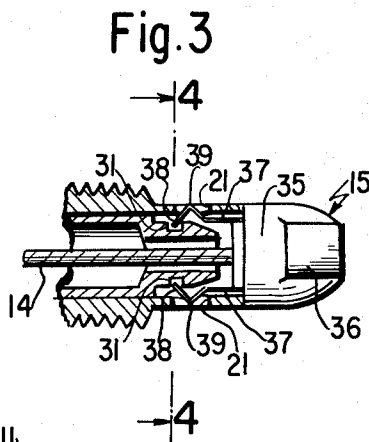
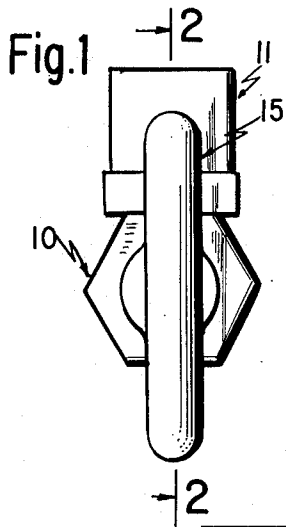


Fig. 5

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The present invention relates to mechanisms, and more particularly to an improved hand operated slidable control device for actuating a flexible transmitting element and an electrical switch.

The present invention is primarily concerned with fire extinguishing systems which are operated in an emergency from a remote location. Such systems, for example, are used in connection with a gasoline or diesel engine which constitutes a fire hazard; and include a switch for shutting off the ignition and/or the supply of fuel to the engine, a valve for releasing fire extinguishing medium from a source to allow the same to be directed onto the fire hazard, and a control head for the valve which is operable by means of a flexible element such as a cable from a remote location.

Accordingly, an object of the present invention is to provide an improved actuator for practically simultaneously operating an electrical switch and a valve control head.

Another object is to provide such an actuator which is reliable in operation and is readily reset.

A further object is to provide such an actuator which is simple and compact and economical in construction.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawing, forming a part of the specification, wherein:

FIG. 1 is a front elevational view of an actuator in accordance with the present invention.

FIG. 2 is a sectional view taken along the line 2-2 on FIG. 1.

FIG. 3 is a sectional view taken along the line 3-3 on FIG. 2.

FIG. 4 is an enlarged sectional view taken along the line 4-4 on FIG. 3.

FIG. 5 is a sectional view similar to FIG. 2 illustrating the actuator after operation thereof.

Referring now to the drawing in detail, there is shown an actuator which generally comprises a body 10, a switch 11 mounted on the body, a shuttle 12 slidably mounted in the body for operating the switch, a pull cable 14 for operating a valve control head such as shown in United States Patent No. 2,386,210, and a pull handle 15 secured to the cable and releasably locked on the body and the shuttle for effecting movement of the shuttle.

The body 10, as shown in FIGS. 2 and 5, is an elongate member having a longitudinal bore or guideway 16, an elongate lengthwise extending recess 17 at one side extending from the bore 16 to the switch 11, a pair of openings 18 at the opposite side of the recess 17 extending from the bore to the exterior of the body, and an extension 19 at one end of the bore formed with an open ended slot 20 and with a pair of opposite internal recesses or transverse apertures 21 each spaced circumferentially ninety degrees from the slot 20 (FIGS. 3 and 4).

The switch 11 may be of the toggle type as shown and has an operating element 22 housed in the recess 17 and extending partially into the bore 16. The switch 11 is secured to the body 10 by screws 24 and 25 having their

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heads diametrically opposite the openings 18 to provide access for a screw driver through the openings 18 to secure or remove the screws.

The shuttle 12 comprises a tubular portion 26 fitted into the bore 16 for slidable movement therein, and a head 27 at the sleeve end of the bore integral with the portion 26.

The tubular portion 26 has an aperture 28 into which the outer end of the switch element 22 extends to provide means on the shuttle for operating the switch, and has an elongate lengthwise extending slot 29 through which the screw 25 extends to limit the lengthwise movement of the shuttle and to prevent rotation thereof. The portion 26 also has an opening 30 adapted to be aligned with one of the openings 18 when the actuator is in the position as shown in FIG. 2 to provide access to the screw 25 through the tubular portion 26.

The shuttle head 27 is of smaller diameter than the tubular portion 26 and is located within the extension 19 to provide an annular space between the extension and the head (FIG. 4). The head also has a pair of opposite external recesses 31 facing the inner ends of the recesses 21 of the bore extension 19, and has tapered free end 32 disposed outwardly of the recesses 21 and 31 (FIG. 3). The head further has a radially extending pin or button member 34 thereon which extends outwardly through and is movable in the slot 20 to facilitate manual resetting of the shuttle (FIGS. 2 and 5).

The cable 14 extends through the bore 16 of the body and the bore of the shuttle 12, and has its outer end secured to the handle 15 for movement therewith.

The handle 15 comprises a body portion 35, a pair of radially extending, manually engageable arms 36 (FIGS. 1 and 3) on one end of the body portion, and a pair of lengthwise extending, diametrically opposite tabs 37 at the other end of the body portion 35 adapted to be disposed in the annular space between the bore extension 19 and the shuttle head 27. The tabs are bent akimbo to provide an inwardly facing portion 38 at their free end adapted to extend into the recesses 31 and releasably grip the shuttle head and to provide an outwardly extending portion 39 between the ends thereof adapted to extend into the recess 21 to releasably lock the handle on the body 10.

As shown in FIG. 2, when the actuator is in its non-operated position, the switch operating element 22 extends towards the left and the screw 25 is at the right hand or outer end of the slot 29 as viewed so that the shuttle is in its inner position, and the tab portions 38 and 39 are respectively disposed in the recesses 31 and 21 with the handle body portion 35 held snugly against the extension 19.

In operation when the handle 15 is pulled outwardly, the tab portions 39 slip out of the recesses 21 and bear against the inner wall of the extension so that the tab portions 38 are held securely in the recesses 31 and the handle effects outward movement of the shuttle 12, whereby the switch element 22 in the aperture 28 is flipped toward the right as viewed (FIG. 5). As this occurs, the inner or left hand end of the slot 29 engages the screw 25 to prevent excessive outward movement of the shuttle. The shuttle 12 now is in its outer position and the tab portions 38 slip out of the recesses 31 to disconnect the handle from the shuttle and the body, whereby continued outward pulling of the handle pulls the cable 14 to effect operation of the valve control head (not shown).

In an emergency, the switch 11 can reset by manipulating the reset button to move the shuttle to its inner position.

In order to reset the entire actuator (FIG. 2), the reset button 34 likewise is manipulated to move the shuttle 12 to its inner position, and the handle tabs 37 are re-inserted

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to connect the same to the body and the shuttle while manually pulling the cable 14 to the left as viewed.

From the foregoing description, it will be seen that the present invention provides an improved actuator for practically simultaneously operating an electrical switch and a valve control head in a simple and practical manner. The actuator is readily installed, serviced and repaired, is rugged and economical in construction and is easily reset after operation thereof.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

I claim:

1. An actuator comprising a body having a bore formed with an outer end and having a recess laterally adjacent said bore, a switch operating element in said recess and extending into said bore, a shuttle slidably mounted in said bore having means thereon for operating said switch element and having an outer end, cooperating means on said body and said shuttle for limiting the extent of movement of said shuttle towards the outer end of said bore, a pull handle, a flexible element connected at one end of said handle for movement therewith and extending through said bore, cooperating means on said handle and said body at the outer end of said bore for releasably locking said handle on said body, and cooperating means on said handle and the outer end of said shuttle for locking said handle on said shuttle and releasing said handle from said shuttle when movement of said shuttle towards the outer end of said bore is stopped, whereby upon pulling of said handle separation of said handle from said body is first effected to allow said handle to move said shuttle to operate said switch element and separation of said handle from said shuttle is then effected to allow said handle to further pull said flexible element.

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2. An actuator according to claim 1, wherein said bore has a lengthwise extending slot at its outer end and said shuttle has a radially extending member thereon movable in and extending through said slot for resetting said shuttle.

3. An actuator according to claim 1, wherein said cooperating means on said body, handle and shuttle include external recess means on said shuttle adjacent its outer end, internal recess means on said body adjacent the outer end of said bore and facing said shuttle recess means, and yieldable tabs at the inner end of said handle each having an inner portion extending into said body recess means and each having an outer portion extending into said shuttle recess means.

4. An actuator according to claim 3, wherein said tabs comprise a pair of diametrically opposite tabs, said body recess means are diametrically opposite openings, said bore has a lengthwise extending slot at its outer end spaced circumferentially between said body recess means openings, and said shuttle has a radially extending member thereon movable in and extending through said slot for resetting said shuttle.

5. An actuator according to claim 3, wherein said tabs are akimbo to provide an inwardly extending outer portion and an outwardly extending inner portion on each tab.

6. An actuator according to claim 5, wherein said outwardly extending inner portions upon releasing said body recess means are urged inwardly by the body structure defining said bore to move said inwardly extending outer portions inwardly and retain the same in locking engagement with said shuttle recess means until the outer end of said shuttle is moved outwardly of the outer end of said bore.

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BROUGHTON G. DURHAM, *Primary Examiner*.