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L. J. BORDELON

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COMBINED VALVE AND SWITCH DEVICE

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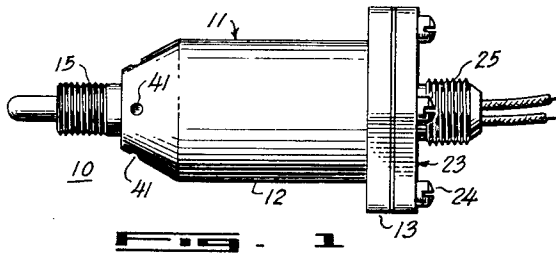


FIG. 1

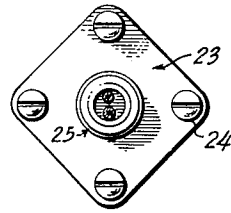


FIG. 2

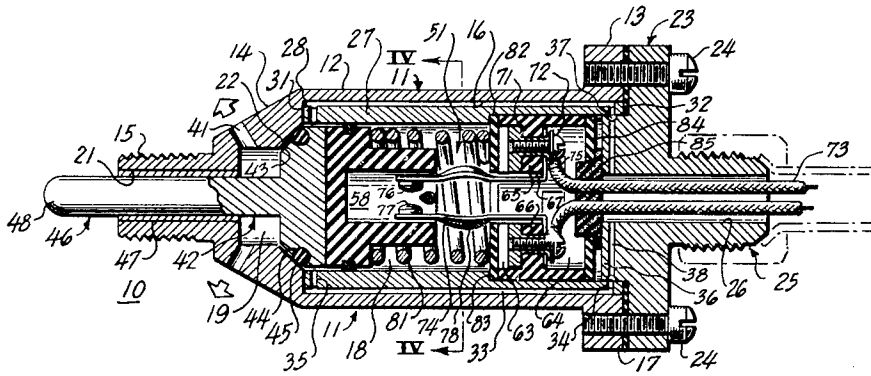


FIG. 3

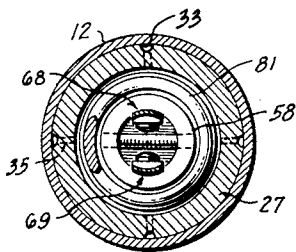


FIG. 4

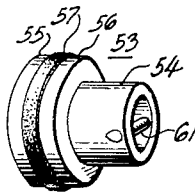


FIG. 5

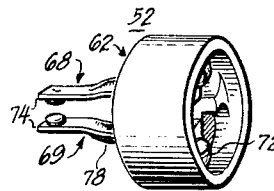


FIG. 6

INVENTOR.

Lawrence J. Bordelon

BY
Shaler J. Jason
ATTORNEY

UNITED STATES PATENT OFFICE

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COMBINED VALVE AND SWITCH DEVICE

Lawrence J. Bordelon, San Diego, Calif., assignor
to Consolidated Vultee Aircraft Corporation,
San Diego, Calif., a corporation of Delaware

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12 Claims. (Cl. 200—53)

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This invention relates to switch and valve control devices and more particularly to improvements in a unitary switch and valve arrangement.

An object of this invention is to provide a unitary switch and valve arrangement having an improved construction and wherein the switch and valve are concurrently operable through the same actuating means.

Another object of the present invention is the provision of a combined switch and valve device embodying an improved enclosing housing having a construction whereby fluid, such as air, is passed through the housing bypassing the switching mechanism, and whereby the passage of said fluid is controllable by the valve.

A further object of the invention resides in providing a unitary switch and valve device which is of economical and simple construction, which is durable, and which further operates in positive and efficient manner.

Other objects and features of the present invention will be readily apparent to those skilled in the art from the following specification and appended drawings wherein is illustrated a preferred form of the invention, and in which:

Figure 1 is a side view of a combined switch and valve device embodying the invention.

Figure 2 is an end view of the device of Figure 1.

Figure 3 is an enlarged longitudinal sectional view of the device.

Figure 4 is a transverse sectional view taken on the line IV—IV of Figure 3; and

Figures 5 and 6 are perspective views of details of the switching mechanism.

As illustrated in the drawings, the combined switch and valve device, indicated generally by the numeral 10, comprises a metallic housing 11 having a cylindrical main body portion 12, at one end of which is integrally formed a four sided flange portion 13, the periphery of which defines, generally, the shape of a square.

Provided at the opposite end of the cylindrical main body portion 12 is an integral frusto-conical portion 14 from the end of which extends a threaded connecting nipple 15.

Housing 11 is provided with a coaxial passage 16 therein extending from one extremity thereof to the other. Passage 16 opens through one end 17 of housing 11 and includes an annular chamber 19 within main body portion 12, which connects to an annular chamber 18, of smaller diameter, provided within frusto-conical portion 14. This latter chamber opens into an axial opening 21 extending through nipple 15. Disposed around the inlet end of annular chamber 19 is a tapered

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valve seat 22, the defining walls of which are inclined toward the longitudinal axis of housing 11.

A generally square-shaped cap member or cover 23 is positioned at the open end 17 of housing 11, being tightly secured to flange portion 13 by a plurality of mounting studs 24. A threaded inlet nipple 25 serves to connect, in a known manner, the device 10 to a usual conduit whereby air may be led through a co-axial bore 26 provided in cap member 23 to be passed therefrom.

Contained within main body portion 12 is an elongated tubular or sleeve member 27 having one end 28 disposed against an annular shoulder 31 located adjacent the tapered valve seat 22 and the opposite end 32 disposed flush with the end surface of flange portion 13. The outer wall surfaces of sleeve 27 are adapted to lie contiguous the interior wall surfaces of the annular chamber 18. Four radially arranged grooves 33 are provided in the periphery of sleeve 27 and extend longitudinally substantially the whole length of the sleeve 27 from end 28 to a point short of end 32 at which point each groove 33 intersects a transverse bore 34, which bores 34 are provided to extend completely through the thickness of the sleeve wall. Near the end 28 of sleeve 27 are provided another group of four transverse bores 35, which extend through the thickness of sleeve 27 and afford communication between the grooves 33 and the annular chamber 18. It is noted that the interior wall surfaces of main chamber 18 act to close the open sides of grooves 33 to effect continuous passageways for the length of the grooves 33 and thereby provide communication between the transverse bores 34 and the transverse bores 35.

The cap member 23 has an annular boss 36 which is adapted to project into the open end 32 of sleeve 27. An annular groove 37 is formed on boss 36 into which the transverse bores 34 open. A plurality of transverse bores 38 in boss 36 connect the annular groove 37 with the co-axial bore 26 through cap 23. With this arrangement air led into co-axial bore 26 will flow through transverse bores 38 and into peripheral groove 37 on boss 36; this air is then fed to the transverse bores 34 and therethrough to the passageways afforded by the grooves 33. From these passageways this air passes through transverse bores 35 and into annular chamber 18 and thence into smaller annular chamber 19 from which it spills through a plurality discharge ports 41, which ports 41 extend through frusto-conical portion 14.

To control the discharge of air from housing 11 there is provided a valve 42 for cooperating with the valve seat 22. Valve 42 comprises inwardly tapered wall surfaces 43 within which is formed an annular groove 44 for carrying a suitable sealing ring 45. The sealing ring 45 is adapted to be pressed upon the inclined wall surfaces of tapered valve seat 22 for sealing engagement therewith. Valve 42 also includes a projecting stem portion 46 which extends into and through a bushing 47 carried within axial opening 21 of nipple 15. The bushing 47 closely receives stem portion 46 to serve as a guide therefor and maintains the valve 42 in alignment with valve seat 22 throughout the co-axial reciprocation thereof. The end 48 of stem 46 extends beyond the end of nipple 15 and is adapted to be engaged and inwardly moved upon the application of external force thereto by any suitable actuator, not shown.

Located in its entirety within sleeve member 27 is a switching assembly, indicated generally by the numeral 51. The switching assembly 51 comprises, as two main elements thereof, a contact carrying structure 52 and an actuator body 53, with contact carrying structure 52 located near end 32 of sleeve member 27 and actuator body 53 disposed near end 28 thereof. Actuator body 53 is formed of insulating material and embodies a cylindrical portion 54 having integral therewith an annular portion 55 of larger diameter. Formed into the outer wall surfaces of portion 55 is an annular groove 56 within which is fitted a suitable packing or sealing member 57 which is adapted to engage the interior wall of sleeve 27 to effect an airtight seal. Actuator body 53 is provided with an axial bore 58 which is closed at one end and at its open end communicates with the interior of sleeve 27. Across the mouth of the open end of bore 58 is fitted a transverse bar or pin 61, which serves a purpose to be hereinafter fully described.

Contact carrying structure 52 comprises a cylindrical body element 62 formed of insulating material and having recesses 63 and 64 extending thereinto one from each end of the element, and terminating at integral shoulder portions 65 and 66 provided within element 62. A co-axial bore 67 interconnects the recesses 63 and 64.

A pair of contact members 68 and 69 is mounted by body element 62, with contact member 68 being secured to shoulder 65 and contact member 69 to shoulder 66 by suitable connectors 71. Terminal studs 72 adapted to be threaded into connectors 71 serve to attach conducting leads 73 to the contact members 68 and 69. Each of the contact members 68 and 69 comprises an elongated resilient body portion 74 formed of a suitable material such as spring steel. One end of the body portion 74 is bent over, as at 75, to provide for mounting of the contact member by a connector 71. The contact members 68 and 69, at the free ends of their elongated body portions 74, carry contact faces 76 and 77, which are maintained, in normal condition, spaced from one another. It is noted that a portion of bar member 61 extends into the space provided between these contact faces 76 and 77.

The elongated body portions 74, as best shown in Figure 3, are each provided with a cam portion 78 located on its outer face and spaced from the free end. These cam portions 78 are conveniently formed by being pressed from the body portions 74.

With switching assembly 51 arranged within

sleeve 27 the actuator 53 will lie disposed against the interior face of valve 42 and is maintained in contact therewith by a spring member 81. Spring member 81 encircles cylindrical portion 54 of actuator 53 and bears at one end against annular portion 55, and at its other end against an insulating annular washer 82. The bias of spring member 81 serves to maintain valve 42 in sealing engagement with its cooperating valve seat 22.

Insulating washer 82 rests upon an annular shoulder 83 formed in the wall of sleeve member 27. In pressing engagement with washer 82 is the inner end of cylindrical body element 62 of the contact carrying structure 52. Projecting contact members 68 and 69 are adapted to pass through an opening in washer 82 and extend into recess 58 in actuator body 53 a sufficient amount to locate the contact faces 76 and 77 within the recess inwardly of pin 61. Cam portions 78 on contact members 68 and 69 will lie disposed between the end of actuator 53 and washer 82.

A second insulating washer 84 is fitted adjacent the outer end of cylindrical body element 62 and has a central opening therethrough into which is pressed a sealing grommet 85 formed of rubber or similar material. As is well known, the inherent resiliency of the material employed in the formation of the grommet 85 maintains the grommet within the opening of the washer 84.

The construction herein described affords an effective air-tight structure both in the prevention of leakage of air through the device 10 and in the sealing off of the contact members from the air flow to avoid possible corrosion thereof due to condensation of moisture present in the air. The compact and tight manner of assembling the contact carrying structure 52 and its associated elements, as above described, tends to prevent air-flow therepast to the area of the contact members, and the provision of the packing or sealing element 57 on actuator 53 acts to block the passage of any air past the actuator 53 to this same area.

With the cooperation of spring 81 leakage past the valve 42 is effectively prevented. Spring 81 seating against the washer 82 exerts its force to maintain actuator 53 in engagement with valve 42 and through this engagement to press the sealing ring 45 carried by valve 42 against valve seat 22 with the force required to prevent any leakage past the ring 45 or any movement of the valve 42. It is understood that a spring 81 is provided in the present invention that would have the strength required for effective performance.

In setting forth the operation of the combined switch and valve device 10 above described it is to be assumed that the invention is mounted in operative position to control the passage of a fluid, such as air, from a suitable conduit and the electric leads 73 are connected into a desired circuit.

Upon the application to the valve stem 46 of an actuating force of a magnitude sufficient to overcome the force of spring 81 the valve 42 will be axially moved within sleeve member 27 to disengage sealing ring 45 from valve seat 22. Air will then pass from the bore 26 in cap 23 through transverse bores 33 in the same cap; into annular groove 37, through transverse bores 34, and over to transverse bores 35 by way of passageways 33 and thence into chamber 19 from which it flows through discharge ports 41 into the atmosphere.

Simultaneously with the opening of valve 42 the actuator 53 abutting valve 42 is moved within sleeve member 27 against the bias of spring 81 and toward contact carrying structure 52. This longitudinal movement of actuator 53 will force the defining walls of recess 58 in actuator 53 to engage camming portions 78 on resilient contact members 68 and 69 and ride thereupon. This operation results in the contact members 68 and 69 being moved one toward the other to effect engagement of contact face 76 with contact face 77 to complete a switching operation. Contact faces 76 and 77 will remain in circuit making position as long as the external force is maintained on the valve stem 46 to compress spring 81. Upon relieving valve stem 46 of this external force spring 81 will expand to its normal length to move actuator 53 toward end 28 of sleeve 27 and away from contact carrying structure 52. This movement removes the walls of recess 58 from their engagement with camming portions 78 on contact member 68 and 69, which permits these members to move apart under the force of their inherent resiliency. Should the contact faces 76 and 77 undesirably be welded together during a switching operation the transverse pin or bar member 61 disposed across the recess 58 will act to force them apart, since pin 61 is required to be positioned with a portion thereof disposed in the space separating the contact faces 76 and 77, and the force of spring 81 will be sufficient to cause bar 61 to come between and pry such contact faces apart should they be fused.

Expansion of spring 81 acts through actuator 53 to move valve 42 axially to force sealing ring 45 upon valve seat 22 effectively to close off further air flow through device 10.

The combined switch and valve device 10 herein described is designed for use with those structures from which air under pressure is to be released, the switch effecting operation of the control means which permits the air to flow from the air-filled compartment and the valve allowing the released air to flow through device 10 to atmosphere. A particular use for which the present combined switch and valve device is intended is in aircraft of the pressurized type, the combined switch and valve device assisting in the automatic discharge of air from the airplane cabin to effect an equalization of the internal cabin air pressure with ground atmospheric pressure. With these pressures equalized there is no possibility of injury occurring to a passenger, or to the airplane structure, by reason of a sudden ejection of large masses of air when the cabin door is opened. The combined switch and valve device 10, when employed in aircraft for the above stated purpose, is located adjacent the landing gear in position to have its stem portion 46 of valve 42 engageable by a moving part of the landing gear as the latter is compressed upon landing of the aircraft. The moving valve 42 will operate the switching assembly 51 to actuate the motor of the air pumping device in the cabin to start the flow of air therefrom. This air will pass through a connecting conduit from the cabin to device 10 and to escape by way of device 10 to atmosphere past the open valve and thereby effect an equalization of internal cabin air pressure with external air pressure.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited

thereto as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

I claim:

1. A combined electric switch and valve device comprising a fluid-tight housing having an opening extending therethrough, a valve seat formed in said housing, a valve means movable into and out of engagement with said valve seat for controlling flow through said housing, a valve stem provided by said valve means and extending to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cover member supported by said housing at the inlet end of said opening, said cover member having a through bore leading to the opening in the housing, relatively movable contact means disposed in operative position within said housing, actuator means for moving said contact means between circuit making and circuit breaking positions, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved to actuate said contact means to perform a switching operation, means for enclosing the contact means, and means defining passageways for bypassing said enclosed contact means and affording communication between the bore in the cover member and said valve seat.

2. A combined electric switch and valve device comprising a fluid-tight housing having an opening extending therethrough, a valve seat formed in said housing, a valve means movable into and out of engagement with said valve seat for controlling flow through said housing, a valve stem provided by said valve means and extending to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cover member supported by said housing at the inlet end of said opening, said cover member having a through bore leading to the opening in the housing, relatively movable contact means disposed in operative position within said housing, actuator means for moving said contact means between circuit making and circuit breaking positions, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved to actuate said contact means to perform a switching operation, means for enclosing the contact means, said enclosing means comprising a tubular member within which said contact means are supported and within which said actuator means is movably fitted for sealing one end of the tubular member and means for closing the opposite end of the tubular member, and means defining passageways for bypassing said enclosed contact means and affording communication between the bore in the cover member and said valve seat.

3. An electric switch and valve device comprising a fluid-tight housing having a passage extending therethrough and terminating in inlet and outlet openings, a valve seat formed in said housing, a valve means movable into and out of engagement with said valve seat for controlling flow through said outlet opening, a valve stem extending through said outlet opening to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cap member support-

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 ed by said housing at the inlet opening to said passage, said cap member having a through bore leading to the passage in the housing, a sleeve member disposed within said housing and extending from the cap member to a position adjacent said valve seat, said sleeve member having passageways formed in its exterior surface, which passageways connect with the bore in the cap member and with said valve seat to provide communication between said bore and said valve seat by way of the exterior of the sleeve member, relatively movable contact means supported within said sleeve member, and actuator means for moving said contact means between circuit making and circuit breaking positions, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved to actuate said contact means to perform a switching operation.

4. An electric switch and valve assembly comprising a fluid-tight housing having a passage extending therethrough and terminating in inlet and outlet openings, a valve seat formed in said housing, a valve means movable into and out of engagement with said valve seat for controlling flow through said outlet opening, a valve stem extending through said outlet opening to the exterior of said housing and to which an external force may be applied for effecting movement of the valve means, a cap member supported by said housing at the inlet opening to said passage, said cap member having a through bore leading to the passage in the housing, a sleeve member disposed within said housing and extending from the cap member to a position adjacent said valve seat and with its exterior wall surfaces contiguous, throughout the length of the sleeve member, to interior wall surfaces of said housing, said sleeve member having longitudinal grooves formed in said exterior wall surfaces, which grooves connect with the bore in the cap member and with said valve seat to provide communication, exteriorly of the sleeve member, between said bore and said valve seat, cooperating movable contact means supported within said sleeve member and in disengaged position, an actuator means slidably supported within said sleeve member for moving said contact means into engagement, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved to operate said contact means to engaged position, and means for enclosing the contact means within said sleeve member.

5. An electric switch and valve arrangement comprising a housing having an opening extending therethrough a valve seat formed in said housing, a valve means movable into and out of engagement with said valve seat for controlling flow through said housing, a valve stem provided by said valve means and extending to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cover member supported by said housing at the inlet end of said opening, said cover member having a through bore leading to the opening in the housing, relatively movable contact means contained within said housing, said contact means comprising a pair of spaced elongated engageable members normally biased to disengaged positions, actuator means for moving said pair of contact members into engagement, said actuator means comprising a generally

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 cylindrical body portion having means for engaging and moving said elongated contact members into circuit making position, means for enclosing said contact means, said means comprising a tubular member having a support therein on which the contact means are supported, the actuator means which is slidably fitted into one end of said tubular member to close said end, and a sealing means for closing the opposite end of said tubular member, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved to engage and move said elongated contact members to perform a switching operation, and means defining passageways for bypassing said enclosed contact means and affording communication between the bore in the cover member and said valve seat.

6. An electric switch and valve device comprising a housing having a co-axial passage extending therethrough and terminating in inlet and outlet openings, a valve seat formed in said housing, a valve means movable into and out of engagement with said valve seat for controlling flow through said outlet opening, a valve stem extending through said outlet opening to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cap member supported by said housing at the inlet opening to said passage, said cap member having a through bore leading to the passage in the housing, a sleeve member disposed within said housing with its exterior wall surfaces lying contiguous to interior wall surfaces of the housing and extending from the cap member to a position adjacent said valve seat, said sleeve member having longitudinal grooves formed in its exterior surface, which grooves connect with the bore in the cap member and with said valve seat to provide communication between said bore and said valve seat, a support member mounted within said sleeve member, relatively movable contact means carried by said support member, said contact means comprising a pair of spaced elongated members normally biased to circuit breaking position, actuator means for moving said pair of contact members into engagement to complete an electrical circuit, said actuator means comprising a generally cylindrical body portion movably fitted into one end of said actuator sleeve and having means for engaging and moving said contact members into circuit making position, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved to actuate said contact means to perform a switching operation, and means for enclosing the contact means within said sleeve member, said means comprising the actuator means fitting into one end of said sleeve member and a sealing means closing the opposite end of the sleeve member.

7. An electric switch and valve arrangement comprising a housing having an opening extending therethrough, a valve seat formed in said housing, a valve means movable into and out of engagement with said valve seat for controlling flow through said housing, a valve stem provided by said valve means and extending to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cover member supported by said housing at the inlet end of said opening,

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said cover member having a through bore leading to the opening in the housing, relatively movable contact means contained within said housing, said contact means comprising a pair of spaced elongated engageable members normally biased to disengaged positions, actuator means for moving said pair of contact members into engagement, said actuator means comprising an insulating body portion having means for engaging and moving said elongated contact members into circuit making position, means carried by said insulating body portion adapted to pass between said elongated contact members on movement of said insulating body portion from engagement with the contact members to provide a prying action thereon should such contact members fuse together during a switching operation, means for enclosing said contact means, said means comprising a tubular member having a support therein on which the contact means are supported, the actuator means, which is slidably fitted into one end of said tubular member to close said end, and a sealing means for closing the opposite end of said tubular member, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved to engage and move said elongated contact members to perform a switching operation, and means defining passageways for bypassing said enclosed contact means and affording communication between the bore in the cover member and said valve seat.

8. A combined electric switch and valve arrangement comprising a unitary housing having a co-axial passage extending therethrough and terminating in inlet and outlet openings, an annular shoulder formed within said housing, a valve seat disposed around said annular shoulder, a valve means movable into and out of engagement with said valve seat for controlling flow through said outlet opening, a valve stem extending through said outlet opening to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cap member supported by said housing at the inlet opening to said passage, said cap member having an axial bore therethrough leading to the passage in the housing, a sleeve member disposed within said housing with its exterior wall surfaces contiguous to interior wall surfaces of said housing and extending from the cap member to rest on said annular shoulder, said sleeve member having longitudinal grooves formed in its exterior wall surfaces, said sleeve member having transverse bores provided through one end interconnecting with transverse bores through said cap member to provide a connection between the axial bore in said cap member and said grooves, said sleeve member having transverse bores provided at its opposite end interconnecting said grooves with the valve seat thereby providing communication between said axial bore and said valve seat, relatively movable contact means supported within said sleeve member, and actuator means for moving said contact means between circuit making and circuit breaking positions, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved to actuate said contact means to perform a switching operation.

9. A combined electric switch and valve de-

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vice comprising a unitary housing having a passage extending therethrough and terminating in inlet and outlet openings, a valve seat formed in said housing, a valve means movable into and out of engagement with said valve seat for controlling flow through said outlet opening, a valve stem extending through said outlet opening to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cap member supported by said housing at the inlet opening to said passage, said cap member having a through bore leading to the passage in the housing, switching means contained within said housing, a support for said switching means, said switching means comprising a pair of spaced elongated contact members formed of a resilient material and normally maintained disengaged, camming means on said contact members, actuator means for moving said elongated contact arms into engagement, said actuator means comprising an insulating body member having a recess therein and into which said elongated contact members project, spring means interposed between said actuator means and said switching means support for maintaining said actuator means normally spaced from said support, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved toward said switching means support to bring the defining walls of said insulating body recess into engagement with the camming means on said contact members to move the latter into circuit making position, means for enclosing said switching means, said means comprising a tubular member adapted to mount said switching means support, the actuator means, which is slidably fitted into one end of said tubular member to close said end, and a sealing means for closing the opposite end of said tubular member, and means defining passageways for bypassing said enclosed switching means and affording communication between the bore in the cover member and said valve seat.

10. The structure as defined in claim 9 wherein there is provided means carried by said insulating body member adapted on return movement of said insulating body member away from the switching means support to pass between said pair of elongated contact members to provide a prying action thereon should such contact members fuse together during a switching operation.

11. An electric switch and valve assembly comprising a unitary housing having a co-axial passage extending therethrough and terminating in inlet and outlet openings, an annular shoulder formed within said housing, a valve seat disposed around said annular shoulder, a valve means movable into and out of engagement with said valve seat for controlling flow through said outlet opening, a valve stem extending through said outlet opening to the exterior of said housing and to which stem an external force may be applied for effecting movement of the valve means, a cap member supported by said housing at the inlet opening to said passage, said cap member having an axial bore therethrough leading to the passage in the housing, a sleeve member disposed within said housing with its exterior wall surfaces contiguous to interior wall and extending from the cap member to rest against said annular shoulder, said sleeve member having longitudinal grooves formed in its exterior wall surfaces, said sleeve member having transverse bores provided through

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one end interconnecting with transverse bores through said cap member to provide a connection between the axial bore in said cap member and said grooves, said sleeve member having transverse bores provided at its opposite end interconnecting said grooves with the valve seat thereby providing communication between said axial bore and said valve seat, a support means mounted within said sleeve member, switching means carried by said support means, said switching means comprising a pair of spaced elongated contact members formed of a resilient material and normally maintained disengaged, camming means on said contact members, actuator means for moving said elongated contact arms into engagement, said actuator means comprising an insulating body member having a recess therein and into which said elongated contact members project, spring means interposed between said actuator means and said switching means support for maintaining said actuator means normally spaced from said support, said actuator means having an operative connection with said valve means whereby on movement of said valve means from engagement with its valve seat said actuator means is moved toward said switching means support to bring the defining walls of the insulating body recess into engagement with the cam-

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ming means on said elongated contact members to move the latter into circuit making position, and means for sealing said switching means within said sleeve member, said means comprising said actuator means, which is slidably fitted into one end of said sleeve member to close said end, and a sealing means for closing the opposite end of said sleeve member.

12. In an electric switch and valve assembly as set forth in claim 11, means carried by said insulating body member adapted on return movement of said insulating body member away from the switching means support to pass between said pair of elongated contact members to provide a prying action thereon should such contact members fuse together during a switching operation.

LAWRENCE J. BORDELON.

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