M. GUETT.

ELECTRIC SNAP SWITCH.

APPLICATION FILED SEPT. 12, 1916.

1,282,815.

Patented Oct. 29, 1918.

Fig. 1.

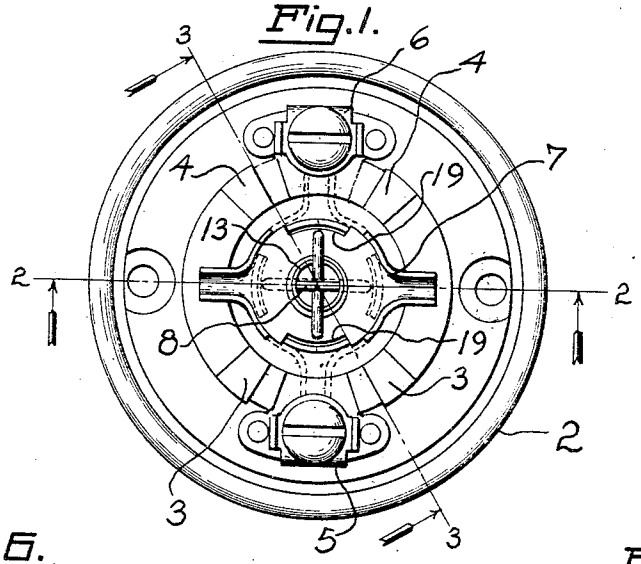



Fig. 6.

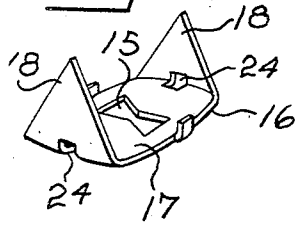



Fig. 5.

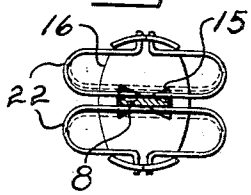



Fig. 2.

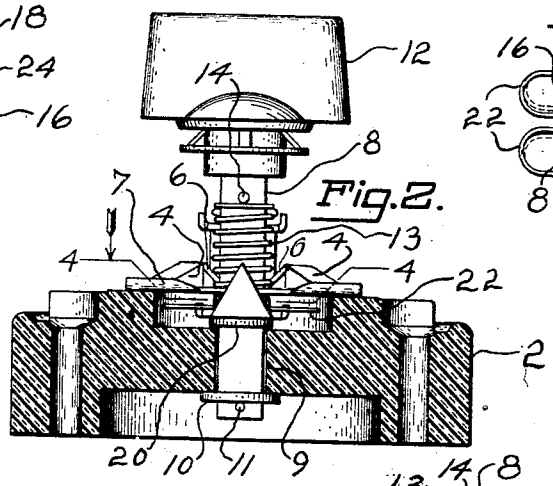



Fig. 4.

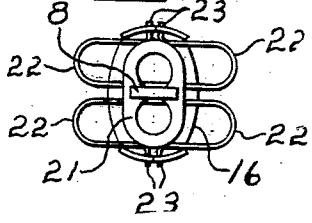
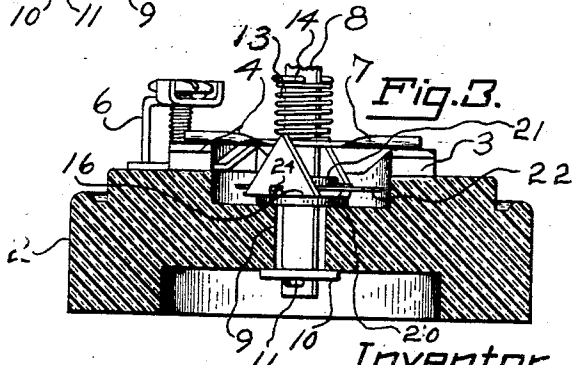



Fig. 3.




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# UNITED STATES PATENT OFFICE.

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## ELECTRIC SNAP-SWITCH.

1,282,815. Specification of Letters Patent. Patented Oct. 29, 1918.

Application filed September 12, 1916. Serial No. 119,735.

*To all whom it may concern:*

Be it known that I, MONROE GUETT, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Electric Snap-Switches, of which the following is a specification.

This invention relates to electric snap switches, the object of the invention being to provide an article of this character which is simple in construction and effective and certain in action.

In the drawings accompanying and forming part of the present specification I have shown in detail one convenient form of embodiment of the invention which I will set forth fully in the following description. I do not restrict myself to this disclosure; I may depart therefrom in several respects within the scope of the invention defined by the claims following said description.

Referring to said drawings:

Figure 1 is a top plan view of a snap-switch involving the invention, with the cover removed and showing by dotted and full lines two positions of the switching member.

Fig. 2 is a cross section on the line 2—2 of Fig. 1, looking in the direction of the arrows.

Fig. 3 is a cross section on the line 3—3 of said Fig. 1, also looking in the direction of the arrows, but with the spindle and certain coöperative elements partly turned and the switching member in the act of being retracted.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 2.

Fig. 5 is also a horizontal section of the same, the section being taken just below the upper washer of the spindle.

Fig. 6 is a perspective view on an enlarged scale, of an actuator.

Like characters refer to like parts throughout the several views.

There is a snap switch in use which comprises a base or body to receive for rotation, a spindle. In conjunction with this spindle is a switching member, there being interposed between the switching member and the spindle a spring. This spindle when turned carries the spring therewith, the spring being tensioned when the switching member at its ends meets obstructions on the base or body. On the continued movement of the spindle, the spring is tensioned and simultaneously the switching member is retracted, owing to its having a feed connection for this purpose with the spindle, the tensioning of the spring being obtained by said retractive movement. When the apexes of the obstructions are reached, the spring then under maximum tension, is intended to impart a snap movement to the switching member to carry the same entirely free of the obstructions, and to on or off position as the case may be. Frequently the ends of the switching member owing to said feed connection are forced against the tops of these obstructions to such an extent that they bind thereon and thus prevent this snap movement. I provide a construction wherein this difficulty is eliminated. Although the switching member in my switch might move in only one direction, I prefer that it be oppositely movable; that is to say, the switching member can be moved to on or off by turning the spindle in either direction. This in itself is a feature of considerable importance and advantage.

With the foregoing general observations I will now refer more fully to the form of switch which I have selected for showing in the annexed drawings, having made it clear that I do not restrict myself thereto except as demanded by my claims.

The switch includes in its make-up a suitable base or body such as that denoted in a general way by 2 and which as illustrated is practically circular and may be made of any suitable insulating material such as porcelain or composition. On the base or body 2 are arranged coöperating pairs of spaced projections as 3 and 4 which may and preferably are integral with the base or body 2. These projections or obstructions are generally of wedge or approximately inverted V-shape, as somewhat common in this art. The base is equipped with contacts 5 and 6 diametrically opposite each other, attached thereto in any desirable manner and furnished with any suitable wire connecting means. The lateral portions of the contacts 5 and 6 fit firmly against adjacent faces of the coöperating projections or obstructions 3 and 4 as is common in this art. The foregoing is a brief description of the base or body portion of a snap switch of known kind with which my improvements can be advan-

tageously utilized. Obviously, however, I am not restricted in this particular.

In connection with the contacts 5 and 6 is a suitable switching member such as that denoted in a general way by 7. As will be hereinafter more fully set forth this switching member is oppositely rotative. It may as illustrated consist of a plate shown by full lines in Fig. 1 in its off position, and in dotted lines in said view in its on position. When in the on position, the ends of the switching member overlie the coöperating contacts 5 and 6 as familiar. In conjunction with this switching member is a suitable spindle, that denoted by 8 answering satisfactorily in this connection. This spindle 8 extends through an approximately central hole in the switching member and also through a hole or perforation 9 in the base or body 2, being held in position as represented by a washer 10 and pin 11. The spindle 8 as illustrated is rectangular in cross section, consisting preferably of a flat elongated strip. It may be turned in any desirable manner as by the handle 12 connected thereto. The spindle extends freely through the switching member, by reason of which the two can relatively turn and the switching member can also move longitudinally of the spindle for a reason that will hereinafter appear. Surrounding the spindle 8 is a coiled spring as 13. As shown one end of this spring bears against a suitable stop as the pin 14 on the spindle, the other end bearing against the switching member or plate 7, the spring serving as a suitable means to constantly advance the switching member or, to hold the same yieldingly against the base or body 12 and likewise against the contacts 5 and 6.

The spindle 8 also extends through a slot as 15 in what I term an "actuator" such as that denoted in a general way by 16, the purpose of this actuator being to impart a retractive movement to the switching member 7 as will hereinafter more particularly appear. This slot provides a convenient lost motion connection between the actuator or the switching member and the spindle. Said actuator comprises the base portion 17 and the two wedge or cam teeth 18 disposed as shown exactly opposite each other, the slot 15 being formed in the base portion 17. This actuator can be readily stamped from sheet metal and afterward suitably shaped up. When the spindle 8 is in the neutral position, it is exactly coincident with the longitudinal axis of the slot 15. This slot comprises two duplicate portions, the side walls of which converge toward each other and merge about on the longitudinal central line of the base portion 17. Owing to this fact it will be clear that when the spindle is in the neutral position, it is not in contact with either side wall of the slot. When the spindle is turned in either direction, it can have a slight movement before it engages the base portion 17. When this engagement takes place, the spindle will be against opposite walls of the terminal enlarged portions of the slot. After this point is reached on further turning of the spindle, the actuator will turn with the spindle. The central portion of the switching member 7 has diametrically opposite slots as 19 in its periphery, which receive the teeth 18. It will be assumed that the actuator 16 is being turned by the switching member in a manner hereinafter set forth. As the actuator moves opposite side edges of the teeth 18 by simultaneously engaging diagonally opposite walls of the notches or slots 19 carry the switching member with the spindle until the ends of the switching member meet coacting diagonally opposite projections or obstructions (3 or 4 as the case may be) at which time the edges of said teeth which are impinged against said notch walls, will cam the switching member 7 so as to retract or move the same longitudinally of the spindle 8. In the organization shown the retractive movement of the switching member is upward, although this is merely illustrative. This action it will be understood, is repeated on either movement of the spindle. Said retractive movement of the switching member will permit the same to ride up the inclined faces of the opposite coöperating obstructions 3 and 4. During the arresting of the switching member spring means hereinafter described is tensioned so that the instant the ends of the switching member reach the tops of the said obstructions, the switching member is immediately snapped to its on or its off position as the case may be by this second spring means. It will, of course, be understood that on the recessive movement of the switching member 7 under the action of the cam or wedge-like teeth 18, the spring 13 is compressed, so that when the switching member has been snapped free of the obstructions which it had just engaged, said spring 13 will instantaneously advance the switching member into engagement with the body 2 or the fixed contacts 5 and 6 thereon.

Staked to or otherwise suitably connected with the spindle 8 are superposed and practically duplicate washers 20 and 21 between which the base 17 of the actuator 16 is confined. These washers act conveniently as stops to prevent movement of the actuator in the direction of the length of the spindle. Between the base 17 and the washer 21 are disposed the duplicate springs 22 constituting a convenient means for imparting a snap movement to the switching member 7 as will hereinafter more particularly appear. These springs are of elongated loop-like form extending across and projecting from

the base portion 17. Their outer bars are split and from the terminals of the split portions are extensions 23 projecting through slots as 24 formed in the actuator 16 at the junction of the base portion 17 and respective teeth 18. This provides a convenient way of positioning the springs without in any wise affecting their proper action. The inner and adjacent bars of the springs 22 abut against lugs or ears as 24 struck up from the base portion 17. It will be understood that the flat spindle or shank 8 extends through the space between and is in contact with the inner bars of the loop-like springs 22.

When the parts are at rest, the balanced springs 22 acting against the spindle 8 will hold the latter in neutral position, at which point the sides thereof are out of contact with the side walls of the slot 15 as shown for example by full lines in Fig. 5. When the spindle is turned in either direction, it acts through the intermediate springs 22 to correspondingly turn the actuator 15, and the latter in the manner hereinbefore described by acting against the switching member 7 turns the latter, the motion continuing until the ends of the switching member engage diagonally opposite projections 3 and 4, thus arresting but not stopping the turning movement of the switching member. When the switching member is thus arrested, the spindle 8 turns with respect to the switching member until its sides engage diagonally opposite portions of the slot 15. During this motion of the spindle diagonally opposite corners of it by acting against the two springs 22 will tension the latter, the tensioned springs when freed acting to impart the necessary snap movement to the switching member. After the shank 8 is turned sufficiently to permit it to engage the actuator, the two springs 22 at this time being under maximum tension, the teeth 18 will, by engaging the switching member in the manner also already described, cam said switching member in the present case in an upward direction, it being evident that at this time the actuator and the switching member are turning with the spindle. When the apexes of the projections thus engaged are reached, the switching member is released from the hold of the projections. As a consequence the springs 22 under maximum tension at this time are permitted to react and apply their effect to the actuator, and the latter in turn being in engagement with the switching member effects an accelerated or snap movement of the switching member from on to off or vice versa. After the switching member has been snapped free of obstructions, the other spring 13 immediately advances the switching member, so that if the switching member for instance is being moved from off to on, the switching member after projections have been cleared is immediately moved to straddle the coöperating contacts. In Fig. 5 I show how the relative motion between the spindle 8 and the actuator 16 occurs, and I also illustrate in this view how the snap springs 22 are tensioned during this relative movement. It is conceivable that in all cases an actuator of which that denoted by 16 is an example need not be always utilized for imparting the retractive or obstruction freeing motion to a switching member as 8. Such an element, however, movable with respect to the spindle has its advantages.

What I claim is:

1. The combination of a switching member movable about an axis, a spindle movable about the same axis with respect to the switching member, spring means between the spindle and the switching member to cause the movement of the switching member with the spindle, an obstruction in the path of and adapted to check the movement of the switching member with the spindle and at the same time to retract the switching member in the direction of said axes, the spindle acting to tension said spring means when the switching member is thus arrested, means for freeing the switching member by a retractive movement thereof, from the arresting effect of said obstruction, said tensioned spring means when said switching member is freed serving to impart a snap movement to the switching member, and spring means acting independently of the other spring means and tending to constantly advance the switching member.

2. The combination of a switching member movable about an axis, an oppositely rotative spindle movable about the same axis with respect to the switching member, spring means between the spindle and the switching member to cause the movement of the switching member with the spindle on either movement of the spindle, obstructions in the path of and adapted to check the movement of the switching member with the spindle and at the same time to retract the switching member in the direction of said axes, the spindle on each of its opposite movements acting to tension said spring means when the switching member is thus arrested, and means for freeing the switching member from the arresting effect of said obstructions, said spring means when said switching member is freed, serving to impart a snap movement to the switching member.

3. The combination of an oppositely rotative spindle, a rotary switching member, the two being coaxial, obstructions arranged in the path of movement of the switching member, and mechanism coöperative with the switching member and the spindle for causing the switching member to turn with

the spindle on opposite movements thereof, to be freed from said obstructions, and to impart a snap movement to the switching member when the same is thus freed.

4. The combination of a switching member, an oppositely rotative spindle movable with respect to the switching member, spring means between the spindle and the switching member to cause the movement of the switching member with the spindle on opposite rotations of the latter, obstructions in the path of and adapted to check the movement of the switching member with the spindle on said opposite movements and at the same time to cause a lateral movement of the switching member, the spindle acting to tension the spring means when the switching member is thus arrested, an element movable with respect to the switching member and actuated by the spindle for freeing the switching member from the arresting effect of said obstructions, said tensioned spring means when the switching member is thus freed, acting to impart a snap movement to the switching member.

5. The combination of an oppositely rotative switching member, a spindle oppositely rotative with respect to the switching member, spring means between the spindle and the switching member to cause the movement of the switching member with the spindle, obstructions in the path of and adapted to check the movement of the switching member with the spindle on the opposite movements of the latter and at the same time to cause the lateral movement of the switching member, the spindle acting to tension said spring means when the switching member is thus arrested, and means for moving the switching member in the direction of the axis of rotation of the spindle to free it from said obstructions, said tensioned spring means when the switching member is freed serving to impart a snap movement to the switching member.

6. The combination of an oppositely rotative switching member, a spindle extension through the switching member and oppositely rotative relatively thereto, spring means between the spindle and the switching member to cause the movement of the switching member with the spindle, obstructions in the path of and adapted to check the movement of the switching member with the spindle and at the same time to cause the lateral movement of the switching member, the spindle acting on its motion to tension the spring means when the switching member is thus arrested, and means active during the opposite rotations of the spindle for moving the switching member in the direction of the axis of rotation of the spindle to free the switching member to tension the spring means, the latter when the switching member is freed, imparting a snap movement to the switching member.

7. The combination of a switching member, a spindle movable with respect to the switching member, spring means between the switching member and the spindle to cause the movement of the switching member with the spindle, an obstruction in the path of and adapted to check the movement of the switching member with the spindle and at the same time cause the lateral movement of the switching member, the spindle acting to tension said spring means when the switching member is thus arrested, and means movable independently of the switching member and actuated by the spindle for freeing the switching member from the arresting effect of said obstruction the tensioned spring means when the switching member is freed, imparting a snap movement thereto.

8. The combination of an oppositely rotative switching member, a spindle oppositely rotative with respect to the switching member, spring means between the spindle and the switching member to cause the movement of the switching member with the spindle, obstructions in the path of and adapted to check opposite movements of the switching member with the spindle and at the same time to cause the lateral movement of the switching member, the spindle acting to tension the spring means when the switching member is thus arrested, and means movable with respect to the switching member and the spindle and actuated by said spindle for releasing the switching member from the arresting effect of the obstructions, said tensioned spring means when the switching member is freed, imparting a snap movement to the switching member.

9. The combination of a switching member, a spindle movable with respect to the switching member, spring means between the spindle and the switching member to cause the movement of the switching member with the spindle, an obstruction in the path of and adapted to check the movement of the switching member with the spindle and at the same time to cause the lateral movement of the switching member, the spindle acting to tension said spring means when the switching member is thus arrested, and a cam element movable with respect to the spindle and the switching member and actuated by the spindle on the turning thereof, said cam element when actuated by the spindle operating against the switching member to free the same from the arresting effect of said obstruction, the spring means when the switching member is freed, imparting a snap movement to the switching member.

10. The combination of an oppositely rotative switching member, a spindle ex-

tending freely through the switching member, both the switching member and the spindle being oppositely rotative, an actuator through which the spindle extends, the spindle having a lost motion connection with the actuator, the actuator having beveled teeth and the switching member being slotted to receive said teeth, springs between the actuator and the spindle, obstructions in the path of the switching member and adapted to arrest the movement thereof, the spindle when the switching member is arrested tensioning both springs and moving the actuator, and the teeth of the actuator when the latter is moved by the spindle, acting to move the switching member free of the obstructions.

11. The combination of an oppositely rotative switching member, a spindle extending freely through the switching member, both the switching member and the spindle being oppositely rotative, an actuator through which the spindle extends, the spindle having a lost motion connection with the actuator, the actuator having beveled teeth and the switching member being slotted to receive said teeth, springs between the actuator and the spindle obstructions in the path of the switching member and adapted to arrest the movement thereof, the spindle when the switching member is arrested tensioning both springs and moving the actuator, and the teeth of the actuator when the latter is moved by the spindle acting to move the switching member free of the obstructions, and a coiled spring around the spindle acting to constantly urge the switching member forward.

12. The combination of aa oppositely rotative switching member having peripheral slots in its central portion, a flat spindle extending freely through the switching member and also oppositely rotative, an actuator comprising a body, and wedge teeth extending from the body, the wedge teeth being fitted in said slots and the body of the actuator having a slot, the sides of which at opposite ends thereof converge toward the center thereof, said last mentioned slot receiving said spindle, loop-like springs connected with the actuator and bearing at opposite sides against the spindle, wedge-shaped obstructions arranged in coöperating pairs disposed in the path of the switching member, and a coiled spring, the spring acting against the switching member and tending constantly to urge the same forward.

In testimony whereof I affix my signature in the presence of two witnesses.

MONROE GUETT.

Witnesses:

L. L. MARKEL,

HEATH SUTHERLAND.