

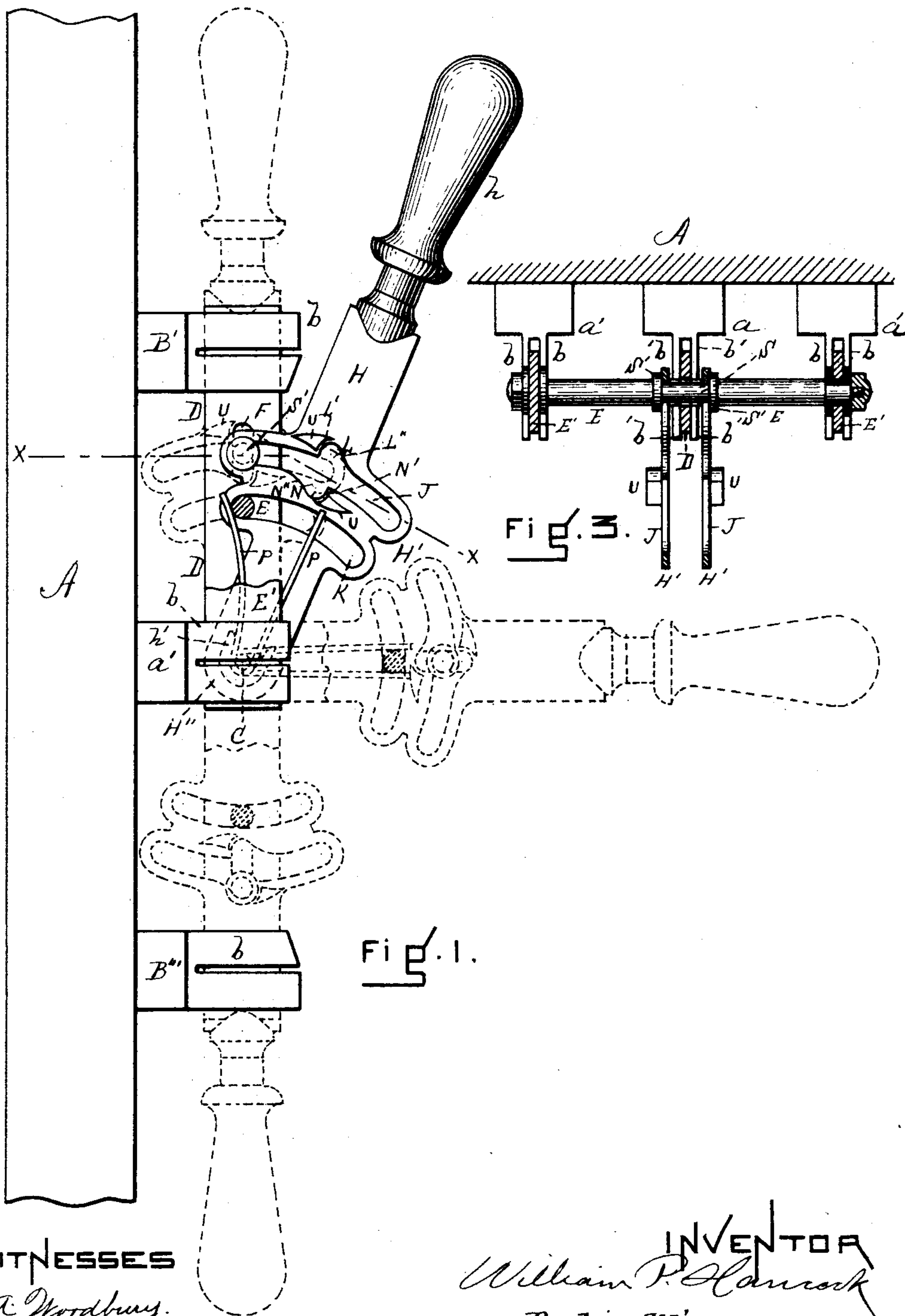
(No Model.)

2 Sheets—Sheet 1.

W. P. HANCOCK.
ELECTRIC SWITCH.

No. 541,608.

Patented June 25, 1895.



WITNESSES
E. A. Woodbury.
A. N. Bonney.

INVENTOR
William P. Hancock
By his Atty.
S. W. Williams

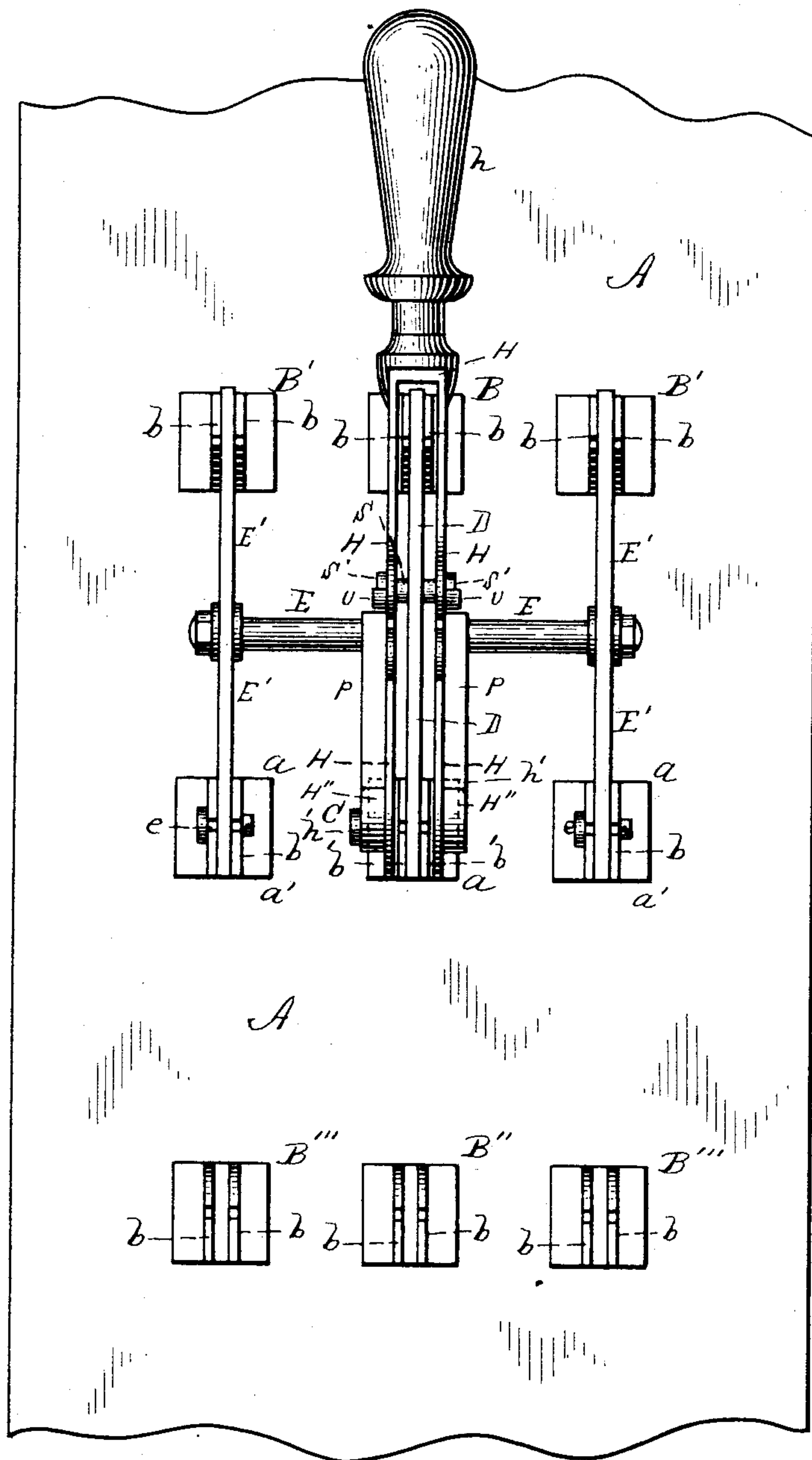
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A. N. Boney.

FIG. 2.

INVENTOR

William P. Hancock

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Henry Williams

UNITED STATES PATENT OFFICE.

WILLIAM P. HANCOCK, OF EVERETT, MASSACHUSETTS.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 541,608, dated June 25, 1895.

Application filed February 7, 1895. Serial No. 537,576. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. HANCOCK, a citizen of the United States, residing at Everett, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Electric Switches, of which the following is a specification.

This invention relates to switches for electric circuits, and particularly to that class known as "double-throw" switches, in which the carrier and blade may be swung over in either of two opposite directions, thus connecting the feed wire with either circuit; and the invention consists of the novel construction and arrangement of parts hereinafter described, whereby a sharp and quick break of the circuit is produced, thereby preventing injurious sparking by reason of the formation of an arc at the contacts when the circuit is broken, and whereby the switch is rendered more perfect in construction and efficient in operation, all substantially as illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of a double-throw switch embodying my invention, the full lines representing the parts in the position assumed when the handle has been swung out until the circuit is about to be broken, and the broken lines representing the handle thrown half way over and entirely over to the opposite contacts. In this figure, a portion of one of the outer blades is represented as broken out. Fig. 2 is a plan view with the switch closed so as to complete the same circuit as in Fig. 1. Fig. 3 is a section taken on line *x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The switch illustrated is what is known as a three-pole switch mounted upon a suitable base A of non-combustible insulating material. On this base are mounted three (in this instance) contacts B, B', B' connecting with one circuit, and three contacts B'', B''', B''' connecting with the other circuit, and central contacts *a*, *a'*, *a'* connecting with the feed wire. Each of these contacts consists of a block or base and a pair of vertical spring plates *b*, not new in this invention. The central pair of vertical plates, that is the plates extending from the contacts *a*, is lettered *b'*, and a pivot pin C extends horizontally through said spring plates *b'*, as shown in Fig. 2 and in broken lines in Fig. 1. Secured to and between the spring plates *b'* by means of said

pivot is the blade D, made of conducting material. This blade, in case a three-pole switch is used, is provided with horizontal arms E whose outer ends are connected with blades E' pivoted at *e* to the central spring plates *b*. In case the outer or flanking sets of contacts B', B'', B''', are not used, the arms E need not extend but a short distance on each side of the central blade D. The blades D and E' are of sufficient length to extend from the central contacts *a*, *a'* to the outer contacts B, B', B'', B''', and the central blade D is provided with a longitudinal slot F (Fig. 1).

H is the metallic carrier provided with the handle *h*. This carrier is bifurcated or made in two parallel parts or plates, as shown, exactly similar in shape and construction, and each broadened at H' and provided at that portion with two concentric slots J and K formed substantially on arcs of circles of which the pivot C is the center. The slots K are to accommodate the arms or rods E, and the slots J are provided with recesses L and N in their upper and under edges, each recess being the reverse of the other, and each consisting of one side L' N' which is abrupt or substantially on a radius of the arc formed by the slot, and the other side L'' N'' which is gradual in its deflection from the slot. The two portions of the carrier are pivoted at their lower ends to the pin C on the outer sides of the spring plates *b'*, so that these spring plates lie between the blade D and the carrier H. The pivoted ends of the two portions of the carrier H are thickened at H'' to receive the long U-shaped springs P, whose folded ends lie in suitable grooves or against suitable shoulders indicated by the broken lines *h'* in Figs. 2 and 3, and whose outer ends extend upon opposite sides of the bars or arms E, said grooves or shoulders holding the two leaves of the spring normally parallel.

S is a free pin or traveling pin located in the slot F in the blade and the slots J in the carrier, said slots being coincident as to distance from the pivot C. The traveling pin S is provided with flanges or heads S' at its ends, whereby it overlaps the outer surfaces of the two portions of the bifurcated carrier H, and is prevented from dropping out.

The operation is as follows: The carrier being in the position shown in Fig. 2, thus making the circuit through the contacts B B',—in order to throw the switch over upon the con-

tacts B'' B''', the handle is drawn forward, thus swinging the carrier H forward until it reaches the position indicated in full lines in Fig. 1. Meantime the blade D (and consequently the blades E') remains in the vertical position shown in Fig. 1, held by the pressure of the spring plates *b*, which is sufficient to overcome the power of the springs P which press against the bar E. The traveling pin S, which when the carrier was vertical, lay in the recesses N, has moved from said recesses up the inclines N'' into and toward or to the ends of the slots J, such change in the relative position of the pin and carrier being due to the fact that the blade (in which the pin can have a vertical movement only by means of the slot F) has remained stationary. As soon as the handle is swung a little farther forward, the blade D flies out of contact with the spring plates *b* whose friction is overcome by the ends of the slots J pressing against the traveling pin, or by the superior power of the springs P pressing against the bars E, or by both combined, and the blade D comes again into line in the carrier. The suddenness of the release of the blade forms a very quick break of the circuit and prevents injurious sparking by the formation of an arc. When the blade is released and flies into line with the carrier, it sends the traveling pin back into its position in the recesses N. As the carrier is swung over and down into engagement with the spring plates *b* extending from the contact B'', the traveling pin drops from the recesses N to the recesses L, as shown in broken lines in Fig. 1, and as the blade D is pressed between the spring plates *b* the pin, bearing against the edges L', holds the blade in line with the carrier in order that it may be pressed between the spring plates. When the carrier is thrown up again, the traveling pin rolls up the incline L'' into the slot J, the other arms of the springs P are stretched, the blade is released, and the pin is thrown back into the recesses L until, as the carrier rises it drops into the recesses N and, bearing the portion N' thereof, forces the blade between the upper spring plates *b*.

In order that the traveling pin may be directed the more surely into the recesses when the blade is released, I provide upon the opposite outer surfaces of the bifurcated carrier, deflectors or guides U. These deflectors are situated between the ends of the slots J and the abrupt edges L' N' of the recesses L N, and are of substantially the shape shown, so that as the blade is released the pin which might by centrifugal force fly outward—will be directed inward toward the recesses which are between it and the pivot of the carrier.

Of course in a three-pole switch the blades E' necessarily follow exactly the movement of the carrier blade D.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an electric switch of the character de-

scribed, the carrier H provided with the curved slot J, the blade D provided with the longitudinal slot F intersecting the line of the slot J, said carrier and blade being both pivotally secured to an electrical connection with the feed wire, and the traveling pin S moving in said slots and extending from one to the other, substantially as set forth.

2. In an electric switch of the character described, the carrier H provided with the curved slot J, said slot being formed on its opposite edges with the recesses L N, each being the reverse of the other and consisting of the abrupt sides L' N' and the gradual approaches L'' N'', the blade D provided with the longitudinal slot F intersecting the line of the slot J, said carrier and blade being both pivotally secured to an electrical connection with the feed wire, and the traveling pin S moving in said slots and extending from one to the other, substantially as described.

3. In an electric switch of the character described, the carrier H provided with the concentric slots J K, the blade D provided with the longitudinal slot F intersecting the line of the slot J, said carrier and blade being both pivotally secured to an electrical connection with the feed wire, the rod or pin E extending from the blades into said slot K, the traveling pin S moving in said slots F J and extending from one to the other, and the U shaped spring P having its closed end held rigidly in the carrier and with its open ends extending on opposite sides of the pin E thus holding said pin and carrier normally in line, substantially as set forth.

4. In an electric switch of the character described, the carrier H provided with the curved slot J whose opposite edges are formed into the reverse recesses L L' L'' and N N' N'', the reverse deflecting blocks or guides U formed on the carrier and adapted to guide the traveling pin toward the recess on the opposite side of the slot, the traveling pin S extending from the slot F into the slot J and free to move in both, said carrier and blade being pivotally secured to an electrical connection with the feed wire, and a spring extending from the carrier into engagement with the blade, substantially as described.

5. In an electric switch of the character described, the bifurcated carrier H provided with the concentric slots J K, recesses L N and deflectors U, the blade located within said carrier and provided with the pins or rods E extending into the slots K, the U shaped spring P on opposite sides of the carrier and secured thereto at their closed ends and with their free ends straddling the pins E, the traveling pin S S' free in the slots F J, and the spring plates *b* extending up from the contacts, substantially as set forth.

WILLIAM P. HANCOCK.

Witnesses:

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E. A. WOODBURY.