

(No Model.)

2 Sheets—Sheet 1.

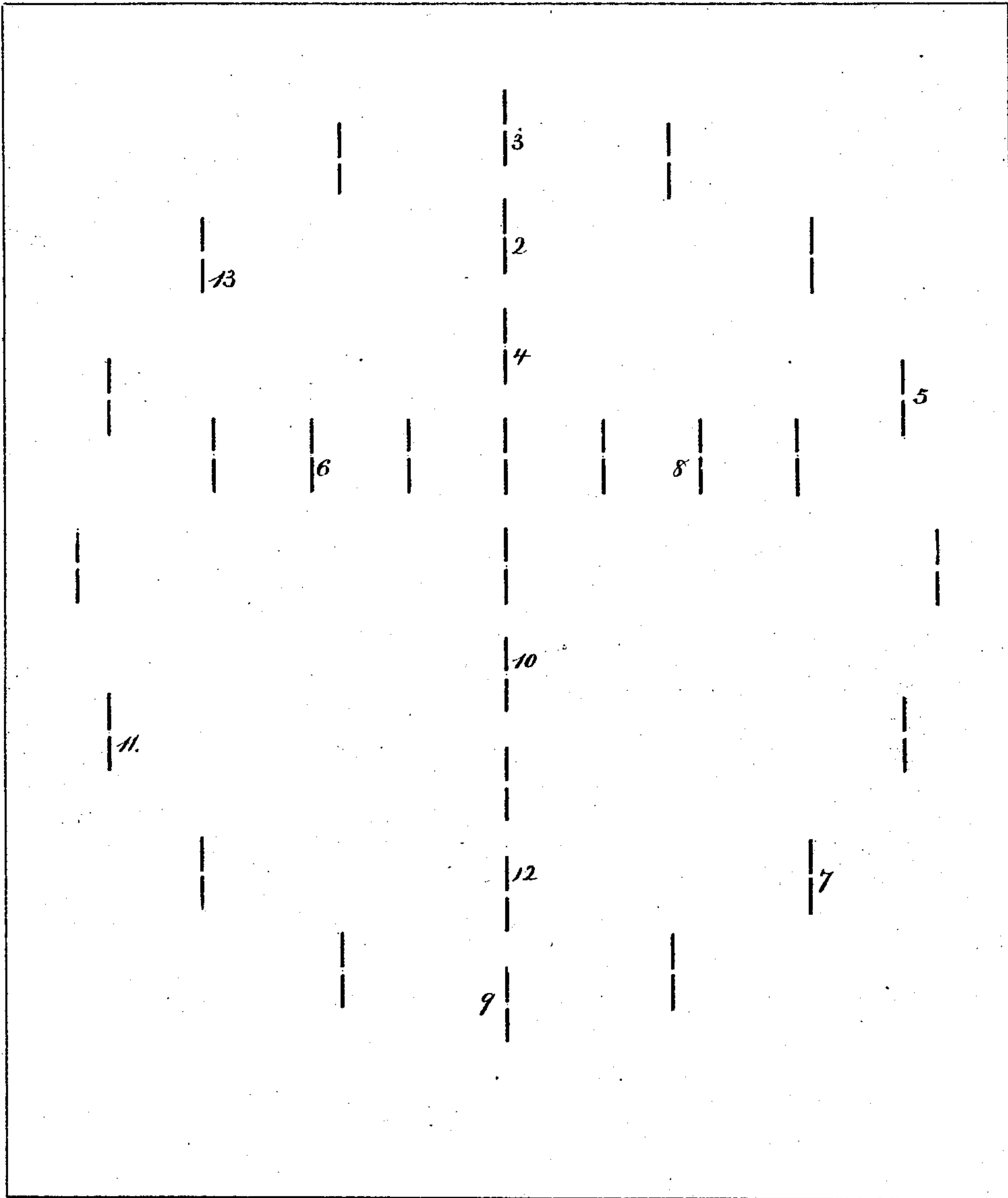
A. C. FERGUSON.

SIGNAL AND PYROTECHNIC ELECTRIC LIGHT.

No. 370,052.

Patented Sept. 20, 1887.

Fig. 1.



Witnesses

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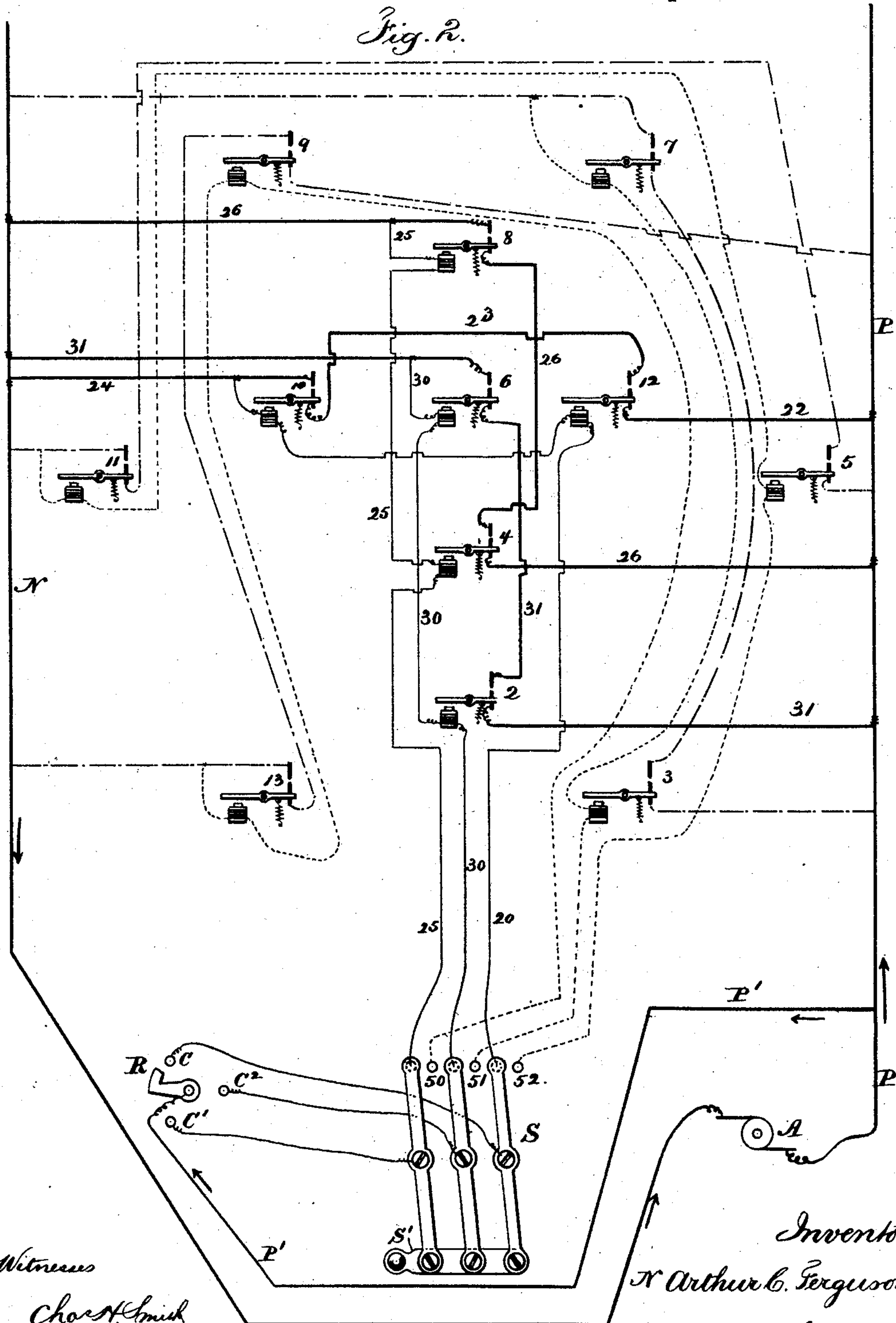
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UNITED STATES PATENT OFFICE.

ARTHUR C. FERGUSON, OF SARATOGA, NEW YORK.

SIGNAL AND PYROTECHNIC ELECTRIC LIGHT.

SPECIFICATION forming part of Letters Patent No. 370,052, dated September 20, 1887.

Application filed December 22, 1886. Serial No. 222,260. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR C. FERGUSON, of Saratoga, in the county of Saratoga and State of New York, have invented an Improvement in Electric-Lighting Apparatus, of which the following is a specification.

In Letters Patent No. 334,365 a rotary circuit-closer is represented as moving in contact with carbons or other electrodes, and in Letters Patent No. 334,366 carbon electrodes in pairs are represented as adapted to produce ornamental figures or letters by flashes of light.

In my present improvements the electrodes are brought into contact by magnetism, and the magnets are energized by a shunt-connection and two or more helices of the electro-magnets are in the same shunt, so as to be energized simultaneously, and there is a revolving circuit-breaker by means of which the shunt-connections are closed in succession and the carbon electrodes and the electro-magnets for moving the same are placed in such a manner as to produce letters, figures, or designs or to produce two or more designs either in the same field or in adjoining fields.

By this improvement I am able to vary the designs or letters with great facility, because the electro-magnets and the electrodes upon which they act can be changed from one place to another with facility, the wires being sufficiently long to allow for so doing, whereas in my Patent No. 334,366 the mechanism employed for giving motion had to be constructed with reference to the production of a specific figure or letter, and was not well adapted to the showing of two figures in the same field, one succeeding the other.

In the drawings, Figure 1 is a representation of a board or field with electrodes for showing a cross and a circle, and in Fig. 2 the electric connections are represented; but only a few of the electrodes in each figure are shown in order to avoid confusion from the multiplicity of wires, the wire-connection to the other electrodes being mere duplications of those which are shown.

Each point of illumination is composed of two electrodes, preferably of carbon, one of which is fixed in a support upon a board or other background, but can be moved by hand

or otherwise from time to time as the electrode is consumed. The other electrode is carried by or connected with the armature of an electro-magnet, and the normal condition of the electrodes is that of an open circuit, the spring of the armature separating the electrodes and the magnetism bringing them together. The parts are to be constructed in any suitable manner, the drawings indicating the general character of the parts, and it will be apparent that if an electric current is passed through the carbons while they are in contact an illuminating-flash will be produced by separating the electrodes when the magnetism that has brought them together ceases.

In the drawings some of the electrodes that go to form the cross are marked 2, 4, 6, 8, 10, 12, while some of the electrodes that go to form a circle are marked 3, 5, 7, 9, 11, 13.

Upon reference to Fig. 2 I have shown at A the commutator-brushes of a dynamo-electric machine or other source of electric energy, and circuit-wire P N extending from the same. At R is a rotator having a spring-arm acting as a circuit-closer to the respective contacts, C C'. I have only shown three such contacts; but in the actual machine there will be a considerable number—say twelve or more—according to the number of electro-magnets that are used to make up the letters, numbers, or designs. At S, I have represented a range of switches connected by a bar, S'. There should be the same number of switches as there are contact-points, and a wire passing from each contact-point to the pivot of one of the switches. If there are two figures—such as the cross and circle—to be illuminated, there will be two sets of contacts for the switches, as shown on Fig. 2. If there are three or more figures to be illuminated, the number of sets of contacts for the switches will be correspondingly increased.

In Fig. 2 the circuit-connections from the switches S to the magnets of the carbons 3, 5, 7, 9, 11, 13 are shown by dotted lines, and the circuit-connections to the carbons 2, 4, 6, 8, 10, 12 are shown by full lines. When the switch S is turned so as to make contact with the wires leading to the electro-magnets controlling the carbons of the cross, that alone will be illuminated. When the switches are shifted

to close the circuits through the dotted lines, then the circle alone will be illuminated, and the switches can be changed as often as desired, so as to illuminate by flashes first one figure 5 and then the other.

By following the circuit-connections in Fig. 2 it will be seen that the rotator R closes the circuit from the positive wire P through the shunt-wire P', contact C, and the switch and wire 20 to the electro-magnet that actuates the carbons 12, and from there the current passes through the electro-magnet that closes the carbons 10 and returns to the wire N. The carbons 10 and 12 now being brought into contact, the multiple-arc circuit between P and N is closed through the wires 22, carbons 12, wire 23, carbons 10, and wire 24 to N. The contact R, passing off of C, breaks the shunt circuit over the wires 20 and 21, and the springs simultaneously separate the electrodes 10 and 12 and produce an illuminating-flash. In like manner the contact of R with C' closes the shunt through 25, and the electro-magnets bring the carbons 4 and 8 together in the multiple-arc circuit 26, and these illuminate by the flash when the carbons are separated, and when the revolver R closes contact with C² the shunt through 30 closes the carbons 2 and 6 in the multiple-arc circuit 31, and these in turn illuminate by the flash as the carbons are separated.

The same system of connections is made use of for all the electrodes that are made use of in illuminating the cross, and it is to be understood that where two pairs of carbon electrodes are in multiple-arc circuit there should be as many contact-pins and switches as there are pairs of electrodes, and the circuit-connections should be arranged so as to flash the adjacent carbons and the whole of the carbons and the figure with sufficient rapidity, so that the image upon the eye of the observer will be that of a continuous illumination so long as the switches are unchanged.

When the switches are changed to the contacts 50 51 52, the revolving arm R closes the shunt from 50 through the magnets of the carbons 9 and 13, from 51 through the helices of the carbons 3 and 7, from 52 through the helices of the carbons 5 and 11, and in all instances the shunt-circuit through the rotator and the switches acts by the electro-magnets to move the carbons, and the flashes are given by separating the carbons while the current is passing in multiple arc between one main-line conductor and the other.

I do not confine myself to any particular character of rotating circuit-closer, nor to any particular character of switches, nor to the number of electrodes in the multiple arc or of the electro-magnets in the shunt.

I claim as my invention—

1. The combination, with the main-line conductors, of illuminating-electrodes, connected into multiple arcs between the main conductors, electro-magnets and armatures for separating the carbon electrodes, shunt-circuit connections, and a revolving circuit-closing device for bringing into action the electrodes successively, substantially as set forth.

2. The combination, with the main-line conductors, the electrodes in multiple-arc connections between the main conductors, a revolving circuit-closer, switches, and shunt-circuit connections through the helices of the respective electro-magnets, substantially as set forth, for bringing into action any desired set of electrodes composing a figure, substantially as set forth.

Signed by me this 21st day of July, A. D. 1886.

ARTHUR C. FERGUSON.

Witnesses:

W. H. EDDY,
H. M. WEED.