

W. D. R. MACDIARMID.
ELECTRIC SWITCH.
APPLICATION FILED JUNE 3, 1908.

959,769.

Patented May 31, 1910.

2 SHEETS—SHEET 1.

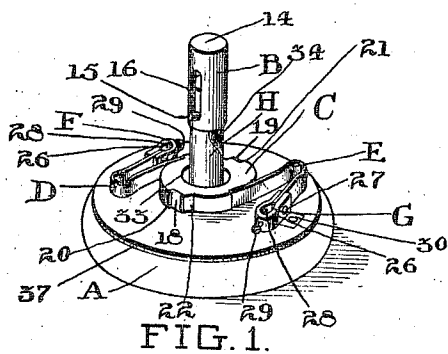


FIG. 1.

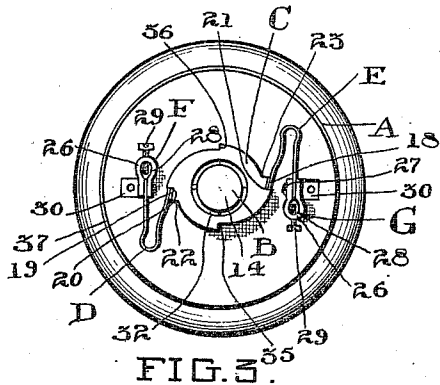


FIG. 3.

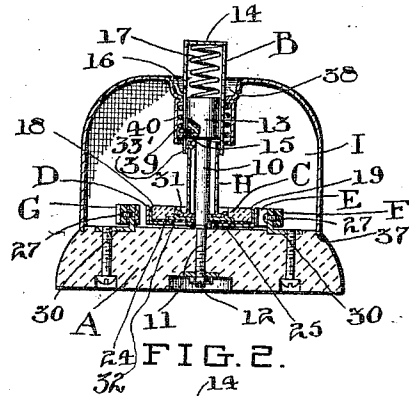


FIG. 2.

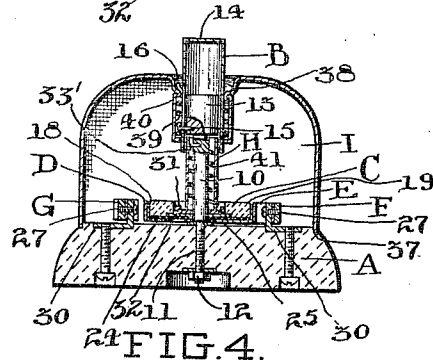


FIG. 4.

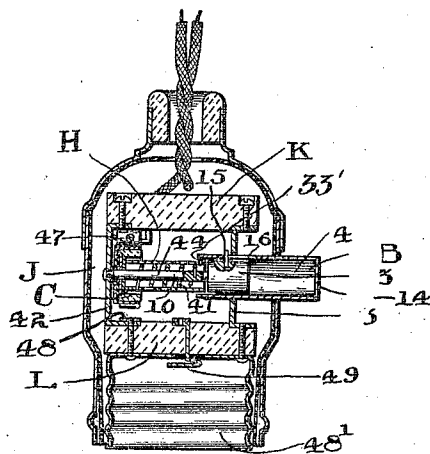


FIG. 5.

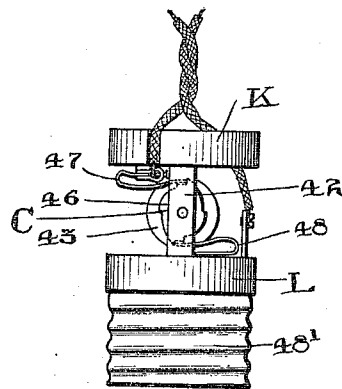


FIG. 6.

WITNESSES.

F. H. Shaw
Wm. A. [Signature]

INVENTOR
W. D. R. MACDIARMID.

BY *[Signature]*
ATT'Y.

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2 SHEETS—SHEET 2.

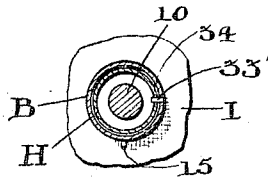


FIG. 7.

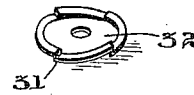


FIG. 8.

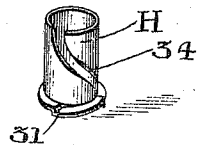


FIG. 9.

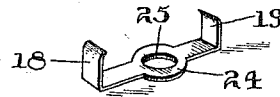


FIG. 10.

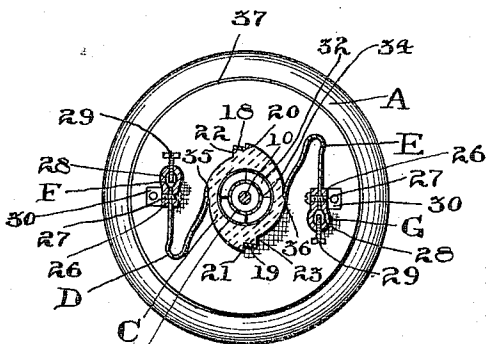


FIG. 11.

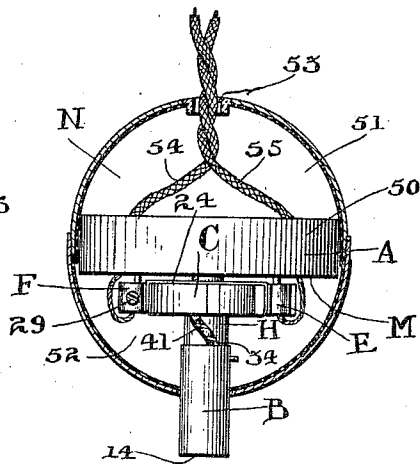


FIG. 12.

WITNESSES.

J. H. Clew

Wm. G. Wyman

INVENTOR
W. D. R. MACDIARMID.

BY

Lucas S. S. S. S.

ATTY.

UNITED STATES PATENT OFFICE.

WESLEY DUNCAN RICHARD MACDIARMID, OF OTTAWA, ONTARIO, CANADA, ASSIGNOR
OF ONE-THIRD TO HORACE CASLER DIER AND ONE-THIRD TO CLAUDE ELMER
WILTSIE, BOTH OF OTTAWA, CANADA.

ELECTRIC SWITCH.

959,769.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed June 3, 1908. Serial No. 436,331.

To all whom it may concern:

Be it known that I, WESLEY DUNCAN RICHARD MACDIARMID, of the city of Ottawa, Province of Ontario, Canada, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to improvements in electric switches, particularly of the rotating commutator type, and its objects are to eliminate sparking in such switches, and to provide a spring in connection with the commutator which will render the same absolutely safe, in operation, and free from any liability of arcing.

Further objects are to provide improved means of attaching the cover to the switch and to improve the binding posts and brush holders, the different features of the invention being fully set forth and described in the following specification and accompanying drawings.

In the drawings, Figure 1 is a perspective view of the switch with the cover removed. Fig. 2 is a vertical section through the cover in place. Fig. 3 is a plan view with the cover removed. Fig. 4 is a vertical section through an alternative form of the invention. Fig. 5 is a vertical section through an incandescent lamp socket with a switch manufactured according to the present invention. Fig. 6 is a side view of the socket with the cover removed. Fig. 7 is a transverse sectional view showing the pin on the depressible member which enters the inclined groove on the reciprocative member. Fig. 8 is a perspective view of the ratchet wheel on the commutator. Fig. 9 is a perspective view of the reciprocative member. Fig. 10 is a perspective view of the contact points on the commutator. Fig. 11 is a transverse section through the commutator. Fig. 12 is a vertical section through the switch applied to a pendant.

In the drawings, like characters of reference indicate corresponding parts in each figure.

Referring, first, to the forms illustrated in Figs. 1 to 4 and 7 to 11, A represents the base of any suitable insulating material, which supports the central post 10 of the switch, the said post, in the embodiment illustrated, having a reduced screw-threaded lower portion, 11, which extends through the

base and is held by a nut 12 screwed on the end of the same.

The top of the post is provided with an enlarged cylindrical portion 13 on which fits the tubular depressible member B, the top 14 of which serves as the press button for the switch. This depressible member is prevented from turning during depression, by means of a pin 15 on the central post extending through a slot 16 on the member. The member is retained in raised position by means of a compression spring 17 located within the same and extending between the top of the post and the top of the depressible member.

Mounted on the central post 10 immediately above the base, is the rotatable commutator C which has a ratchet shaped periphery and has conducting contact plates 18 and 19, located in rabbets 20 and 21 in the periphery, and immediately at the end of the contact plates second rabbets 22 and 23 are formed, in order that the brushes may spring clear of the contact plates, the instant they have moved past the same. The contact plates are electrically connected in a suitable manner, that illustrated consisting of a base plate 24 integral with the contact plates and having a central aperture 25 which extends around the post 10 leaving an annular insulating air space between.

D and E are the brushes which are formed of U-shaped strips of spring metal having their free ends bearing against the periphery of the commutator. Their opposite ends are held in the binding posts F and G, each of which is formed by a strip of metal 26 folded on itself, and having the free ends attached to the spring brush by a screw 27, a suitable cylindrical recess being formed in the folded end, into which the conducting wire may be inserted and a suitable clamping set-screw 29 being provided extending through the folded end. One of the ends of the folded strip 26 has a projecting flange 30 formed integral thereon, which is bent beneath the two ends and secured to the base A.

In order to cause rotation of the commutator on each depression of the depressible member B, a reciprocative connecting member H is provided having an annular ratchet wheel 31 formed on the bottom thereof,

which engages a like ratchet wheel 32 secured in a recess 33 in the top of the commutator, whereby the turning of the connecting member in only one direction shall be effective in rotating the commutator. The connecting member has operative connection with the depressible member through the medium of a pin 33' provided on the latter, which extends in a spirally inclined slot 34 in the connecting member and thus, when the depressible member is depressed, it will cause a turning movement of the connecting member and this will be communicated to the commutator through the cooperating ratchet wheels 31 and 32. On release of the depressible member, the spring 17 will raise the same upwardly and the pin 33' will cooperate with the slot 34 to turn the reciprocative connecting member in the reverse direction, but this, on account of the peculiar formation of the ratchet wheels will produce no rotation of the commutator.

Preferably, only the two contact points are provided on the commutator, but it is evident that if desired, a greater number might be employed, and thus a three or even four pole switch provided. When only two contact plates are provided, central intermediate rabbets 35 and 36 are provided, into which the ends of the spring brushes are adapted to fit when the switch is open, as shown in Fig. 11. It may also be mentioned that the inclination of the contact plates 18 and 19 is slightly greater than that of a tangent, to the periphery of the commutator at that point, whereby an increased spring resistance will be offered by the brushes to the initial movement of the commutator thereby causing an excessive pressure to be exerted on the depressible member, which, when the commutator once starts to move, will result in it being almost instantaneously turned to open position.

I represents the dome-shaped casing for the upper part of the switch, having the lower edge thereof adapted to take into a rabbet 37 in the base, the said casing being provided with a central aperture 38, through which the depressible member B extends. The casing is retained in position by means of a screw-threaded member on the interior of the aperture 38 which engages the pin 15 which is lengthened for that purpose. In the embodiment illustrated, this screw-threaded member is formed by a spring 39 located within an annular extension 40 on the casing and secured thereto, and this spring, as well as forming a spiral locking means, gives a certain degree of resiliency to the lock, thereby insuring that the casing will always be held tightly in position, and will not work loose.

The inclined spiral groove 34 extends substantially one quarter way around the mem-

ber, and thus, on each depression, the commutator will be rotated ninety degrees, and this will alternately bring the rabbets 20 and 21, 35 and 36, into engagement with the end of the spring brushes, thereby alternately making and breaking the circuit between the brushes.

In the form shown in Fig. 4, the compression spring 17 is omitted, and a spiral spring 41 provided extending around the shank on the inside of the reciprocative member, and having the upper end connected to the shank and the lower end to the reciprocative member. Thus, when the member is turned, the spring will be wound up and on release, will restore it to its original position. In addition to this, the spring being compressive as well as spiral, will press the reciprocating member downwardly, and hold the ratchet wheel 31 thereon, in resilient contact with the corresponding ratchet wheel 32.

In the application of the invention to an incandescent lamp socket, as shown in Figs. 5 and 6, J represents the exterior casing of suitable construction, and K and L the top and bottom blocks of porcelain or other suitable material, connected together by uprights 42 and 43. The central post 44 is supported from the upright 42 and the depressible member 45 extends through a suitable aperture in the member 43. The commutator 46 is necessarily reduced in diameter, but is otherwise constructed and arranged the same as hereinbefore described. The brushes 47 and 48 are supported from the top and bottom blocks respectively, and the electrical connections of the socket are effected in the usual manner, the current passing through the brushes to the screw-threaded socket 48' on the lamp, and then, through the lamp back to the central contact point 49, and from there out the other conductor.

In the form shown in Fig. 12, the construction of the switch M itself is the same as shown in Figs. 1 to 3 but the base 50 of the switch, is supported from the upper member 51 of a spherical casing, N, the lower member 52 having suitable releasable engagement with the upper member, as by the screw-threading illustrated. The upper member is, as usual, provided with an aperture 53 through which the conducting cords 54 and 55 extend.

A considerable advantage in the construction of my switch is the snap effect in its action, due to the spring brushes acting together with the rabbets in the armature.

It will be seen that it is impossible to partially turn the switch on or off, as, until the brush reaches the edge of the rabbets above the contact plate, no electrical connection is made, and if released, it would simply, under action of the spring 17, return to its normal position. In the same way, when the circuit is being broken, it is necessary to exert an

excessive pressure to overcome the resistance of the spring brushes, and this causes the commutator to at once swing around to open position. It may be observed also that if the commutator were in closed position, and only a slight movement made, the brushes would remain in contact with the plates until they passed the edge of the rabbets 22 and 23 when they would at once spring out of contact, and it is impossible to move them back into engaged position, without rotating the commutator first to closed position. It will also be observed that the walls of the rabbets 22 and 23 extend substantially radially and that the peripherally extending insulating portion between the rabbets and the notches 35 and 36 is considerably less in diameter than the shortest distance between the contact plates, and so when the brushes have once passed the edge of the contact plates, they will at once jump to the insulating portions of less diameter, and owing to the radial character of the wall, it will be impossible for them to be forced outwardly against the contact plates or to produce an arc.

As many changes could be made in the above construction, and many apparently widely different embodiments of my invention within the scope of the appended claims could be made without departing from the spirit or scope thereof, it is intended that all matter contained in these specifications and drawings shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language of the following claims is intended to cover such generic and specific features of the invention herein described which, as a matter of language, might be said to be included thereby.

What I claim as my invention is:

1. In an electric switch and in combination, a base, a central post thereon, a depressible member slidably mounted on the end of the post, means for preventing rotation of the same, a tubular reciprocating connecting member also rotatably mounted on the post, connecting means extending between the depressible member and the connecting member, whereby the depression and raising of the depressible member reciprocates the reciprocating member, a commutator mounted on the post and means for communicating the movement of the reciprocating member in one direction only to the commutator.

2. In an electric switch, and in combina-

tion, a base, a central post thereon, having a pin outwardly protruding therefrom, a tubular depressible member mounted on the top of the post, having a longitudinal slot in which the pin extends, a tubular reciprocative connecting member mounted on the shaft having an inclined slot therein, a pin on the depressible member entering said slot, a commutator and means for communicating the movement of the reciprocative member in one direction only to the commutator.

3. In an electric switch, the combination with the brushes, of a binding post consisting of a strip of metal folded on itself to engage the brush between its outer ends, a screw extending through the inner end of the strip adapted to clamp a conducting wire inserted therein, and a flange on one end of the folded strip bent beneath the same, by means of which the binding post may be attached to the base.

4. In an electric switch, the combination with the base and central post thereon, of a casing having a central aperture therein, a screw-threaded member formed on the interior of the aperture, and a pin on the post engaging the screw-threaded member.

5. In an electric switch, the combination with the base, of a casing mounted thereon having a central aperture therein with a spring supported on the interior of the aperture, and means extending from the base and engaging between the coils of the spring, whereby on rotation of the casing and spring, the casing will be clamped to the base.

6. In an electric switch, a commutator having spaced contact plates with rabbets below the edge of each and being formed with a radially extending wall and notches half way between the contact plates providing peripherally extending annular insulating portions between the upper edges of the notches and the wall of the rabbets, said insulating portions having a diameter less than the distance between the nearest portions of the contact plates and brushes engaging the commutator and adapted to engage the notches when the commutator is turned to cut off the current.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

WESLEY DUNCAN RICHARD MACDIARMID.

Witnesses:

RUSSEL S. SMART,
J. H. OLNEY.