Feb. 27, 1951 W. C. MASON 2,543,119

ELECTRIC SWITCH

Filed March 10, 1947

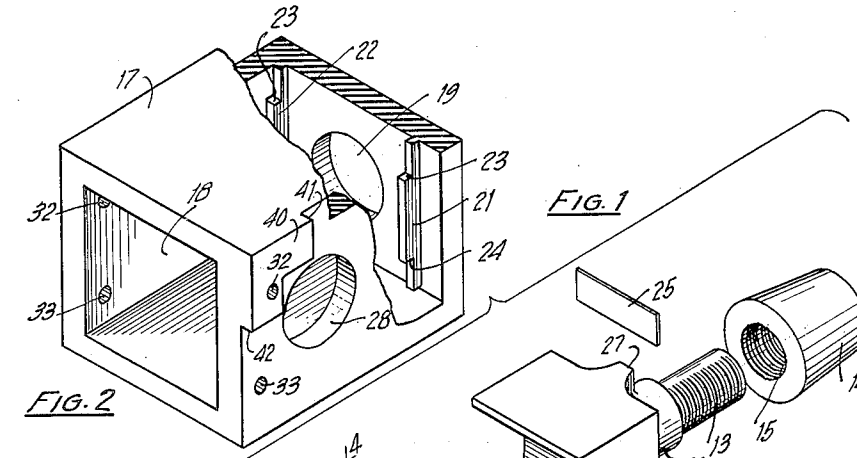
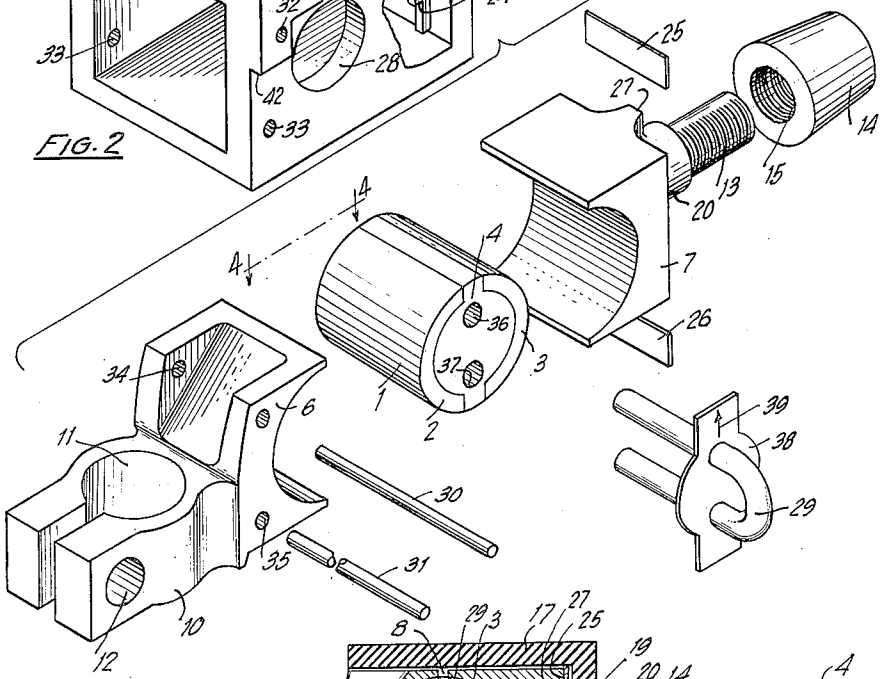


FIG. 2

FIG. 1



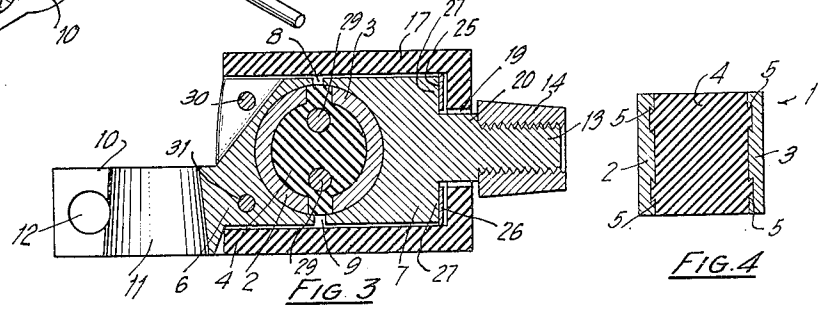


FIG. 3

FIG. 4

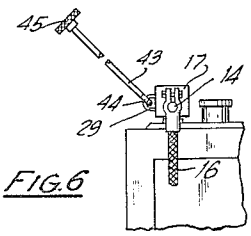


FIG. 6

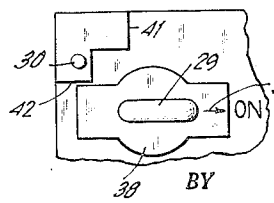


FIG. 5

INVENTOR.

William C. Mason

BY

ATTORNEY

Patented Feb. 27, 1951 2,543,119

UNITED STATES PATENT OFFICE

2,543,119

ELECTRIC SWITCH

William C. Mason, Slingerlands, N. Y.

Application March 10, 1947, Serial No. 733,526

3 Claims. (Cl. 200—51)

1

My invention relates to electric switches and particularly to switches for use on storage batteries such, for example, as the storage batteries with which motor vehicles, boats, aeroplanes, and the like, are equipped.

A switch, by means of which the operator of a motor vehicle may cut the storage battery out of the starting, lighting and ignition circuits, would be a very desirable accessory not only when short circuits in the wiring develop but also when it is necessary to repair the wiring or to remove or install any instruments or other accessories which are normally connected to the battery. By cutting the battery out of the circuits at the battery itself, all danger of sparking, blown fuses, fused parts, and fires due to accidental short circuits, while working on the car, or when the car is parked or stored, is entirely eliminated. Furthermore, if the switch is of such design that the operating means may be positioned so that it is always within convenient reach of the operator, delays in cutting the battery in and out of the circuits will be avoided. Such a switch would be particularly useful in preventing fires where many cars are stored or parked in close proximity to each other by making it quite impossible for disastrous short circuits to develop in any car equipped therewith, provided the switch is turned to the "off" position before the car is left.

One of the objects of my invention is to provide a simple, compact switch which may be attached directly to one of the terminals (preferably the grounded terminal) of a storage battery, thereby eliminating all "live" parts or conductors beyond the battery itself. Another object is to provide a switch of this character in the form of a comparatively small unit but which is capable of carrying, without overheating, the very heavy currents necessary when the engine starting motor is being operated. Another object is to provide a storage battery switch which is exteriorly insulated substantially throughout, except for the terminals, so that the exposure of "live" elements is reduced to a minimum. A further object is to provide a switch of this character which may be easily manufactured, assembled and disassembled, and in connection with which a simple, remote control means may be installed in any one of various positions relative to said switch, depending upon the choice of the operator.

I accomplish these objects by means of the novel elements and the combinations and arrangements thereof described below and illustrated in the accompanying drawing in which—

2

Fig. 1 is an exploded, perspective view of all of the essential elements of my switch except the casing;

Fig. 2 is a perspective view of the casing with certain portions broken away to show the interior construction;

Fig. 3 is a longitudinal section of the switch showing the various parts in assembled relation with the switch in the "off" position;

Fig. 4 is a section through the cylindrical element shown in Fig. 1 in the plane 4—4;

Fig. 5 is a fragmentary side elevation of the switch in the "on" position; and

Fig. 6 is a fragmentary elevation view of a storage battery showing my switch attached thereto.

Referring to the drawing—

My switch comprises a cylindrical male element 1, having the cylindrical surface thereof formed of two separate metallic elements 2 and 3 which are secured together by a core 4 of moldable, insulating material, such, for example, as "Bakelite."

The inner faces of the elements 2 and 3 are provided with re-entrant portions 5 into which the moldable material flows and secures the parts together, as shown in Fig. 4.

Cooperating with the cylindrical element 1 and forming a bearing in which said element floats are two female, substantially semi-cylindrical, jaw-forming elements 6 and 7 which, when in engagement with the element 1, are slightly spaced from each other, as shown at 8 and 9 in Fig. 3. The element 6 is provided with a female terminal 10 having an inverted, frusto-conical passage 11 therethrough adapted to fit over one of the terminals of a storage battery and to be clamped thereto by means of a clamping bolt (not shown) extending through the passage 12. The element 7 is provided, on the back, with a threaded stud 13 which is adapted to receive a frusto-conical male terminal 14 which is internally threaded, as shown at 15, and which is adapted to have clamped thereto the conductor 16 (see Fig. 6) which would normally be connected to the storage battery terminal but which is removed in order to attach the switch thereto.

17 is the casing within which the various elements are assembled by simply sliding them therein through the open end 18 of the casing. The rear of the wall of the casing is provided with a passage 19 which is somewhat larger in diameter than the shoulder 20 on the stud 13 so that some play is provided therebetween.

The interior of the rear wall of the casing 17 is provided with the lugs 21 and 22 which are

provided at the top and bottom with steps 23 and 24, and flat springs 25 and 26 are retained in place between the steps and the top and bottom, respectively, of the casing, as shown in Fig. 3. The rear wall of the element 7 is provided at the top and bottom with a central projection, such as shown at 27 in Fig. 1, which are designed to abut the springs 25 and 26, as shown in Fig. 3. The side of the casing is also provided with a passage 28 adapted to pass the bifurcated, staple-like, operating element 29, shown in Fig. 1.

In assembling my switch, and assuming the casing to be held with the open end up, the springs 25 and 26 are first dropped into position in the bottom of the casing; the element 7 is then inserted and the male terminal 14 threaded thereon. The cylindrical element 1, which floats between the jaws of elements 6 and 7, is then dropped into position in the element 7 and the element 6 is inserted in engagement with the element 1. In order to hold the parts in assembled relation, I provide two pins 30 and 31 which pass through openings 32 and 33, respectively, in the sides of the casing and through the passages 34 and 35, respectively, in the element 6. When the parts are loosely assembled as described above, the passages in the element 6 are not in precise alignment with the pin passages in the casing and it is necessary to press the element 6 firmly into the casing so that the flat springs 25 and 26 are slightly flexed and stressed in order to bring the pin passages in alignment with each other whereupon the pins may be simply pushed into place. Because the springs 25 and 26 are flexed and under stress when the parts are assembled, it will be apparent that the female elements 6 and 7 are held in firm contact with the male element 1. After the parts are assembled, the operating element 29 is merely pushed into the passages 36 and 37 in the cylindrical element 1.

Secured to the element 29 is an index plate 38, preferably having an arrow 39 thereon. When the parts are in the position shown in Figs. 1 and 3, the switch is in the "off" position and the arrow 39 will point upwardly. However, by turning the cylindrical element clockwise through an angle of 90°, the switch will be in the "on" position and the arrow will be in the position shown in Fig. 5. In order to provide positive steps at the "on" and "off" positions, a projection 40 having surfaces 41 and 42 (see Figs. 2 and 5) which are normal to the side of the casing, is molded on the outside of the casing adjacent the upper left hand corner, as viewed in Fig. 2. When the switch is in the "on" position, the index 39 abuts the surface 42, as shown in Fig. 5, and when in the "off" position, it abuts the surface 41.

In order to attach my switch to the battery, it is only necessary to remove one of the conductors 16 (see Fig. 6) from the storage battery terminal and attach it to the male terminal 14 of the switch, and then to attach the female terminal 10 of the switch to the terminal of the battery from which the conductor 16 was disconnected.

In order to operate the switch from a remote point, I provide a rod 43 having a hooked end 44 which engages in the operating element 29 and which may be provided at the other end with a knurled button 45 by which the rod 43 and the operating element 29 may be turned. The hooked end of the rod 43 and the element 29 cooperate to form what is substantially a universal coupling so that considerable latitude is provided as to the positioning of the rod 43 and its button 45.

From the foregoing, it will be apparent that, when the switch is in the "on" position, the stationary elements 6 and 7 are bridged and electrically connected at the top and bottom by the metallic elements 2 and 3 on the movable cylindrical element, and these elements may be made long enough and thick enough to provide an electrical connection of any desired cross sectional area between the elements 6 and 7 and to provide sufficient area of contact between the stationary and movable elements to carry any current without over-heating.

It will also be apparent that, as distinguished from most other switches in which wear of the contacts impairs the operation and efficiency of the switch, the more my switch is used, the better the contacts become because any high points on the contacting surfaces will wear down and the elements will become substantially lap-fitted together. By reason of the facts that the cylindrical element 1 floats between the jaws of elements 6 and 7, and these last mentioned elements are relatively movable in the casing, these parts, which cooperate to conduct the current through the switch, are self aligning, and thus perfect electrical contact is maintained between the jaws and the element 1 throughout the entire cylindrical areas of the jaws.

While I have described my invention in its preferred embodiment, it is to be understood that the words which I have used are words of description rather than of limitation and that changes, within the purview of the appended claims, may be made without departing from the true scope and spirit of my invention in its broader aspects.

What I claim is:

1. An electric switch comprising a casing formed of insulating material, a pair of spaced, metallic, jaw-forming elements within said casing relatively movable towards and away from each other and laterally define, between said jaws, a substantially cylindrical space, a floating cylinder rotatably mounted in said space in contact with said jaw-forming elements and maintaining said elements in slightly spaced relation; at least one of said jaw-forming elements being mounted to float within said casing, and said cylinder being mounted to float in all directions, whereby said jaw-forming elements and said cylinder are self-aligning, thereby maintaining substantially constant overall contact throughout their contacting areas; the surface of said cylinder comprising two diametrically opposed metal portions spaced by portions formed of insulating material; resilient means within said casing biased to urge said jaw-forming elements into close contact with said cylinder to form a bearing therefor, means extending through said casing and cooperating with said cylinder for manually rotating the same to bring the metal portions of the surface of said cylinder into and out of contact with each of said jaw-forming elements electrically to connect and disconnect the same, and means on each of said jaw-forming elements extending exteriorly of said casing and forming a terminal of said switch; one of said terminal forming means having a frusto-conical passage therethrough adapting it for direct attachment to a frusto-conical terminal of a storage battery.

2. A rotary switch adapted for direct attachment to the terminal of a storage battery for connecting said battery in and disconnecting it

from a circuit in which it forms the source of power; said switch comprising a casing formed of insulating material; a pair of relatively movable, metallic, jaw-forming elements closely but slidably fitted in said casing in opposed relation and laterally enclosing therebetween a substantially cylindrical space; a floating cylinder rotatably mounted in said space, with said elements forming a bearing therefor, and maintaining said elements in slightly spaced relation; at least one of said jaw-forming elements being mounted to float within said casing, and said cylinder being mounted to float in all directions around its longitudinal axis, whereby said jaw-forming elements and said cylinder are self-aligning, thereby maintaining substantially constant overall contact throughout their contacting areas; the surface of said cylinder comprising two, slightly spaced, substantially semi-cylindrical metallic portions electrically insulated from each other; resilient means in said casing cooperating with said floating jaw element and biased to maintain said elements and said floating cylinder in close surface contact; means extending through said casing and cooperating with said cylinder for manually rotating the same to open and close said switch; and switch terminals exterior of said casing connected, respectively, to said jaw-forming elements.

3. A rotary switch adapted for direct attachment to the terminal of a storage battery for connecting said battery in and disconnecting it from a circuit in which it forms the source of power; said switch comprising a casing formed of insulating material; a pair of metallic, jaw-forming elements closely fitted in said casing in opposed relation and laterally enclosing therebetween a substantially cylindrical space; a floating cylinder rotatably mounted in said space, with said elements forming a bearing therefor, and maintaining said elements in slightly spaced relation; one of said jaw-forming elements being rigidly mounted within said casing and the other

of said jaw-forming elements being mounted to float therein, and said cylinder being mounted to float around its longitudinal axis, whereby said jaw-forming elements and said cylinder are self-aligning, thereby maintaining substantially constant overall contact throughout their contacting areas; the surface of said cylinder comprising two, slightly spaced, substantially semi-cylindrical metallic portions electrically insulated from each other; resilient means in said casing cooperating with at least one of said elements and biased to maintain said elements and said floating cylinder in close surface contact; means extending through said casing and cooperating with said cylinder for manually rotating the same to open and close said switch; and switch terminals exterior of said casing connected, respectively, to said jaw-forming elements; one of said terminals being provided with a frusto-conical passage adapted to embrace the frusto-conical terminal of said battery for attaching said switch directly to said terminal.

WILLIAM C. MASON.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,136,406	Butts	Apr. 20, 1915
1,173,609	Savage et al.	Feb. 29, 1916
1,541,015	Weeks	June 9, 1925
1,615,106	Bethea	Jan. 18, 1927
1,950,563	Miller	Mar. 13, 1934
1,995,946	Schild	Mar. 26, 1935
2,427,940	Ayres	Sept. 23, 1947

FOREIGN PATENTS

Number	Country	Date
9,917	Great Britain	1889
386,426	Great Britain	Jan. 19, 1933