

Feb. 11, 1930.

E. E. SMART

1,746,911

ELECTRIC SWITCH

Filed June 17, 1925

Fig. 1.

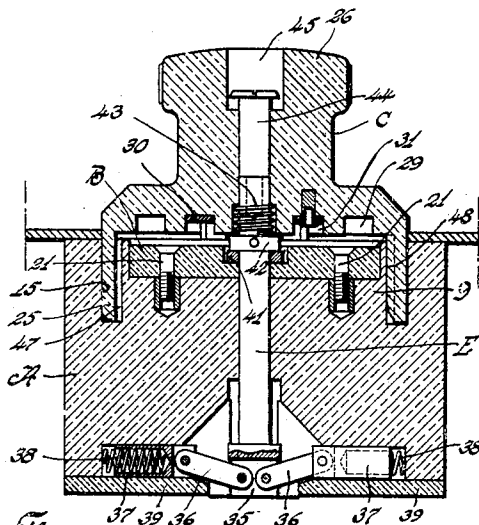


Fig. 2.

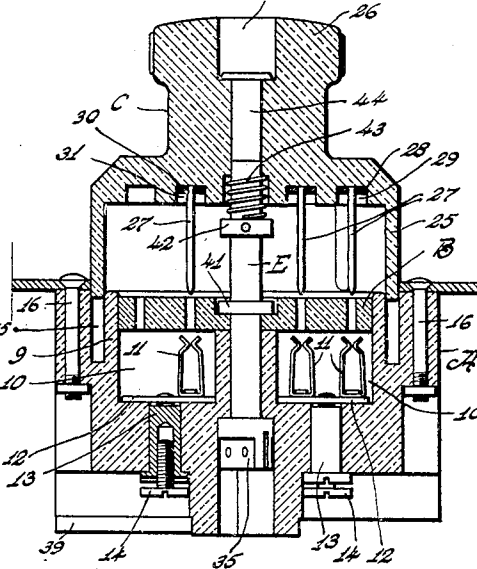


Fig. 3.

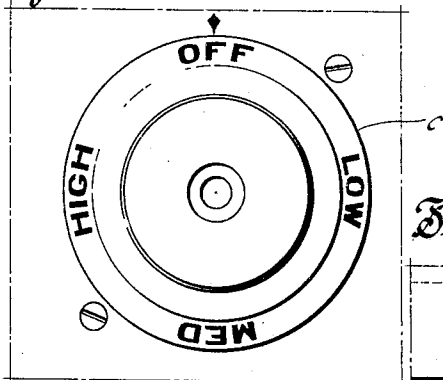


Fig. 4.

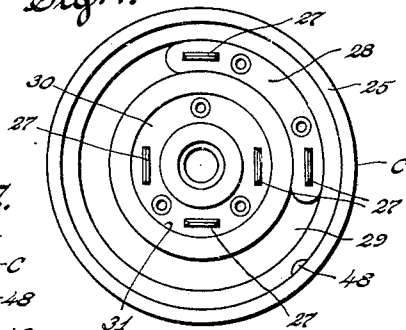


Fig. 7.

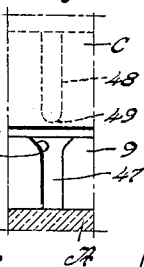


Fig. 6.

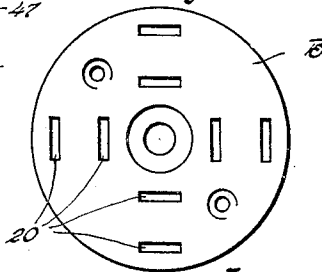
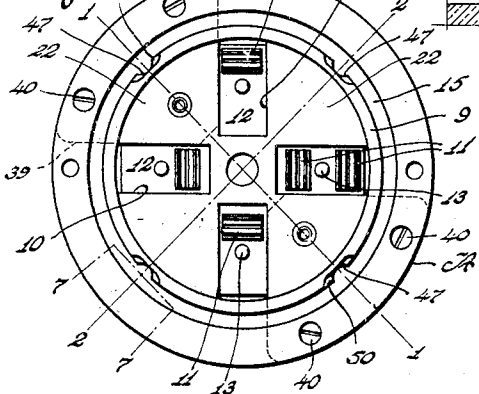


Fig. 5.



Inventor

Ezra E. Smart

By

W. H. Lindsey

Attorney

UNITED STATES PATENT OFFICE

EZRA E. SMART, OF HARTFORD, CONNECTICUT

ELECTRIC SWITCH

Application filed June 17, 1925. Serial No. 37,322.

The present invention relates to switches or devices for controlling electric circuits, and has as its object to provide a device of this sort having various features of novelty and advantage and which is particularly characterized in that it is very simple and compact in construction, neat in appearance, economical in manufacture and may be very quickly and easily manipulated. My improved switch is capable of being used on high voltages, and the arrangement is such that arcing or sparking is substantially eliminated. A switch constructed in accordance with the present invention is very durable, particularly so as arcing is eliminated, the parts are relatively strong and likelihood of the arrangement getting out of order is extremely small.

Other objects will be in part obvious and in part pointed out more in detail.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings, I have shown, by way of illustration, one of the many embodiments which the present invention may take, it being understood that this disclosure is solely by way of exemplification and is not to be taken as restrictive.

In said drawings:

Figure 1 is a sectional view of my improved switch, this view being taken on line 1—1 of Fig. 5 and the switch being shown in closed or "on" condition.

Fig. 2 is a view similar to Fig. 1 but taken on line 2—2 of Fig. 5 and the switch being shown in open or "off" condition.

Fig. 3 is a front view of the switch;

Fig. 4 is an inside view of the detached cover or cap;

Fig. 5 is a front view of the switch with the cover removed;

Fig. 6 is a plan view of the disk B; and

Fig. 7 is a detail view taken on line 7—7 of Fig. 5 and showing a guide groove in the base and the guide rib on the cover.

Referring to the drawings in detail, A de-

notes generally a base having a cylindrical portion 9 provided with wells or recesses 10 in which are located the terminals 11. The terminals may be in the form of pairs of spring contact arms riveted or otherwise secured to plates 12 held in place by screws 13 passing up through the bottom of the base A. The screws 14, which are threaded into the screws 13, may be employed to connect the wires of the circuit to the switch.

In the present instance, the wells 10 are four in number and spaced 90 degrees apart, it being understood, however, that the number of such wells and the spacing thereof and the number and arrangement of terminals will depend upon the use to which the switch is to be applied. In the drawing, the switch is illustrated by way of exemplification as being arranged for use in connection with a heating device having three heats, namely, high, medium and low, but it is obvious that the switch may be arranged to effect a greater or smaller number of connections and it may be employed in combination with other apparatus than heating applications. The cylindrical portion 9 may be formed by providing a relatively narrow, deep, annular groove 15, in the outer face of the base. The base may be secured to a panel in any suitable manner, as by means of bolts 16. Fitting within the cylindrical portion 9 is a disk B having apertures 20 in alignment with the respective terminals 11. The disk B may be secured in place by screws 21 and rests upon the outer ends of the partitions 22 which separate the wells from one another.

The letter C denotes, generally, a cover or cap which is suitably connected to the base for axial movement and for rotary movement so that, by turning the cap to a given position and then moving the cap inwardly, the desired connections may be made and, by pulling the cap outwardly, the connections may be broken. As hereinafter pointed out more in detail, both the making and breaking is effected with snap movements. The cap C has a cylindrical skirt 25 adapted to fit about the cylindrical portion and within the annular groove 15 of the base. The cap has, at its outer end, a knob or handle 26 by means

of which the cap may be moved in and out and rotated. The cap carries contact makers which are in the form of blades 27 so arranged and connected as to obtain different combinations of connections. In the present illustrative disclosure, two of the blades are carried by an arcuate strip 28 located and secured in an annular groove 29 in the cap. The remaining three blades are carried by a ring 30 secured in place within a groove 31. The cover may have on it indicia noting the relative positions of the blades, for instance, the indicia "off," "low," "medium" and "high," where the switch is to be used on a range having three heats.

Slidably and axially mounted within the base is a stem E having at its lower end a head 35 connected by toggle links 36 to spring pressed plungers 37 mounted for radial sliding movement in the bottom of the base A. Behind these plungers are the respective springs 38. The recesses, in which the plungers are housed, may be closed by the plates 39 secured in place by screws 40. The forward end of the stem extends axially through the cap and has axial movement relative thereto in both directions. Fitting loosely about the stem and positioned in the disk B is a collar 41. Fixed to the stem is a collar 42 between which and the cap is interposed a spring 43. The outer end of the stem is formed, in part, of a screw 44, the head of which overhangs the bottom of a recess 45 in the knob 26.

The cylindrical portion 9 of the base is provided on its external surface with a plurality of longitudinal extending guide grooves 47, corresponding in number to the wells 10. Provided on the internal circumference of the skirt 25 of the cap is a projection 48 in the form of a longitudinal extending rib, the lower end of which is rounded or wedge shaped, as indicated by the numeral 49. Each of the grooves 47 at its outer end has a flaring mouth 50. The purpose of the grooves 47 and the rib 48 is to properly align the blades 27 with the apertures 20 when the cap is forced inwardly to make a connection. Owing to the fact that the outer ends of the grooves 47 are flared and the inner end of the rib 48 is wedge shaped, the rib will be properly guided into the respective groove, although the cap may not have been brought to the exact proper indexed position preliminary to making the connection.

From the foregoing description, taken in connection with the accompanying drawing, it will be seen that when it is desired to break the circuit, it is merely necessary to pull on the knob 26 to thereby move the cap from the position shown in Fig. 1 to that shown in Fig. 2, and in which latter position the free ends of the blades 27 clear the disk B. When the knob is thus pulled out, the adjacent ends of the links 36 are moved upwardly with the

stem E until the links pass dead center, whereupon the springs 38, acting through the toggle and the stem, will throw the cap, together with the contact knives 27 carried thereby, with a snap movement to the extreme position shown in Fig. 2. This snap movement takes place at such time that the contact knives are withdrawn from the terminals with a quick, sharp jerk, whereby arcing and sparking are avoided on the break. If there is any tendency to arc, the arcs will be snuffed out owing to the fact that the openings 20 in the disk are relatively small in cross section. When it is desired to make a specific connection, the cap is rotated about the stem E as an axis to the proper position which may be determined by the indicia on the cap, and then the knob is pushed inwardly so as to move the cap from the position shown in Fig. 2 to that shown in Fig. 1. When the cap is thus pushed inwardly, it completes its stroke with a sharp, quick movement or jerk under the influence of the springs 38 and therefore the blades are quickly brought into engagement with the respective terminals so as to avoid arcing. It will thus be seen that the connections may be made, broken, and changed very rapidly and conveniently. Owing to the facts that the making and breaking of the circuit are done with a snap movement, the handle cannot be held in arcing position; and when a circuit is broken, another one is not made immediately, there is substantially no arcing, which means that the switch may be used to advantage on relatively high voltages. The switch is very neat in appearance as the end of the cover alone may be exposed to view. None of the parts is subjected to excessive wear, and the possibility of the parts becoming damaged or out of order is very slight. It will further be noted that the terminals in the several walls are insulated and partitioned off from each other and other metal parts of the switch.

I claim as my invention:

1. An electric switch having a base, spring contacts on said base, a contact carrying member, means connecting said member to said base for movement towards and away from said base and for rotary movement, and a plurality of sets of contact blades carried by said member and adapted to be selectively engaged with said spring contacts.

2. An electric switch having a base, a cap, a member carried by said base and supporting said cap for axial movement and for rotary indexible movements, spring contacts on said base, a plurality of sets of contact blades on said cap, and indicia on said cap indicating its indexed positions.

3. An electric switch having a base, contacts on said base, a cap, a member carried by said base and supporting said cap for axial movement toward and away from said

base and for rotary movement when in withdrawn position, contacts carried by and housed by said cap and adapted to be selectively engaged with said first contacts, and means for registering said contact when the cap is moved in a direction to make a circuit.

4. An electric switch having a base element, a second element, a member carried by said base element and supporting said second mentioned element for movement toward and away from said base element and for rotary movement when in withdrawn position, contacts carried by said base element, contact blades on said second element adapted to be selectively engaged with said contacts, and a rib carried by one of said elements, the other of said elements having grooves adapted to selectively receive said rib, the inner end of said rib being wedge shaped and each of said grooves having a flaring mouth.

5. An electric switch having a base element, a second element, a member carried by said base element and supporting said second mentioned element for axial and rotary movements, cooperating contacts respectively carried by said elements, and means for imparting a snap movement to said second element when making or breaking a circuit.

6. An electric switch having a base provided with a plurality of contacts, a cap provided with a plurality of contacts adapted to be selectively engaged with said first contacts, said cap being mounted for movement towards and away from said base to make and break the circuits, said cap being mounted for rotary indexible movement when in withdrawn position, and means for imparting a snap movement to said cap when making a circuit.

7. An electric switch having a base provided with a plurality of contacts, a cap provided with a plurality of contacts adapted to be selectively engaged with said first contacts, said cap being mounted for axial movement towards and away from said base to make and break the circuits, said cap being mounted for rotary indexible movement when in withdrawn position, and means for imparting a snap movement to said cap when breaking a circuit.

8. An electric switch having a base, a cap, cooperating contacts on said base and cap adapted to be selectively engaged, and a non-rotatable stem mounted for axial movement in said base, said cap being mounted for rotary indexible movement on said stem when in withdrawn position.

9. An electric switch having a base, a cap, cooperating contacts on said base and cap, a stem mounted for axial movement in said base, said cap being mounted for rotary indexible movement on said stem when in withdrawn position, and means for imparting a snap movement to said stem.

10. An electric switch having a base element, a second element, cooperating contacts on said elements, and adapted to be selectively engaged, a stem mounted for axial movement in said base, said second element being mounted for axial movement and rotary movement on said stem, and means for imparting a snap movement to said stem when moved in either direction.

11. An electric switch having a base provided with spring terminals, a stem mounted for axial movements in said base, a cap mounted for axial and rotary movements on the said stem, contact blades on said cap, and means for moving said stem and said cap with a snap movement when making or breaking a circuit.

12. An electric switch having a base, a stem mounted for axial movement in said base, a cap mounted for axial and rotary movements on said stem, cooperating contacts on said base and cap, a spring pressed plunger connected to said stem and arranged to throw the latter with a snap movement.

13. An electric switch having a base provided with contacts, a cap having contacts adapted to be selectively engaged with said first contacts, a stem mounted for axial movement in said base, said cap being mounted for axial and rotary movements on said stem, a pair of opposed spring pressed plungers in the bottom of said base, and a link between each plunger and said stem.

14. An electric switch having a base provided with contacts, a cap having contacts adapted to be selectively engaged with said first contacts, a stem mounted for limited axial movement in said base, said cap being mounted for rotary indexible movement and for limited axial movement on said stem, a spring between said stem and cap normally urging the latter outwardly of the former, and means on the bottom of said base for imparting a snap movement to said stem.

15. An electric switch having a base, contacts on said base, a member mounted for movement towards and away from said base and for rotary movement, a plurality of contact blades carried by said member and adapted to be selectively engaged with said contacts, and an element carried by said base and having apertures in alinement with said contacts and adapted to receive said blades, said blades being free of said element when said member is in its outermost position.

16. An electric switch having a base, terminals on said base, a cap mounted for axial movement towards and away from said base, contact blades on said cap adapted to be selectively engaged with said terminals, an element carried by said base and having apertures in alinement with said terminals and adapted to receive said blades, said cap being indexible about its axis and said blades being free of said element when said cap is in its

outermost position, and means for imparting a snap movement to said cap when a circuit is made or broken.

17. An electric switch having a base provided with a cylindrical portion and a plurality of angularly spaced apart wells within said cylindrical portion, a stem mounted for axial movement in said base, a cap mounted on said stem for axial and rotary movements, said cap having a skirt surrounding said cylindrical portion, terminals in said wells, contact blades carried by said cap and adapted to be selectively engaged with said terminals, a disk carried by said base and closing the outer ends of said wells, said disk having apertures in alinement with said terminals and adapted to receive said blades, and means for imparting a snap movement to said stem.

EZRA E. SMART.

20

25

30

35

40

45

50

55

60

65