No. 692,737. Patented Feb. 4, 1902.

H. B. TODD.

STATIC ELECTRIC MACHINE.

(Application filed May 11, 1901.)

(No Model.) 2 Sheets—Sheet 1.

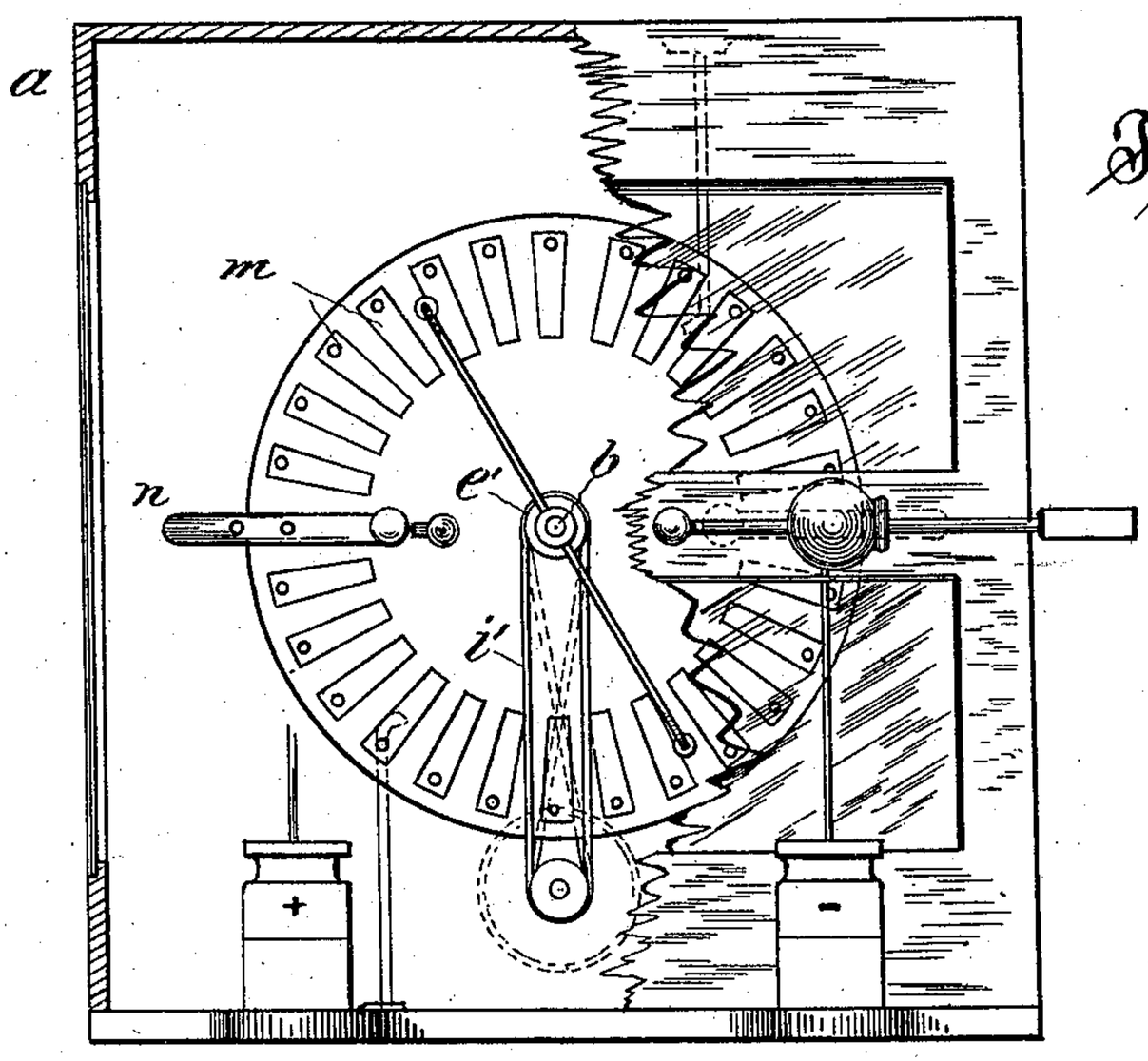

Fig. 1

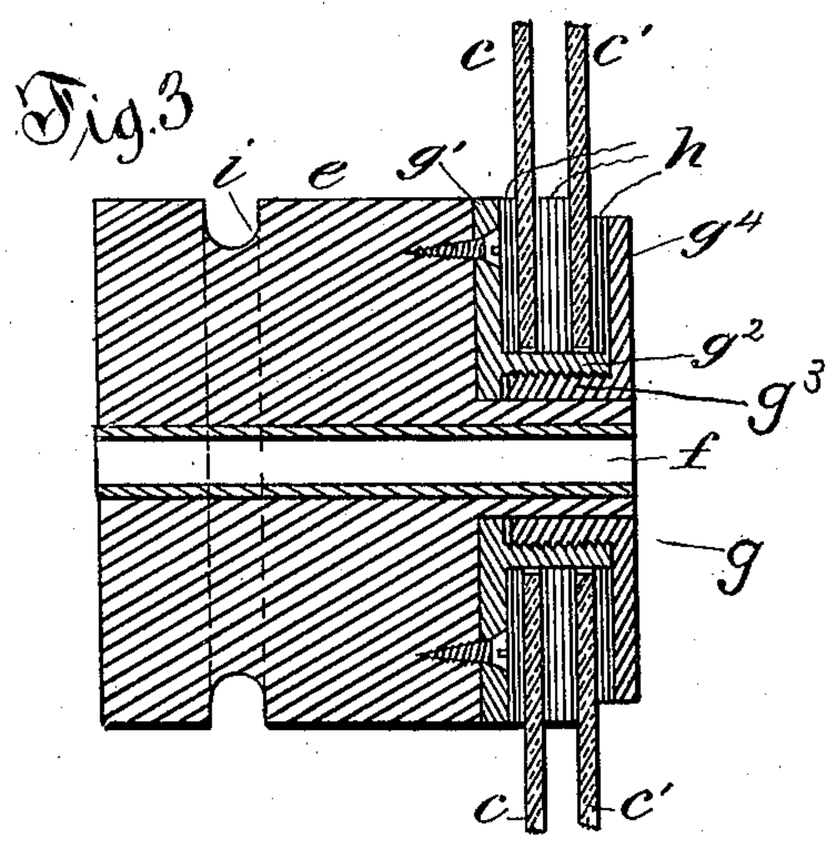

Fig. 3

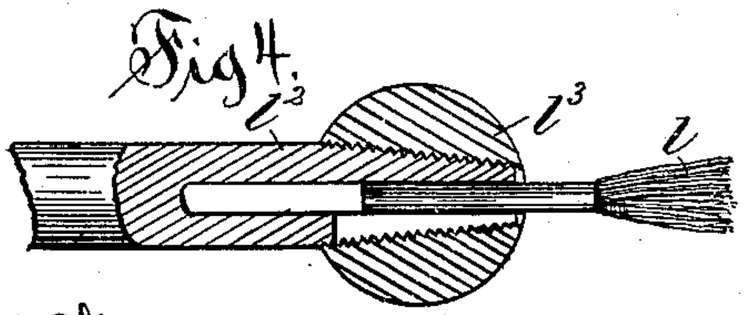

Fig. 4.

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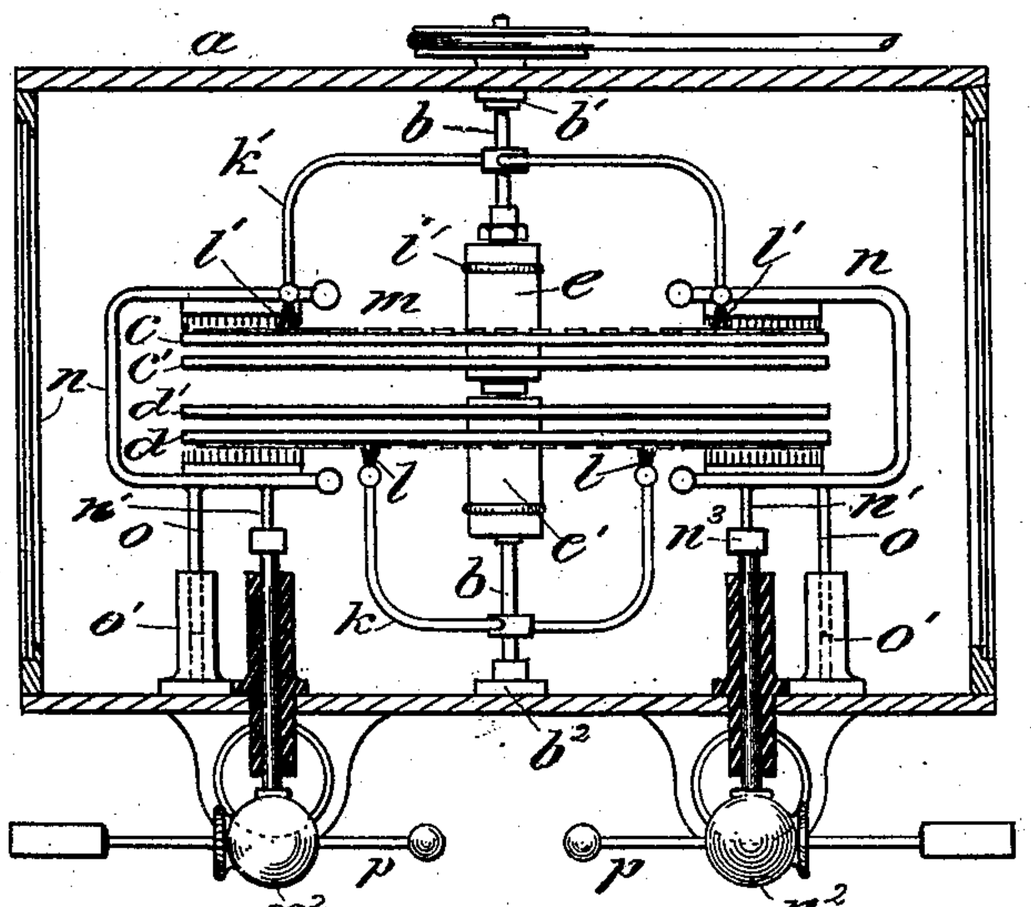
Fig. 2



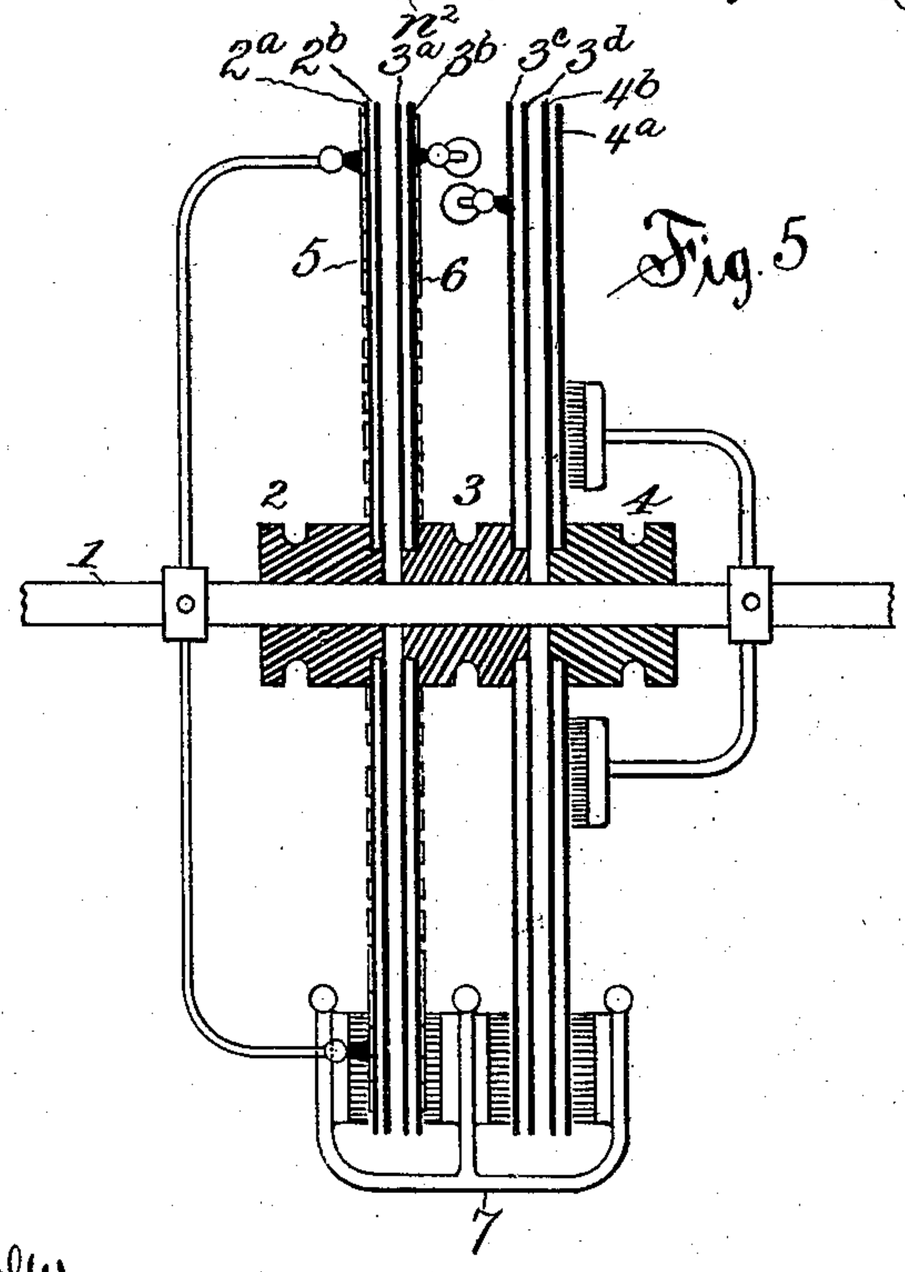


Fig. 5

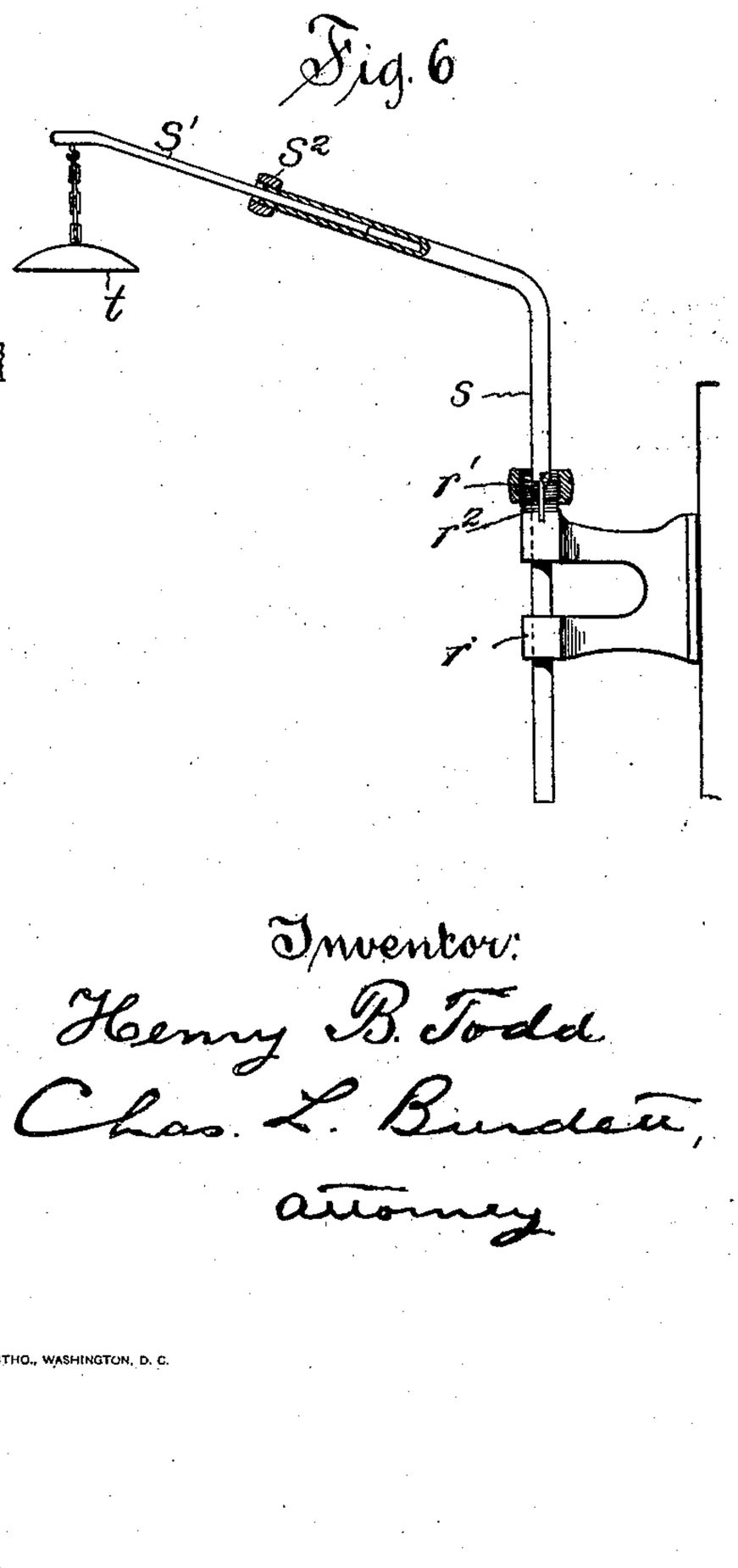


Fig. 6

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UNITED STATES PATENT OFFICE.

HENRY B. TODD, OF MERIDEN, CONNECTICUT.

STATIC ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 692,737, dated February 4, 1902.

Application filed May 11, 1901. Serial No. 59,812. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. TODD, a citizen of the United States, and a resident of Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Static Electric Machines, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

My invention relates to the general class of machines for producing static electricity, and is capable of embodiment in the varying types of such machines, whether of the "Wimshurst," the "Holtz," or other types, the object of my invention being to increase the power of the machine by simple devices and at small expense.

Referring to the drawings forming part hereof, Figure 1 is a view in front elevation of a static electric or induction machine embodying my invention, with parts broken away to show construction. Fig. 2 is a view in horizontal section through the machine on a plane just above the shaft which supports the plates. Fig. 3 is a detail view of the hub and plate-clamp. Fig. 4 is a detail view of the brush-clamp. Fig. 5 is a diagram view of a modified form of the invention or, rather, of an extended form. Fig. 6 is a detail view of a breeze electrode usable with this static machine.

In the accompanying drawings the letter *a* denotes a case of usual form and construction, within which the plates, collectors, equalizers, and similar parts are located. A main shaft *b* extends across the case, being supported in suitable bearings *b' b²* on opposite sides, and on this shaft the plates *c c'* and *d d'* are mounted. The plates are preferably of glass coated with shellac and secured to hubs *e e'* of insulating material.

A feature of my invention is the arrangement of a supplemental plate *c'* on the same hub *e* as the generator-plate *c* and at a distance from it, depending on the diameter of the plate or extent of surface. In a machine already constructed and used I have found that with plates of double thick glass and of thirty inches in diameter an effective working space between the generator-plate and the supplemental plate is one-fourth of an inch; but good results are obtained with spaces varying in extent from the preferred extent of space stated.

In the form shown (see Fig. 3) the hub, as *e*, to which a pair of plates, as *c c'*, is secured, has a central opening and a bushing *f*, with provision for any suitable form of bearing on the fixed shaft *b*, and to one end of the hub one member *g'* of the sectional coupling or clamp *g* is secured. This member *g'* fits upon the end of the hub to which it is fastened and has a tubular hub *g²* with a threaded surface. A like plate, with a threaded hub *g³*, forms the other member *g⁴* of the coupling, and the sections are removably connected together by the interengaging threaded parts. To secure the plates *c c'* to the hub, they are located on the hub of section *g'* of the clamp with washers *h* of somewhat elastic material, as thick paper or strawboard, between adjacent bearing-surfaces, and the member *g⁴* of the clamp is then screwed firmly to place.

Each hub is provided with a pulley with a groove, as *i*, in the surface of the hub, so that it serves the same purpose, and a cord or band *i'* from a suitable shaft rotates the hub and the attached plates.

When two generator-plates are used in the machine, as shown in Figs. 1 and 2 of the drawings, the hubs are mounted on the shaft *b*, held at the required distance apart by a washer placed between them on the shaft and by nuts or like devices located near or against the outer ends of the hubs. The driving mechanism is so arranged as to revolve the generator-plates in opposite directions.

On the shaft *b*, as the most convenient arrangement, equalizer-rods *k k'* are mounted and by means of a clamp-screw so secured to the shaft that the brushes *l l'* at the outer ends of the equalizer-rods will be properly located to wipe across the surface of the metallic segments *m*, which are arranged on the outer surface of the generator-plates. Each brush is held by a clamp composed of a split tube *l²*, with a tapered and threaded extension, and a spherical nut *l³*, fitting and screwed upon the tube end. By means of this nut the force of the grasping hold of the tube end upon the brush-handle inserted within it may be regulated and the brush adjusted in the desired position.

The collectors *n* are arranged, as usual in

this class of machines, on opposite sides of the plates in the plane of the axis. They are preferably of rods bent to U shape, with rounded ends and the group of points or "combs" located on the side next to the generator-plates and projecting toward the plates, the edges of the group of plates being located within the bend of the U. Each collector is fastened to a pole-piece n', which extends through a tube of insulating material fastened to the front of the case, the outer end of the pole-piece terminating in a ball n^2. This pole-piece is made with telescoping sections clamped by a nut n^3, so as to enable the collector to be properly adjusted with relation to the plane of the generator-plates. Each collector is also provided with a shank o, located on the same side a short distance from the pole-piece and projecting into a socket in a bracket o', fast to the inner surface of the case. This device serves to hold the collector in a fixed plane and prevent accidental displacement. At the outer ends of the pole-piece electrodes p are arranged, with the usual handle of insulated material and the spherical form of terminal.

The machine thus far described has one pair of generator-plates and is the elemental or first form of embodiment of my invention; but the power of the machine may be increased to any desired extent by increasing the number of hubs, each with the pair of plates which rotate with it. All plates except in the first set can be made plain and without metallic sectors, as the extra plates are made active by an initial charge from the first set and their power increased greatly by induction.

A diagram view of a machine with an increased number of plates and illustrating the manner of mounting and joining up such a structure is shown in Fig. 5 of the accompanying drawings, where the numeral 1 denotes a fixed shaft, 2, 3, and 4 hubs rotatably mounted on the shaft, 2^a and 2^b the generator-plates and supplemental plate secured to hub 2, and 4^a and 4^b like plates secured to hub 4. To the intermediate hub 3, which rotates in a reverse direction of rotation from that in which the hubs 2 and 4 rotate, a pair of plates is secured to each end 3^a and 3^b on one end and 3^c and 3^d on the other.

Metallic sections 5 6 are secured to the outer surface of the generator-plates 2^a and 3^b, and brushes on the ends of equalizer devices are located in operative contact with the sectors. The collector 7 has three arms in form of a trident and is arranged to collect the electricity as in the simpler form of machine. In like manner the number of hubs and pairs of plates (generator and supplemental) may be increased to any desired extent and the power and efficiency of the machine greatly extended in a simple and inexpensive manner.

In Fig. 6 the letter r denotes a bracket secured in any convenient position on the case inclosing the machine. This bracket has a socket arranged to hold a rod s in a vertical position, this rod being adjustably held by means of a clamp-nut r', screwed upon the threaded projection r^2 on the bracket, which is slitted to give flexibility to the parts of the socket member. This forms a convenient clamp for holding the rod in any position of vertical or rotary adjustment. The rod s is bent so that its upper part is located at an angle with the vertical, this outer end telescoping with an extension s', that supports on its outer end by a flexible connection a breeze electrode t. The telescoping parts of the rod are clamped together by a clamp device s^2, similar to that connected with the bracket.

One feature of my invention is embodied in the means for supporting each collector n, as the means described serves not only to adjust the collector with relation to the plane of the generator-plates, but also enables the electrode to be adjusted horizontally as well as vertically, the latter of course by rotation on the pole-piece n', which supports it. The pole-piece n' is made with telescoping sections clamped by a nut n^3, and by loosening this nut a rotary movement of the outer section which supports the electrode p is permitted. By this rotation the vertical adjustment of the ball on the end of the electrode is secured. The existence of the shank o, fitting in the socket in a bracket o' as one support for the collector n, does not prevent this rotary movement of the outer section of the telescopic pole-piece, as described.

The main feature of my invention resides in the supplemental plates arranged to increase by induction the power of the machine, one or more supplemental plates being arranged in close relation to a generator-plate and revolving with it in the same direction.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a static induction-generator, the combination with the usual driving, supporting and collecting mechanism, of a generator-plate and a supplemental plate mounted in close relation to and turning with the generator-plate.

2. In a static induction-generator, the combination with the usual driving, supporting and collecting mechanism, of a generator-plate and a supplemental plate mounted on the same hub and rotating with the generator-plate.

3. In static machines, the combination of a pair of plates mounted in close relation to each other and adapted to turn together in the same direction of rotation.

4. In static machines, in combination, a hub, a plate-clamp having one section secured to the hub, a removable section, threaded interengaging hubs on the respective sections and a generator-plate secured to the hub by means of the sectional clamp.

5. In static machines, in combination, a hub, a sectional clamp having one member secured to the hub and the other removable therefrom, interengaging threaded parts on the respective sections of the clamp, a generator-plate adapted to be mounted on the hub-section of the clamp and a supplemental plate mounted on the clamp and in close relation to the generator-plate and secured thereon by means of the clamp.

6. In static machines, in combination, a plural number of plates mounted to turn in pairs in opposite directions each pair made up of a generator-plate and a supplemental plate turning with the generator-plate and located a short distance from it on the same axis.

7. In static machines, in combination with the generator-plates, a collector arranged to embrace the edges of the plates on one side and having two supporting devices, one formed in telescopic sections with a clamp to bind the sections together and the other fitting a socket or guide in a fixed bracket, one of said supports forming the pole-piece.

8. In a static induction-generator the combination with the usual driving, supporting and collecting mechanism, of a generator-plate and a supplemental plate mounted in close relation to and turning with the generator-plate, the inclosing case, a bracket secured thereto, a bent rod with one arm adjustably clamped to the bracket, the rod clamped on the bracket, a telescopic section borne on the outer end of the rod and a breeze electrode supported from the outer end of the rod.

9. In static machines in combination with the generator-plates, a collector arranged to embrace the edges of the plates on one side and having two supporting devices, one consisting of the pole-piece made in the telescopic sections with a clamp device for binding the sections together and the other fitted into a socket or guide in a fixed bracket.

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