(Model.) 2 Sheets—Sheet 1.

J. H. McEVOY.

ELECTRIC SNAP SWITCH.

No. 548,583. Patented Oct. 22, 1895.

Fig. 1.

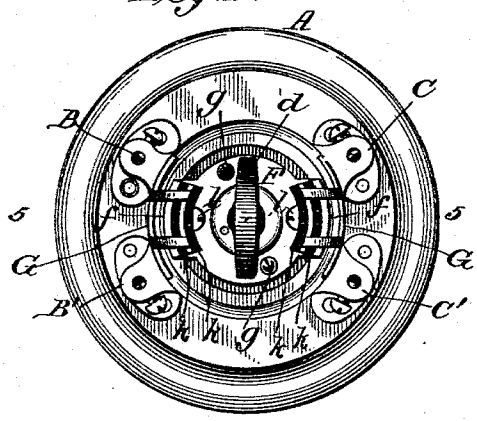


Fig. 2.

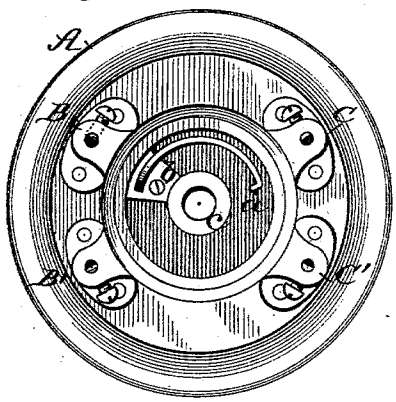


Fig. 3.

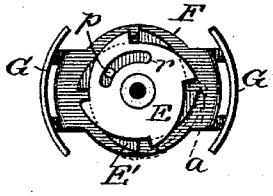


Fig. 4.

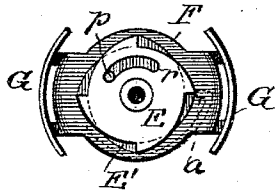


Fig. 5.

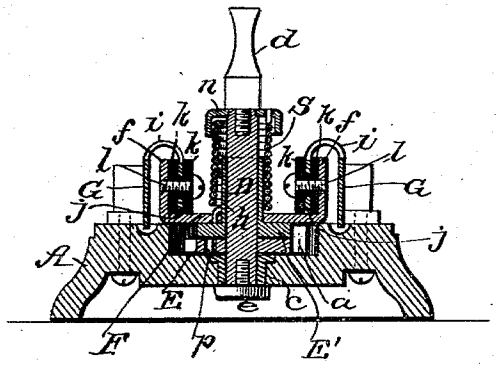


Fig. 6.

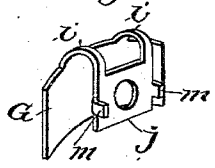


Fig. 7.

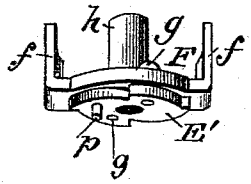
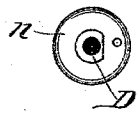


Fig. 10.



WITNESSES:

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(Model.) 2 Sheets—Sheet 2.

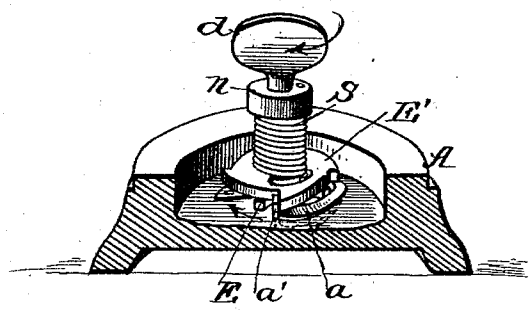
J. H. McEVOY.

ELECTRIC SNAP SWITCH.

No. 548,583. Patented Oct. 22, 1895.

Fig. 8.

Fig. 9.



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UNITED STATES PATENT OFFICE.

JOSEPH H. McEVOY, OF WATERBURY, CONNECTICUT.

ELECTRIC SNAP-SWITCH.

SPECIFICATION forming part of Letters Patent No. 548,583, dated October 22, 1895.

Application filed February 18, 1893. Serial No. 462,842. (Model.)

To all whom it may concern:

Be it known that I, JOSEPH H. McEVOY, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Electric Snap-Switches, of which the following is a specification.

My invention relates to that class of electric switches known as "snap-switches," in which contact between the terminals is made and broken by a sudden snap-spring action, so as to make a quick and positive connection and avoid the making of arcs.

It consists in the peculiar construction and arrangement of the parts, which may be cheaply made of punched pieces and quickly assembled, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a plan view of the switch. Fig. 2 is a plan view of the base with the other parts removed. Figs. 3 and 4 are inverted plan views of the switch-bar and attached parts, showing different positions. Fig. 5 is a vertical central section through line 5 5 of Fig. 1. Fig. 6 is a perspective view of one of the spring contact-plates. Fig. 7 is a perspective view of the switch-bar. Fig. 8 shows inverted plan views of the disk on the bottom of the switch-bar, showing modifications; and Fig. 9 is a perspective view, in section, showing a modification of the detent-spring and its co-operating parts. Fig. 10 is a top view of cap *n*.

In the drawings, A represents a circular or other shaped base, of porcelain or other non-conducting material. This base is formed with a circular recess in which lies a semi-circular spring-detent *a*, (see Fig. 2,) one end of which is turned inwardly to form a tooth, and the other end of which is fixed to or formed with a metal plate *b*, which is embedded in the base and is perforated with a central hole to form a metal bushing or bearing *c* for the axial pin of the switch.

On one side of the base A are mounted two binding-posts B B′ and on the opposite side are two binding-posts C C′, these binding-posts being provided with vertical holes or wire-seats which extend all the way through to the bottom of the base, so that the circuit-wires may be carried under the base and run up through the holes in the binding-posts from underneath. These binding-posts have horizontal binding-screws tapped laterally into the wire-holes to clamp and hold the circuit-wires.

D is the axial pin of the switch. This is provided with a thumb-piece *d* at its upper end, by which it is turned, and its lower end is closely fitted to turn in the metal bearing *c* in the base, and is prevented from being pulled up and out by a screw *e* in its lower end, whose head is large enough to extend beyond the lower edges of said bearing *c*. This axial pin has rigidly attached to it a four-toothed ratchet-wheel or quadruple cam-disk E, which lies in the bottom of the recess in the base A, and whose cam-surfaces bear against the tooth of the spring-detent *a* and throw it outwardly at each quarter-turn, the tooth of the detent dropping behind the tooth of the ratchet at each quarter-turn and preventing it from being moved backward.

F is the rotary switch-bar. (See Fig. 7.) This is stamped up out of sheet metal in the form of a central disk with upturned ears *f f* on opposite sides, which latter form attaching-points for the contact-plates, as hereinafter described. To the bottom of this switch-bar is rigidly attached a ratchet-wheel E′, with four teeth corresponding to the ratchet-wheel E except that the teeth point in the opposite direction.

To the upper side of the switch-bar is a sleeve or elongated hub *h*, which stiffly holds the switch-bar on the axial pin, so that it oscillates in a true plane. If desired the ratchet-wheel E′ and hub *h* may be made in one piece with the switch-bar F; but I prefer to make the ratchet-wheel E′ and hub *h* in one piece and fasten them to the switch-bar by screws *g*, as shown, as this is the simpler and better manner of manufacture.

To the upturned ears *f* of the switch-bar are secured the metal contact-plates G. These are curved to correspond with the inner faces of the binding-posts B B′ and C C′, which are turned upon the inside to form concave contact-faces. These contact-plates G are long enough to connect the binding-posts B and B′ and C and C′, and are short enough to lie between these pairs of binding-posts without touching either. These contact-plates G are

supported upon spring-arms *i i*, that bend over from a plate *j*, which is clamped between two non-conducting blocks *k k*, which by means of a screw *l* are fastened to the upturned ears *f* of the switch-bar. This screw *l* is not allowed to touch the plate *j*, and the latter is held and prevented from being displaced by lugs *m*, that enter notches in one of the non-conducting blocks. This construction permits the plates G to be stamped up out of sheet metal and causes the plates G to yield as springs, so as to press closely against the contact-faces of the binding-posts.

Around the axial pin D is wound a spiral spring S, one end of which is entered into a hole in the switch-bar F, and the other end of which is connected to the axial pin through the intervention of a cap *n*, which is flanged to receive and hold the end of the spring, and is perforated to allow the end of the spring to pass into and secure an anchorage against the same. This cap is made to turn rigidly with the pin by having one side of its hole flattened, as shown at *o*, Fig. 10, or by a square or angular hole. The thumb-piece *d* is screwed into the pin outside of this cap. By means of this cap a spiral spring of large diameter and loose coils may be used, which will not cramp and bind upon the pin when constricted, and at the same time this loosely-fitted spiral is held always concentric.

Upon the lower side of the ratchet E′ of the switch-bar there is a short pin *p*, which passes through and plays in a slot *r* in the ratchet E, attached to the pin, which slot is about a quarter of a revolution in length and concentric with the pin.

The operation of my snap-switch is as follows: The plates G connect in one position the binding-posts B and B′ on one side and C and C′ on the other side. When the axial pin is turned a quarter of a revolution, these plates pass off the binding-posts and occupy a position between the pairs of binding-posts so that B is no longer connected to B′ nor C to C′. This movement is a sudden snap action, and is effected by an intermittent rotation of the axial pin by its thumb-piece always in the same direction. To better understand how this is accomplished by my mechanism, I would state that the tooth of the spring-detent *a* lies normally at rest against the ratchet-faces of the two ratchets E and E′, as shown in Fig. 3, holding them both against rotation in opposite directions. Now when the axial pin is turned a quarter of a revolution the slot in ratchet E of the pin allows this motion, tension is stored up in the spring between the cap and the switch-bar, and at the same time one of the cam-faces of the ratchet E pushes outwardly the tooth of detent *a* until it is beyond the tooth of the ratchet E′, (see Fig. 4,) at which moment the tension of the spring asserts itself and whirls the switch-bar around, its motion being limited to a quarter of a revolution by the re-engagement of the detent *a* against the next tooth of ratchet E′. This action may be repeated as often as desired by simply turning the axial pin in the same direction again. The teeth of ratchet E have a cam action on the spring-detent, forcing it outwardly, while the teeth of ratchet E′ act as stop projections only, and for this reason their shape may be modified without departing from my invention. Thus, for instance, as in Fig. 8, four stop-pins or lugs may be fixed to the bottom of the switch-bar to accomplish the same result.

As so far described my invention has been shown only in connection with a double-pole switch; but it is obvious that it is equally applicable to a single-pole switch by merely omitting one of each pair of binding-posts.

I may also modify the construction of the spring-detent *a*, as shown in Fig. 9, in which the spring *a* does not move away from the axial pin in a plane at right angles thereto, but is depressed or moved downwardly by the lugs of the cam-disk E, the upturned end *a′* of the spring rising to engagement with the stop-disk E′ of the switch-bar by a motion at right angles to its plane instead of a motion parallel to it, as in the first case. The slot-and-pin connection between E and E′ and all other features remain the same.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with peripheral contacts, of a rotary switch bar F and means for actuating it, the said switch bar being arranged between the peripheral contacts and constructed with upturned ears *f f*, provided with detachable and yielding contact plates, substantially as shown and described.

2. The combination with the peripheral contacts and the rotary switch bar; of the yielding contact plates G, made in one piece with bent arms *i i* and attaching plates *j*, and means for connecting it to the switch bar, substantially as shown and described.

3. The combination with the peripheral contacts and the rotary switch bar; of the yielding contact plates G, made in one piece with bent arms *i i* perforated attaching plate *j* with lugs *m*, the insulating blocks *k k* and attaching screw *l*, substantially as shown and described.

4. In a snap switch, the combination with an intermittently rotating switch bar, a winding stem with key or thumb piece, and a spiral spring; of two disks laid flat against each other and connected loosely by a slot and pin, one of said disks being connected to the switch bar and provided with stop projections, and the other disk being connected to the winding stem and provided with cams corresponding to the stop projections, and a detent bearing against said stop projections and operated upon by the said cams, substantially as shown and described.

5. The combination of a rotary switch bar having stop projections attached to its lower

side, an axial pin passing through the same and having a cam disk attached to it and lying beneath the switch bar, the cam disk and switch bar being connected by a curved slot and pin, a spiral spring wound about the axial pin and connected at one end to the pin and at the other to the switch bar, and a base frame having a spring detent attached thereto arranged to engage the stops of the switch bar and be thrown out by the cams of the axial pin, substantially as shown and described.

6. The combination of a rotary switch bar having stop projections attached to its lower side, an axial pin passing through the same and having a cam disk with ratchet teeth lying beneath the switch bar, the cam disk and switch bar being connected by a curved slot and spring, a spiral spring wound about the axial pin and connected at one end to the pin and at the other to the switch bar, and a base frame having a spring detent attached thereto and having an inwardly projecting tooth adapted to move in a plane at right angles to the axial pin and lock against the stops of the switch bar, and be projected outwardly by the cams of the ratchet, substantially as shown and described.

7. The combination with the switch bar and the axial pin; of a loose or enlarged spiral spring connected at one end to the switch bar, and at the other end provided with a detachable cap *n* rigidly connected to the axial pin for rotary movement and holding the spring concentric in relation thereto and a thumb piece *d* clamping the cap to the axial pin, substantially as shown and described.

8. The switch bar F having an elongated hub or sleeve *h* combined with the axial pin and the spiral spring wound about the sleeve about its lower end and means for holding the upper end of the spring concentrically about the axial pin, substantially as shown and described.

9. The recessed base A having metal bushing *c* plate *b* and spring pawl *a* connected together, in combination with the contact plates, the switch bar and the axial pin extending through the said bushing and provided at its lower end with a retaining screw, substantially as described.

JOSEPH H. McEVOY.

Witnesses:
EDW. W. BYRN,
P. B. TURPIN.