No. 751,084. PATENTED FEB. 2, 1904.

E. A. LOWE.

ELECTRIC SWITCH.

APPLICATION FILED JAN. 17, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

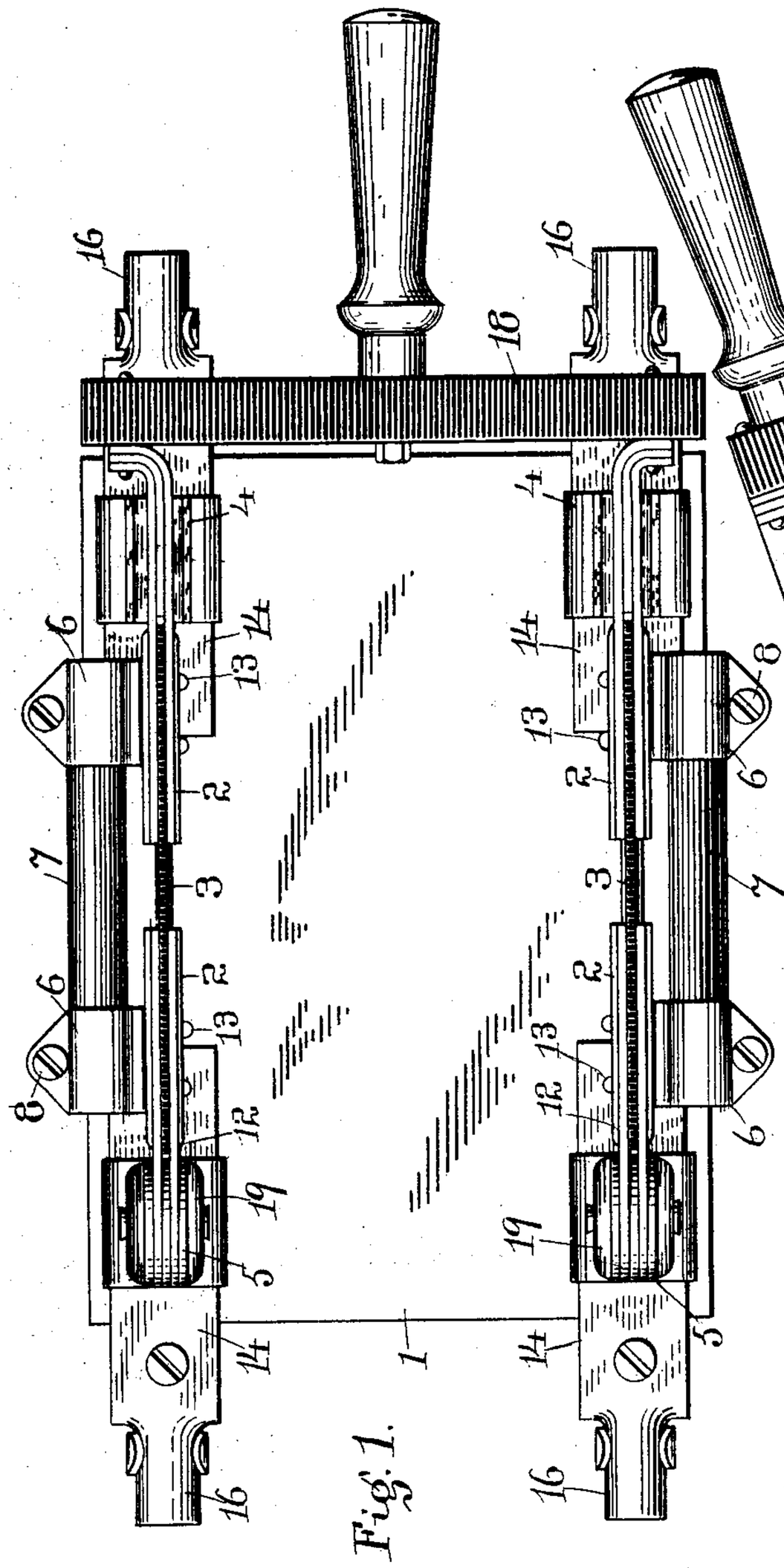

Fig. 1.

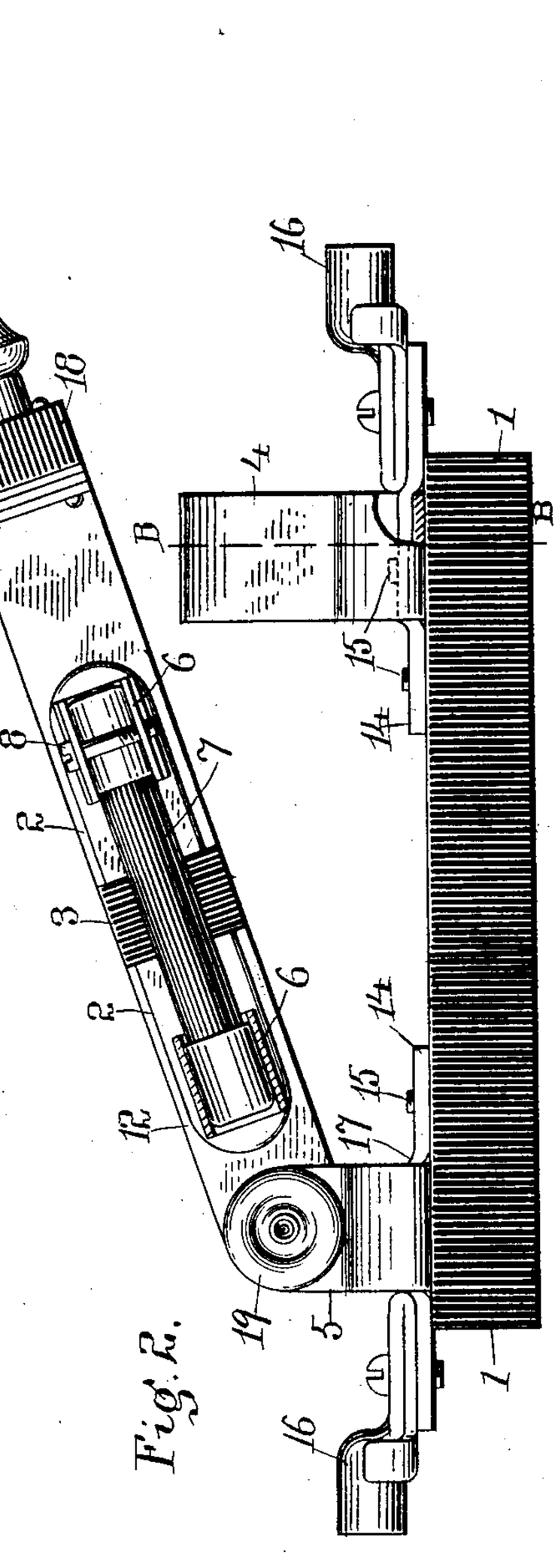

Fig. 2.

Witnesses:
Otto Greenberg
Ethel L. Lawler

Inventor
E. A. Lowe
By H. G. Townsend
Attorney

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

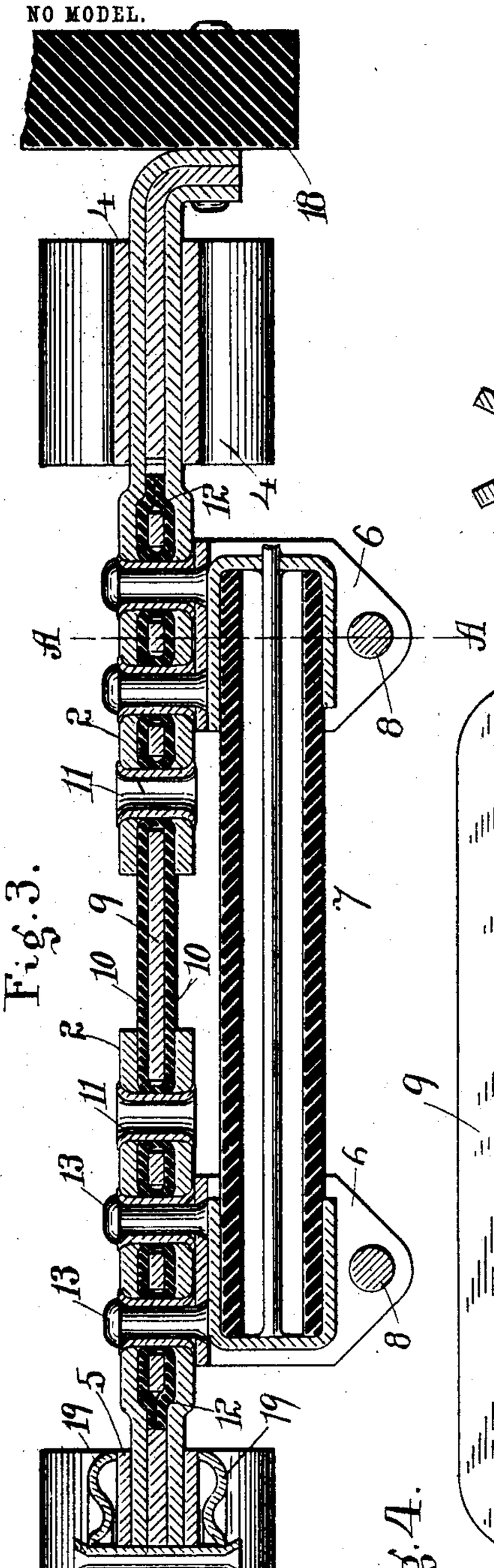


Fig. 4.

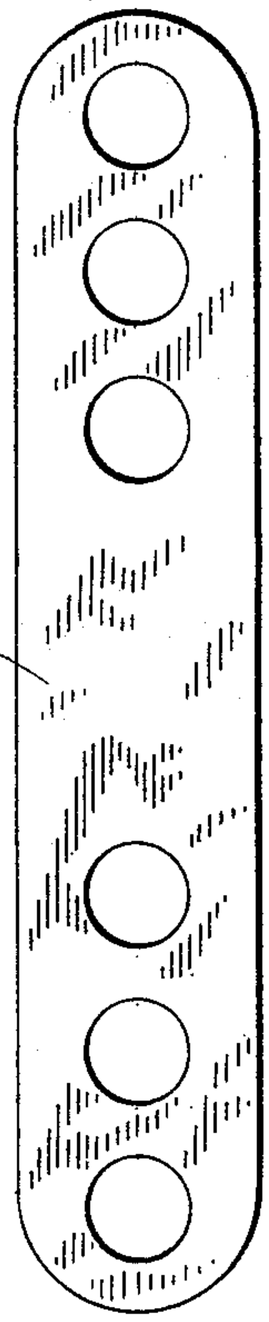


Fig. 5.

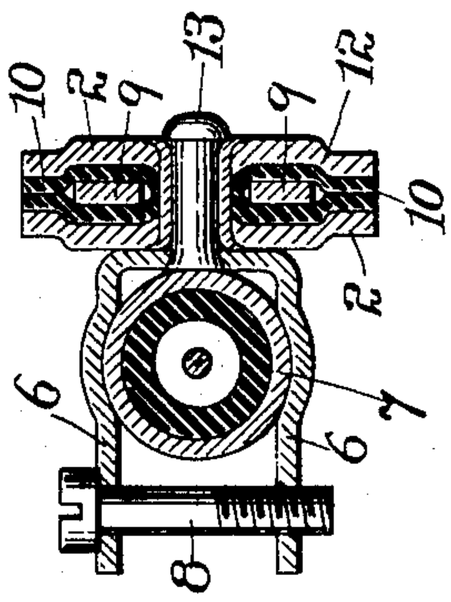
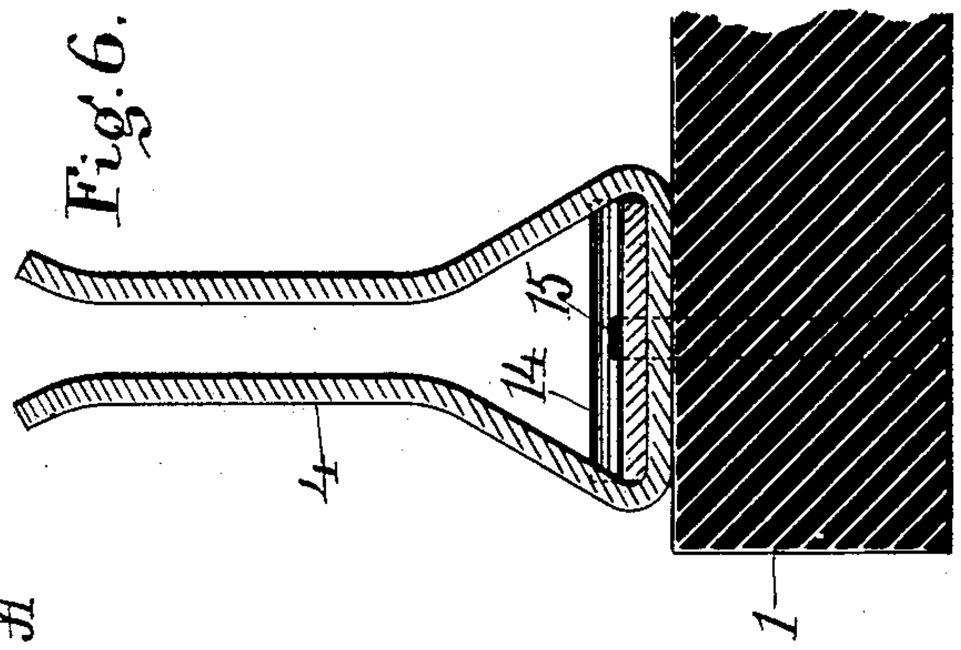


Fig. 6.



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Otto Greenberg
Ethel L. Lawler

Inventor
E. A. Lowe
By W. L. Townsend
Attorney

No. 751,084. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

ERNEST A. LOWE, OF PLAINFIELD, NEW JERSEY.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 751,084, dated February 2, 1904.

Application filed January 17, 1902. Serial No. 90,152. (No model.)

To all whom it may concern:

Be it known that I, ERNEST A. LOWE, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to the construction of electric switches, and is useful particularly for switches of the type known as "knife-switches."

One of the principal objects of the invention is to secure compactness, strength, cheapness, and serviceability, particularly in switches of the jackknife type, while at the same time facilitating the operation of re-fusing the circuit when the fuse blows and making it impossible to overload the switch by using on the circuit thereof a fuse or cut-out of larger capacity than the switch itself.

My invention consists in the particular construction of the insulating junction or joint between the two portions of the switch-lever, whereby I am enabled to secure substantially the same mechanical rigidity and strength as would exist if the lever or knife were made of one piece of metal.

Other features of my invention relate to details of construction whereby I secure cheapness in manufacture, compactness, and durability, all as will be more clearly apparent from the subjoined description, taken in connection with the accompanying drawings, in which—

Figure 1 is a plan of an electric switch embodying my invention and shows the invention as realized in a double-pole knife-switch. Fig. 2 is a side elevation of the switch open. Fig. 3 is a longitudinal section through one side or lever of the switch, showing the construction of the insulating joint or junction. Fig. 4 is a plan of the metal coupling-piece used in the joint. Fig. 5 is a vertical cross-section through the switch-lever and clip or clamp carried thereby on the line A A, Fig. 3. Fig. 6 is a vertical cross-section through the contact spring or clip which receives the end of the lever in order to close circuit, taken on the line B B, Fig. 2.

1 indicates the base, of slate or other insulating material, to which the parts are secured.

2 indicates the blade or knife of the switch, made in two portions or sections, as indicated, insulated from one another or bisected at 3, so that in the absence of other devices the circuit from the pivotal end of the switch to the end which enters the contact-clip 4 would be broken. These two sections, each consisting of a plate or plates, are connected together by a suitable lap-joint, being insulated from one another by the interposition of a sheet of insulating material between the lapping surfaces. By preference I construct this lap-joint by using an interposed coupling-plate between said sections, as will be hereinafter described.

5 is the post upon which the two levers 2 are mounted, so as to be capable of swinging in a vertical plane to and from the base 1.

6 indicates fuse clamps or sockets mounted, respectively, on the two portions or sections of the lever 2 at opposite sides of the break 3 in such manner that when the fuse is inserted in said clips the connection will be completed from one section to the other. These fuse clips or clamps are made of a size or capacity adjusted to the current-carrying capacity of the switch—that is to say, they are of such form or size as to be incapable of receiving a fuse of larger capacity than the rated capacity of the switch itself. Hence it is impossible to overload the switch, as might be done if the fuse-holder were a separate construction, in which case it would be easy to connect up the switch to a fuse-holder of greater capacity than the switch, or, in other words, to employ fuses such that the switch might be overloaded.

By constructing the switch, as shown, with fuse clips or clamps arranged to bridge the two sections of the lever the operation of re-fusing the circuit is somewhat facilitated, since when the circuit requires to be re-fused all that is necessary is to open the switch, and to thus completely open the circuit through the fuse-holder and to thereby avoid any possible annoyance or danger in replacing the blown fuse. After re-fusing the switch is thrown

down to circuit-closing position and the circuit is complete.

The construction of the switch lever or knife and of the insulating-joint between the two members or portions thereof is preferably as follows: Each section or portion consists, as shown, of two plates of sheet metal, between which is clamped one end of a coupling-piece 9, also of sheet metal, but which is insulated from the two clamping-pieces by sheets of mica or other suitable insulating material 10, interposed, as shown, between the inner faces of the clamping-plates and the two faces of the plate 9, clamped between them. The plates are clamped by means of rivets 11, which I preferably make as hollow rivets in order to afford openings through which other rivets 13 may pass, whereby the fuse-clips 6 may be secured to the lever. In order to secure a perfect insulation of the coupling piece or plate 9 from the blade or lever 2, it is desirable that it should be insulated not only upon its opposite faces, but around the edges of the openings made through the same for the passage of the rivets or clamps, as well as around its edges at the ends and sides. To attain this result by a simple and inexpensive construction, I provide the plates which make up the two sides of the lever 2 with a shoulder or offset 12, the outline of which is indicated in Fig. 2 and which follows the general form or conformation of the plate 9. The effect of this shoulder or offset is to compress the sheets of insulation closely together all around the outer edge of the plate 9, when the two sides of each section 2 are firmly clamped together by the rivets 11 or other expedient. This clamping or riveting is preferably done in a power-press in order to secure a rigid construction and a complete meeting of the plates of insulation at the edges on the line of the offset or shoulder 12. Thorough insulation around the edges of the openings in the plate 9 is secured by corresponding shoulders or offsets in the clamping-plates 2, which may be made through the upsetting of the metal of said plates in the operation of punching the holes which receive the rivets 11.

By inspection of Fig. 3 it will be seen that the metal of the coupling-plate 9 is completely surrounded by insulation, so that there is no opportunity for a leak from said plate to the levers, either from one plane surface to the other or from the edge of the plate to the rivet or clamping device passing through the opening in the plate.

The clamps or sockets 6, which receive the fuse, are preferably constructed of a loop or yoke-shaped piece of sheet metal whose base or yoke portion has an opening through which passes one end of the rivet 13, whereby said clamp or socket is firmly united to and in electrical connection with the switch-lever. The outer or free ends of the loop are provided with the clamping-screw 8. 4 indicates the contact-spring or clip which receives the end of the switch-blade, and 5 indicates the post in which the switch-lever is mounted.

The clip and post consist, preferably, of a piece of sheet metal in the form of a loop or yoke, as shown in Fig. 6, the yoke or base of which, uniting the two arms, is clamped to the face of the base 1 by a clamp plate or block 14, which passes through the yoke, as shown, and is fastened securely by means of screws passing through the base 1 from beneath. The ends of these screws appear at 15 in Figs. 2 and 6. These clamp-plates carry also the electric terminals or sockets 16, which are adapted to receive the ends of the conductors for the circuit upon which the switch is employed. These sockets or terminals 16 may be made of a separate piece of metal fastened to 14 and preferably arranged, as shown, in position to engage by their square edge the edge of the upright clip 4 and post 5 and to be thereby prevented from turning on the plate 14.

18 indicates a cross-bar of insulating material used in the double-pole switch for uniting the two knives or plates, the latter of which at their free ends are bent to afford means for fastening the cross-piece 18. The pivoted ends of the levers are secured in the posts 5 between the open ends of the loop or yoke by means of a rivet which passes through the parts and is headed down upon spring plates or washers 19. By this means I secure a firm pivoted support for the lever and one which affords at all times a good electrical connection from the post to the lever. In this respect the construction is a great improvement upon prior constructions of pivot for electric switch-levers, which are liable to work loose at this pivot and in time afford an imperfect contact, which adds to the resistance of the circuit and is liable to have the parts fused and welded together by arcing at the surfaces of imperfect contact.

It will be obvious that the switch described may be used either fused or not at will, since if no fuse is required it is simply necessary to place in the clamps 6 any suitable pieces of conducting material, thereby permitting the same construction of switch to be used interchangeably either fused or not.

What I claim as my invention is—

1. In an electric switch, a switch plate or lever consisting of the two metal portions each comprising two plates of metal combined with a coupling-plate and sheets of insulating material clamped between the said plates, as and for the purpose described.

2. The improved electric insulating-joint herein described comprising a metal coupling piece or plate clamped at its ends between sheets of insulation, and exterior plates of conducting material provided with suitably-lo-

cated offsets or shoulders adapted to compress the insulation around the edges of the coupling-piece, as and for the purpose described.

3. In an electric switch, the combination with the switch-lever made in sections, of the metal coupling-piece, the clamping-rivets 11 passing through said plate and through the exterior plates or pieces forming one end of the knife-blade, and rivets 13 passing through the hollow rivets 11 and securing the fuse clamp or socket to the switch-blade.

Signed at New York city, in the county of New York and State of New York, this 13th day of January, A. D. 1902.

ERNEST A. LOWE.

Witnesses:

H. C. TOWNSEND,

E. L. LAWLER.