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E. W. CALDWELL.

ELECTROSTATIC APPARATUS.

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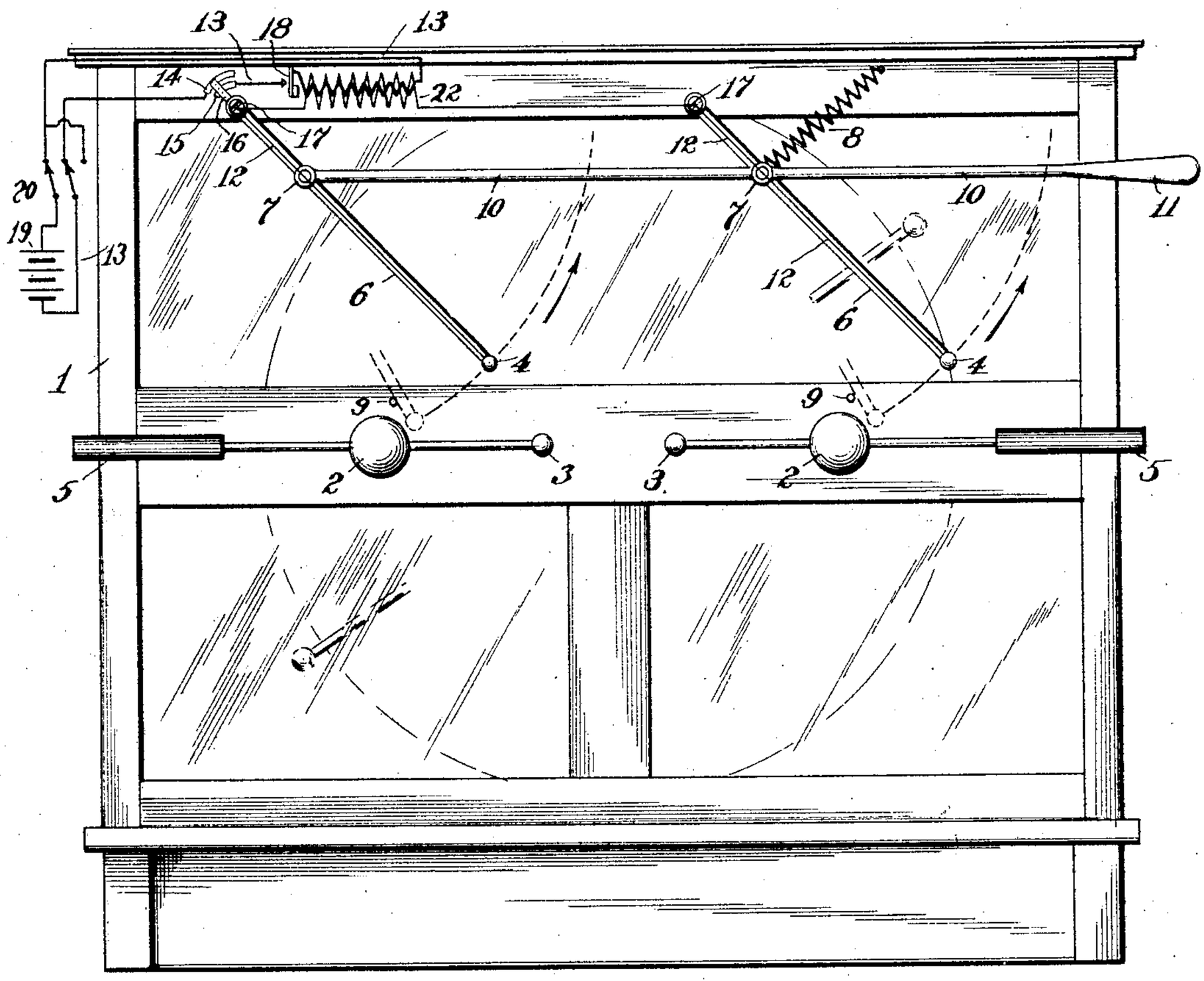

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No. 787,561. Patented April 18, 1905.

UNITED STATES PATENT OFFICE.

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ELECTROSTATIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 787,561, dated April 18, 1905.

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To all whom it may concern:

Be it known that I, EUGENE W. CALDWELL, a citizen of the United States, and a resident of New York city, in the county and State of New York, have invented certain new and useful Improvements in Electrostatic Apparatus, of which the following is a specification, taken in connection with the accompanying drawing, which forms a part of the same.

This invention relates to electrostatic apparatus, and relates especially to electrostatic generating apparatus comprising an induction-coil and auxiliary devices for giving a preliminary charge to said generator.

The accompanying drawing is an elevation, partly diagrammatic, of an embodiment of this invention.

In the illustrated embodiment of this invention the static generator 1 is indicated as being an ordinary plate-machine of the well-known Toepler-Holtz or Wimshurst type, the prime conductors 2 being located on the outside of the machine and having the usual discharging-rods provided with the balls 3 at their outer ends and actuated by the insulated handles 5, as is customary in this art. A suitable induction-coil, as indicated diagrammatically, may be mounted in connection with this static generator. The primary circuit 13 may be provided with the break 18 and may be connected through a suitable reverser 20 of well-known construction with the battery or other source of current 19. If desired, also, a switch may be introduced into this primary circuit, and, as indicated, it may comprise the metallic segments 14 15, joined to the primary circuit 13 and electrically connected at the proper intervals by the switch member 16, mounted on the swinging arm 12, this switch being closed to actuate the induction-coil in the position indicated. The arm 12, of insulating material, which may be actuated in any desired way, may be pivoted about the pin 17 on the machine, and its extension 6 may be provided with a ball or similar member 4 at its outer end, if desired. This arm may be actuated by the rod 10, preferably provided with the insulated handle 11, this rod being pivoted to the arm by the pin 7, and in the form indicated being also pivoted in a similar manner to a second arm 12, likewise pivoted to the machine. The spring 8, secured to one of these arms and to the machine, normally tends to retract the arms and raise them into an elevated position, so that all the parts of this device are away from the operating elements of the generator and from its exposed conductors.

The arm 12 and the ball or other conductor 4 at its outer end are electrically connected with the secondary 22 of the induction-coil, so that when the induction-coil is operated this arm is charged with high-tension electricity at intervals depending on the interruptions in the primary induction-coil circuit. In starting the static generator, therefore, this arm may be brought adjacent the prime conductor 2 or other exposed part of the generator-conductors, so as to impart to the generator a suitable initial charge, although it is usually undesirable to make actual metallic contact between these parts. For this purpose a suitable stop 9 may be used which, as indicated, serves to limit the movement of the arm toward the prime conductor or other part of the generator. In this way a suitable electrical discharge can take place between these parts, the distance being preferably limited, so that a spark takes place only when the induction-coil circuit is broken, and in this manner an electrical charge of definite polarity is given to the generator-terminal. In a well-known manner this acts inductively in the generator and insures its proper operation. It is manifest that by operating the reverser in the primary circuit of the induction-coil the polarity of the charge imparted to the electrostatic generator can be reversed, and the polarity of its terminals can thus be reversed during operation by first discharging all electricity and then suitably recharging the parts, as has been indicated. If desired, a second arm 12 may be provided on its extension 6 with the ball 4, similarly connected with the other terminal of the secondary circuit of the induction-coil, this arm being arranged to move close to the other prime conductor or similar exposed part of

the generator, the stop-pin 9 being used, if desired, to prevent actual contact. If desired, however, only a single movable conductor connected with the induction-coil need be used, and its movement toward the generator-conductor can be effected by any desired mechanism.

In the illustrated form of this apparatus the movement of the handle 11 swings the arms downward toward the prime conductors of the generator and also this movement operates to close the switch and actuate the induction-coil. Then as soon as sufficient electricity has been imparted to the generator the arms are allowed to swing upward and are firmly held out of the way by the spring 8, this movement opening the induction-coil circuit and stopping the action of this device. By this apparatus these large electrostatic generators can be quickly brought into full operation. They are made largely independent of atmospheric conditions, and their polarity can be readily reversed, if desired.

It is of course understood by those familiar with this art that many modifications may be made in the size, form, proportions, and numbers of parts of this apparatus. Parts of the same may be used alone and also in connection with other devices without departing from the spirit of this invention or losing the advantages of the same. I do not, therefore, desire to be limited to the details of the disclosure which has been made in this case; but

What I claim as new, and what I desire to secure by Letters Patent, is set forth in the appended claims:

1. In electrostatic apparatus, an electrostatic generator, an induction-coil comprising a break, a reverser and a switch in its primary circuit, a plurality of arms on said generator carrying exposed conductors electrically connected with the secondary of said induction-coil, stops to limit the movement of said arms and prevent actual contact between the same and the exposed parts of said generator and spring-actuating means for said arms normally holding them in inoperative position, said switch being automatically operated by said arms to energize said induction-coil as said arms move toward said generator.

2. In electrostatic apparatus, an electrostatic-plate generator, an induction-coil having a switch in its primary circuit, an arm movably mounted on said machine and electrically connected with the secondary of said induction-coil and actuating said switch and means to move said arm adjacent to a conductor of said generator to impart an initial charge thereto.

3. In electrostatic apparatus, an electrostatic generator, an induction-coil, an arm connected with said induction-coil, and movable into electrical relation with a conductor of said generator, means to operate said arm and means to reverse the polarity of said induction-coil.

4. In electrostatic apparatus, an electrostatic generator, an induction-coil, means connected with said induction-coil to move into electrical relation with part of said generator to charge the same and means to reverse the polarity of said induction-coil.

5. In electrostatic apparatus, an electrostatic generator, an induction-coil and means connected with said induction-coil to move into electrical relation with part of said generator to charge the same.

6. In electrostatic apparatus, an electrostatic generator and means comprising an induction-coil to impart an initial charge to said generator.

7. In electrostatic apparatus, an electrostatic generator and electromagnetic means to impart an initial charge to said generator.

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Witnesses:
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