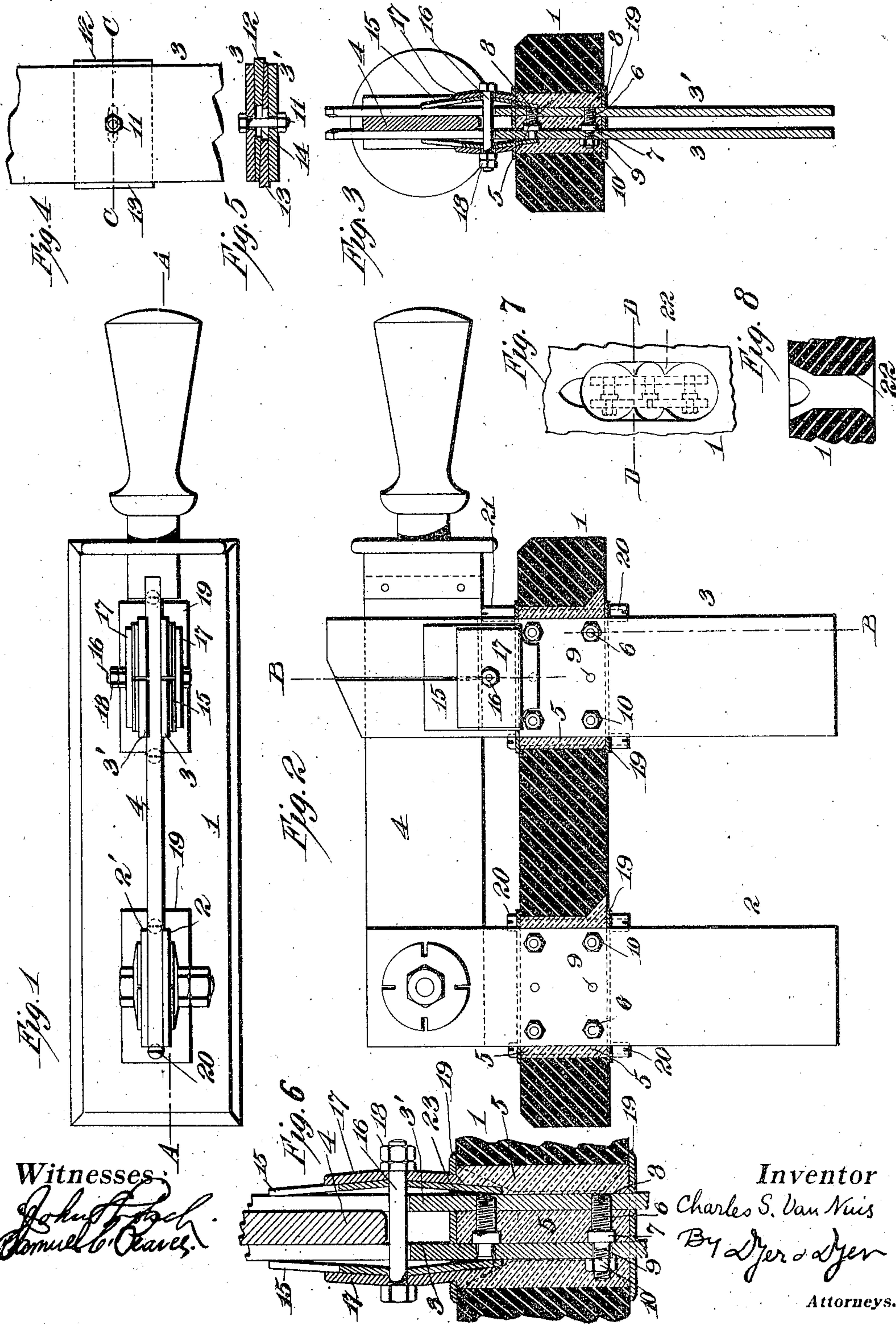


C. S. VAN NUIS.
ELECTRIC SWITCH.
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Patented Jan. 17, 1911.



Witnesses:

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES S. VAN NUIS, a citizen of the United States of America, a resident of New Brunswick, county of Middlesex, State of New Jersey, have invented Improvements in Electric Switches, of which the following is a specification.

The object I have in view is the production of an electric switch which will have advantages over those heretofore designed. The common practice in making some kinds of electric switches, especially knife switches, necessitates, after the switch parts are assembled, the clips being first "fitted" to the blades and afterward "set", or bent to secure the necessary rigidity and intimacy of contact between the fixed and movable parts. By the present invention, I seek not only to avoid the operation of "fitting" but also to avoid the necessity of giving the clips the permanent "set" heretofore required, thus saving two operations and retaining a nicety of fit between the parts which the "setting" unavoidably destroys. Another advantage is to provide means for placing the clips so that the latter are held in a state of perfect equilibrium, so that the clips, together with the blade or separate therefrom will constitute an article of manufacture for use in making complete switches. By "equilibrium" is meant the state of permanence of parallelism or non-parallelism of the inside faces of the clips. It is to be understood that blades are never of exactly uniform thickness, and their opposite faces are seldom exactly parallel, hence one edge is of less width than the other. The inside faces of the clips are also seldom parallel with the outside faces, and the portion of the inner face of the clip which is in engagement with the blade is seldom parallel with the other portion of the same face; the difference being caused by the grinding operation made necessary to insure a good contact with the blade. When the clips are in proper contact with the blade, they are "in equilibrium," although they are not necessarily parallel, nor are the inside opposing faces of the two clips parallel.

In the accompanying drawing, Figure 1 is a plan view of a switch embodying my invention, Fig. 2 is a longitudinal section thereof, taken on the line A—A of Fig. 1, Fig. 3 is a section taken on the line B—B of Fig. 2. Fig. 4 is a view of a detail of a switch showing a modification, Fig. 5 is a

section thereof on the line C—C of Fig. 4, Fig. 6 is an enlargement of a detail illustrated in Fig. 3, and Figs. 7 and 8 are a top view and a section, respectively, on the line D—D of a slot in the switch base.

In all the views, like parts are designated by the same reference characters.

In carrying out the invention I provide a base 1 of insulating material having the clips, 2 2' and 3, 3', secured thereto. The clips 2, 2' carry the pivot for the blade 4, the clips 3, 3' extending upward a sufficient distance to form contact surfaces with the blade 4. The clips 2, 2', and 3, 3' are secured to the base 1 in any suitable manner, but preferably by means of a molded mounting 5. Each pair of clips 2, 2' and 3, 3' is first properly aligned and secured together. One way of doing this is shown in Figs. 2, 3 and 6. Bolts or spacing studs 6 are arranged, each having a collar 7 intermediate its ends. The end of the bolt or spacing stud is provided with a nick 8 for application of a screw-driver. The other end of the bolt or spacing stud is provided with a reduced portion 9 which may be threaded or not, depending upon the location of the bolt. In situations where the bolt with an unthreaded extension is used, that extension is preferably only so long as the thickness of one of the clips. Where bolts with threaded extensions are used, such extensions are sufficiently long to permit the attachment of a nut 10 thereto. One of each pair of clips as 2 and 3 is provided with holes to permit the passage of the extensions 9 of the bolts 6, freely therethrough, and the other clip of the pair as 2' and 3' is provided with corresponding holes, which are screw-threaded and adapted to engage with the threads on the body of the bolts 6. As shown in Fig. 2 each pair of clips is provided with six pairs of such holes, two in the center for use with bolts with the short unthreaded extensions and the other four pairs of holes for use with bolts having the longer threaded extensions. I prefer to simultaneously drill all of the holes. By selecting a proper sized drill, a hole may be made which can be tapped so as to allow the threaded ends of the bolts and the unthreaded ends to properly engage. As an example, I may use a No. 28 drill, which is .004" larger than the regular No. 29 drill which is used for the No. 8-32 thread tap. This No. 8 tap may be effectually used in the hole made by the

No. 28 drill. I can now clamp the clips together and simultaneously drill them with a jig, assuring a true alinement. One clip of each pair may be then tapped, the other furnishing clearance for a No. 6-32 or smaller end of the spacing studs.

In assembling the clips, the bolts or spacing studs 6 are first screwed into that clip which has the holes screw-threaded for attachment of the threaded portions of the body of the bolts as 2' or 3'. The bolts or spacing studs 6 are introduced within the threaded holes in the clip as already mentioned and are screwed down so that the collars 7 are in contact with the clip. The other clip of the pair, as 2 or 3, is then placed in position with the extensions of the reduced bolts passing through the holes in the clip. The two clips are now separated the proper distance by means of a liner or templet of the same width as the blade and the bolts or spacing studs 6 screwed up by means of a screw-driver applied to the nick 8, so that the collars engage with the other clip. The blade itself is best used as the templet. As blades differ in thickness, and degree of parallelism or non-parallelism of their opposite sides, it is best to assemble each switch part with its own particular blade, so that the contact will be perfect. The nuts 10 are then put on the threaded extensions of the bolts. This will hold the two clips together in absolute equilibrium and without tension. If desired the nuts can be soldered so as to be irremovable.

The clamping together of the two clips by means of bolts as disclosed is important for other reasons. I prefer to make the opening through the base 1, in the form of a slot formed of a number of connected round holes. The rib 22 which connects the holes is not removed, as shown in Fig. 7, but on the contrary is allowed to remain, as it forms a very efficient anchorage to the molded mounting. The preferred form of slot discloses two ribs on each side. The upper and lower edges of the ribs are beveled as shown in Fig. 8. This constitutes a means for wedging the mounting against the clips, where a material is used for the mounting which contracts upon cooling. The clips are thereby more rigidly and properly held in place. The advantage of the function of the bolts as described is now made manifest. The round end of the slot, together with the two ribs adjacent to that end, form that part of the mounting in the shape of a vise, which clamps the ends of the clips together. The bolt adjacent to that end resists such clamping action, and consequently the clips still remain in parallelism. The centrally located bolt resists clamping action of the mounting caused by the wedging action of the contracting material engaging with the beveled ends of the ribs 22. By the struc-

ture just disclosed I am enabled to secure a connection between the clips and the base which will be permanent and exact, without danger of affecting the parallelism of the clips.

In the modification shown in Figs. 4 and 5, in place of the bolts already described, a single bolt, as 11, may be used. Between the two clips are wedges 12, 13. These wedges are provided with slots 14 through which the bolt 11 will pass. By hammering inward upon the ends of the wedges 13, the proper separating interval of the two clips can be arranged for.

In connection with the clips already described, I may use a spring device for imparting the necessary "set" to the clips. As shown in Figs. 2 and 3, this spring device comprises an elastic spring member 15 arranged on each side of the clips. This spring member is secured in place by a bolt 16 which extends through an opening in the clips below the blade 4. Washers 17 are provided between the heads of the bolt and the springs. These washers are shown as embedded a short distance within the molded mounting 5 so as to be laterally immovably held in place. The lower ends of the spring 15 are embedded a considerable distance within the molded mountings. This distance, preferably below the adjusting bolt, is equal, approximately, to the distance that the members extend above the bolt so as to place the bolts adjacent to the middle of the load. The molded mounting should not occupy the space between the spring and the clip. To attain this, a washer 23 of felt or other material may be inserted before the molding operation; afterward the washer may be removed if desired, but this is not necessary. Where the upper ends of the clips 3 are forked, as shown in Fig. 2, for the purpose of increasing the contact of the clips, the spring 15 may also be similarly forked so that it will have a portion engaging with each fork of the clip. By adjusting the position of the nut 18 on the bolt 16, the tension of the springs 15 can be varied. By employing the springs 15, the necessity of "setting" the clips is avoided, hence the danger of impairing the contact between the contact members is done away with. An additional advantage lies in the fact that the clips can be made of soft copper possessing high conductivity while the spring members 15 may be made of hard bronze, possessing great elasticity. This feature of adjustability and elasticity of the clips in engagement with the blade may be used in connection with the other features of my invention or not, as desired.

The upper and lower faces of the molded mountings are inclosed by escutcheon plates 19. These are held in position by means of

bolts 20. One of the bolts is provided with an elongated or enlarged member 21 in such a position that it will be engaged by the blade 4 when the latter is in the closed position. This enlarged member therefore serves the double purpose of retaining the escutcheon plate in position and supporting the switch blade. The enlarged member may be the elongated head of the bolt or a deep nut.

In accordance with the provisions of the patent statutes, I have described the principle of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is merely illustrative and that the invention can be carried out in other ways.

Having now particularly described and ascertained the nature of my said invention what I claim and desire to secure by Letters Patent is:

1. As a new article of manufacture, a pair of clips for an electric switch secured together by bolts, the said bolts having collars and reduced extensions, the collars engaging with that clip through which the extensions pass, with means for clamping that clip against the collars.

2. An electric switch having open clips embedded in a molded mounting, and a blade, with adjustable spring means secured in the mounting for engaging the clips with the blade outside the mounting.

3. An electric switch having open clips and a blade, the said clips being embedded in a molded mounting, with spring plates engaging with the clips outside the mount-

ing, the said plates being secured in the mounting, and means for adjusting the tension of the plates upon the clips.

4. An electric switch having open clips and a blade, the said clips being embedded in a molded mounting, with spring plates engaging with the clips outside the mounting, the said plates being secured in the mounting, and a bolt passing through the clips and plates, with means for engaging the bolt with the plates to adjust the tension of the plates upon the clips.

5. An electric switch having the clips secured to the base by a molded mounting, the hole in the base having opposed ribs with beveled ends, so that as the mounting contracts it will more intimately engage with the clips.

6. The combination with a base having a slot therein, the said slot having opposed ribs, of a pair of clips adjustably secured together and separated to form the space for the blades, and adjustable means for resisting distortion of the clips as the mounting contracts.

7. The combination with a base having a slot, which has opposed ribs and beveled ends, of a pair of clips, and a molded mounting, and means between the clips to resist distortion of the clips as the mounting contracts.

This specification signed and witnessed this twenty-first day of January, 1907.

CHARLES S. VAN NUIS.

Witnesses:

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