March 11, 1924. 1,486,744

F. H. HARTZELL

ELECTRIC SWITCH

Filed Nov. 14, 1916

Fig. 1

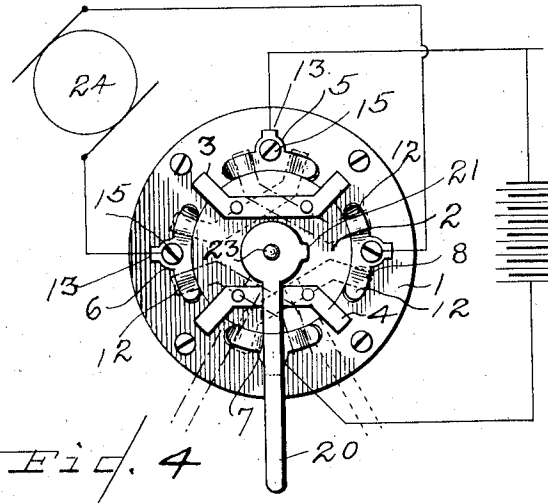


Fig. 2

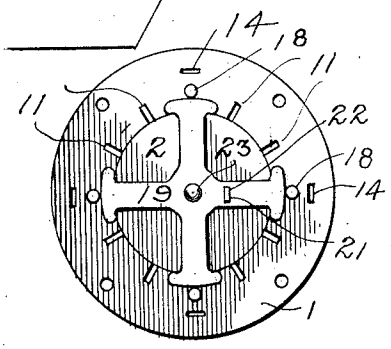


Fig. 3.

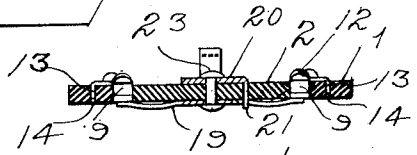


Fig. 4

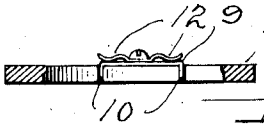


Fig. 6

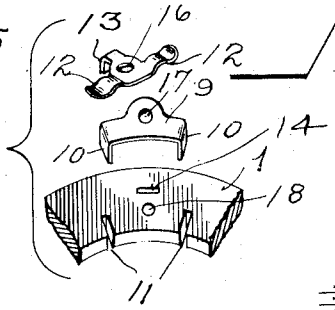
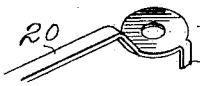
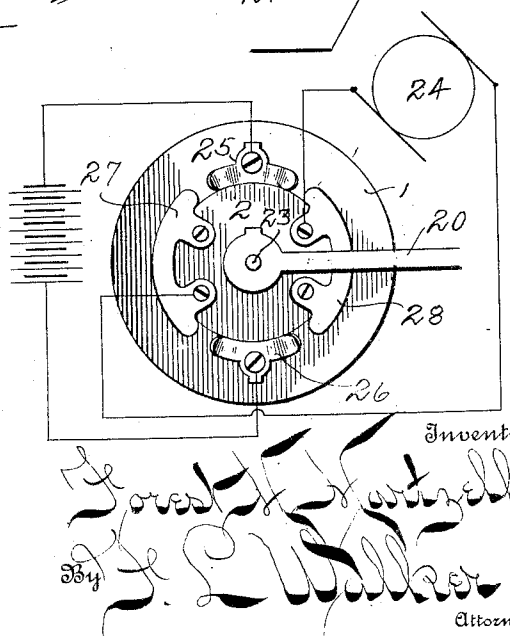


Fig. 5

Fig. 7





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UNITED STATES PATENT OFFICE.

FOREST H. HARTZELL, OF DAYTON, OHIO.

ELECTRIC SWITCH..

Application filed November 14, 1916. Serial No. 131,309.

To all whom it may concern:

Be it known that I, FOREST H. HARTZELL, citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to electric switches and more particularly to rotary switches of the knife blade type.

The object of the invention is to simplify the construction as well as means and mode of operation of such devices whereby they will not only be cheapened in construction but will be more efficient in use, positive in operation, easily operated, adapted to insure perfect electrical contact and unlikely to get out of repair.

A further object of the invention is to provide an efficient and economical form of reversing switch, particularly adapted for use in conjunction with toy motors or other electrical toy apparatus but which may be applied to other practical uses.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention consists of features of construction, the parts and combinations thereof and the mode of operation or their equivalents as hereinafter described and set forth in the claims.

Referring to the drawings Fig. 1 is a top plan view of the assembled switch forming the subject matter hereof. Fig. 2 is a bottom plan view thereof. Fig. 3 is a vertical sectional view thereof. Fig. 4 is a detailed side elevation of the contact fingers. Fig. 5 is a detail view of the component parts of the receiving contact. Fig. 6 is a detail perspective view of the operating handle or lever. Fig. 7 is a top plan view of a modification of the construction shown in Figs. 1 and 2.

Like parts are indicated by similar characters of reference throughout the several views.

In constructing the switch there is employed a fixed or stationary annular base or frame member 1, preferably of hard rubber, fiber or other non-conductive material. Located within the annular frame member 1, and concentric therewith is a revoluble disc 2. Secured to the upper face of the disc 2 are the transverse bars 3 and 4 of conductive material, which upon the oscillation of the disc 2, are adapted to connect the contacts 5, 6, 7 and 8, located upon the annular frame 1, into alternating pairs.

The contacts 5, 6, 7 and 8 comprise a metallic inverted U shaped member 9 the pendent legs 10 of which extend in notches or recesses 11, formed in the annular frame 1. Overlying the member 9 is a T shaped contact member, the arms 12 of which are curved or corrugated and the stem 13 of which is bent downward and projects within a recess or opening 14 in the annular frame member 1. An attachment screw 15 extends through holes 16 and 17 in the contact members and engages in an opening 18 in the frame member 1. The pendent legs 10 and 13 of the contact members by their engagement in the openings 11 and 14, prevent the rotation of the contact members around the attachment screws 15 and maintain the alignment of the contact members one with the other and with the periphery of the disc 2.

As the disc 2 is rotated to and fro the projecting ends of the conductor bars 3 and 4 which extend beyond the periphery of the disc and overhang the annular frame member 1, are carried beneath the overhanging curve arms 12 and on to the contact member 9. The arms 12 being somewhat resilient, bear upon the interposed extremities of the bars 3 and 4 thereby insuring perfect electrical contact therewith. Secured to the underside of the disc 2 is a cross arm or spider 19, the extremities of the arms of which extend beyond the periphery of the disc 2 and engage the under side of the annular frame member 1. These arms are preferably slightly curved and are of resilient material whereby they will exert a slight spring pressure or tension upon the disc 2 tending to drive the disc downward thereby drawing the extended arm of the contact bars 3 and 4 into close engagement with the contact 9. The extension of the cross arm or spider 19 engaging the other side of the frame member 1 and the extensions of the contact bars 3 and 4 engaging the upper side of said frame member 1, prevents the displacement of the disc 2 and serves to maintain the disc in a common plane with the frame member 1. Secured centrally to the disc 2 is an operating lever or handle 20 having a downward lug or finger 21, which extends through a suitable opening in the disc 2 and through a corresponding perforation in one of the cross

arms or spider arms 19 as indicated at 22, Fig. 2. The cross arms or spider 19 and the operating handle or lever 20 are secured to the disc 2 by a common stud or rivet 23. By oscillating the handle of lever 20 toward the right in Fig. 1 as indicated by dotted lines the contacts are connected in pairs 5—6 and 7—8. Upon oscillating the disc 2 toward the left in Fig. 1 as indicated by dot and dash lines the contacts are connected into pairs 5—8 and 6—7 thereby reversing the polarity of the motor 24. By adjusting the handle or lever 20 to a medial position as shown in solid lines the circuit intermediate the battery and motor is opened.

In Fig. 7 there is shown a modification of the construction heretofore described in which the base member 1 carries but two contacts 25 and 26 similar in construction to the contacts 5 to 8 heretofore described. These contacts 25 to 26 are oppositely disposed upon frame member 1. Secured to the rotary disc 2 at diametrically opposite points are two arcuate contact bars or blades 27 and 28. The contacts 25 and 26 are positioned in the paths of the arcuate contacts 27 and 28 to be engaged thereby as the disc 2 is rotated. These contact blades 27 and 28 overhang the upper face of the annular frame member 1 while a spider or cross arm overhangs the other face of the annular member as before described and as shown in Fig. 2.

By oscillating the disc 2 in one direction the contact blade 27 enters between the members of the stationary contact 25 while the contact blade 28 is entered between the members of the stationary contact 26. Upon the oscillation of the disc 2 in the opposite direction the relation of the contact blades and the fixed contacts is reversed. In Fig. 7 the parts are shown in an intermediate or neutral position. In this connection the battery conductors are connected to the contact 25 and 26 while the motor conductors are connected to the contact blades 27 and 28 or vice versa. While this form of device will be found suitable and desirable for some conditions of use it is less desirable for general purposes than that shown at Fig. 1, due to the fact that it necessarily involves two movable conductors, namely those circuit connections which are connected directly to the contact blades 27 and 28. The operating handle or lever is formed and attached in the same manner as before described.

The switch thus formed will be found cheap, economical and efficient.

From the above description it will be apparent that there is thus provided a device of the character described, possessing the particular features of advantage before enumerated as desirable but which obviously is susceptible of modification in its form, proportion, detail construction or arrangement of parts, without departing from principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to certain structural features, it is understood that the invention is not limited to any specific details, but that the means and construction herein described comprise but one mode of putting the invention into effect, and the invention is therefore claimed broadly in any of its possible forms or modifications within the scope of the appended claims.

Having thus described my invention I claim:—

1. In an electric switch, two flat plate like members, of substantially equal thickness, one of which has an opening extending therethru in which the other member is located for relative movement, a retaining finger carried by one of said members and overlapping the other member on one face of the device, and a contact finger carried by one of the members and overlapping the other member on the opposite face of the device, and a contact with which the contact finger engages upon the relative movement of the said members.

2. In an electric switch two relatively movable plate like members lying substantially in a common plane, a spring arm carried by one of said members and overlapping the other member upon one face of the device, and a contact finger carried by one of the members and overlapping the other member on the opposite face of the device, and a contact engaged by the contact finger upon relative movement of the members.

3. In an electric switch, two plate like members of substantially equal thickness, one of said members having a circular opening extending therethru, the other member being of circular contour to agree with said opening in which it is located, said members being capable of relative revoluble movement in relation one with the other, spring fingers carried by one of said members overlapping the other member on one face of the device and a contact finger carried by one member and overlapping the other member on the opposite face of the device.

4. In an electric switch two relatively movable plate like members of substantially equal thickness positioned for relative movement in a substantially common plane, coacting electrical contacts carried by the respective members and operatively engaged upon relative movement of the members, and resilient means for restraining the plate like members against relative movement of the members, and resilient means for restraining the plate like members

against relative movement perpendicular to their planes.

5. In an electric switch, two relatively movable contact supporting members, substantially T shaped contacts carried upon one of the members, the stem portion of which is bent laterally and embedded in the supporting member, the arms of which extend laterally from such embedded portion, substantially in the direction of the relative movement of the member, and a contact finger carried by the other member and movable into and out of engagement with the T shaped contact by the relative movement of the supporting members.

6. In an electric switch, two relatively movable supporting members, double contacts carried by one of said members each comprising a substantially U shaped contact member the legs of which are embedded in the supporting member and a substantially T shaped contact member superposed upon the U shaped member, the stem portion of the T shaped contact member being bent laterally and embedded in the supporting member, and a contact finger carried by the other supporting member adapted to be moved into and out of a position intermediate the U shaped and T shaped contact members by the relative movement of said supporting members.

7. An electric switch comprising a plate of insulating material having a circular opening therein, a second plate of insulating material located within the circular opening of the first mentioned plate said plates being relatively rotatable in a common plane, resilient fingers carried by one of said plates and extending beyond the periphery thereof, into overlapping relation with both faces of the other plate, whereby said overlapped plate will be located intermediate the planes of said overlapping resilient fingers, and electrical contacts carried by the overlapped plate, with which certain of the said resilient fingers make contact upon relative rotation of the plates.

In testimony whereof, I have hereunto set my hand this 25th day of October A. D. 1916.

FOREST H. HARTZELL.

Witnesses:
HARRY F. NOLAN,
GEO. STAUT.