Sept. 5, 1950 M. SORENSEN 2,521,489

SWITCH CONSTRUCTION

Filed April 11, 1946

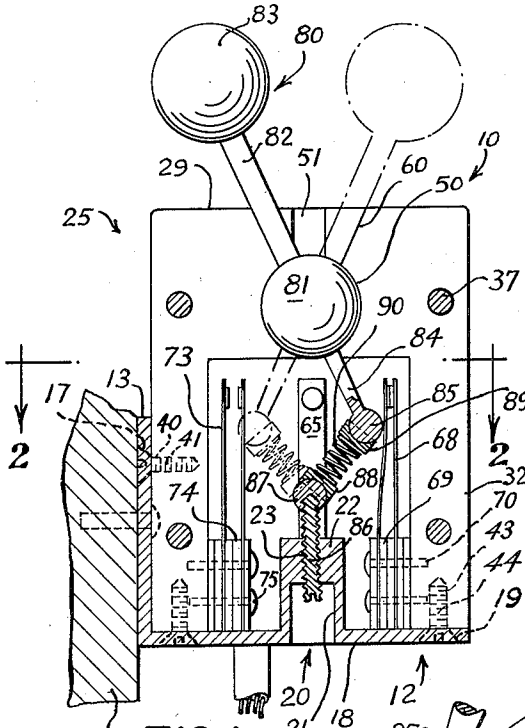


FIG. 1

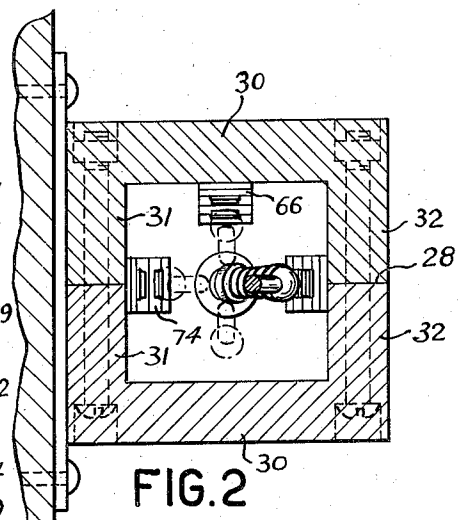


FIG. 2

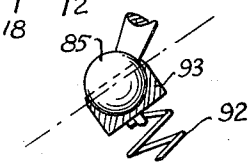


FIG. 5

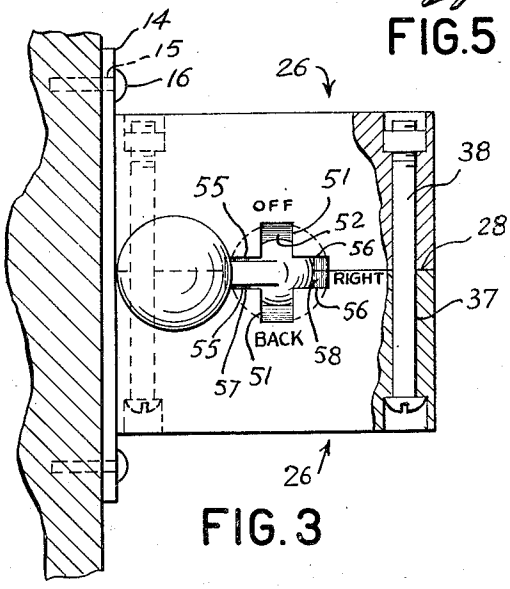


FIG. 3

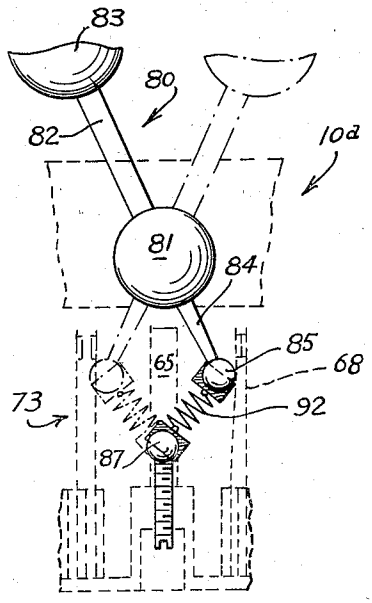


FIG. 4

INVENTOR.
MARIUS SORENSEN
BY
J. B. Fellin
ATTORNEY

Patented Sept. 5, 1950 2,521,489

UNITED STATES PATENT OFFICE

2,521,489

SWITCH CONSTRUCTION

Marius Sorensen, Astoria, N. Y.

Application April 11, 1946, Serial No. 661,215

2 Claims. (Cl. 200—17)

1

This invention relates to switch construction.

An object of this invention is to provide a switch of the character described which shall be simple in construction and which will have a wiping or sliding movement to insure clean contacts at all times and which is made of few and simple parts, easily assembled together.

Another object of this invention is to provide an improved multiple-throw switch which operates as a toggle switch and which shall have one or more switch positions and one neutral position.

Another object of this invention is to provide in a switch of the character described spring means to insure toggle action and improved means for adjusting the spring means.

Still another object of this invention is to provide a multi-throw switch which shall have momentary contact when actuated and which is provided with spring means to return the switch to neutral position when released.

Yet a further object of this invention is to provide a switch of the character described comprising a case formed with crossing slots, a lever having a ball and socket connection with the casing and being slidably movable into any branch of the crossing slots, and switches actuated by the lever as it is moved to its various selected positions.

Yet a further object of this invention is to provide a strong, rugged, durable and compact switch of the character described which may operate as a single or multiple throw switch, and which may be used with either single or double contacts, and which shall be relatively inexpensive to manufacture, and yet practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawings in which is shown one of the various possible illustrative embodiments of this invention,

Fig. 1 is an elevational cross-sectional view of the switch embodying the invention;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a top plan view of the switch shown in Fig. 1 with parts broken away and in cross-section; and

2

Fig. 4 is an elevational view of the switch embodying the invention and illustrating a modified construction.

Fig. 5 is an enlarged view of the spring and socket member of Fig. 4.

Referring now in detail to the drawing, 10 designates a switch embodying the invention attached to any suitable support 11. The switch comprises a substantially L-shaped bracket 12 provided with a vertical wall 13 contacting a surface of the support 11. Wall 13 is provided with wing extensions 14 formed with openings 15 receiving fastening means 16 for fastening the bracket 12 to support 11. Bracket 12 is formed with a plurality of counter-sunk openings 17 for the purpose hereinafter appearing.

Said bracket 12 furthermore comprises a horizontal bottom wall 18 extending at right angles to the vertical wall 13. Said bottom wall is formed with a plurality of counter-sunk openings 19 for the purpose hereinafter appearing. Extending upwardly from the center of the bottom wall 18 is a cylindrical inverted cup-shaped portion 20 comprising a cylindrical wall 21 and a top wall 22. The top wall 22 is formed with a central screw threaded opening 23 for the purpose hereinafter appearing.

Mounted on the bracket 12 is a casing 25. Said casing 25 is formed of a pair of substantially similar symmetrically disposed parts 26, having mutually contacting faces 28. Each of the parts 26 has a top wall 29, a side wall 30, a rear wall 31 and a front wall 32. The parts 26 when placed together, form a casing open at the bottom. Said parts 26 are formed with horizontal registering through openings 37 to receive attaching bolts 38 for attaching said parts 26 together. It will be noted that the inner surfaces 28 of walls 29, 31 and 32 contact one another. The walls 31 may be formed with screw threaded openings 40 registering with openings 17 to receive attaching screws 41 which attach the casing to the bracket wall 13. The heads of the screws 41 are received in the counter-sunk openings 17.

The parts 26 are furthermore formed in their end edges with screw threaded openings 43 registering with the openings 19 to receive fastening screws 44 which fasten said parts to the bottom wall 18 of the bracket.

The wall 29 of each of the parts 26 is formed in its face 28 with a hemi-spherical socket 50 disposed below the upper surface of said wall. Communicating with said socket is a slot or groove 51 at right angles to surface 28. Said slot 51 has

an inclined bottom 52 which is inclined upwardly and outwardly. Wall 29 of part 26 is also formed in the surface 28 with oppositely extending similar, symmetrical, shallow grooves 55 and 56 at right angles to the slot 52. The grooves 55 and 56 in the mating parts 26 together form oppositely extending slots 57 and 58 which cross slots 51. At the bottoms of the grooves 55, 56 are inclined upwardly and outwardly extending surfaces 60. It will now be understood that at the top of the casing 25 are crossing slots communicating with a ball socket formed by the two half sockets 50.

Attached to the inner surface of wall 30 are a pair of parallel spring switch blades or contacts 65, insulated from each other by suitable insulating strips 66. The lower ends of the spring blades or contacts are attached to the insulating strips and wall 30, and the free ends of said strips project upwardly. The blades 65 are centrally located with respect to wall 30 and hence are aligned with slots 51. At the upper end of the strips 65 are usual contacts. Said blades hence together form a normally open switch which is closed in the manner hereinafter to be described.

Attached to the inner surfaces of walls 32 are spring blades or springs 68. The blades 68 are also insulated from one another by insulating strips 69 and attached to walls 32 by means of rivets 70 or in any other suitable manner. The lower ends of the blades 68 are fixed to said wall 32 and the upper ends are free. Said blades are furthermore aligned with slots 56.

Attached to the inner surfaces of walls 31 are a pair of spring blades 73. The lower ends of said blades are likewise insulated from one another by means of insulating strips 74. The insulated blades are attached to said walls 31 by means of rivets 75. The blades 73 are aligned with the slots 55; and the upper ends thereof are free and together form a normally open switch.

Means is provided to selectively close switches 65, 68 or 73, and to retain the selected switch in closed condition, the arrangement being such furthermore, as will appear hereinafter, that all of said switches may be left open to provide a neutral condition. To this end there is mounted on casing 25 a switch actuating lever 80. The lever 80 includes a ball portion 81 journalled in the ball socket 50. Extending upwardly from ball 80 is a stem 82, projecting upwardly through the crossing slots in the top of the casing. At the upper end of the stem 82 is a ball handle 83. Extending downwardly from the ball portion 81 is a stem 84 aligned with stem 82. At the lower end of stem 84 is a ball head 85. It will now be understood that by grasping the handle 83 the lever may be moved to bring stem 82 into either slots 55, 56, or either of the slots 51.

Screwed within the screw threaded opening 23 in the top wall 22 of cup-shaped member 20 is a screw 86. Attached to the upper end of the screw 86 is a ball 87. Rotatably mounted on ball 87 is a socket member 88. Rotatably mounted on head 85 of the lever is a similar symmetrically disposed socket member 89. Interposed between socket members 88, 89 is a coil compression spring 90. The socket members 88 and 89 each have a part-spherical surface engaging the balls 87 and 85, respectively, and also have guide portions or stems engaging within the ends of coil spring 90.

In Fig. 1 the lever is shown in position with the head 85 closing switch 68. The stem 82 is in slot 55. The coil spring retains switch 86 closed.

If it is desired to close switch 65, the lever is first moved to vertical position and then swung to the right to cause the head 85 to press the spring blades 65 together. If it is desired to close switch 73, the lever is moved into slot 56. If it is desired that all switches remain open, the stem 82 is moved into the slot 51 which is located above the switch 65, so that the head 85 moves towards the opposite side of the casing, which side has no switch. Any suitable number of switches may be employed and the switches may either comprise multiple spring blades as shown, or a single contact or multiple open or closed or combinations of open and closed contacts. It will be noted that there is a wiping and sliding movement of the contacts to insure a clean contact at all times. Both spring contacts are free to bend, and when they are closed they will bend and slide relative to one another to make a good switch closure.

It will be noted furthermore that the assembling of the two blocks or parts 26 together with the bottom bracket provides a complete assembly, and the bottom bracket encloses the cavity in the casing and supports the adjusting screw. The switches are actuated by toggle action and the spring maintains the selected switch in closed position or retains the lever in neutral position. The lever may also be operated manually or by mechanical or electrical means.

The lever furthermore may be used as a common electrical ground if desired.

The screw 86 may be turned for adjusting the compressive capacity of the spring.

In Figs. 4 and 5 there is shown a switch spring 10*a* embodying the invention and illustrating a modified construction. The switch 10*a* is similar to the switch 10 except that the compression spring 90 is replaced by a tension spring 92. The tension spring 92 interconnects a pair of socket members 93 which rotatably receive portions of the heads 85 and 87. Spring 90 thus pulls the lever back to neutral, vertical position when released after it has been moved to a position for closing the selected switch.

If desired, the adjusting screw 86 may be omitted. Furthermore, in construction of device 10*a*, an additional switch may be placed against the wall 30 which in the device 10 does not have a switch. Thus in device 10*a* there may be four switch closing positions and a neutral, vertical position. In the device 10*a* the lever must be held in switch closing position as long as it is desired that the switch shall be closed, since release of the lever handle will cause the lever to be moved to neutral position.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In switch construction, a pair of symmetrical members made of non-conducting material, each member having a top wall and side walls extending down from the top wall, one of said members having a rear wall extending downwardly from the top wall of said member and

the other member having a front wall extending downwardly from the top wall of said member, the front faces of the top and side walls of the first member contacting the rear faces of the top and side walls of said other member, bolts passing through the side walls of said members for attaching said members together, a chamber being formed below said top walls of said members, open at the bottom, a metallic bracket having a bottom wall contacting the lower edges of said front, rear, and side walls and attached thereto and closing said chamber, the meeting surfaces of the top walls of said members being formed with complementary hemispherical sockets and with complementary grooves forming crossing slots communicating with said sockets and having upwardly and outwardly inclined edges, a lever comprising a ball disposed within said sockets, an arm extending from said ball and projecting upwardly through one of said slots, said sockets communicating with the said chamber, a stem extending from said ball in the direction opposite to the arm and projecting down into said chamber, a part-spherical head at the lower end of said stem, said bottom wall being formed with an upwardly extending tubular wall, a top wall at the upper end of the tubular wall formed with a vertical screw threaded through opening, said tubular wall forming an opening communicating with the under side of said bottom wall, a screw screwed through said screw threaded opening, the axis of said screw passing through the center of said ball, a part-spherical head fixed to the upper end of the screw and disposed within said chamber, a pair of universal sockets on said part-spherical

heads, a coil compression spring interposed between said sockets, a handle at the upper end of the lever arm, and switches within said chamber and disposed at three of the walls of said chamber and adapted to be actuated by the head at the lower end of the stem, said arm of the lever being movable to opposite ends of said crossing slots to bring the head at the lower end of the stem into position for actuating any one of the three switches or to a position where none of said switches are actuated.

2. In switch construction, in accordance with claim 1 in which the lower end of the screw projects downwardly into the opening formed by the tubular wall, and said screw has a slot at its lower end to facilitate adjusting said screw by means of a screw driver.

MARIUS SORENSEN.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
686,272	Dunbar	Nov. 12, 1901
1,277,609	Law	Sept. 3, 1918
1,426,193	Holmgren	Aug. 15, 1922
1,778,676	Kempton	Oct. 14, 1930
1,809,527	Pate	June 9, 1931
1,829,037	Bobroff	Oct. 27, 1931
1,912,624	Douglas	June 6, 1933
2,139,586	Husemoller	Dec. 6, 1938
2,227,350	Kight	Dec. 31, 1940
2,374,868	Krieger	May 1, 1945