

C. J. KLEIN.  
ELECTRIC SWITCH.  
APPLICATION FILED JUNE 8, 1911.

1,306,852.

Patented June 17, 1919.

2 SHEETS—SHEET 1.

Fig. 1

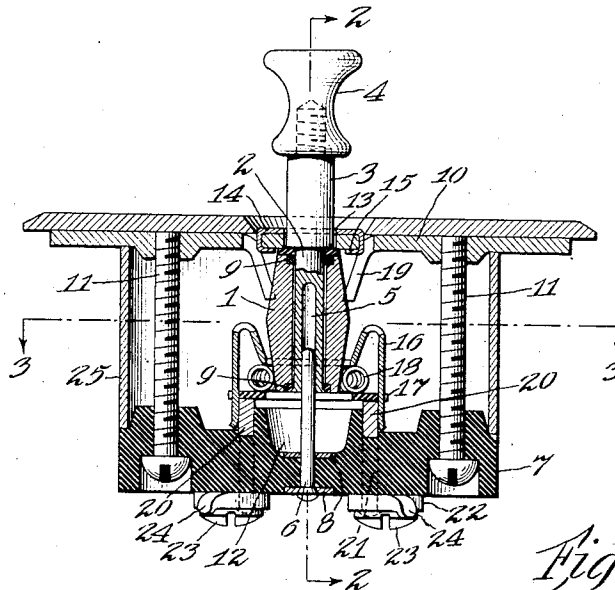
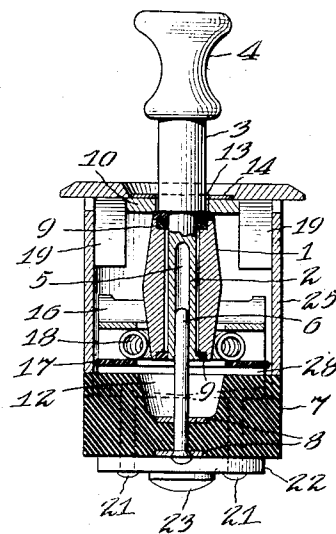
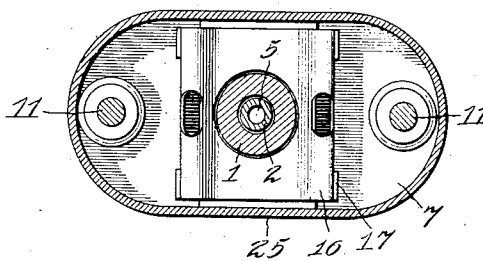


Fig. 2

Fig. 3.



Witnesses:

Geo. Haynes  
A. Klein

Inventor.

Charles J. Klein

By Edwin R. H. Powers, Jr.  
Att'y

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2 SHEETS—SHEET 2.

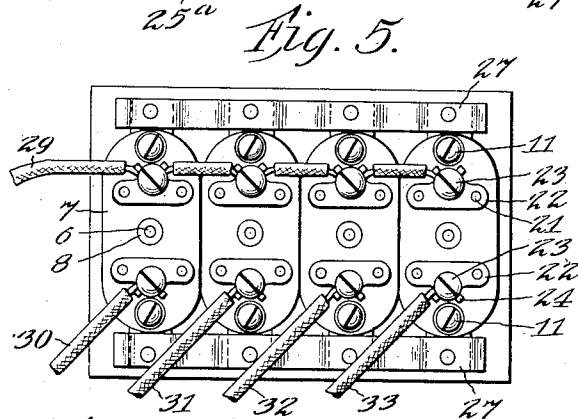
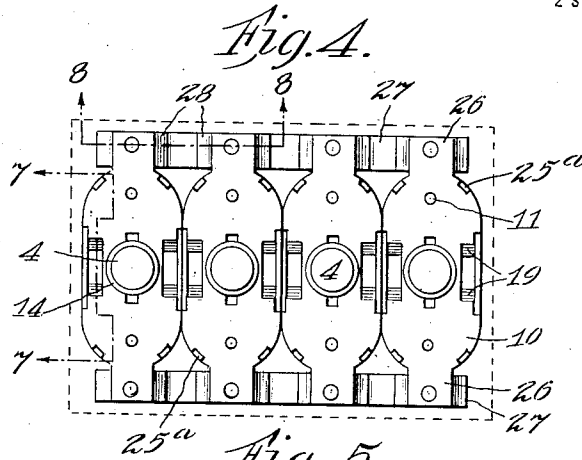


*Fig. 6.*

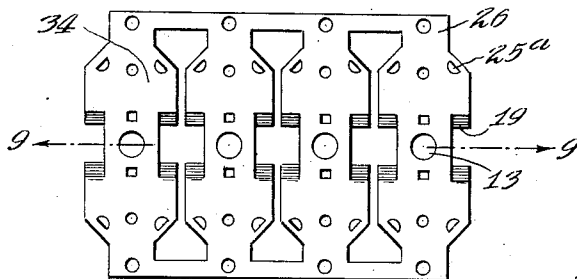
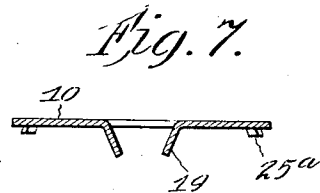
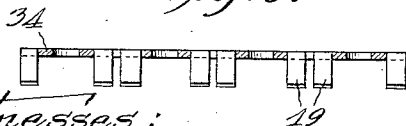


*Fig. 9.*



Witnesses:  
G. W. Hays, Jr.  
A. L. Ladd

Inventor:  
Charles J. Klein.

By Edwin B. Tower, Jr.  
Att'y.

# UNITED STATES PATENT OFFICE.

CHARLES J. KLEIN, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE CUTLER-HAMMER MFG. CO., OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

## ELECTRIC SWITCH.

1,306,852.

Specification of Letters Patent.

Patented June 17, 1919.

Application filed June 8, 1911. Serial No. 631,921.

*To all whom it may concern:*

Be it known that I, CHARLES J. KLEIN, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Electric Switches, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to electric switches.

In one of its adaptations it more especially relates to electric switches of the type known as battery switches, and it is in this relation that I shall describe my invention. However my invention is not limited to this particular use or to the particular form chosen for purposes of illustration, but may assume various other forms and be used in various other relations.

Among the objects of my invention is to provide an improved switch. A further object of my invention is to provide improved means for supporting and inclosing an electric switch and a plurality of electric switches. Other objects and advantages of my improved construction will hereinafter appear.

In the views of the drawings:—

Figure 1 shows a sectional central view through an assembled switch mechanism.

Fig. 2 shows a sectional view on line 2—2 Fig. 1.

Fig. 3 shows a sectional view on line 3—3 Fig. 1.

Fig. 4 shows a top plan view of a series of switches assembled in a gang.

Fig. 5 shows a bottom plan view of the said switches.

Fig. 6 shows a development of a blank used to position the switch mechanisms in a gang and to provide a top plate for the same.

Fig. 7 shows a sectional view on line 7—7 Fig. 4.

Fig. 8 shows a sectional view on line 8—8 Fig. 4.

Fig. 9 shows a sectional view on line 9—9 Fig. 6.

In the construction shown in these drawings a push and pull cam operated snap switch mechanism is inclosed between the parts of a suitable casing and arranged to be actuated to make or break an electrical

circuit with a quick snap action when the cam is pulled in or out.

The switch mechanism is preferably of the type described and claimed in my previously granted Patent No. 985,421 patented February 28, 1911. A cam member 1 of the conformation of a double frustum positioned base to base is carried by a reduced portion 2 of a reciprocating spindle 3. The spindle 3 is provided with a push button or knob 4 on its upper end and is provided with a longitudinally extending recess or bore 5 in its lower end arranged to receive the end of a pin 6 extending vertically upward from a suitable insulating base 7, preferably of molded stone, and positioned in the same by suitable washers 8. The cam member 1 is preferably provided with a central bore of a greater diameter than the diameter of the reduced portion 2 of the spindle 3, and this cam member is preferably insulated from the reduced portion 2 by spacing washers 9 at its opposite ends. In a preferred form the upper end of the cam member 1 which abuts against the spindle 3 is also insulated from this portion of the spindle. The spindle 3 and cam member are arranged to reciprocate upon the pin 6 between the base 7 and a top plate 10 by which the entire switch unit may be supported. The top plate 10 and base 7 are secured together by suitable screws 11 preferably having their heads received in suitable recesses in the base. In order to receive the lower end of the cam member 1 when the spindle 3 is pushed in, the base 7 is provided with a chamber 12 of substantially cylindrical cross section preferably tapering toward the mouth. The bottom of this chamber serves to establish one of the limits of travel of the cam member. The other limit of travel of the cam member is established by the engagement of the insulating washer on its upper end with the walls of a perforation 13 in the plate 10 through which the spindle 3 extends. In a preferred form the upper surface of the plate 10 around the perforation 13 is provided with a plate 14 having depending bent arms 15 passing through suitable perforations in the plate 10.

When the cam member is reciprocated upon a pull or pressure being exerted upon the knob 4, it is arranged to reciprocate a contactor 16 preferably of the type of con-

struction described in my co-pending application Serial No. 628,782 filed May 22, 1911, upon which Patent 1,162,865, issued Dec. 7, 1915. In this instance however, I preferably provide this contactor with an insulating spacing strip 17. Within the contactor is inclosed a garter spring 18 which when the cam member is reciprocated passes over the crest of the cam member to throw the contactor to one or the other limit of its travel with a quick snap action. The upper limit of the travel of the contactor, that is the open circuit limit, is preferably established by bending down two arms 19 on each side of the perforation 13. These arms 19 are preferably struck from the plate 10 and are adapted to engage the top and bottom of the body portion of the contactor 16 at points adjacent the curved rearwardly extending portions of the same. In its other limit of travel the edges of the contactor will engage terminal contacts 20 preferably arranged parallel to each other on opposite sides of the chamber 12. In a preferred form these terminal contacts 20 are provided with depending legs 21 which pass through the insulating base 7 and are riveted to terminal plates 22 on the under side of the base. In a preferred form the terminals 20 are each provided with two depending legs which pass through opposite ends of the plates 22 and a binding screw 23 is placed between these legs 21 and provided with suitable ears 24 to facilitate the connection of the conductors. If desired the walls of the chamber 12 may be grooved to receive the terminal contacts 20 so that the terminal contacts are firmly seated on the base.

In a preferred form the entire mechanism housed between the plate 10 and the insulating base 7 is inclosed in an oval metallic shell 25 so that the assembled switch presents a very neat and compact appearance while the parts are fully protected from injury. In order to make the construction readily assembled I preferably so shape the plate 10 and the shell 25 that they may be readily pressed into assembled relation. This I do by making the shell of a width substantially the same as the width of the plate 10 through the arms 19 so that there will be a snug fit and I further provide the plate with downwardly struck shoulders 25<sup>a</sup> on its four corners which fit snugly within the shell and effectually prevent movement of the plate. If desired the oval shell 25 may be provided with a suitable cut away portion in its edge opposite the end walls of the recess 12 so as to insure a snug fit and its edges may also engage suitable shoulders on the plate 10 and the base 7. It is of course obvious that a suitable face plate may be carried upon the upper surface of the plate 10.

When it is desired to operate the switch the button 4 is pushed in or out. With the parts in the position shown in Fig. 1 the button would be pushed in and the circuit would be broken upon the passage of the cam member through the garter spring, since the moment that the garter spring passed over the crest of the cam the contactor would be thrown to the up position with its body portion abutting against the stops 19. Upon a reversal of the movement of the push button or knob the contactor would move downward to circuit closing position where its limit of travel would be established by the engagement of its spacing strip 17 with the upper surfaces of the terminals. It is to be noted that when the contactor reaches the down position, the cam member engages the edges of the perforation 13 substantially simultaneously, and that when the contactor is moved to the up position the contactor reaches this position at substantially the same time that the cam member engages against the bottom of the chamber 12. Further it is to be noted that the push button or knob 4 is insulated from the operating mechanism in such a manner that no shock can be transmitted to the operator. On account of the provision of the insulating spacing strip in the contactor the current is not permitted to pass through the spring so that the life of the parts is accordingly increased, and the parts which convey the current are of such a construction that they are well able to withstand high currents and voltages if desired.

In Fig. 4 I have illustrated an improved means for mounting a plurality of switches in gang form. The switches find wide use in this particular form when applied to the control of battery circuits, as for instance on an automobile or in fact they may be used in various relations when it is desired to group a series of switches controlling different circuits or any number of circuits in a single compact group. As illustrated in Fig. 4 I have provided the supporting plate 10 with longitudinally extending projections 26 on its opposite ends. These projections are arranged to be received in corrugated strips 27 having shoulders 28 so located that the projections 26 may be received between the same. These strips 27 are arranged on the opposite ends of a series of switches and the projections 26 on the switch plates are secured to the strips as shown in Fig. 4. Thus it is seen that two or more switches may be arranged in a single unitary group of a compact construction in which the individual switches may be connected to a single circuit or a plurality of circuits if desired. In Fig. 5 I have shown a bottom view of the gang arrangement illustrated in Fig. 4. As illustrated in this figure a single conductor 29 may if de-

sired connect the four upper binding posts, while if desired the lower binding posts may be connected to separate conductors 30, 31, 32 and 33. It is of course to be understood that when the switches are arranged in gangs that a single face plate may be readily applied to the gang, the size of the face plate varying with the number of switches. In Fig. 6 I have illustrated a development or a blank from which if desired one or more of the plates 10 may be cut. As illustrated in this figure a plate 10 may be formed by cutting off any one of the elements 34 or if it is desired to mount a series of the switches in gang relation, as for instance three, three of these elements 34 may be left in the blank form and placed in position over the switches so that a unit similar to the unit illustrated in Fig. 4 may be provided. Thus it is seen that the necessity of providing separate plates 10 and the strips 27 is obviated, since the elements 34 in plate form serve the two functions of these separate parts.

While I have in this application described one specific form which my invention may assume in practice, and modified forms of the gang positioning means, my invention is not limited to these particular forms, but is capable of being incorporated into various other forms and being widely modified. Consequently I wish to include in this application all of these forms which fall within the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is as follows:—

1. A switch for concealed mounting comprising; in combination, a front plate having a projecting portion, an insulating base detachably secured to said plate and in spaced relation therewith, a switch mechanism arranged between said plate and base, said mechanism having a single push and pull operating member extending through said plate and guided by said projecting portion, said mechanism having a part fixed to said base and further guiding said member.

2. A switch for concealed mounting, comprising, in combination, a metallic front plate having projecting guides, an insulating base, means detachably securing said base and plate together, an open-ended casing between said base and said plate and spacing the same apart, a switch mechanism arranged within said casing and including stationary contacts on said base and a push and pull operating member carried by said plate and limited in movement thereby.

3. In a device of the character described, in combination, an open casing including an insulating base, a front plate for said casing having projecting guiding means, a switch mechanism having a reciprocable operating member extending through and carried by

said plate and guiding means, a reciprocable contactor associated with said member, a pair of stationary contacts fixed to and carried by said base and means to detachably secure said base and plate together with the switch mechanism parts in registering relation.

4. In an electric switch, a base, contacts carried thereon; a plate having projections substantially in alignment with said contacts, means securing said base and said plate in spaced relation, and a snap switch mechanism between said base and said plate and having a reciprocable contactor, said contactor being limited in its movement by engagement with said contacts and said projections.

5. In an electric switch, a base, stationary contacts carried thereby having terminal shanks extending therethrough, a plate having projections substantially in alignment with said contacts, means securing said base and plate together, a snap switch mechanism arranged between said base and said plate and having a reciprocable operating member and contact member, said members being limited in movement in one direction by engagement with said base and said contacts and in the other direction by engagement with said plate and said projections, and a tubular casing inclosing said switch mechanism and clamped between said base and said plate.

6. In an electric switch, a plate having an opening therein and projections struck up from the same on either side of said opening, a reciprocating snap switch mechanism having its operating member movable through said opening and its operated member limited in its movement by engagement with said struck-up portions, a base provided with a central recess to receive the end of said operating member, terminal contacts mounted on said base on opposite sides of said recess and engaged by said operated member, said terminal contacts having shanks extending through said base, and terminal plates carried on the under side of said base and fixed to said shanks.

7. As an article of manufacture, a supporting plate for electric switches comprising a sheet metal strip having upset portions projecting outside the plane thereof, said strip being composed of a plurality of partially severed unit sections, said upset portions being arranged to permit complete severance of said strip between any two of said sections to provide a unitary plate for any desired number of said sections.

8. As an article of manufacture, a supporting plate for electric switches comprising a sheet metal strip having a plurality of divided unit sections of equal dimensions and similar characteristics each section having upset portions projecting at an acute

angle to the plane of said plate and arranged to permit severance of said plate between certain of said sections to provide unitary plates of a desired size.

- 5 9. In combination, an operating member having a central bore therein, a cam member having a central bore therein through which said operating member extends, means  
10 for insulating said cam member from said operating member, a frame in which said

operating member reciprocates, and a spindle carried by said frame and extending into the bore in said operating member.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses. 15

CHARLES J. KLEIN.

Witnesses:

H. L. ROCKWELL,  
GEO. HAYNES.