(No Model.) 2 Sheets—Sheet 1.

C. J. KLEIN.

ELECTRICAL SWITCH.

No. 477,374. Patented June 21, 1892.

Fig. 1.

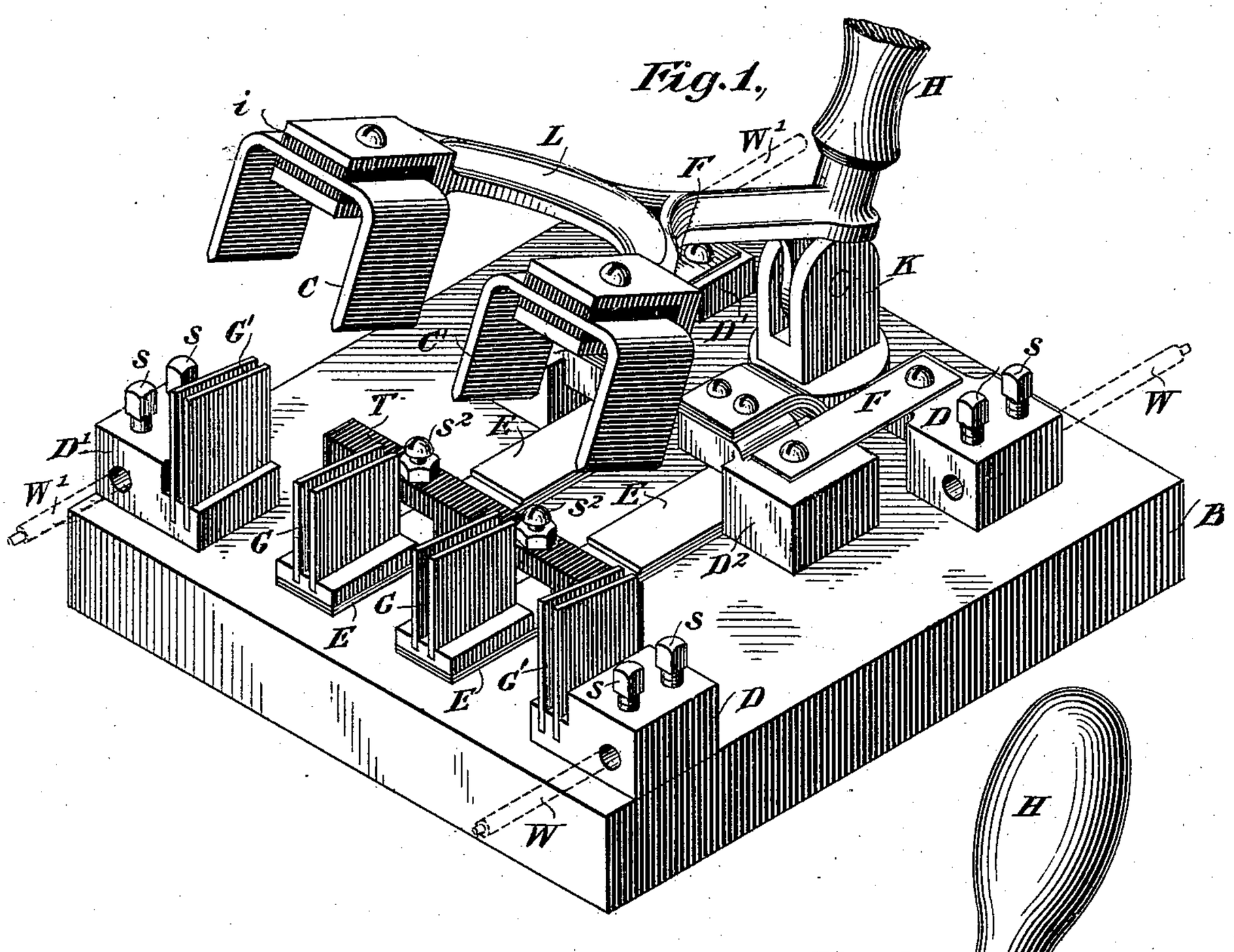
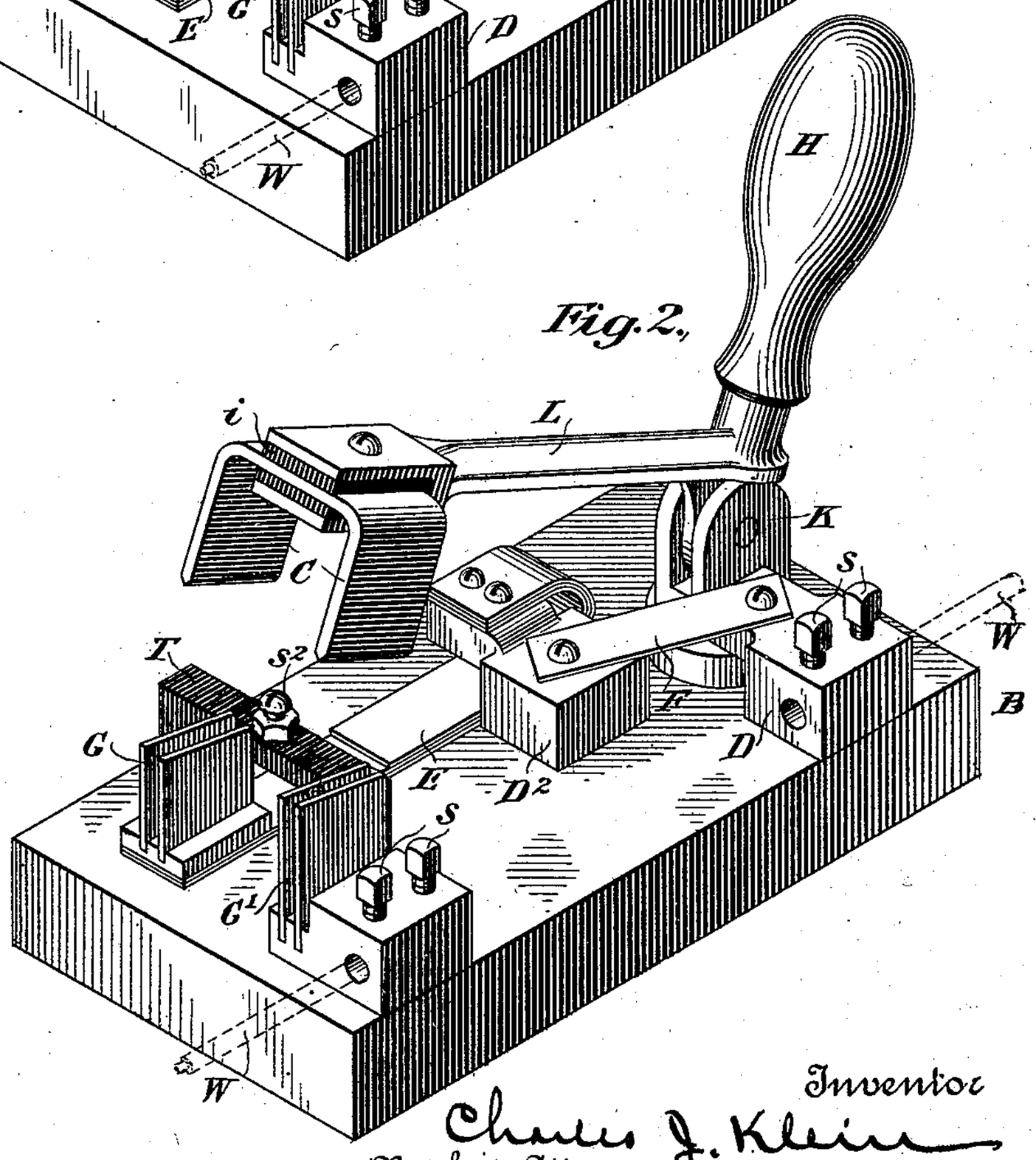


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

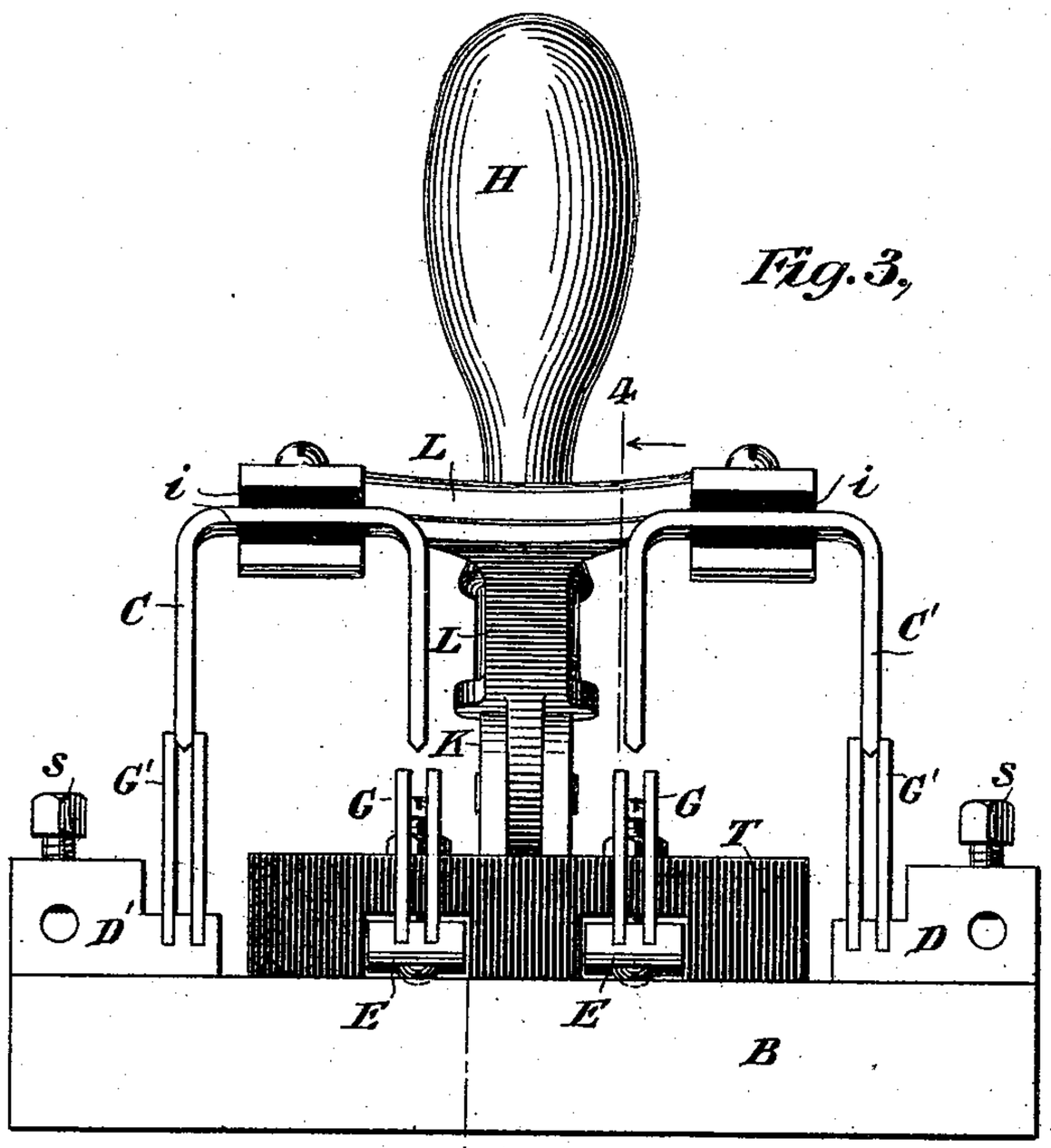
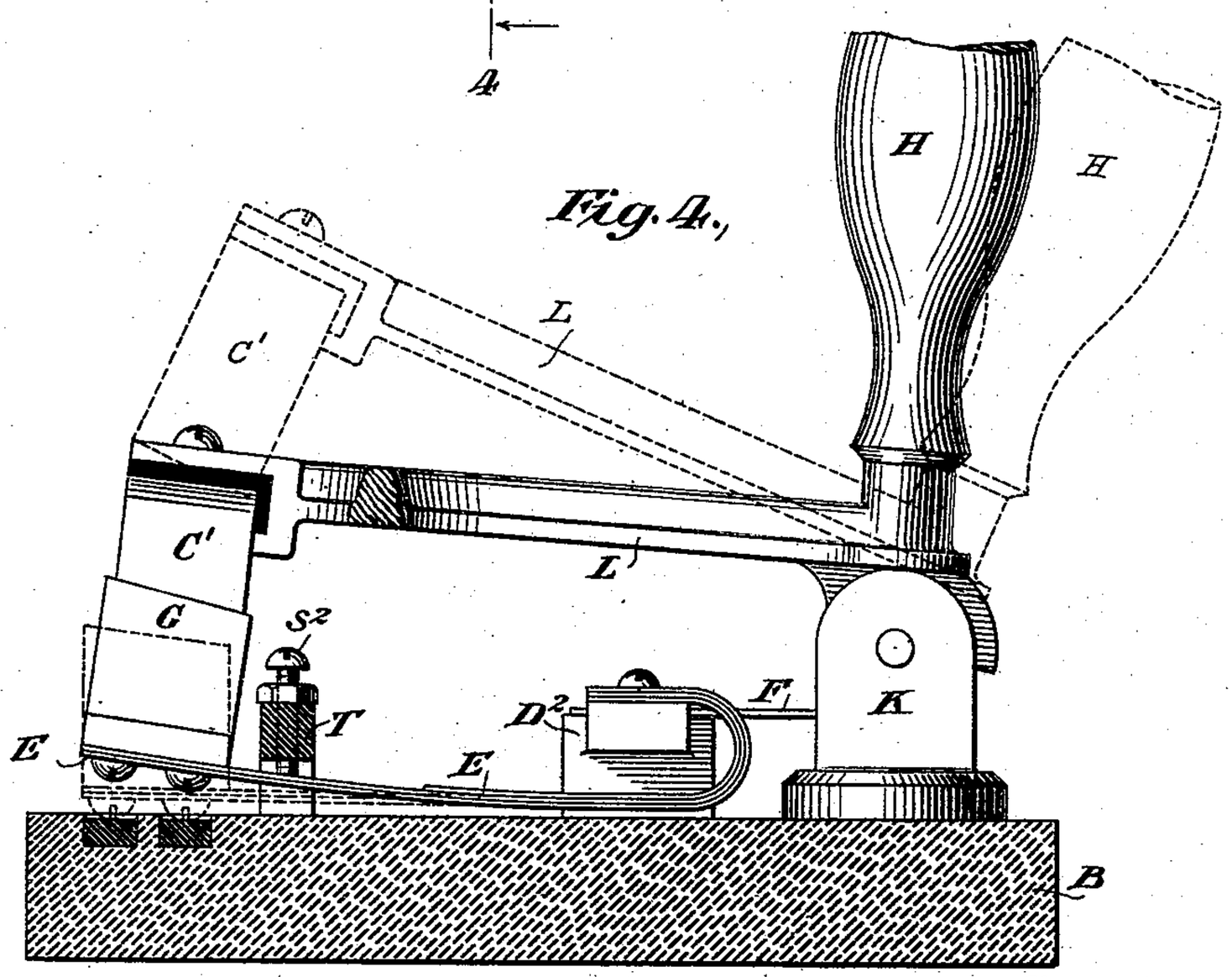


Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES J. KLEIN, OF NEW YORK, N. Y., ASSIGNOR TO THE INTERIOR CONDUIT AND INSULATION COMPANY, OF SAME PLACE.

ELECTRICAL SWITCH.

SPECIFICATION forming part of Letters Patent No. 477,374, dated June 21, 1892.

Application filed May 28, 1891. Serial No. 394,402. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. KLEIN, a citizen of the United States, residing at New York, county and State of New York, have made a new and useful invention in Electrical Switches, of which the following is a specification.

My invention is directed particularly to improvements in that type of electrical apparatus known as "jack-knife" switches, or such as are designed for use in connection with electric-lighting systems, electrical transmission of power, and in kindred places where currents of large quantity or high tension are used, and where it is desired to instantaneously rupture the circuit in order to prevent an arc at the point or points of rupture.

My invention has for its objects, first, the certain or absolute instantaneous rupture of the circuit when the switch is manipulated; second, the prevention of a re-establishment of the circuit through careless handling of the switch, and, third, the accomplishment of the several features hereinafter pointed out in connection with the description of the apparatus and its mode of operation.

In order that my invention may be fully understood, reference is had to the drawings, in which—

Figure 1 represents a perspective view of a two-pole switch constructed in accordance with my invention. Fig. 2 is a similar view of a single-pole switch constructed in accordance with my invention, while Fig. 3 is an end view of the two-pole switch; Fig. 4, a side elevational view, partly in section, showing the switching apparatus in various positions.

Referring now to the drawings in detail, B represents the base of the switch, made, preferably, of slate, vegetable fiber, or any analogous non-conducting non-combustible material, and D D D′ D′ represent four metallic binding-posts secured thereto and provided with the necessary binding-screws *s s*.

L represents a forked angular switch-lever provided with a wooden handle H and secured to the base B by a pivoted support K. At the outer ends of the forked lever L in Figs. 1 and 3 is secured a pair of angular conducting-bridges C C′, insulated from the lever L by insulating material *i*. Lying in the paths of the ends of these bridges are two sets of metallic plates G G G′ G′, the plates G′ G′ being rigidly secured to the inner sides of the binding-posts D′ D′, while the plates G G are secured in like manner to the free ends of a pair of yielding conducting-springs E E, which in turn are secured at their other ends to inwardly-projecting lugs on a pair of conducting-blocks D^2 D^2, said conducting-blocks being secured to the base B in the same manner as are the binding-posts D D′ and connected in turn electrically with said binding-posts by a pair of fusible metallic strips F F of well-known form.

T represents a bridge-piece of insulating material secured to the base B and provided with two notches, through which the free ends of the springs E project.

s^2 s^2 are adjustment-screws lying in the path of the free ends of the springs E and adapted to vary their upward motion as desired.

It will be observed upon examination of Figs. 1 and 3 that the side plates G′ G′ are somewhat longer than are the middle plates G G, the function of these plates G′ G′ being to receive the outer ends of the bridges C C′ before contact is made by the inner ends of said apparatus with the plates G G, so that unless both of the bridge-pieces C C′ are forced home by exerting considerable pressure upon the handle H the switch will rest in the position shown in Fig. 3, the circuit being broken at two points between the plates G and inner ends of the bridges.

The operation of the apparatus is as follows: Suppose the circuit to be open, as shown in Fig. 1. The operator taking hold of the handle H forces it forward with sufficient energy to cause the bridges C C′ to enter at their opposite ends between the plates G G and G′ G′, there being when the plates are thus forced home considerable frictional resistance between both ends of the bridge-pieces and the two sets of plates. Under this condition of affairs the current enters, for instance, by the conductor W on the right of Fig. 1, passing thence through binding-post D, fusible strip F, conducting-block D^2, spring E, plates G, conducting-bridge C′, the right-hand pair of conducting-plates G′, binding-post D, by the conductor W, passing thence to the point of

service, returning by conductor W′ on the left, passing through binding-post D′, plates G′, by bridge C to the plates G, spring E, the duplicate block D^2, the second fusible cut-out F to the binding-post D′, thence by wire W′ to the starting-point.

When it is desired to break the circuit, the handle H is tilted from the position shown in Fig. 4 in full lines to that shown in dotted lines, and in passing from the former to the latter position the frictional bearing between the inner ends of the bridge-pieces C C′ and their corresponding pairs of contact-plates G G on the ends of the springs E is sufficient to lift these springs, and thereby place them under considerable stress, so that by the time they are brought into contact with the adjustment-screws s^2, as shown in Fig. 4, and just before the outer ends of the bridges C C′ are removed from the plates G′ G′ they will be suddenly snapped apart, thereby rupturing the circuit instantaneously and preventing any abnormal arc. After the circuit is ruptured should the attendant carelessly tilt the switch-handle forward a sufficient distance for it to assume the position shown in Fig. 3 there will be no danger of a re-establishment of the circuit, as is now liable to occur in well-known forms of jack-knife switches, and a re-establishment can only occur when the attendant forces the handle H forward with sufficient energy to drive the inner free ends of the bridges into firm frictional contact between the plates G G which, when the rupture took place, assumed their normal position, resting on the base B, as shown in Figs. 1 and 3 in full lines and in Fig. 4 in dotted lines. I prevent this re-establishment of the circuit under accidental conditions with the single-pole switch shown in Fig. 2 by making the single pair of plates G′ somewhat longer than are the plates G, as clearly shown, so that when the lever L is tilted into its forward position that side of the bridge C lying in the plane of the plates G′ will rest upon them and circuit can only be made by exerting considerable pressure upon the handle H, as described in connection with the two-pole switch in Figs. 1 and 3. The operation of the single-pole switch shown in Fig. 2 will be obvious in view of the description already given in connection with the other figures of the drawings.

I do not limit myself to the specific arrangement of parts herein shown and described for causing a spring-supported electrode to be positively separated from another electrode with which it contacts after the spring which supports said electrode has been placed under tension through the agency of an operating-handle, as I believe I am entitled to claim, broadly, such a combination of parts with means lying in the path of the spring-supported electrode and adapted when the switch-handle is operated and after the spring is put under tension to cause such a positive separation of the electrodes and permit the snap action due to the stored-up energy of the spring to bring about a sudden rupture of the circuit, all substantially as described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. An electric switch having electrodes supported at the free ends of two springs E E, a pair of electrodes adapted to contact therewith, a pivoted operating-handle, and means located in the path of the free ends of the springs and adapted after they have been put under stress by the operating-handle to cause the electrodes to be positively separated, substantially as described.

2. A pair of elastically-sustained electrodes, corresponding pairs of contacting-electrodes adapted to contact therewith, an operating-handle adapted to place the elastically-sustained electrodes under stress, in combination with means lying in the path of the elastically-sustained electrodes and adapted after said electrodes have been placed under stress by the operating-handle to positively rupture the circuit between the two sets of electrodes and allow the springs to complete the separation, whereby arcing is prevented, substantially as described.

3. A switch having a pivoted electrode and a spring-sustained electrode consisting of one or more yielding conducting-plates adapted to make frictional contact with the pivoted electrode, in combination with a stop or bridge adapted to cause the spring-sustained electrode to be suddenly withdrawn from the pivoted electrode after the former has been put under stress, substantially as described.

4. A switch having a pivoted electrode and a spring-sustained electrode, the latter consisting of one or more pairs of yielding conducting-plates adapted to hold or grasp the pivoted part, in combination with a bridge or stop lying in the path of the yielding electrode, substantially as described.

5. A switch having a pivoted lever carrying one or more conducting bridge-pieces and an operating-handle, in combination with two or more pairs of conducting-plates carried by springs and adapted to make frictional and electrical contact with said bridge-pieces, and a stop or bridge-piece lying in the path of the spring-sustained plates, substantially as described.

6. A switch having a pivoted operating-lever carrying a pair of conducting bridge-pieces, in combination with four pairs of conducting-plates, between the free ends of which the bridge-pieces are adapted to have frictional contact, two of the pairs of said plates being attached to the free ends of conducting-springs and the other two pairs being fixedly attached to the base of the switch and of greater length than the first-named pairs, with circuit-connections, substantially as described.

7. An electrical switch having a pivoted operating-lever carrying a conducting-electrode

and a second conducting-electrode consisting of a pair of conducting-plates secured to the free end of a conducting-spring, a stationary bridge-piece secured to the base of the switch in the path of the free end of the spring which supports the second-named electrode, and circuit connections through the switch, substantially as described.

8. An electrical switch having a pair of conducting-plates secured to the free end of a conducting-spring, attached at its other end to the base of the switch, a second electrode attached to an operating-handle and adapted to contact electrically and mechanically with the first-named electrode, a stationary bridge-piece adapted to remove the spring-supported electrode after it has come in contact therewith, and circuit connections, substantially as described.

9. An electrical switch having a pivoted operating-lever carrying a conducting-electrode, a second conducting-electrode consisting of a pair of conducting-plates secured to the free end of a conducting-spring, a stationary bridge-piece secured to the base of the switch and provided with an adjustable stop located in the path of the free end of the spring which supports the second-named electrode, and circuit connections through the switch, substantially as described.

CHARLES J. KLEIN.

Witnesses:
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