(No Model.)

A. L. BOGART.

STATIC INDUCTION ELECTRIC GENERATOR.

No. 597,137. Patented Jan. 11, 1898.

Fig. 2.

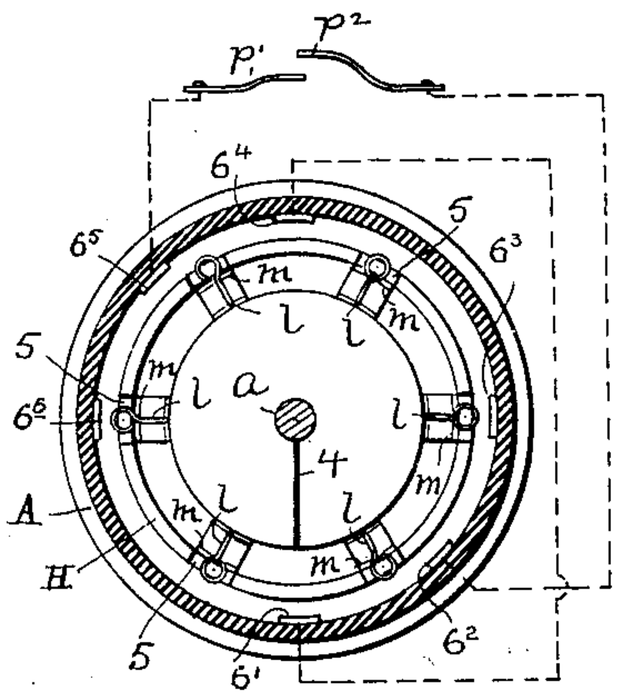


Fig. 4.

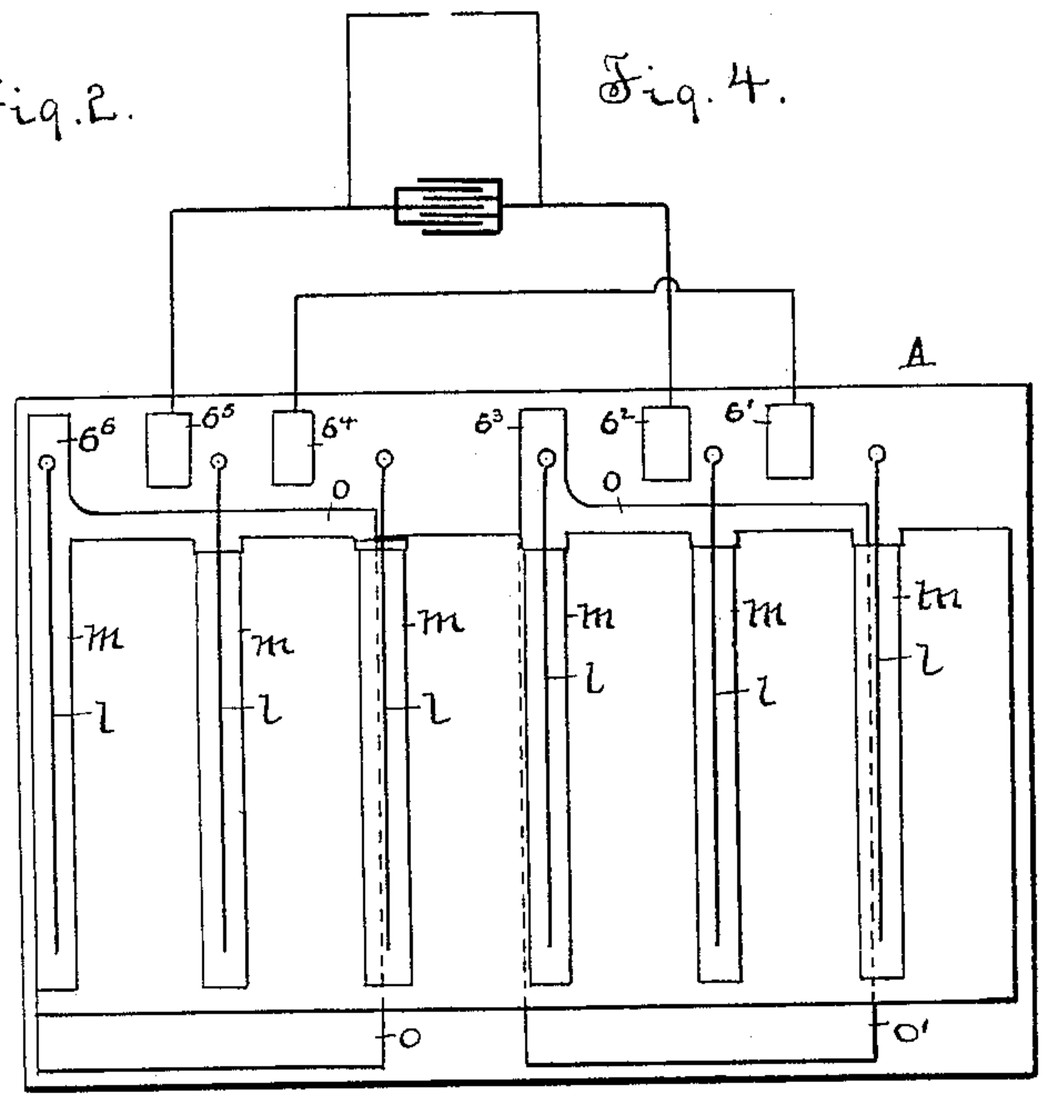


Fig. 1

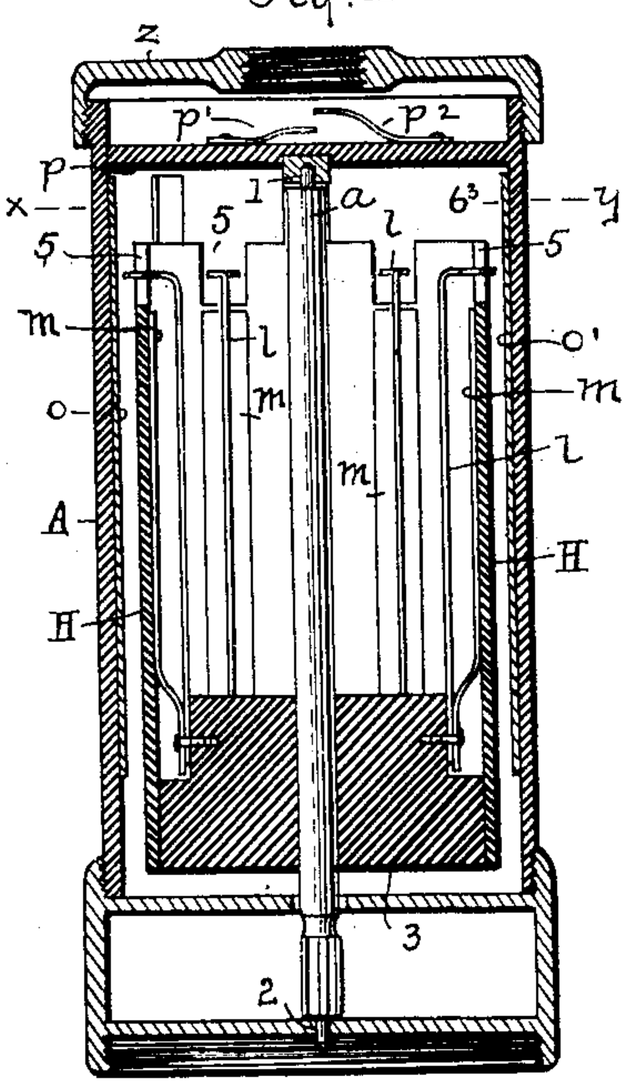
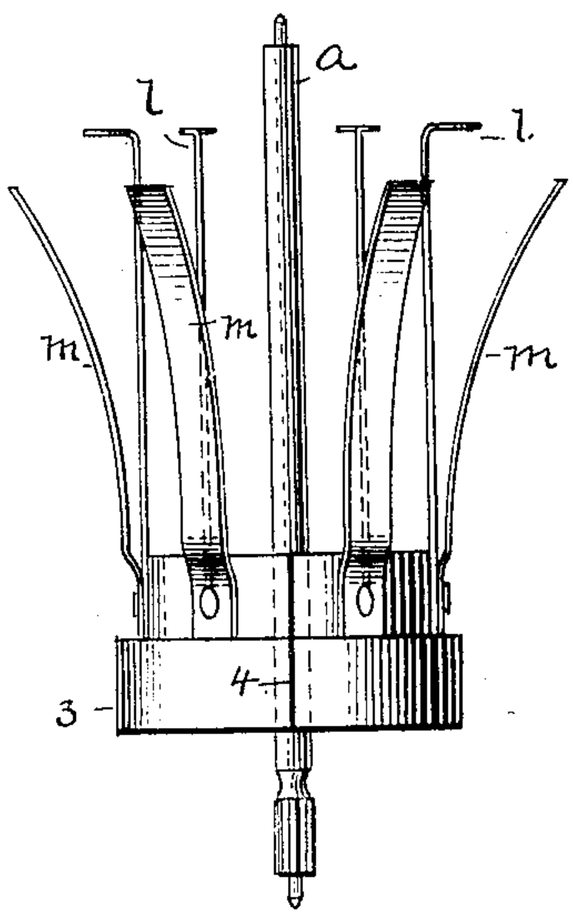


Fig. 3.



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UNITED STATES PATENT OFFICE.

ADRIAN LIVINGSTON BOGART, OF JAMAICA, NEW YORK, ASSIGNOR TO WILLIAM B. M. JORDAN, OF NEW YORK, N. Y.

STATIC-INDUCTION ELECTRIC GENERATOR.

SPECIFICATION forming part of Letters Patent No. 597,137, dated January 11, 1898.

Application filed May 5, 1897. Serial No. 635,177. (No model.)

To all whom it may concern:

Be it known that I, ADRIAN LIVINGSTON BOGART, a citizen of the United States, residing at Jamaica, in the county of Queens and State of New York, have invented a certain new and useful Improvement in Electric Generators or Spark-Producing Apparatus, of which the following is a specification.

This invention relates to that certain class of electrical generators known as "static-induction" or "influence" machines, and more particularly and specially to the specific apparatus shown and described in Letters Patent Nos. 324,009 and 324,010, dated August 11, 1885, granted to Charles L. Clarke.

The object of my invention is to improve the apparatus described in the aforesaid patents whereby the same may be reduced in cost of construction, simplified in its working parts, its efficiency and ease of operation increased, while permitting of ready repair or attention should the mechanism get out of order.

In order that the nature of my improvements may be more fully understood, I will first briefly describe the apparatus set forth in the Clarke patents above mentioned and point out the objections and difficulties existing in such constructions.

It is practically a dynamo-generator for extremely high potential currents of very low amperage, consisting of a stationary vulcanite cylinder on the interior of which are two metal plates placed opposite to one another, acting as field-plates, the equivalent of poles of a dynamo, for the purpose of setting up a field force. Within the stationary cylinder is located a second cylinder, also of vulcanite, having a series of metallic strips running longitudinally and separated from one another. This second cylinder constitutes the armature of the dynamo, the metallic strips being the equivalent of the ordinary winding or conductors. A series of wires or contact-springs (corresponding to the brushes of a dynamo) are attached to one of the heads of the outside cylinder and extend within the second cylinder, resting against its interior, so as to come in contact with the metallic strips, they acting as a commutator when the armature is revolved.

It will be observed that the method of securing the contact springs or wires rigidly, as shown in the Clarke patents, is necessarily expensive, and it is necessary to so bend these contact-springs that their free ends shall press firmly against the interior of the inner cylinder. This makes it difficult to introduce one cylinder into the other without bending the contact-springs out of place and thus rendering them practically useless, and it is impossible to know that the contact-springs are occupying their proper positions, so as to engage and make contact with the commutator-plates. By my arrangement of contact-springs these objections are entirely overcome. I attach the same to the inner cylinder instead of to the outer cylinder by a simple form of connection, and so arrange them that one cylinder may be introduced into the other without liability of forcing the contact-springs out of their operative position, thus insuring efficiency of action of each of the contact-springs and its related working parts.

In the form of device shown in the said Clarke patents the contact-springs must at the outset bear heavily against the interior of the inner cylinder, thus producing considerable resistance to the starting of the said cylinder, which, added to the natural inertia of the parts, brings, in the first place, a heavy strain on the motor mechanism, tending to destroy the cog-wheels and racks ordinarily used for its propulsion and making it difficult for the operator to manipulate the mechanism. By my arrangement of contact-springs the same do not initially or when out of operation bear against the commutators; but upon starting the motor mechanism the free ends of the contact-springs are by centrifugal force thrown into contact therewith, and thereby the mechanism is started easily by hand without undue strain of the motor mechanism or the exertion of great strength on the part of the operator.

Another difficulty which is found in the Clarke device arises from the fact that in all apparatus of this description ozone is produced by the operation thereof. It acts, I believe, chemically upon the surface of hard rubber or vulcanite, out of which the cylinders are mainly constructed, in such manner

that the surface of the hard rubber or vulcanite loses its insulating capacity, resulting in a discharge or short circuit between the various conducting parts, naturally making the instrument useless as a generator. In order to restore this insulation, it is simply necessary to rub off or otherwise remove the surface of hard rubber which has been acted upon by the ozone. In the apparatus of the Clarke patents this loss of insulation occurs more particularly on the interior of the inner cylinder, and in order to restore the insulation it is necessary to remove the metallic strips, which are usually of metal foil pasted to the surface of the said cylinder, and consequently difficult of removal and replacement. By my invention this difficulty is entirely avoided, the interior surface of the inner cylinder being readily accessible and the sandpapering easily carried out.

In the annexed drawings, Figure 1 represents a sectional elevation of such generator containing my improved armature. Fig. 2 is a horizontal section of Fig. 1 along the line $x\,y$ and has the connections between the various commutator-plates indicated in dotted lines. Fig. 3 is a perspective projection of the metal strips and contact springs or brushes, together with their supports, shown as removed from the revolving cylinder which contains them. Fig. 4 is a diagrammatic view of both the outer and inner cylinders unrolled and showing the relative positions of field-plates, armature-strips, spring-brushes, and commutator-plates, together with their various connections.

I have, as far as possible, used the same lettering to indicate equivalent parts as that employed in the drawings of the Clarke patents before referred to. Where they vary, I have employed numbers in place of letters.

A represents the outside of the vulcanite cylinder, having at its upper end the partition p, also vulcanite, upon the upper surface of which are attached contact-springs $p'\,p^2$. The metallic cap z is provided with screw-threads, both for attaching it to the vulcanite inclosing case A, as well as for the insertion and securing of a lighting-tube, if desired. The lighting-tube is not shown. The inductors or field-plates $o\,o'$, of thin metal foil, are fastened to the internal surface of the cylinder opposite to one another and are of the usual dimensions.

H is the inner revolving armature-cylinder with its metallic axis a, which is carried in suitable bearings, one at the upper end, numbered 1, and the other at the lower end, numbered 2.

In place of having the armature strips or conductors $m\,m\,m$ attached to the inner surface of the revolving cylinder H and the contact springs or brushes $l\,l$ attached to the outer cylinder I combine the two together within the inner or armature cylinder H in the following manner: A cylindrical block 3, of hard rubber or other suitable material, is forced onto the shaft or axis a. I prefer to run in a saw cut 4 from the outside of this block to the center, so as to cause the block to act as a spring, permitting an easier reception of the axis and at the same time preventing the slipping of the said block. The diameter at the greatest dimension of this block 3 is sufficient to receive and hold the cylinder H. The upper portion of this block may be made slightly less in diameter, as shown. At equal distances apart, by means of pins, screws, or other agency, are secured the armature-plates $m\,m\,m$, as well as the commutator brushes or springs $l\,l\,l$. These may be readily attached to the block 3 prior to the insertion of the shaft or axis a. The armature plates or strips $m\,m\,m$ should be of spring metal and set outward by bending, as shown in Fig. 3. The upper ends of the commutator-springs $l\,l\,l$ are bent at right angles and then turned into the eyes, as shown in Fig. 2. The said spring-brushes $l\,l$ are so arranged that the distance across the diameter of the circle they form from outside to outside is a trifle greater than the exterior diameter of the revolving armature-cylinder H. In putting the armature together after the axis a has been properly inserted in the plug 3 the armature-plates m and spring-brushes l are squeezed together in the hand and introduced into the interior of the movable armature-cylinder H, and are then pushed through until the said armature-cylinder H properly embraces and incloses the plug 3, holding the two parts closely together. The spring-surface of the armature-plates m will now lie closely up against the interior wall of the cylinder H, as shown in Fig. 1. The upper part of the cylinder H, as its edge shows, is serrated or toothed, so that the loop at the upper end of the spring-brush $l\,l$ will project through the openings. It is not necessary to have the upper edge of this cylinder cut out in this manner, as the loops at the end of the spring l may extend above the upper edge of the cylinder H; but I consider that it is preferable to employ the means shown and described, for the reason that the said springs are more readily located and held in position and the serrations 5 5 act as guides for the projecting ends of the springs l. The complete armature may now be introduced into the exterior inclosing cylinder A. Commutator-plates $6'\ 6^2\ 6^3\ 6^4\ 6^5\ 6^6$ are provided at the upper end of the interior of the inclosing cylinder A, two of which, 6^3 and 6^6, are merely prolongations of the field-plates or inductors $o\,o'$. The others are insulated and cross connected, as shown in Figs. 2 and 4. When the armature, completed, is inserted into the exterior casing A, all of the terminals of the spring contact-brushes $l\,l\,l$ are entirely free of the inner wall of the inclosing cylinder A.

If it be now desired to operate the instrument, the axis a is rotated by any desired means, (either by means of a rack and thumb-piece, as is shown in the Clarke patents be-

fore referred to, or any other method.) As no portion of the armature is in contact with any part of the inclosing cylinder A, it is therefore necessary simply to overcome the inertia of the armature. As soon, however, as the armature commences to rotate the end of the brushes *ll* are thrown outward by centrifugal force and impinge upon the commutator-plates 6 6 6, making a positive contact, the amount of such contact depending upon the speed with which the armature is rotated.

In this form of construction location of both armature-plates *m* and the contact-brushes *l* is easy, as it is performed without the armature-cylinder A being in place. If it be necessary at any time to repair either the metallic strips *m* or the springs *l*, the cylinder H can be quickly and easily removed from the plug 3 and as readily replaced at will. If breakage of the cylinder H should take place at any time, a new one can be substituted without necessitating any alteration or labor upon the plates *m* or the springs *l*. If it be necessary to scrape, sandpaper, or remove the inner surface of the cylinder H to improve or increase the insulation, the said cylinder can be readily and quickly slipped away free of all the other parts and ready access had thereto from either or both ends. The cylinder H can also be readily centered upon the shaft *a*, and in my form of construction such centering does not require to be so exact, for the reason that the contact-brushes *l* are independent as to their positions on the cylinder H. The principles of operation, as well as the method of electrical connection between the parts, are the same as described in the said Clarke patents.

As the contact-springs are usually the first to get out of order, they alone, if desired, may be employed with the plug advantageously, the old cemented foil strips being secured within the inner cylinder.

From the foregoing description it will be apparent that my improved device is simple in construction, the parts capable of readier assemblage and separation for purposes of repair, more efficient in operation, and less likely to get out of order than the devices mentioned in the Clarke patents.

I claim—

1. A cylinder for an electrical generator of the static induction or influence type, made of insulating material, a removable plug therefor of similar material, metallic contact-springs carried by said plug and adapted to contact with the stationary member of the device, substantially as set forth.

2. A cylinder for an electrical generator of the static induction or influence type made of insulating material, a removable plug therefor of similar material, and metallic strips carried by said plug and contact-springs also carried thereby adapted to contact with the stationary member of the device, substantially as set forth.

3. A cylinder for an electrical generator of the static induction or influence type made of insulating material, a removable plug therefor of similar material, metallic spring-strips carried by said plug and contact-springs also carried thereby adapted to contact with the stationary member of the device, substantially as set forth.

4. A cylinder for an electrical generator of the static induction or influence type made of insulating material and having notches therein and metallic contact-springs provided with heads projecting through said notches, and adapted to contact with the stationary member of the device, substantially as set forth.

5. A cylinder for an electrical generator of the static induction or influence type made of insulating material and having notches therein, metallic strips carried by said plug and contact-springs also carried thereby, and provided with heads projecting through said notches and adapted to contact with the stationary member of the device, substantially as set forth.

6. A cylinder for an electrical generator of the static induction or influence type made of insulating material and provided with a shouldered removable plug of the same material, contact-springs and metallic spring-plates said contact springs and plates being secured to the inset formed by said shoulder and being sprung out, substantially as set forth.

7. The combination in an electrical generator of the static induction or influence type, of a stationary and movable cylinder, means for driving the latter, of generating parts, substantially as described, the contact-springs thereof being normally out of contact, and brought into contact by centrifugal force, substantially as set forth.

This specification signed and witnessed this 28th day of April, 1897.

ADRIAN LIVINGSTON BOGART.

Witnesses:

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JNO. R. TAYLOR.