

(No Model.)

E. A. SPERRY.
ELECTRIC SWITCH.

No. 446,031.

Patented Feb. 10, 1891.

Fig. 1.

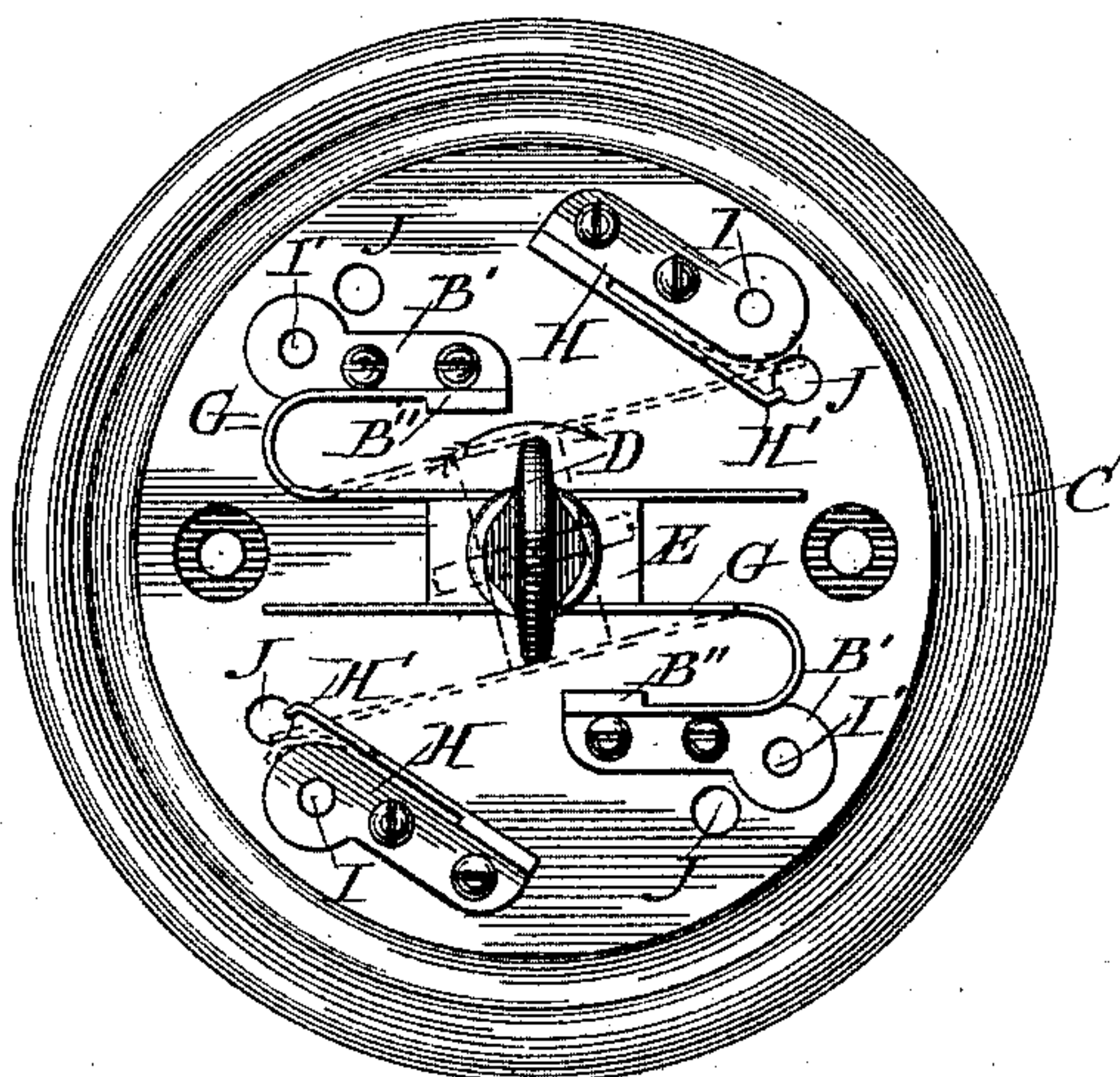


Fig. 2.

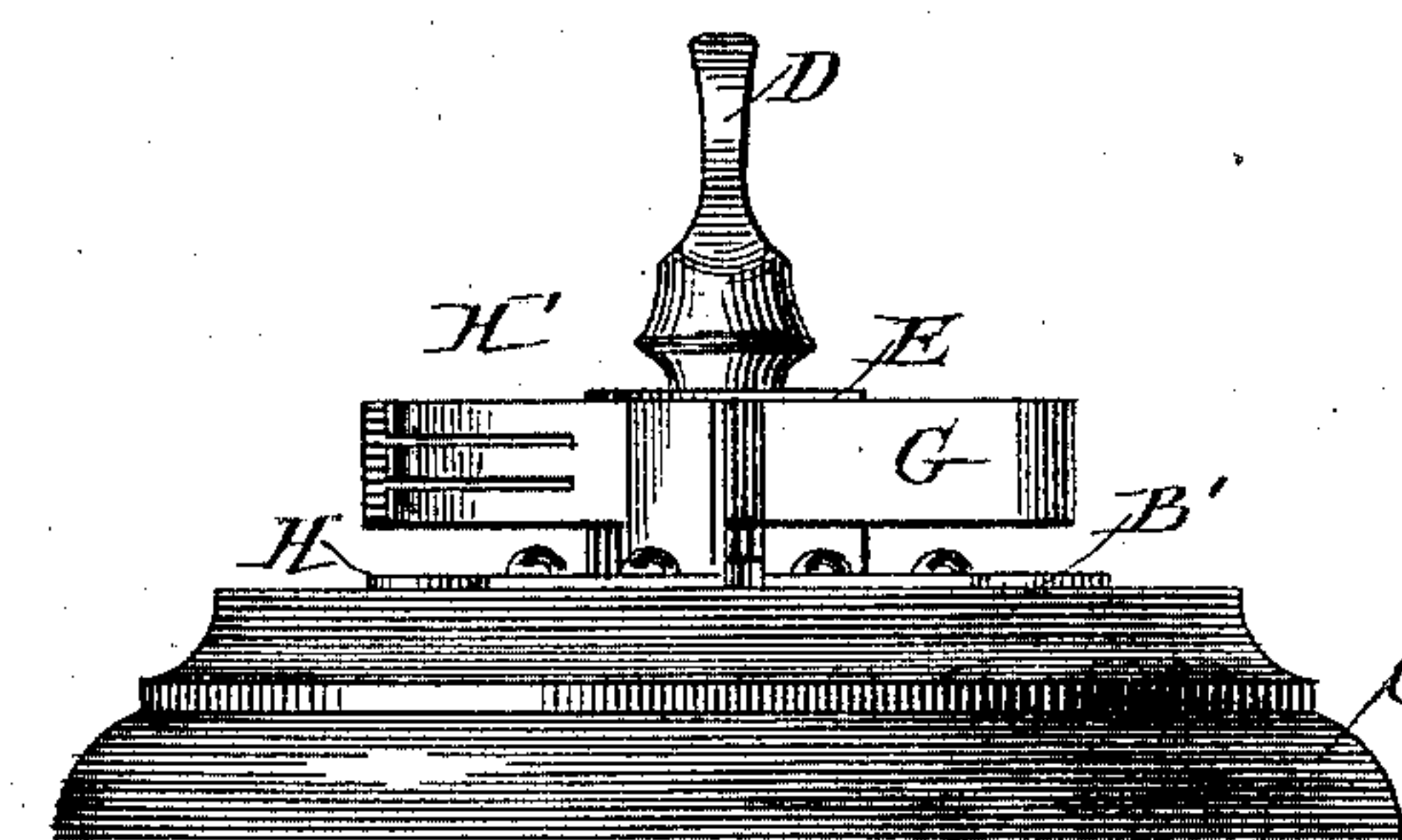


Fig. 3.

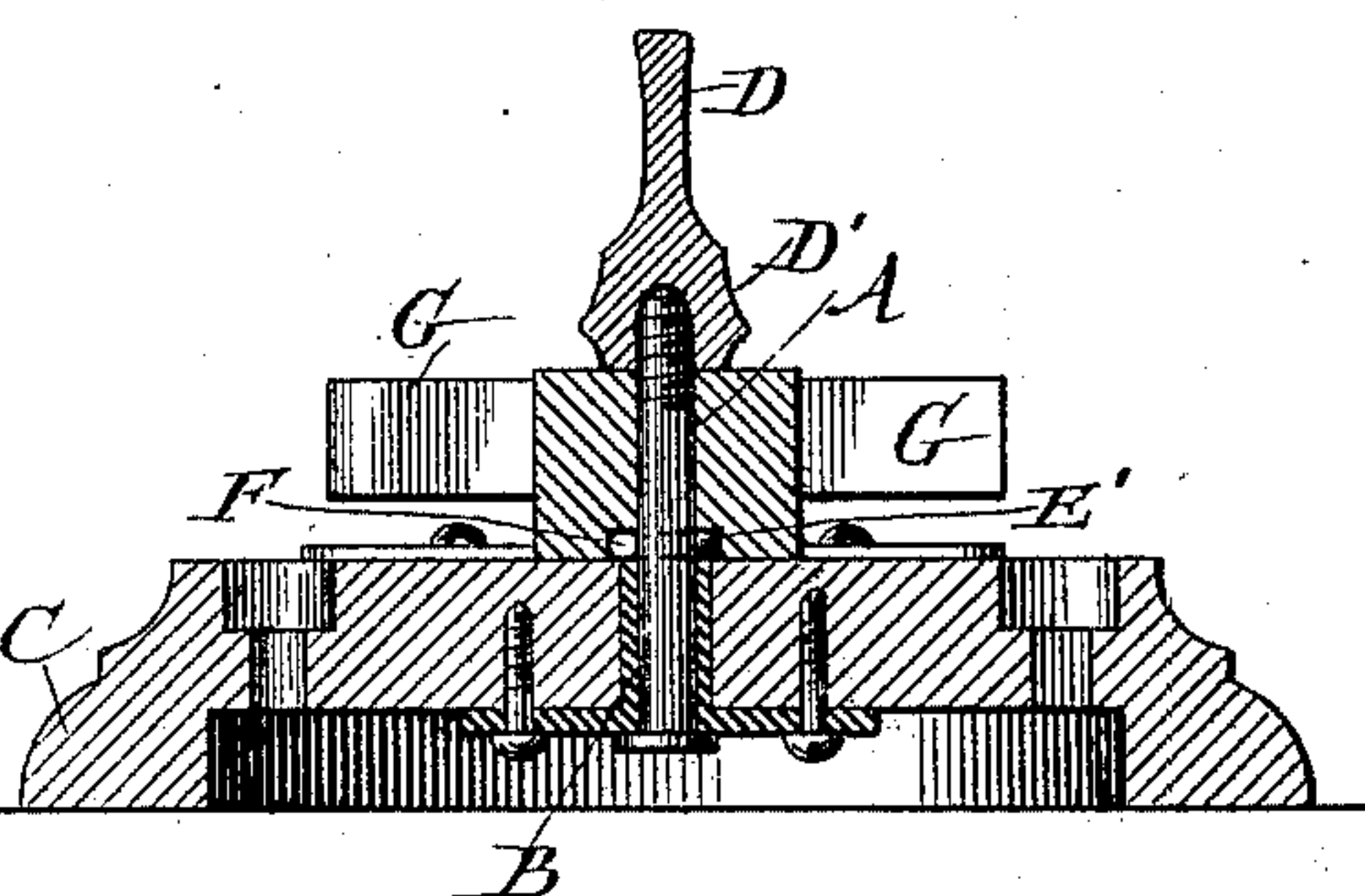
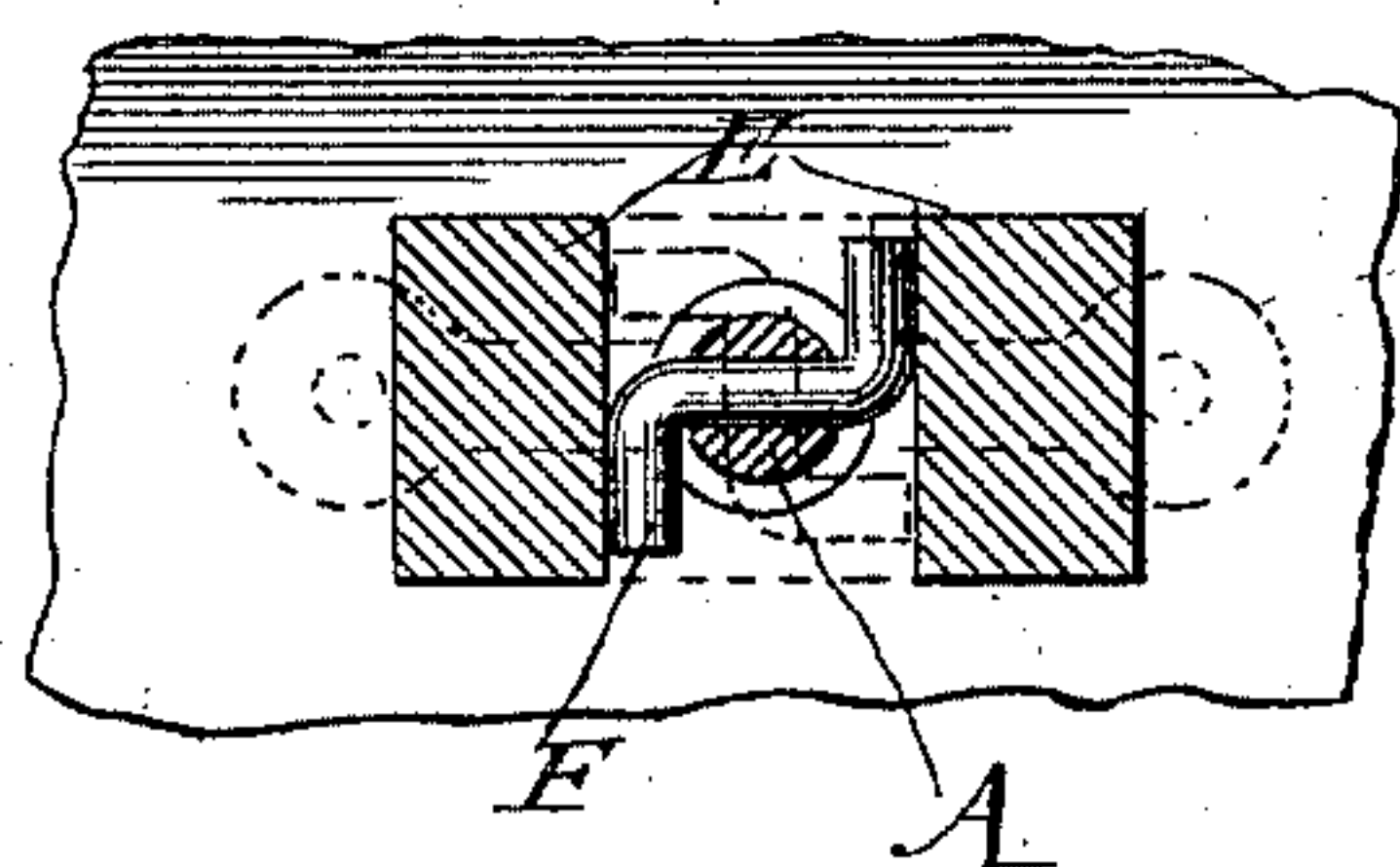


Fig. 4.



Witnesses:
David J. Johnson.
Jean Elliott.

Inventor:
E. A. Sperry
By Francis W. Parker,
Attorney.

UNITED STATES PATENT OFFICE.

ELMER A. SPERRY, OF CHICAGO, ILLINOIS.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 446,031, dated February 10, 1891.

Application filed July 2, 1890. Serial No. 357,519. (No model.)

To all whom it may concern:

Be it known that I, ELMER A. SPERRY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Contact-Maker, of which the following is a full, clear, and exact specification.

My invention relates to a switch or contact-maker for electrical circuits; and it consists in the simple arrangement of parts pointed out and claimed fully herein, being a continuation of the invention described in application Serial No. 323,478.

Referring to the accompanying drawings, Figure 1 is a plan view. Figs. 2 and 3 are side elevations, partially in section; and Fig. 4 is a detail.

Like letters of reference indicate the same parts throughout the several views.

A indicates a revolving stem mounted loosely in casting B, which is secured to the base C of the switch. Upon the top of this stem is the thumb-piece D, by means of which the stem is rotated. This thumb-piece D is secured by screw-threads D', the same being such that when the switch is turned in the direction of the arrow the thumb-piece D is secured upon the stem A; but when an attempt is made to turn the switch in the opposite direction the thread is loosened and the thumb-piece detached.

E indicates a rectangular cam fitting loosely upon the stem A, in the edge of which is a slot E' for the engagement of the pin F. This may be seen by reference to Fig. 4, which indicates the amount of lost motion that exists before the pin F will engage the cam upon turning the stem A. This is so adjusted that the stem A can turn about forty-five degrees before such engagement takes place. The terminals B' are supplied with an upright portion B'', into which are tightly secured the springs G, being supplied with bends to increase their elasticity. The tendency of the spring G is such as to rest heavily upon the cam E.

H indicates a terminal rising from the base C of the switch supporting the elastic contact H'.

The screw-holes I and I' are used for bringing the castings H and B' and the spring G

into the electrical circuit by means of wires rising through the apertures J.

The respective dimensions of the cam E shown herein have been determined to be well proportioned, the drawing being about full size. Its relation with the spring G has also been found to be good in practice. The angles and positions are such that the pressures upon the rectangular cam are about equal, as well as being opposite. The bent portions of the two springs G are in the same relation to the direction of rotation of the cam, which is a valuable feature, as has been determined in practice.

Having thus described my invention, its operation will be easily understood as follows: Upon turning the stem A in the direction of the arrow the springs G will be compressed as the corners of the cam E impinge against them and will advance toward the contact-springs H' under the pressure of the advancing rotating cam E, and upon further turning the cam E the springs G will make contact with the springs H', and a point will be reached where an equilibrium will be established, as indicated in dotted lines in Fig. 1. Upon further turning the stem in the direction of the arrow the pin F, impinging upon the side of the slot E', will advance the cam E until the line of pressure of the springs G is out of line with the axis of the cam sufficiently, when the cam E, acting under this pressure, will move forward instantaneously independent of the movement of the stem A, the contact of springs G and H' will be broken and the cam and springs again assume their original position, as shown in full lines. It will readily be understood that the operation of the lost-motion device, (shown in Fig. 4,) both in opening and closing the circuits, is to permit the cam to move forward under a certain direction of pressure of the springs G independently of the movement of the stem A, and thus to secure practically an instantaneous contact or separation of the springs G and H'.

I have found in using the flexible contact-making spring H that a peculiar action takes place. When the contact-spring G goes out of contact, the flexibility of the spring H', together with its inertia, makes it follow the

spring G to a greater distance than its point of equilibrium, and when the two springs separate this spring H' actually springs in the opposite direction, the spring G meanwhile continuing its action in the same or separating direction. The actual separation is therefore made by a double instantaneous movement, as is shown in practice, by the remarkably small spark that is obtained in breaking high potentials. It will be seen in the drawings that the springs H' are set at an angle to the springs G. This is for the purpose of producing a rub when the springs G are forced up, so as to keep the contact-surfaces bright.

The action of the spring H in reference to the cam E is peculiar, inasmuch as it admits of the cam E passing the corner or point much higher than is shown in Fig. 1, which must be done once in each operation—that is, before the cam E comes to its position as shown in dotted lines, and also before it comes to its position as shown in full lines. As it passes the corner of the rectangular cam, the spring bends backward and allows the movement of the spring G, and as it comes back down onto the end of the oblong cam, as shown in Fig. 2, it will follow it, still retaining good contact. There is therefore a union of connection between the oblong cam E and the spring H'.

It will be seen that by bending the driving-pin off at a tangent a good surface to drive the cam is secured with a simple parallel-sided groove in the cam.

There is a direction which is taken by the springs within the switch in the performance of their functions. The tangent to the direction of movement of any point in the springs I call the "line of elasticity" of the springs.

In operating this switch the loosely-mounted cam comes to rest when the direction of the pressure of the spring and the line of contact of such spring upon the cam is in a line with the center of movement of the cam.

This I call the "dead-point" of the cam. In the vibration of the spring the point of the

spring describes a circle, approximately, the center of which circle I call the "center of movement."

I claim as new and desire to secure by Letters Patent—

1. In a contact-making device, a flat oscillating or vibrating spring forming one contact secured to the base, having a bent portion near this end and a straight portion near the other end acted upon by a rotating oblong cam, and a flat spring set at an angle thereto forming the other contact.

2. In a contact-making device, two contacting springs, and an oblong cam having flat faces mounted upon a stem protruding upward from the base, in combination with co-operating contacts consisting of springs placed at an angle to said contacting springs, so as to secure a positive rubbing action in making contact.

3. In a contact-making device, a rotating cam having dead-points mounted loosely upon a stem and provided with a groove or slot the walls of which are parallel to each other, and a driving-pin the ends of which are bent, connected to the stem, adapted to work in said groove.

4. In a contact-making device, a rotating stem, a cam mounted loosely thereon, a pin in the stem, the end or ends of which are bent so as to be on a tangent, and means on the cam for engaging such pin.

5. A double contact-making device worked by a loose rotating cam, consisting of springs which at all times bear in directly-opposite directions from each other, the cam being located between the springs, which in their operation are at all times parallel to each other, and co-operating contacts consisting of flexible springs placed at an angle to the main contact.

Signed this 24th day of June, 1890.

ELMER A. SPERRY.

In presence of—

C. E. DAVIS,

H. E. GOODMAN.