

No. 698,417.

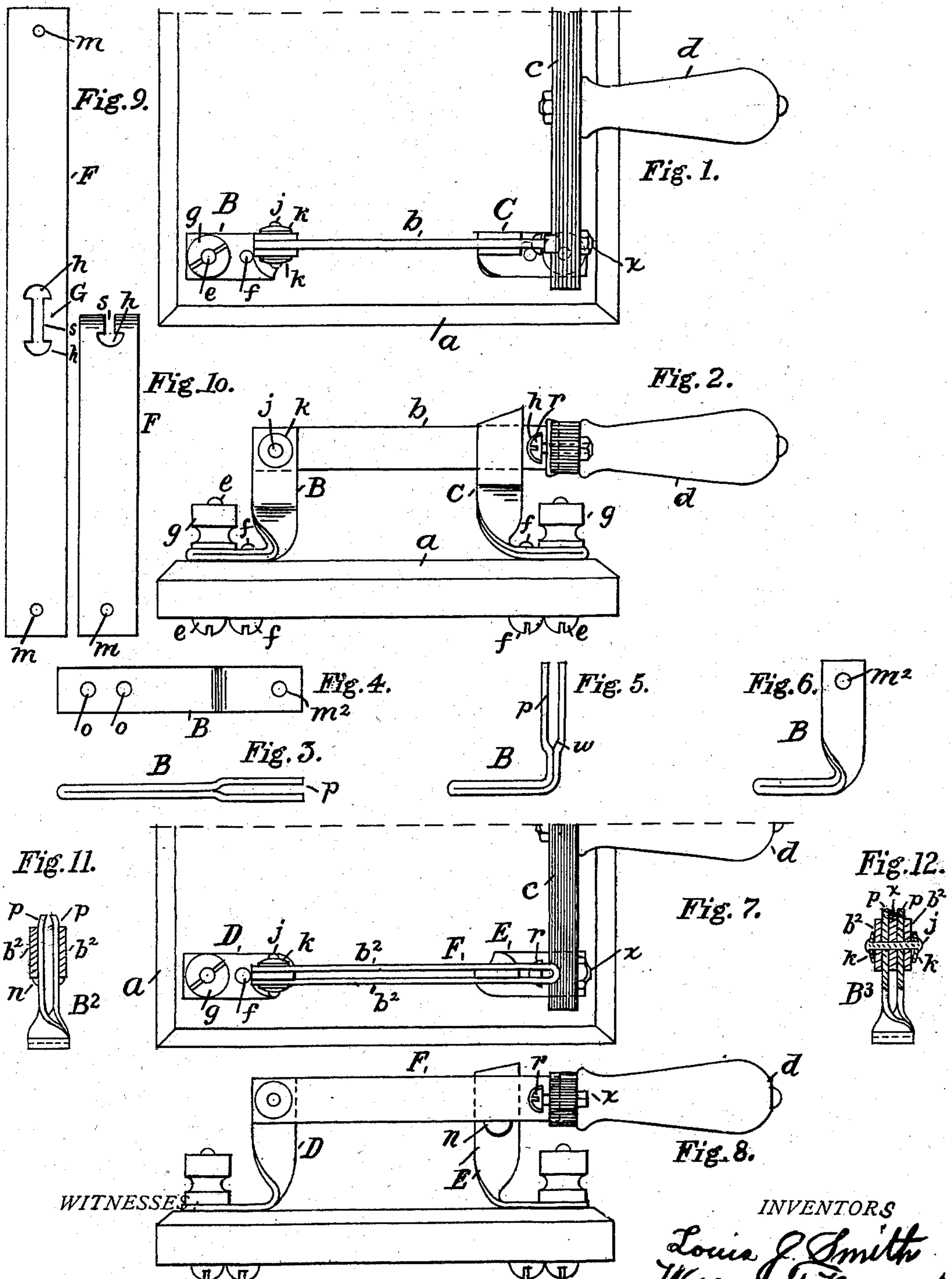
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L. J. SMITH & W. F. BOSSERT.

ELECTRICAL KNIFE SWITCH.

(Application filed Nov. 28, 1901.)

(No Model.)



Witnesses:  
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# UNITED STATES - PATENT OFFICE.

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## ELECTRICAL KNIFE-SWITCH.

SPECIFICATION forming part of Letters Patent No. 698,417, dated April 22, 1902.

Application filed November 26, 1901. Serial No. 83,705. (No model.)

*To all whom it may concern:*

Be it known that we, LOUIS J. SMITH, residing at Leroy, in the county of Genesee, and WILLIAM F. BOSSERT, residing at Utica, in the county of Oneida, State of New York, have invented certain Improvements in Electrical Knife-Switches, of which the following is a specification.

The present invention relates to electric switches of the type commonly known as "knife-switches," consisting of an insulating-base supporting the terminal clips to which the blades of the switch are pivoted and contact with.

The especial features of the invention relate to the terminal clips and to the blades which are adapted to span between them, the object being to form these parts in the most simple and practicable manner, with the least waste of material. The parts mentioned are therefore made complete from sheet-copper sheared into a ribbon of certain thickness and width, from which pieces of the proper length are cut off, which are then punched and bent or twisted into the desired form, without being machined in any way, as we will now proceed to describe and claim.

Of the accompanying drawings, which illustrate the invention, Figures 1 and 2 are a partial top view and a side view of a single-blade knife-switch. Figs. 3, 4, 5, and 6 are views to illustrate the forming of a terminal clip for the same. Figs. 7 and 8 are a partial plan and a side view of a double-blade knife-switch, and Figs. 9 and 10 are views to show the formation of the double blade used with this switch. Figs. 11 and 12 are modifications of the terminal clips.

Referring to Figs. 1, 2, 3, 4, 5, and 6, which represent a double-pole switch, but one blade being shown, however, *a* indicates the insulating-base, usually of slate, drilled with holes to receive the bodies of the screws *ee* and *ff*, which secure the terminal clips B and C to the upper side of the same. The screws pass through the base from the bottom and thread into the footpieces of the clips, the screws *e* extending above the footpieces to receive the binding-nut *g*. The blade *b* is pivoted at one

end to the clip B by the rivet *j*, which is provided at each end with a spring-washer *k*, and the opposite end of the blade is adapted to enter between the spring-arms of the terminal clip C. The two blades forming the switch are connected together by the insulated bar *c*, to which is attached the handle *d* in a manner well understood. The terminal clips are made from a ribbon of sheet-copper cut to the proper length, and the holes *oo* and *m*<sup>2</sup> are punched therein. The ends are offset, as indicated in Fig. 3, and then the piece bent in the middle and flattened, so that the surfaces are in contact, as shown by Figs. 3 and 4. The double piece may then be bent at right angles, as shown by Fig. 5, and the upright part where it joins the foot is twisted a quarter-way around, as represented by Fig. 6, so that the said offset part is adapted to engage the switch-blade. The junction *w* serves as a stop for the blade *b* when forced between the arms *p*. These figures show the terminal clip B, to which the blade is pivoted, and the terminal clip C is made in the same way as the clip B, excepting that the hole *m*<sup>2</sup> is not punched therein, and the copper strip is cut longer to provide for the upward projecting and sloping ends, as shown in Fig. 2, into which the blade passes. In switches which are provided with double blades, as represented by Figs. 7 and 8, the terminal clips are made from a copper strip or ribbon having only one thickness; but the punching, bending, and twisting are produced in a similar manner to that described of the clip with double thickness. In this case a lug-stop *n* is made in the clip E for the resting-point of the blades *b*<sup>2</sup> when closed upon the clip.

By the invention we are enabled to provide a simple and inexpensive terminal clip which meets all the requirements of the trade.

Figs. 7, 8, 9, and 10 indicate a novel form of double blades F for knife-switches. In the manufacture of this double blade a piece of copper is cut off from a ribbon or strip of the required width and thickness, as shown in Fig. 9, and the round holes *mm* and the oblong hole G, consisting of the half-circles *hh* and straight portion *s*, are punched. Af-



terward the piece is bent over at the middle, as shown in Figs. 7 and 10, so that the parts  $b^2 b^2$  are separated the thickness of the clips D and E and parallel with each other, and the half-circle holes  $h h$  register with each other. When the parts are assembled, the head of a screw T is passed sidewise into the holes  $h$  and  $s$ —the head into the former and the body  $n$  into the latter—and is then inserted into the hole made in the insulating-bar  $c$  and a nut  $x$  placed upon the end of the screw and the blades F drawn into a slot in the side of the bar, while the free ends of the blades embrace and are pivoted to the upright end of the terminal clip D. When the blades are closed upon the terminal clip E by the depression of the handle  $d$ , the upper end passes between the blades  $b^2 b^2$ , which find a rest upon the lug  $n$ . The space between the blades is made such that a resilient rubbing contact is made with the side of the clip.

In Figs. 11 and 12 are represented modifications of the terminal clips with which the double blades are associated. Here when the blank is twisted one-quarter way around the free ends  $p p$  are left separated by a space and are parallel with each other, and the blades  $b^2 b^2$  are adapted to embrace the said free ends upon their outer surfaces and at one end are pivoted to a clip by a rivet  $j$ , with intervening spring-washers  $k$ , a washer  $x$  being interposed between the ends  $p p$ , as shown by B<sup>3</sup>, Fig. 12, and at the opposite end the blades are arranged to slide upon the outer surfaces of and to compress the free ends  $b^2 b^2$  of the clip B<sup>3</sup> toward each other, and the said ends are bent inward toward each other at their extremities in order that the blades may more readily engage them, all as represented in Fig. 11. By the modification a very perfect contact is made between the resilient blades and the spring ends  $p p$  throughout their engagement with each other.

Having described our invention, we claim—

1. A terminal clip for electric switches made from a ribbon blank of sheet-copper, the holes for the holding or supporting screws punched therein, the blank bent near the center of its length to a right angle and one member twisted one-quarter way around to stand centrally with the other member, as set forth.

2. A terminal clip for electric switches made from a ribbon blank of sheet-copper, the holes for the supporting and binding screws and for the knife-blade rivet punched therein, the blank bent near the center of its length to a right angle and one member twisted one-quarter way around to stand centrally with the other member, as set forth.

3. A terminal clip for electric switches made from a ribbon blank of sheet-copper, the holes for the supporting and binding screws punched therein, the blank folded and bent near the center of its length to a right angle and twisted one-quarter way around, and the ends offset as set forth.

4. A terminal clip for electric switches made

from a ribbon blank of sheet-copper, the holes for the supporting and binding screws and for the knife-blade rivet punched therein, the blank folded and bent near the center of its length to a right angle and twisted one-quarter way around and the ends offset, as set forth.

5. A terminal clip for electric switches made from a ribbon blank of sheet-copper folded together and the doubled members bent near the center of their length to a right angle and their ends separated and twisted one-quarter way around, as set forth.

6. A terminal clip for electric switches made from a ribbon blank of sheet-copper folded together and the doubled members bent near the center of their length to a right angle and the members closed from the angle toward the ends for a distance, then offset and parallel, and twisted one-quarter way around, as set forth.

7. An electric switch consisting of an insulating-base, terminal clips secured to said base made from a ribbon blank of sheet-copper bent near the center of its length to a right angle and twisted one-quarter way around, the free ends separated and parallel; with a double blade made from a ribbon blank of sheet-copper having a punched central hole with a straight part and enlarged ends, the blank folded through the middle of the said central hole into two parallel blades of the same length and equally spaced apart, secured to a handle by a screw, pivoted to a clip at one end and its inner surfaces adapted to make resilient contact with the outer surfaces of a spring-clip, as set forth.

8. A double blade for an electric switch made from a ribbon blank of sheet-copper, round holes for the rivet at each end and a central hole consisting of a straight part with enlarged ends punched therein, the blank folded through the middle of said central hole into two parallel blades of the same length and equally spaced apart the entire length, as set forth.

9. An electric switch consisting of an insulating-base, terminal clips secured to said base, made from a ribbon blank of sheet-copper, the blank bent near the center of its length to a right angle and twisted one-quarter way around, with a blade pivoted to one of said blanks and adapted to close upon the other, the blade secured to a handle by a screw or screws, as set forth.

10. An electric switch consisting of an insulating-base, terminal clips secured to said base made from a ribbon blank of sheet-copper which is bent near the center of its length to an angle and twisted one-quarter way around; with a double blade made from a ribbon blank of sheet-copper, having a punched central hole with a straight part and enlarged ends; the blank folded through the middle of the said central hole into two parallel blades of the same length and equally spaced apart the entire length, the said blades pivoted to



a clip and adapted to close upon another clip, and secured to a handle by a screw or screws, as set forth.

11. An electric switch consisting of an insulating-base, terminal clips secured to said base made from a ribbon blank of sheet-copper, which is bent near the center of its length to an angle and twisted one-quarter way around; two double blades each made from a ribbon blank of sheet-copper having a punched central hole with a straight part and enlarged ends, the blank folded through the middle of the said hole into two parallel blades of the same length and equally spaced apart the

entire length, the said blades pivoted to a clip at one end and adapted to close upon other clips, and secured to an insulating-bar by means of screws at their opposite ends, the said bar provided with a handle, as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 21st day of November, 1901.

LOUIS J. SMITH.

WILLIAM F. BOSSERT.

Witnesses:

G. A. NILES,

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