No. 825,091. PATENTED JULY 3, 1906.

C. S. VAN NUIS.

ELECTRIC SWITCH.

APPLICATION FILED DEC. 10, 1904.

2 SHEETS—SHEET 1.

Fig. 1

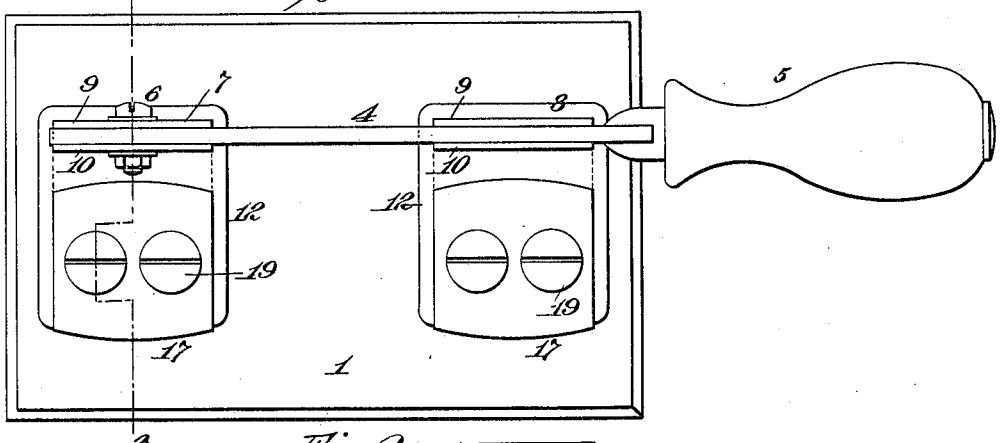


Fig. 2

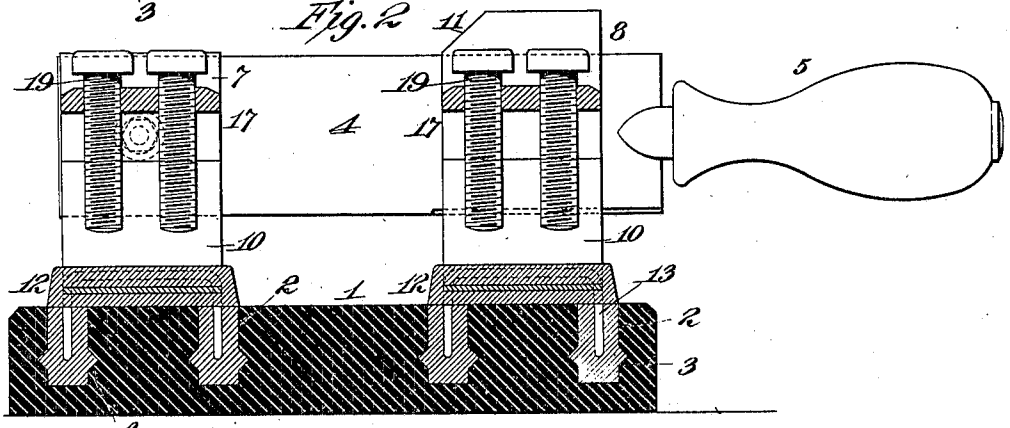


Fig. 3

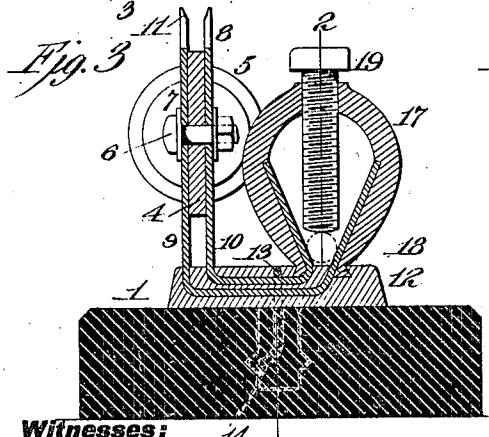
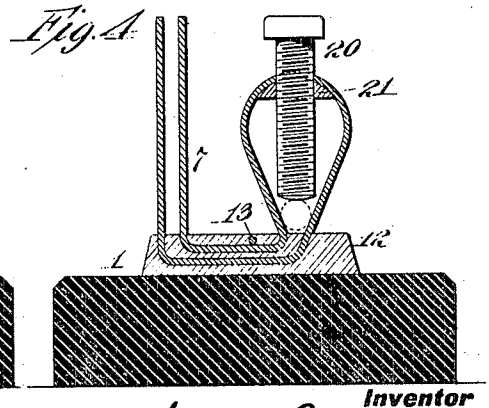


Fig. 4



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ELECTRIC SWITCH.

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2 SHEETS—SHEET 2.

Fig. 5

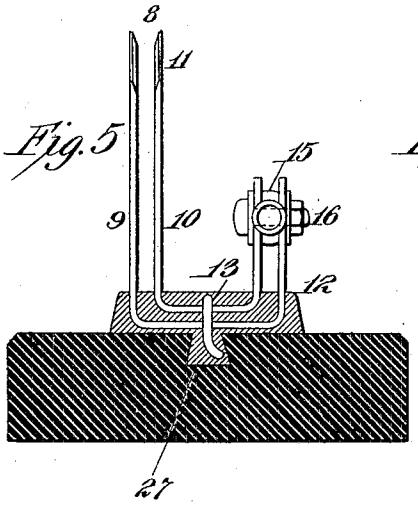


Fig. 6

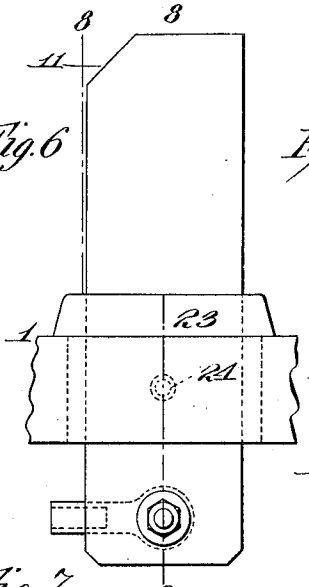


Fig. 8

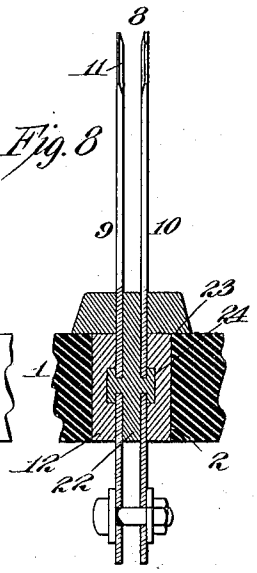
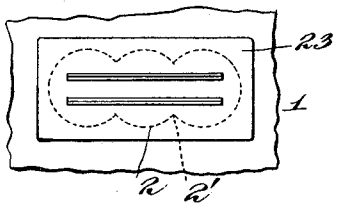


Fig. 7



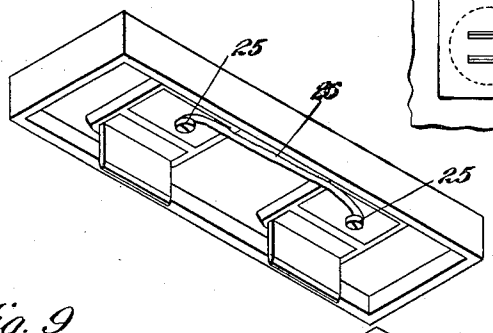


Fig. 9

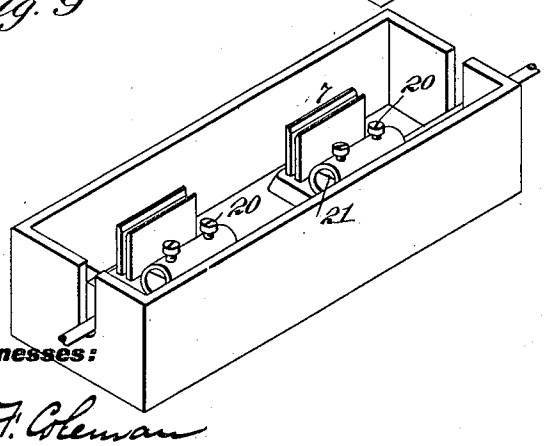
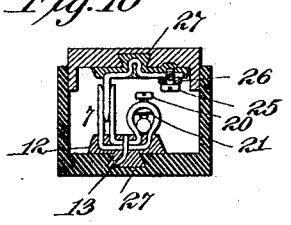


Fig. 10



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UNITED STATES PATENT OFFICE.

CHARLES S. VAN NUIS, OF NEW BRUNSWICK, NEW JERSEY.

ELECTRIC SWITCH

No. 825,091. Specification of Letters Patent. Patented July 3, 1906.

Application filed December 10, 1904. Serial No. 236,277.

To all whom it may concern:

Be it known that I, CHARLES S. VAN NUIS, a citizen of the United States, residing at New Brunswick, in the county of Middlesex and State of New Jersey, have invented a certain new and useful Improvement in Electric Switches, of which the following is a specification.

The present invention relates to electric switches of that type in which a blade or "knife" is pivoted upon supports secured to a base and engages between two fixed jaws, also secured thereon. In making switches of this type the base is formed either of marble or slate, with holes drilled therethrough for the reception of the securing means for the stationary contact members, or the base is formed of porcelain or other vitreous material, with the openings molded therein. In either case there is extreme liability of the holes not being accurately alined and also, if the base be of porcelain, it may be warped.

To permit the different members of the switch to be placed in correct operative position, irrespective of the position of the openings and the character of the base, is one of the objects of this invention.

Another object is to hold the plates of each stationary member in correct contiguous relation.

Another object of the invention is to provide an improved electrical contact between the terminal wires and the switch members.

A further object of the invention is to produce a switch in which the base is not perforated, whereby static discharges through the base of the switch will be prevented.

In order to better understand the nature of the invention, attention is called to the accompanying drawings, in which—

Figure 1 represents a top view of a front-contact switch. Fig. 2 represents a sectional view thereof, taken on the line 2 2 of Fig. 3. Fig. 3 represents a section taken on the lines 3 3 of Fig. 1. Fig. 4 is a sectional view of a device slightly modified from that shown in Figs. 1, 2, and 3. Fig. 5 is a section of another modification. Fig. 6 is a side view of a portion of a back-connected switch. Fig. 7 is a top view thereof. Fig. 8 is a sectional view thereof, taken on the lines 8 8 of Fig. 6. Fig. 9 is a perspective view of a fuse-box, and Fig. 10 is a sectional view taken through the same.

In all of the several views like parts are designated by the same numerals of reference.

The switch consists of a base 1, formed of a slab of marble, slate, or other suitable material having openings 2 2 formed therein. In the front-connected switch these openings do not pass entirely through the base and are provided with undercut portions 3. In the back-connected switch the openings pass entirely through the base, and the undercut portions are not usually necessary, but may be used. The blade 4 has the usual operating-handle 5 and is pivoted at 6 to a suitable support 7. This support 7 and the jaws 8, between which the blade engages, are formed, preferably, each of two plates 9 and 10, of elastic metal, beveled at their upper extremities at 11 to permit the easy entrance of the blade between them. These elastic plates are secured in contiguous relation and to the base 1 in proper operative position to the blade 4 in a novel manner by means of a molded mounting 12. This mounting consists of a mass of material forming a support within which the plates are embedded, and which also enters one or more of the openings 2. In the front-connected switch the mounting also engages within the undercut portions 3, formed within these openings. The material used for making the mounting may be an insulating-cement, but is preferably a metallic composition, a variety of type-metal being preferred. One form of composition may consist of an alloy composed of lead, (seven parts,) tin, (three parts,) and antimony, (one part,) which possess the valuable feature of shrinking very little upon cooling.

The parts of the front-connected switch are assembled by using temporary clamp-supports to hold the blade and stationary members in proper correlative position to each other and to the base and in proper alinement with each other, while the molten metal or the plastic compound is molded around the stationary members and into the recesses o the undercut holes in the base, securing the stationary members permanently to the base in the positions previously determined. A mold (not shown) may be used to give the desired configuration to that part of each mounting 12 that is above the base. To further secure the plates 9 and 10 to the base, a staple 13 may be used, which is so embedded within the mounting that it will straddle the

metallic parts and enter two of the openings 2. To assist in retaining the staple 13 in position, its extremities may be bent, as at 14, (see Fig. 3,) to cause it to engage more intimately with the mounting 12.

In the back-connected switch (shown in part in Figs. 6, 7, and 8) a slot must be formed extending entirely through the base. This may be readily made by means of a number of connected circular openings, as shown in Fig. 7, parts of the molded mounting 12 filling the irregularities in the sides of the openings. In these figures the slot is not shown with the undercut portions, as described and illustrated in connection with the front-connected switch, for the reason that the edges 2′, which form the connecting-walls between the several circular openings which make up the slot, are sufficiently ragged to serve the same purpose and form an efficient lock for the molded mounting. In this form of the invention the molded mounting is made in two parts—a molded mounting proper and a connecting portion 22. This latter, with the flange 23 and engaging ears 24, is first formed in a mold separate from the base. The connecting portion 22 is formed by placing the plates 9 and 10 in proper relative position within a mold, and a sufficient quantity of material is introduced. The same operation forms the flange and ears. It will be understood that enough of the material passes from the space between the plates, through small openings therein, to form the ears 24. The pair of plates, with the connecting portion, may be made in quantities, and they form in themselves a new article of manufacture. In this form they are secured to the base by first being adjusted to proper position in relation to the other stationary members and the movable member and so that the connecting portion 22 will pass through the slot and the flange 23 will engage with the face of the base. Sufficient binding material may then be introduced within the slot and around the stationary members to form the complete mounting, the ears 24 serving to more securely retain the parts in place, the binding material engaging with the ragged projecting edges 2′, as before described. The fact that the back-connected switch is mounted upon a switchboard carrying a number of switches, as well as other devices, makes it desirable that the two or more plates forming each stationary member of the switch should be secured together and their relative position determined and fixed before they are mounted on the switchboard. When, however, the back-connected switch is made with its own base, the plates will be secured together and to the base at the same time by the molded mounting.

Electric connection is made with the plates 9 and 10 in any suitable manner, as by means of a clip 15 and nuts and washers 16, as shown in Figs. 5, 6, and 8, but preferably by means of a device shown in Figs. 1, 2, and 3. This consists of a clamp 17, formed of a general horseshoe shape, with its extremities 18 embedded in the support 12, one extremity of each of the plates 9 and 10 passing into the clamp and being there separated to a V shape, so as to engage with the inside faces thereof. It is of course understood that the extremities of the clamp 17 may not necessarily be embedded within the molded mounting, but may be supported entirely by the separated extremities of the plates 9 and 10. Suitable set-screws 19, passing through threaded openings within the clip, force the terminal wire into engagement with the two extremities of the plates 9 and 10 toward the apex of the separated portion. Owing to the inclined position of these members, the terminal wire may be forced into engagement to any desired extent. In the modification shown in Fig. 4 but one metallic piece for each of the stationary members is used. This is bent as shown, the terminal wire being placed within the loop formed thereby and is engaged by a screw 20. To permit a sufficient engagement of the screw with its opening for the purpose of securing the necessary pressure, an additional piece 21 is inserted, with a threaded opening therein, and this serves the purpose of a nut.

This invention may be applied with but slight modification to a fuse-box, as shown in Figs. 9 and 10, which illustrate a box with double engaging lugs in the base, formed in the same manner as those described in connection with the switch, and single tongues in the cover, formed as shown in Fig. 10. To the screws 25 is secured the fuse-link 26.

Instead of a grooved opening 2 within the base a conical recess 27 (shown in Figs. 5 and 10) may be employed.

It will be seen that the alinement of the cooperating parts of the switch is entirely independent of any conditions of the base either as regards the surface or the position of the openings, the molded mountings compensating for all irregularities. This is a matter of great importance, for when a base is used made of a vitreous material, such as porcelain, the surface may be found to be more or less warped, and when marble or slate is employed the varying densities thereof sometimes cause the drill to make irregularly-formed openings.

The screw-wedge contact-clamp is an efficient feature of my improved switch, as it substitutes for the usual solder and flat surface lug-contacts used in switches in common practice the more rigid and effective connection of a combined pressure contact directly between the conducting-wires and the switch-plates.

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

1. The combination with the base and the stationary contact members of a switch, of a molded mounting for securing such stationary members to the base, whereby an accurate alinement is secured and maintained, substantially as set forth.

2. The combination with two separate contiguous contact-plates, of a molded mounting securing them together, and determining and maintaining their relative position, substantially as set forth.

3. The combination with the base and the movable member of a knife-switch, of the stationary members, and a molded mounting securing such stationary members to the base whereby an accurate alinement of such stationary members with relation to the movable member is secured and maintained, substantially as set forth.

4. The combination with the base and the movable member of a knife-switch, of the stationary members composed of pairs of contiguous plates, and a molded mounting securing the plates of each pair together and to the base, substantially as set forth.

5. The combination with a base, having openings therein, and the stationary contact members of a switch, of a molded mounting engaging with the openings for securing such stationary members to the base, whereby an accurate alinement is secured and maintained, substantially as set forth.

6. In a switch, the combination with a base, of blade-engaging means and terminal connections formed of integral plates and a molded mounting for securing them to the base substantially as described.

7. In a switch, the combination with a base, of blade-engaging means and terminal connections, formed of a pair of contiguous plates and a molded mounting for securing them to the base, substantially as described.

8. In a switch, the combination with a base, of blade-engaging means and terminal connections, formed of a pair of contiguous plates, a molded mounting for securing them to the base, and a staple within the mounting and engaging with the plates, substantially as described.

9. In a switch, the blade-engaging means and terminal connections therefor formed of a pair of coöperating plates, in combination with a molded mounting for supporting the members intermediate the ends thereof, substantially as described.

10. In a switch, the blade-engaging means and terminal connections therefor, formed of a pair of coöperating plates, in combination with a molded mounting for supporting the members intermediate the ends thereof, and a terminal securing means adjacent to one extremity of the pair of plates, substantially as described.

11. In a switch, the combination with a pair of flat elastic plates having a portion thereof intermediate their extremities, embedded within a molded mounting, substantially as described.

12. In a switch, the combination with a pair of flat elastic plates having a portion thereof intermediate their extremities embedded within a molded mounting, and terminal securing means partially embedded within the mounting, adjacent to one extremity of the pair of plates, substantially as described.

13. In a switch, the combination with a pair of flat elastic plates, having a portion thereof intermediate their extremities in close relation, and embedded within a molded mounting and separated at one extremity, and a terminal engaging means, partially embedded within the mounting, adjacent to the said separated extremities of the plates, substantially as described.

14. In a switch, the combination with a pair of flat elastic plates, having a portion thereof intermediate their extremities in close relation, embedded within a molded mounting and separated at one extremity, and means connected to the mounting, carrying means for forcing the terminal into engagement with the separated extremities of the plates, substantially as described.

15. In a switch, the combination with a pair of flat elastic plates having a portion thereof intermediate their extremities embedded within a molded mounting, and terminal securing means adjacent to one extremity of the pair of plates, substantially as described.

16. In a switch, the combination with a pair of flat elastic plates, having a portion thereof intermediate their extremities in close relation, and embedded within a molded mounting and separated at one extremity, and a terminal engaging means adjacent to the said separated extremities of the plates, substantially as described.

17. In a switch, the combination with a pair of flat elastic plates having a portion thereof intermediate their extremities embedded within a molded mounting, and separated at one extremity to form a V shape, a clamp surrounding said separated extremities, and means for forcing the terminal wire within the apex of said separated extremities, substantially as described.

18. In a switch, the combination with a pair of flat elastic plates having a portion thereof intermediate their extremities embedded within a molded mounting, and separated at one extremity to form a V shape, a clamp surrounding said separated extremities, and a screw carried by said clamp for forcing the terminal wire within the apex of said separated extremities, substantially as described.

19. In a switch, the combination with a pair of flat, elastic plates having a portion

embedded within a molded mounting and with one extremity free and separated to form a V shape, of means for forcibly engaging the terminal wire with the apex of the said extremity, substantially as described.

20. In a switch, the combination with the two contiguous plates forming the stationary members, the said plates being separated adjacent to one extremity to form a V shape, of a clamp surrounding the separated extremities of said plates, and a screw carried by the clamp for forcing the terminal wire toward the apex of said separated plates, substantially as described.

21. In a switch, the combination with the two contiguous plates forming the stationary members, the said plates being separated adjacent to one extremity to form a V shape, of a clamp surrounding the separated extremities of said plates, and a screw carried by the clamp for forcing the terminal wire into engagement with the separated plates and toward the apex of the separated portion, substantially as described.

22. In a switch, the combination with a pair of flat elastic plates having a portion thereof intermediate their extremities embedded within a molded mounting, and separated adjacent to one extremity to form a V shape, a clamp surrounding said separated extremity, and a screw carried by the clamp for forcing the terminal wire into engagement with the separated plates and toward the apex of the separated portion, substantially as described.

23. In a switch, the combination with a molded mounting, of a terminal for the line, the said terminal being in flat plate form with two parts embedded within the molded mounting and two parts separated to form a V shape, and means for forcibly engaging the terminal wire with the separated parts, substantially as described.

This specification signed and witnessed this 14th day of April, 1903.

CHARLES S. VAN NUIS.

Witnesses:
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JOHN LOUIS LOTSCH.