E. J. MOLERA & J. C. CEBRIAN.

Electric Switch.

No. 230,321. Patented July 20, 1880.

Fig 1.

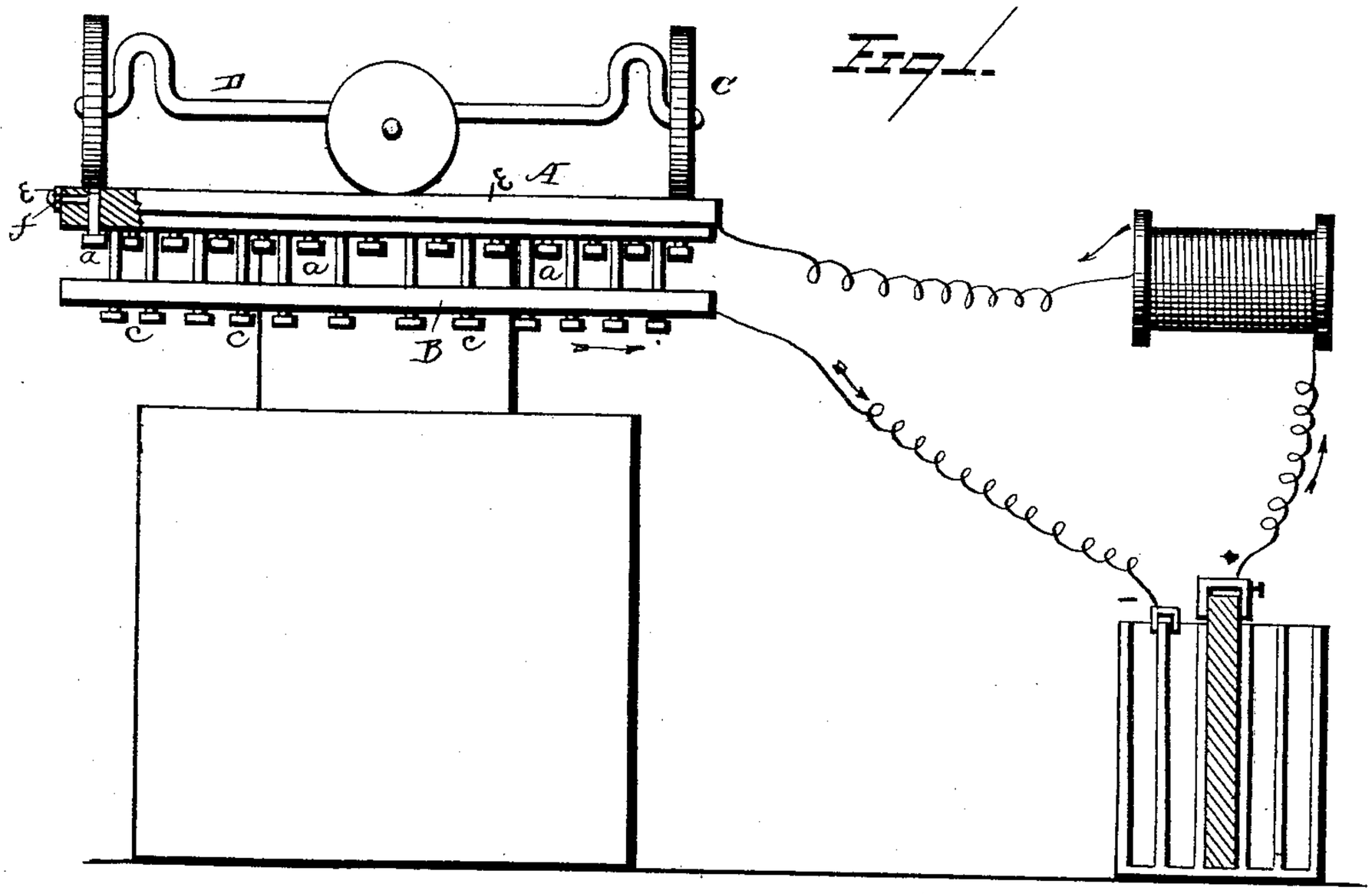
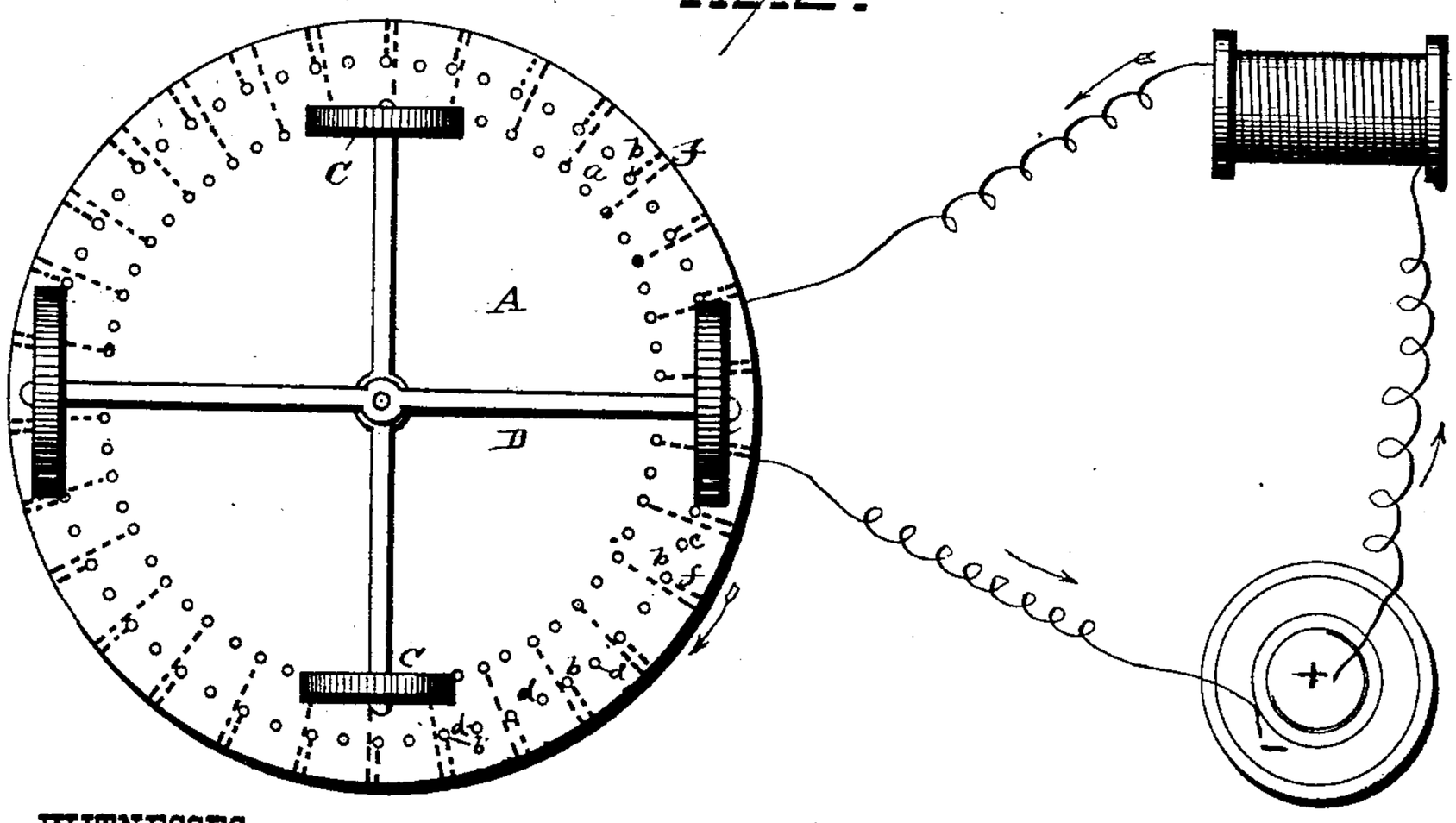


Fig 2.



WITNESSES

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EUSEBIUS J. MOLERA AND JOHN C. CEBRIAN, OF SAN FRANCISCO, CAL.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 230,321, dated July 20, 1880.

Application filed January 27, 1880.

To all whom it may concern:

Be it known that we, EUSEBIUS J. MOLERA and JOHN C. CEBRIAN, of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Electric Switches; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

Our invention is more especially intended for use in connection with apparatus for reducing to a microscopic scale any matter capable of being photographed, as set forth in separate application for patent.

Our object is to provide improved means whereby one or more circuits may be closed at predetermined intervals and for any length of time.

The invention consists, first, in the combination, with a plate and pins adjustable relative to the plate-surface, of a device adapted by movement over the latter to join any pin projecting therefrom and connected with one electric pole to means which connect with the opposite pole; second, in the combination, with a plate provided with holes in which pins are adjustable, of a device adapted to move over said plate and join any projecting pin connected with one electric pole to means connected with the opposite pole; third, in the combination, with a non-conducting plate and conducting-pins adjustable in holes formed in the plate, of a conduction device adapted to join any two consecutive pins projecting beyond the plate, and means which connect the several pins in alternate order, respectively, to opposite electric poles; fourth, in the combination, with a non-conducting plate provided with a conducting-band, of conducting-pins fitted in holes formed in the plate and conducting-strips which connect said pin-holes with the band; fifth, in the combination, with a non-conducting plate provided with a conducting-band and conducting-pins adjustable in holes formed in the plate, of conducting-strips which independently connect the several pin-holes with the band and a movable conducting device adapted to join any two consecutive pins which may project beyond the plate; sixth, in the combination, with a non-conducting plate provided with two or more conducting-bands, of concentric sets of conducting-pins adjustable in holes formed in the plate and conducting-strips which independently connect the several pin-holes of each set to the band of said set; seventh, in the combination, with a non-conducting plate and a circular series of conducting-pins having sliding movement in holes formed in the plate, of a conducting-roller, a radial arm which supports the latter, and means which actuate said roller-arm in circular movement; eighth, in the combination, with a non-conducting plate provided with a conducting-band, adjustable conducting-pins, and conducting-strips, which connect said pin-holes with the band, of a conducting-plate provided with conducting-pins adapted to be adjusted in holes formed in the non-conducting plate, a conducting device having movement over the latter, and means which connect the conducting-plate and the conducting-band to opposite electric poles; ninth, in the combination, with a non-conducting plate provided with a conducting-band, conducting slide-pins, and conducting-strips which connect said pin-holes with the band, of a conducting-plate provided with conducting-pins adapted to slide in holes formed in the non-conducting plate alternately with the first-mentioned pin-holes, a conducting device which moves over the non-conducting plate, and means which connect the conducting-plate and the conducting-band to opposite electric poles.

Referring to the drawings, Figure 1 is a view, partly in vertical central section. Fig. 2 is a plan view.

The upper plate, A, is made of non-conducting material, and is provided with a set of conducting-pins, *a*, adapted to have sliding movement in holes *b* formed in said plate.

The lower plate, B, is made of conducting material, and is provided with a set of conducting-pins, *c*. The lower extremities of the latter have sliding movement in holes formed in said plate, and their upper extremities have like movement in holes *d* formed in the non-conducting plate. Holes *d* alternate in succession with holes *b* in the latter plate, and

hence when both sets of pins project beyond the upper surface of the non-conducting plate any one pin of the latter plate is intermediate two pins of the conducting-plate, and the reverse. The non-conducting plate is provided with one or more conducting-bands *e*.

Conducting-strips *f* independently connect the several pin-holes *b* with the respective band. If one band only is used, there will be but one circular row of pin-holes, all connected to the said band. If more than one row of pin-holes is formed on the plate, there will be a corresponding number of bands, and the pin-holes *b* of each row will be connected to the appropriate band.

In using a single circuit the conducting-plate is connected to one electric pole and the conducting-band on the non-conducting plate is connected to the opposite electric pole. In employing more than one circuit the conducting-plate is connected to one electric pole of all the batteries and the conducting-bands are respectively connected to the opposite poles of the several batteries.

Rollers C, made of conducting material, are mounted on radial arms D. These arms are actuated in their circular movement by any suitable means. Preferably we employ clock-work or other automatic device, so that the rollers may be moved over the plate at a predetermined rate. Each roller is adapted to serve as a conducting device to join any two consecutive pins *a c* which may project above plate A, thereby closing the circuit which passes through said circular row of pins on the non-conducting plate. There may be one or more rollers for each row of pins. Knowing the time required for a roller to complete its revolution, and also knowing the number of pins in the row over which said roller moves, it is evident that by projecting any two consecutive pins above the surface of plate A we may cause the circuit to be closed at any desired time. As many of these pairs of pins may be brought into use as are the different times that the circuit is to be closed for one revolution of the roller. By projecting above plate A any number of consecutive pins greater than two it is evident that the circuit may be maintained closed for a corresponding longer duration of time.

The foregoing description sets forth one specific form of mechanism for carrying out our invention, and our preferable construction is thus given as an illustration of the invention. It is apparent, however, that changes, substitutions, and omissions may be made as regards the previously-described means, provided only the essential features of invention set forth in the following claims are employed.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an electric switch, the combination, with a plate and pins adjustable relative to its surface, of a device adapted by movement over said plate-surface to join pins projecting therefrom and respectively connected to opposite electric poles, substantially as set forth.

2. In an electric switch, the combination, with a plate provided with holes in which pins are adjustable, of a device adapted to move over said plate and join projecting pins respectively connected to opposite electric poles, substantially as set forth.

3. In an electric switch, the combination, with a non-conducting plate and conducting-pins adjustable in holes formed in the plate, of a conducting device adapted to join any two consecutive pins projecting beyond the plate, and means which connect the several pins in alternate order respectively to opposite electric poles, substantially as set forth.

4. In an electric switch, the combination, with a non-conducting plate provided with a conducting-band, of conducting-pins fitted in holes formed in the plate and conducting-strips which connect said pin-holes with the band, substantially as set forth.

5. In an electric switch, the combination, with a non-conducting plate provided with a conducting-band and conducting-pins adjustable in holes formed in the plate, of conducting-strips which independently connect the several pin-holes with the band and a movable conducting device adapted to join any two consecutive pins which may project beyond the plate, substantially as set forth.

6. In an electric switch, the combination, with a non-conducting plate provided with two or more conducting-bands, of concentric sets of conducting-pins adjustable in holes formed in the plate and conducting-strips which independently connect the several pin-holes of each set to the band of said set, substantially as set forth.

7. In an electric switch, the combination, with a non-conducting plate and conducting-pins adjustable relative to its surface, of a conducting device adapted to join two pins projecting beyond its surface and respectively connected to opposite electric poles, substantially as set forth.

8. In an electric switch, the combination, with a non-conducting plate provided with a set of adjustable conducting-pins and a conducting-plate provided with an independent set of adjustable conducting-pins adapted to pass through holes in the non-conducting plate, said two sets of pins being respectively connected to opposite electric poles, of a conducting device which travels over the non-conducting plate and joins a projecting pin of its set with a projecting pin of the conducting-plate set, substantially as set forth.

9. In an electric switch, the combination, with a non-conducting plate and two sets of conducting-pins arranged in a circular row, said sets being respectively connected to opposite electric poles and adjustable relative to the plate-surface, of a conducting-roller adapted to join projecting pins of opposite sets, and

means for actuating said roller in circular movement over the plate, substantially as set forth.

10. In an electric switch, the combination, with a non-conducting plate provided with a conducting-band, adjustable conducting-pins, and conducting-strips which connect said pin-holes with the band, of a conducting-plate provided with conducting-pins adapted to be adjusted in holes formed in the non-conducting plate, a conducting device having movement over the latter, and means which connect the conducting-plate and the conducting-band to opposite electric poles, substantially as set forth.

11. In an electric switch, the combination, with a non-conducting plate provided with a conducting-band, conducting slide-pins, and conducting-strips which connect said pin-holes with the band, of a conducting-plate provided with conducting-pins adapted to slide in holes formed in the non-conducting plate alternately with the first-mentioned pin-holes, a conducting device which moves over the non-conducting plate, and means which connect the conducting-plate and the conducting-band to opposite electric poles, substantially as set forth.

In testimony that we claim the foregoing I, EUSEBIUS J. MOLERA, do hereunto set my hand this 16th day of January, A. D. 1880.

EUSEBIUS J. MOLERA.

Witnesses:

THOMAS D. GRAHAM,

I. O. WEGENER.

And I, JOHN C. CEBRIAN, do hereunto set my hand this 15th day of December, 1879.

JOHN C. CEBRIAN.

Witnesses:

T. B. HALL,

A. W. BRIGHT.