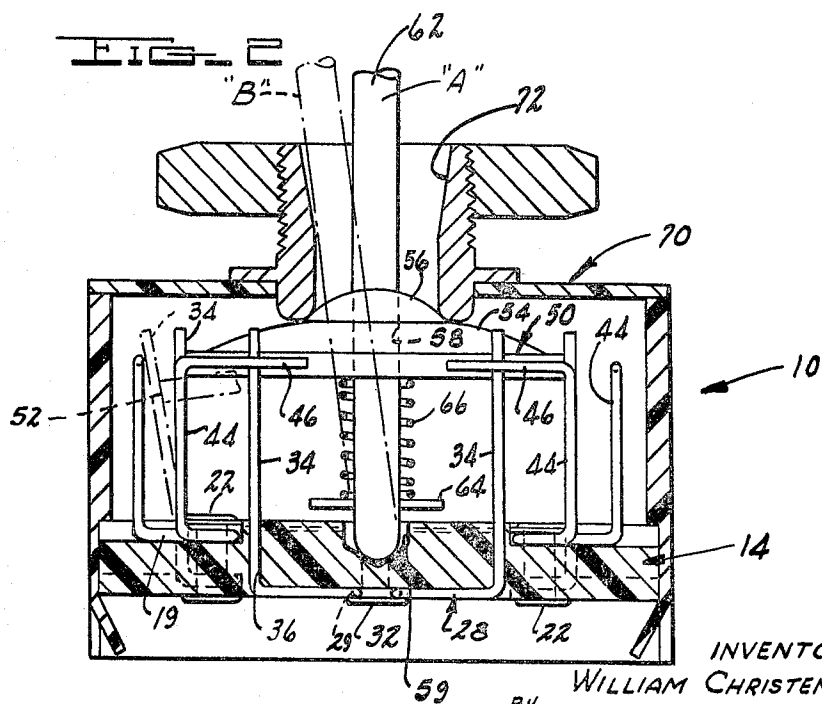
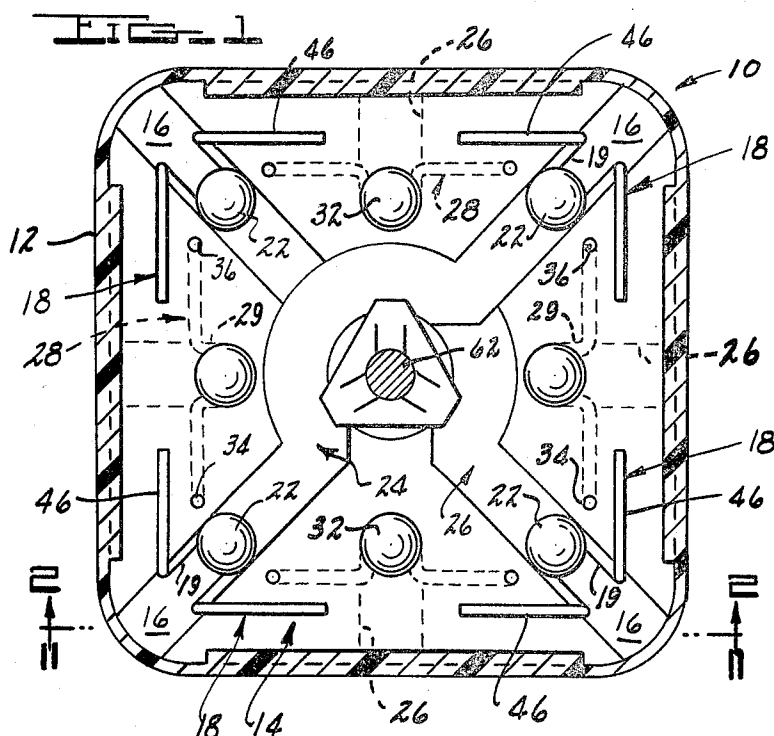


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STATIONARY LEAF-SPRING CONTACTS
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LEVER ACTUATED SWITCH WITH RESILIENT STATIONARY LEAF-SPRING CONTACTS

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12 Claims. (Cl. 200-6)

The present invention relates to new and useful improvements in switches, and more particularly to a multi-position lever switch which utilize resilient wire contacts.

While a switch is not generally considered a new device, the switch herein proposed presents a unique device which can be manufactured at a substantially lower cost than those switches which are currently available in the market place.

It is therefore a primary object of the present invention to provide a multi-position, resilient wire contact switch which is simple, durable and capable of being manufactured at a cost which is substantially below anything which is now available.

Another object of the invention is the provision of a switch wherein the wire contacts when engaged have a double wiping action.

Still another object of the invention is the provision of a switch which has a lever action and is self centering in the off position.

The above and other objects of the present invention can be accomplished by the provision of a switch case; an insulated switch base which forms the bottom of said case; a switch mounting means which forms the top of said switch case; a first group of resilient wire contacts secured to said switch base; a second group of resilient wire contacts secured to said switch base intermediate each of said first group of wire contacts, and in spaced relationship thereto; a buss bar interposed between two of said second group of wire contacts; a buss bar interposed between two other of said second group of wire contacts; an actuator plate of generally symmetrical configuration; the edge of said actuator plate adapted to engage said first group of wire contacts; an opening in said switch mounting means and said actuator plate for receiving a lever member; said lever member pivotal about a pivot pocket in said switch base; a compound spherical radius on the upper surface of said actuator plate for engagement with the edge of said opening in said switch mounting means, said actuator plate maintained in contact with said switch mounting means by a spring interposed between a flange on said lever and the underside of said actuator plate to provide a self centering feature, since the radii for one of said spherical radii is drawn from above the pivot pocket and one is drawn from below the pivot pocket in the switch base; displacement from the center off position of the actuator plate will displace selectively said first group of wire contacts into engagement with said second group of wire contacts.

Other objects of the present invention will appear in the following description and appended claims, reference being had to the accompanying drawings which form a part of this specification, wherein like reference characters designate corresponding parts in the several views.

In the drawings:

FIGURE 1 is a plan view of the present invention with the switch case cut away and the actuator plate removed for clarity.

FIGURE 2 is a cross section taken substantially along lines 2-2 of FIGURE 1, with parts in elevation for the purpose of illustration.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement

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of parts illustrated in the accompanying drawings, since it is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not limitation.

Looking now at the drawings, FIGURE 1 shows an assembly 10 of the present invention, with the upper portion thereof having been removed for clarity. This portion of course is illustrated in FIGURE 2 of the drawings.

It will be noted that the switch case 12 is of generally symmetrical configuration and is fitted with a switch base 14 which is substantially flat. The upper surface of said switch base 14 has a plurality of recessed pockets 16 therein which receive a plurality of wire contacts 18 thereon. Each of said wire contacts 18 are secured by rivets 22, which also secure two buss bars 24 and 26 which connect two diametrically opposed contacts 18. The buss bars 24 and 26 are rigid and separated from each other because of the differing depths of the cut-away pocket portion of the switch base 14 which supports same.

The underside of said switch base also has a plurality of recessed pockets 26 therein which receive a plurality of wire contacts 28. Each of said wire contacts 28 is secured by rivets 32, which extend through the switch base. Each of the wire contacts 28 are of generally U shaped configuration, except for the loop 29 which is used for securing same to the switch base 14. The legs 34 of said U shaped contacts extend vertically upward through openings 36 in the switch base 14.

The wire contacts 18 have a loop 19 for securing same to the switch base, with legs 44 which extend vertically upward and then depend at right angles to the vertical portion thereof and then at substantially right angles to each other in generally parallel relationship to the switch case 12 and base 14. This portion of the wire contact 18 is identified by the numeral 46.

In FIGURE 2 of the drawings, a cross section is taken substantially along lines 2-2 of FIGURE 1. This shows the actuator plate 50 which is of generally symmetrical configuration and the top of the switch case 70 which has the threaded mounting means secured thereon.

The edge 52 of the actuator plate is adapted to engage each of the legs 34 of the contacts 28, thereby centering the switch 10 in the off position. The lower surface of the actuator plate 50 is generally flat, while the upper surface thereof has a compound spherical radius thereon identified by numerals 54 and 56. A pivotal lever 62 is disposed through an opening 72 in the switch mounting means 70 and through an opening 58 in the actuator plate 50. The end of the lever is pivoted in a recessed pocket 59 in the upper flat surface of the switch base 14. A flange 64 depends from the lever 62 and supports a compression spring 66 which is interposed between the underside of said actuator plate 50 and said flange 64, thereby maintaining said actuator plate 50 in contact with the edge of the underside of the opening 72. It is then readily apparent that when the lever 62 is moved from position A to position B (in phantom), the spring 66 will be compressed and leg 34 of contact 28 will be caused to wipe the portion of contact 18 which is identified by numeral 46. Release of the lever 62 results in the lever returning to position A. This is caused by the resilience of the wire contact 34, the spherical radius 56 and the compression spring 66 acting thereon.

Therefore, when appropriate wiring is attached to the rivets 22 and 32 and the lever 62 is displaced, a variety of circuit combinations occurs.

The present invention is simple, durable and relatively inexpensive to manufacture. Because of the wiping action of the contacts, its life expectancy is exceptionally good and its utility and compactness lend itself to many

applications. The switch can be used on such items as automobile window operators, seat adjusters, door locks, automatic rear view mirrors, signal systems, washing machines, dishwashers and many other items too numerous to mention.

Having thus described my invention, I claim:

1. In a multi position, center off lever switch, the combination of,
 - a switch case of generally symmetrical configuration;
 - an insulated switch base which forms the bottom of said case;
 - a switch mounting means which forms the top of said case;
 - a first group of resilient wire contacts secured to said insulated switch base;
 - a second group of resilient wire contacts secured to said insulated switch base;
 - a generally symmetrical actuator plate positioned by said first group of resilient contacts;
 - an opening in said actuator plate and said switch mounting means;
 - a pivotal lever for positioning said actuator plate, said lever extending through said opening in said switch mounting means and said actuator plate, while being pivotal about an opening in said switch base, displacement of said actuator plate causes selective engagement of certain of said first group of resilient wire contacts with said second group of resilient wire contacts, while buss bars connect certain of said second group of resilient wire contacts.
2. In a multi position, center off lever switch, the combination of,
 - a switch case of generally symmetrical configuration;
 - an insulated switch base which forms the bottom of said case;
 - a switch mounting means which forms the top of said case;
 - a first group of resilient wire contacts secured to said insulated switch base;
 - a second group of resilient wire contacts secured to said insulated switch base;
 - a generally symmetrical actuator plate positioned by said first group of resilient wire contacts which extend vertically upward so as to engage the edge thereof;
 - said second group of resilient wire contacts extending upwardly in spaced relationship to said first group or wire contacts and said actuator plate;
 - an opening in said switch mounting means and said actuator plate;
 - a pivotal lever for displacing said actuator plate, said lever extending through said opening in said switch mounting means and said actuator plate, while being pivotal about a pocket in said switch base, displacement of said actuator plate causes selective engagement of certain of said first group of resilient wire contacts with said second group of wire contacts.
3. A switch as in claim 2, wherein portions of said second group of resilient contacts lie in parallel relationship to the edges of said actuator plate.
4. In a multi position, center off lever switch, the combination of,
 - a switch case of generally symmetrical configuration;
 - an insulated switch base which forms the bottom of said switch case;
 - a switch mounting means which forms the top of said case;
 - a first group of resilient wire contacts secured to said insulated switch base;
 - a second group of resilient wire contacts secured to said insulated switch base;
 - a generally symmetrical actuator plate which is self centering in the off position and positioned by said first group of wire contacts;

- an opening in said actuator plate and switch mounting means;
- a pivotal lever for positioning said actuator plate, said lever extending through said opening in said switch mounting means and said actuator plate, while being pivotal about a pocket in said switch base, displacement of said actuator plate causes selective engagement of certain of said first group of resilient wire contacts with said second group of resilient wire contacts.
5. In a multi position, center off lever switch, the combination of,
 - a switch case of generally symmetrical configuration;
 - an insulated switch base which forms the bottom of said case;
 - a switch mounting means which forms the top of said case;
 - a first group of resilient wire contacts secured to said insulated switch base;
 - a second group of resilient wire contacts secured to said insulated switch base;
 - a generally symmetrical actuator plate positioned by said first group of resilient wire contacts;
 - a spherical radius on the upper surface of said actuator plate;
 - a spring for maintaining said actuator plate in contact with the top of said switch case;
 - an opening in said actuator plate and said switch mounting means;
 - a pivotal lever for positioning said actuator plate, said lever extending through said opening in said switch mounting means and said actuator plate, while being pivotal about an opening in said switch base, displacement of said actuator plate causes selective engagement of certain of said first group of wire contacts with said second group of wire contacts.
6. In a multi position, center off lever switch, the combination of,
 - a switch case of generally symmetrical configuration;
 - a switch mounting means which forms the top of said case;
 - an insulated switch base which forms the bottom of said case;
 - a first group of resilient wire contacts secured to said insulated switch base;
 - a second group of resilient wire contacts secured to said insulated switch base;
 - a generally symmetrical actuator plate positioned by said first group of resilient wire contacts which are angularly disposed in relationship to said switch base so as to maintain said actuator plate in contact with the top of said case for centering same;
 - an opening in said actuator plate and said switch mounting means;
 - a pivotal lever for displacing said actuator plate, said lever extending through said opening in said switch mounting means and said actuator plate, while being pivotal about a pocket in said switch base, displacement of said actuator plate causes selective engagement of certain of said first group of wire contacts with said second group of wire contacts.
7. In a multi position lever switch, the combination of,
 - a switch case of generally symmetrical configuration which is adapted for mounting;
 - an insulated switch base which forms the bottom of said case;
 - a first group of four vertically disposed wire contacts secured to said insulated switch base in a groove on the underside thereof;
 - a second group of four vertically disposed wire contacts secured to said insulated switch base in a groove on the top surface thereof;
 - an actuator plate, the edges thereof in engagement with said first group of wire contacts;

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a pivotal lever which extends through said switch case and said actuator plate and is pivotal about a pocket in said switch base, displacement of said actuator plate with said lever selectively engaging one of said first group of contacts with said second group of contacts.

8. A switch as in claim 7, wherein said upper surface of said actuator plate has a compound spherical radius thereon, one radius above said pocket in said switch base and one below for maintaining said actuator plate in a central position.

9. In a multi position lever switch, the combination of, a switch case;
an insulated switch base which forms the bottom of said case;

a switch mounting means which forms the top of said switch case;

a first group of resilient wire contacts secured to said switch base;

a second group of resilient wire contacts secured to said switch base intermediate each of said first group of wire contacts and in spaced relationship thereto;

a buss bar interposed between two of said second group of wire contacts;

a buss bar interposed between two other of said second group of wire contacts;

an actuator plate of generally symmetrical configuration, the edges thereof adapted to engage said first group of wire contacts;

an opening in said switch mounting means and said actuator plate for receiving a lever member, said lever member pivotal about a pocket in said switch base;

a compound spherical radius on the upper surface of

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said actuator plate for engagement with the edge of said opening in said switch mounting means;
said actuator plate spherical radius maintained in contact with said switch mounting means with a spring interposed between a flange on said lever and the underside of said actuator plate to provide a self-centering feature;

one radii for said spherical radius is drawn from a point above the pivot pocket in the switch base, while the other radius is drawn from a point below the pocket; displacement of the lever will displace the actuator plate to selectively engage certain of said first group of wire contacts into engagement with certain of said second group of contacts.

10. A switch as in claim 9, wherein said wire contacts and buss bars are located in grooves in the upper surface of said switch base, said grooves being of different depths to prevent indiscriminate contact.

11. A switch as in claim 9, wherein said wire contacts and buss bars are located in grooves in the lower undersurface of said switch base, said grooves being of different depths to prevent indiscriminate contact.

12. A switch as in claim 9, wherein said wire contacts and buss bars are located in grooves in both the upper surface and lower undersurface of said switch base.

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