(No Model.) 2 Sheets—Sheet 1.

P. C. MORSE.

ELECTRIC CONTACT CHANGER.

No. 381,269. Patented Apr. 17, 1888.

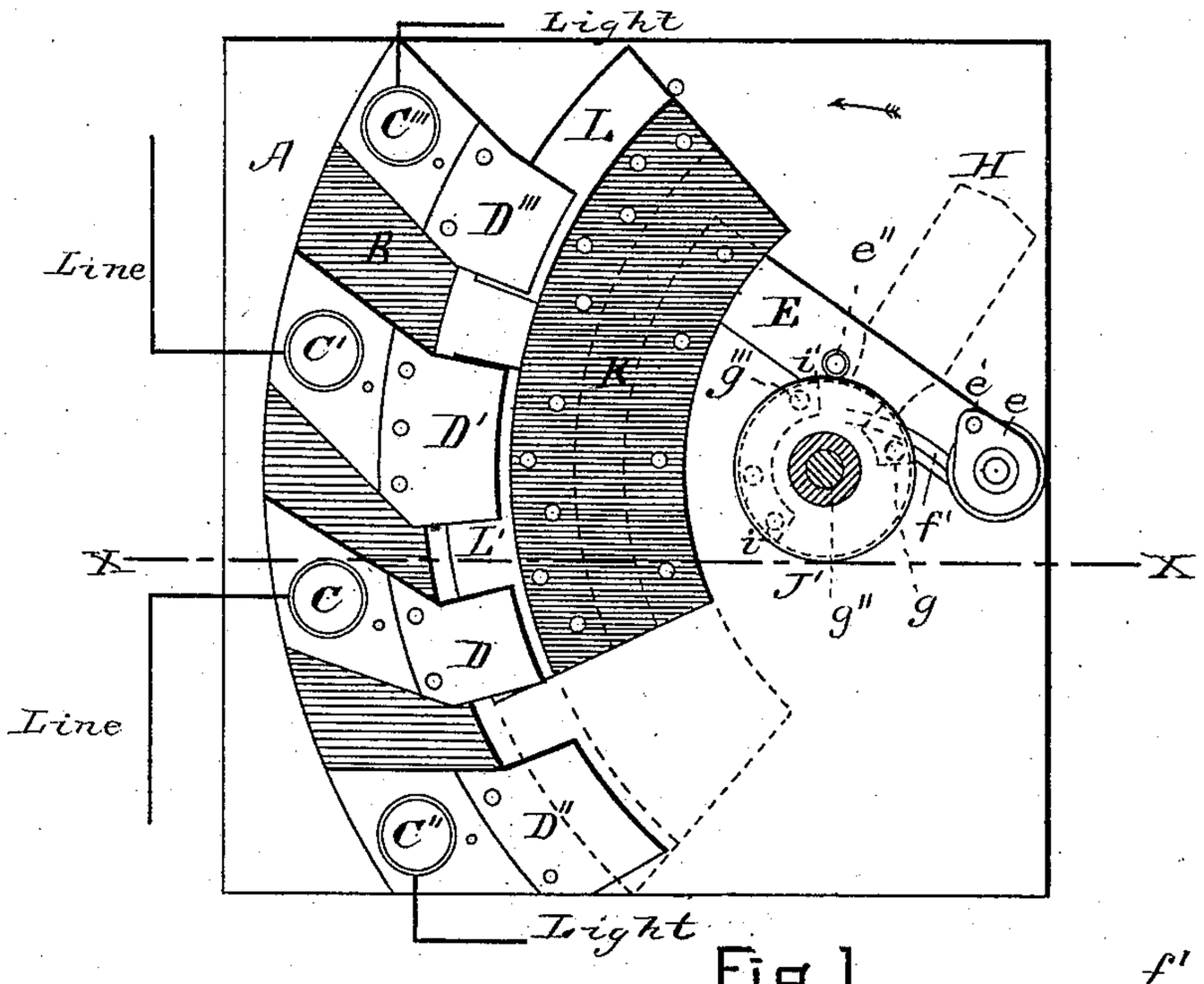

Fig. 1.

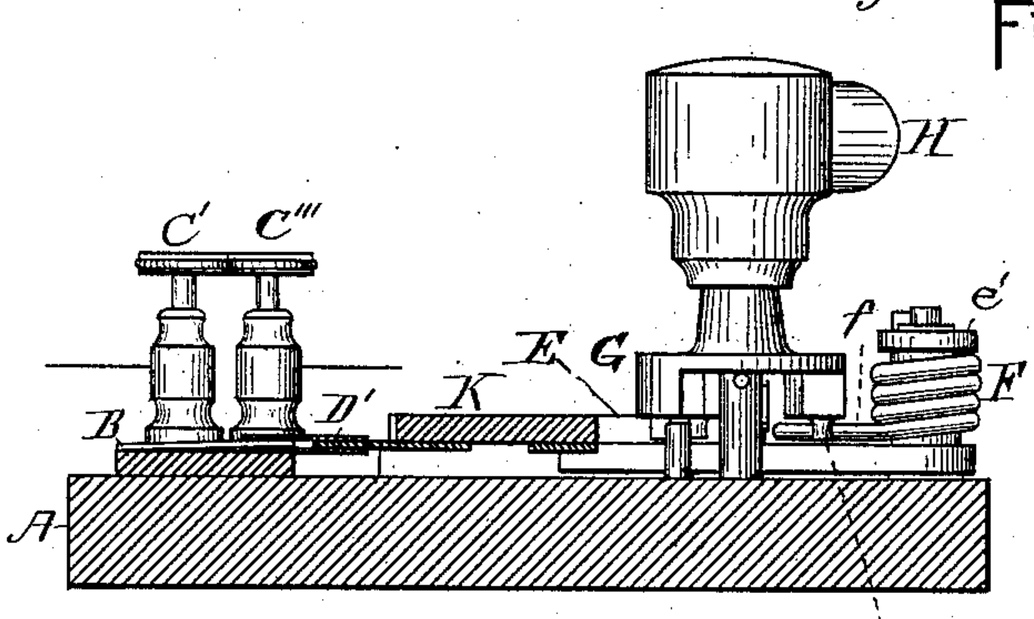

Fig. 2.

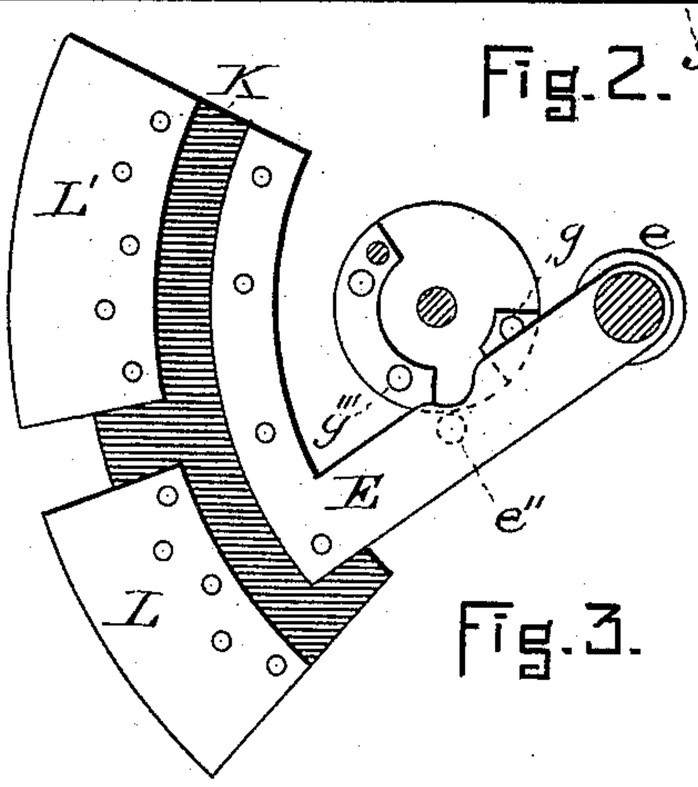

Fig. 3.

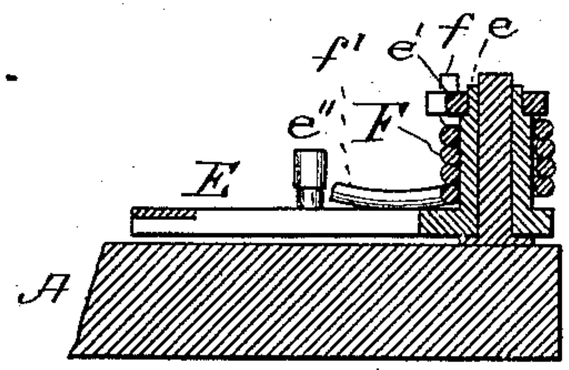

Fig. 5.

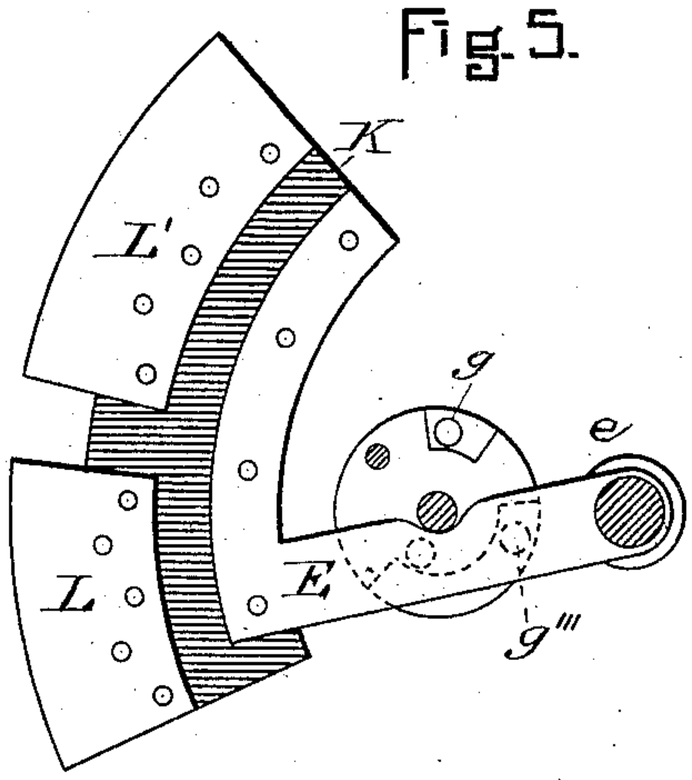

Fig. 4.

WITNESSES.
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(No Model.) 2 Sheets—Sheet 2.

P. C. MORSE.

ELECTRIC CONTACT CHANGER.

No. 381,269. Patented Apr. 17, 1888.

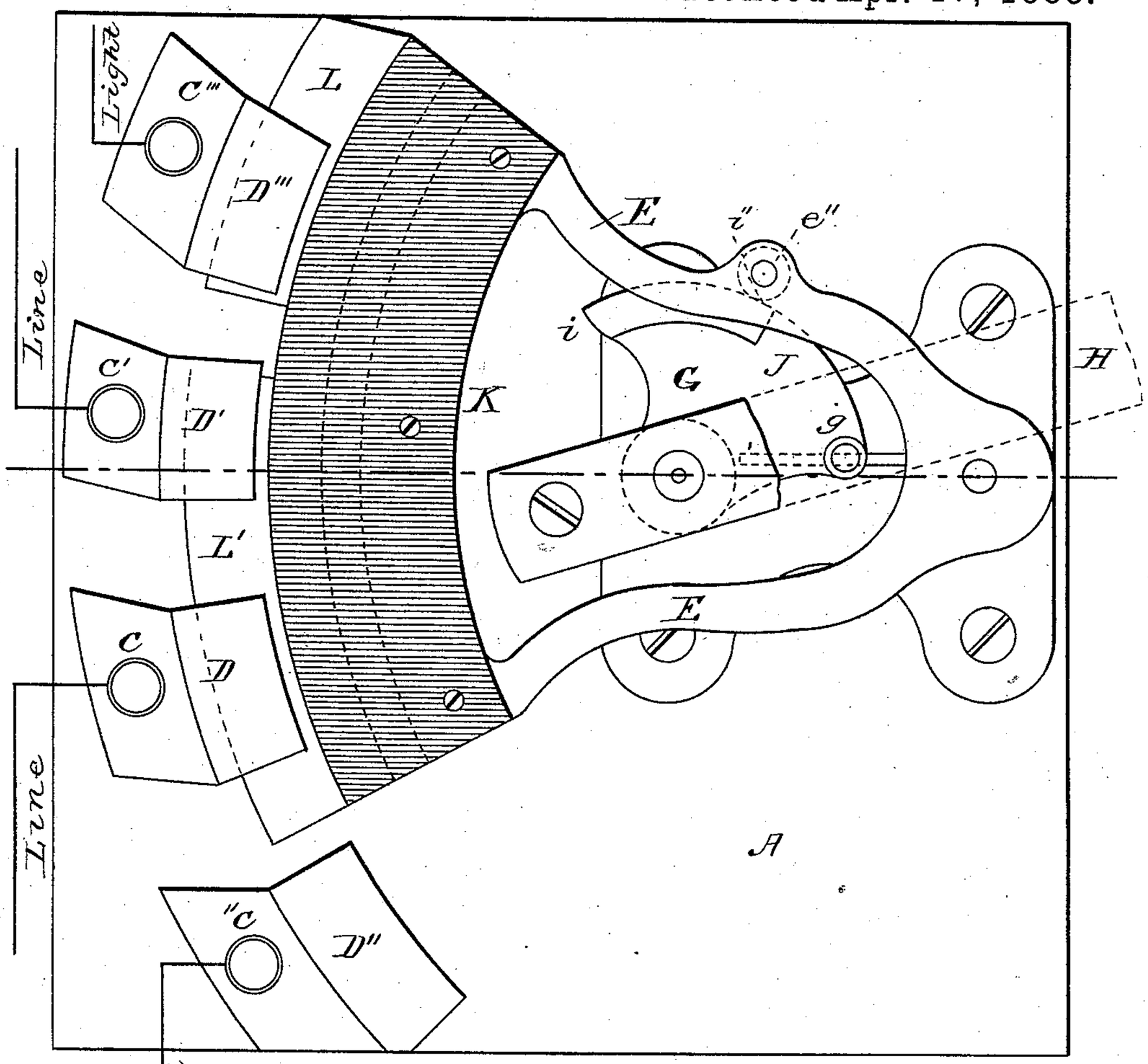

Fig. 6.

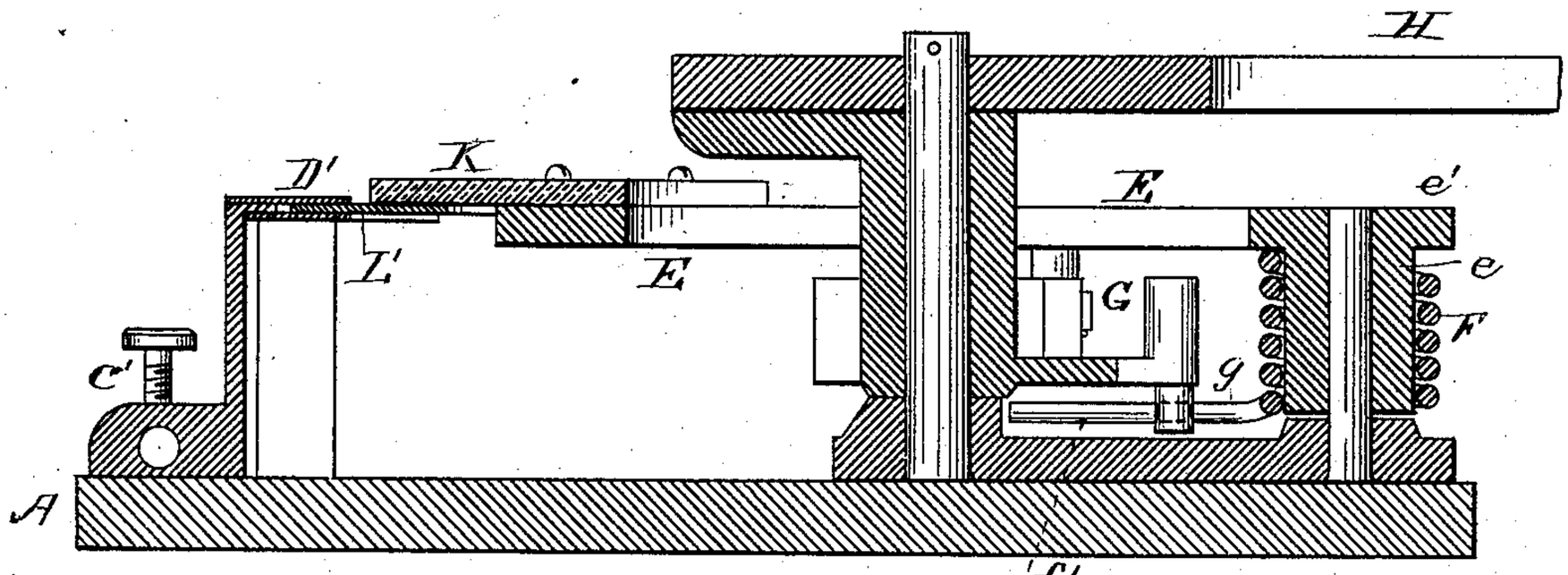

Fig. 7.

WITNESSES.
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UNITED STATES PATENT OFFICE.

PRESTON C. MORSE, OF NATICK, MASSACHUSETTS.

ELECTRIC-CONTACT CHANGER.

SPECIFICATION forming part of Letters Patent No. 381,269, dated April 17, 1888.

Application filed September 1, 1887. Serial No. 248,499. (No model.)

To all whom it may concern:

Be it known that I, PRESTON C. MORSE, of Natick, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Electric-Contact Changers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

In making the electrical contacts which are necessary for switching into and out of circuit some sorts of electric lights it has been found desirable to lay out the switch-contact in such a way as to maintain electrical communication between the line-wires when switching in the loop carrying the lights until communication is established between the line and the loop, and in switching them out to retain the communication between the line and the loop until communication is established between the branches of the line, and also to make or break the communication between the line and the loop suddenly and automatically by the aid of a spring. It is for this purpose that the present instrument has been devised.

In the drawings, Figure 1 is a plan of the apparatus. Fig. 2 is a transverse section of the apparatus on the line *x x* of Fig. 1. Figs. 3, 4, and 5 are detached details. Figs. 6 and 7 are enlarged and modified features of the apparatus shown in Figs. 1 and 2, in which the contact-plates are arranged at a greater distance from the supporting-board of the apparatus than in Figs. 1 and 2, without, however, altering the compactness of the apparatus.

Referring to the drawings, A is the board on which the apparatus is mounted.

B is an insulating-plate attached to the board A.

C C′ are the binding-posts of the line-wire, and C″ C‴ are the binding-posts of the loop-wire leading to the lights. These binding-posts C C′ C″ C‴ have contact-plates D D′ D″ D‴ arranged in geometric arc. There is no particular novelty in this form of binding-posts and contact-plates; but the arrangement in continuous geometric arc is believed to be new.

For the better understanding of the drawings the section of Fig. 2 has been drawn with the radial arm E near the board A, and with the post around which the spring F is wound, and with the spring on the opposite side of said arm E from the board A, and with the escape-wheel G on the opposite side of the radial arm E from the board A. This arrangement of parts brings the contact-plates D D′ D″ D‴ comparatively near the board A.

E is a pivoted arm provided at its pivot with a boss, *e*, firmly attached to the arm and carrying an ear, *e′*. In this ear *e′* a spur, *f*, attached to a torsion-spring, F, is fitted. The other end of the torsion-spring, its tail *f′*, is carried forward along the line of the arm E and engages with a pin, *g* or *g‴*, in the circumference of an escape-wheel, G, which is pivoted to the bed-board A of the apparatus. This escape-wheel G is pivoted at *g″* to the board A, and is provided with a handle, H, by which it is turned. The cylindrical part of the escape-wheel G is not continuous; but its sides are cut away, as shown in dotted lines in Fig. 1, and in whole and dotted lines in Fig. 4. As the pivot of the escape-wheel G and the pivot of the arm E are in line with each other and the oscillation of the arm E is arranged to be in an arc which traverses the field of the escape-wheel G, it is obvious that the pin *g* will serve to some extent as a cam-pin when the handle H is turned to the right, and will put a strain upon the torsion-spring F, and hence cause the tension of that spring to have a tendency to throw the arm E to the right. This tendency will be resisted by the cylindrical sides of the escape-wheel G between the points *i i′*, (see Fig. 1,) because the pin *e″* on the arm E will be in contact with the vertical sides of the escape-wheel G between these points; but in the revolution of the wheel G the cam-pin *e″* arrives at the gap *j′*, Fig. 1, in the escape-wheel G, and the tension of the spring will throw the pin *e″* rapidly through the gap *j′ j* of the escape-wheel G to *j*. At the time the pin *e″* passes through the gap *j j′* the spring F will be in some degree of tension and tend to throw the handle H, when it is released, downward, or in a reverse direction from the one in which it has been moving. This movement will engage the tail *f′* of the spring F with the pin *g‴* on the escape-wheel G, and on reversing the movement of the handle and moving it in the opposite direction from that shown by the

arrow of Fig. 1 it will bring tension upon the spring in the opposite direction. The cam-pin e'' will engage with the exterior of the escape-wheel between $i\,i'$ and roll upon it until it has opportunity to disengage at the opposite side, when it will snap back in the opposite direction and be restored to its first position.

Upon the end of the arm E is an arc, (shown in Fig. 4,) to which arc is attached the insulating-surface K, upon which insulating-surface are attached the metallic plates L L′, of which the plate L serves to make and break the contact between the line binding-post C′ and that branch of the light-loop which carries the binding-post C‴, while the plate L′ serves to make the contact between the line binding-post C and the line binding-post C′ on the one hand, or between the line binding-post C and the light-loop binding-post C″. The connecting-plate L′ is therefore a little longer than the plate L. This scheme for making or retaining connection between the two branches of the line-wire before the connection between the lighting-loop and the line-wire is broken, or until it is made, is not novel; but the thing which is novel is the employment of a torsion-spring or its described equivalent to operate the contact-changer in both directions, which is accomplished by giving tension to said torsion-spring alternately in each direction. This tension of the torsion-spring is accomplished by providing the radial arm E with a cam-pin, e'', which engages with a cam-surface on the escape-wheel G and holds the radial arm E in one position until the proper amount of tension is put upon the torsion-spring, when it is allowed to act. I also believe that placing the contact-plates D D′ D″ D‴ in continuous geometric arc, instead of upon opposite arcs having their cavities turned toward each other, is novel, and is important in making a compact apparatus.

In the drawings, Fig. 1 represents an apparatus in which the throw of the handle H is through a quadrant of arc. Some persons may consider it desirable that the throw of this handle H should be through an arc of less measurement than a quadrant. This result can readily be achieved on the principles of this invention by a simple enlargement of the diameter of the escape-wheel G and an inverse shortening of the cam-surfaces between i and i' in said escape-wheel G.

In lieu of two pins, $g\,g'''$, on the escape-wheel G, a single split pin, with the tail f' in the split, might be employed. This would be obviously two pins united by a bridge. If employed, the split pin should be pivoted in the escape-wheel G rather than fixed to it. I have described this as a known mechanical equivalent for the two pins $g\,g'''$.

Figs. 6 and 7 show the modified form of apparatus referred to when the handle H is adapted to move through an arc of less than a quadrant in order to throw the switch. The escape-wheel G is proportionately larger than in the apparatus shown in Fig. 1. In this apparatus of Fig. 6 the contact-plates are arranged at a greater distance from the back board and the spring F and hub e are below the radial arm E, and in lieu of two pins, $g\,g'''$, on the escape-wheel G there is but one pin—that through which the tail f' of the spring F passes.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. An escape-wheel provided with a cylindrical surface between the points $i\,i'$, which cylindrical surface is adapted to engage the cam-pin e'' upon the radial arm E, and which escape-wheel G is also provided with the pins $g\,g'''$, adapted to engage the tail f' of the torsion-spring F, in combination with the radial arm E, provided with the cam-pin e'', and in further combination with the torsion-spring F, substantially as and for the purposes described.

2. As a means of actuating the automatic making and breaking of electrical contacts, the combination of the arc and line binding-posts C C′ C″ C‴ and their contact-plates D D′ D″ D‴, holding fixed relations with each other, the radial arm E, carrying the insulated contact-plates L L′, substantially as described, which radial arm E is provided with the cam-pin e'', and the torsion-spring F, one end of which torsion spring is held in fixed relation with said radial arm E and the other end of which is moved to the right or left, for the purpose of tension in one direction or the other by means of the pins $g\,g'''$ on the escape-wheel G, and with said escape-wheel G formed, as described, to engage said cam-pin e'' during a portion of its revolution and permit its passage from side to side at other times under the influence of the spring F, substantially as and for the purposes described.

3. In a contact-changer for electric lines and loops, the arrangement of the contact-plates D D′ D″ D‴ in continuous geometric arc upon the same side of a common center, in combination with the metallic plates L L′, also arranged in continuous arc around the same common center and mounted upon the radial arm E, pivoted at the same common center and actuated by a spring alternately in one or the other direction, in combination with an escape-wheel, G, pivoted away from a common center, but upon a radius of the same circle, and provided with the cam-pins g and g''', adapted to engage on the one side or the other the tail f' of the spring F, substantially as and for the purposes described.

4. The escape-wheel G, formed upon its edge with a segmental cylindrical bearing-surface, as shown, extended from i to i', and provided with the handle H, and furnished with abutments for the spring F, adapted to engage the same in either direction, substantially as and for the purposes described.

PRESTON C. MORSE.

Witnesses:
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FRED. B. DOLAN.