F. GHILARDUCCI.

ELECTROSTATIC MACHINE.

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1,011,939.

Patented Dec. 19, 1911.

Fig. 1.

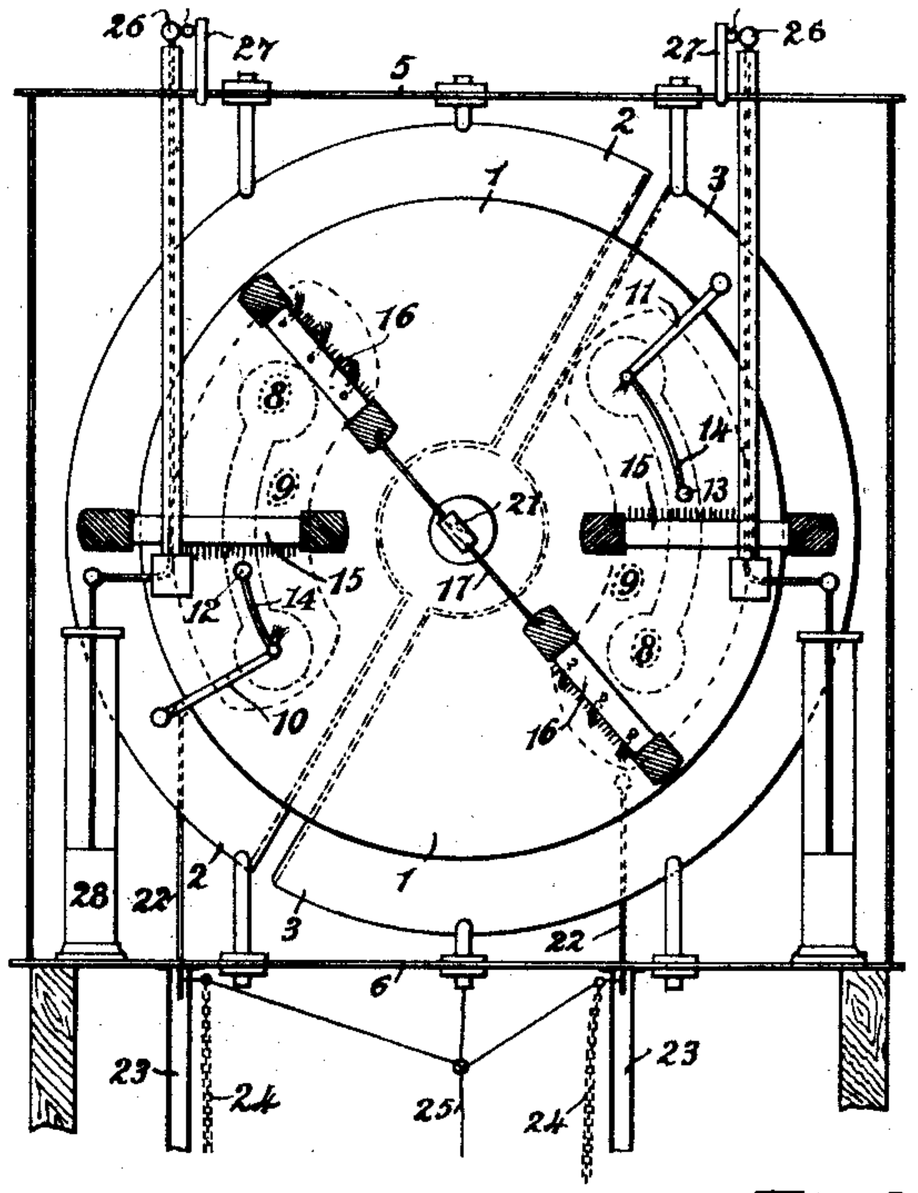


Fig. 2

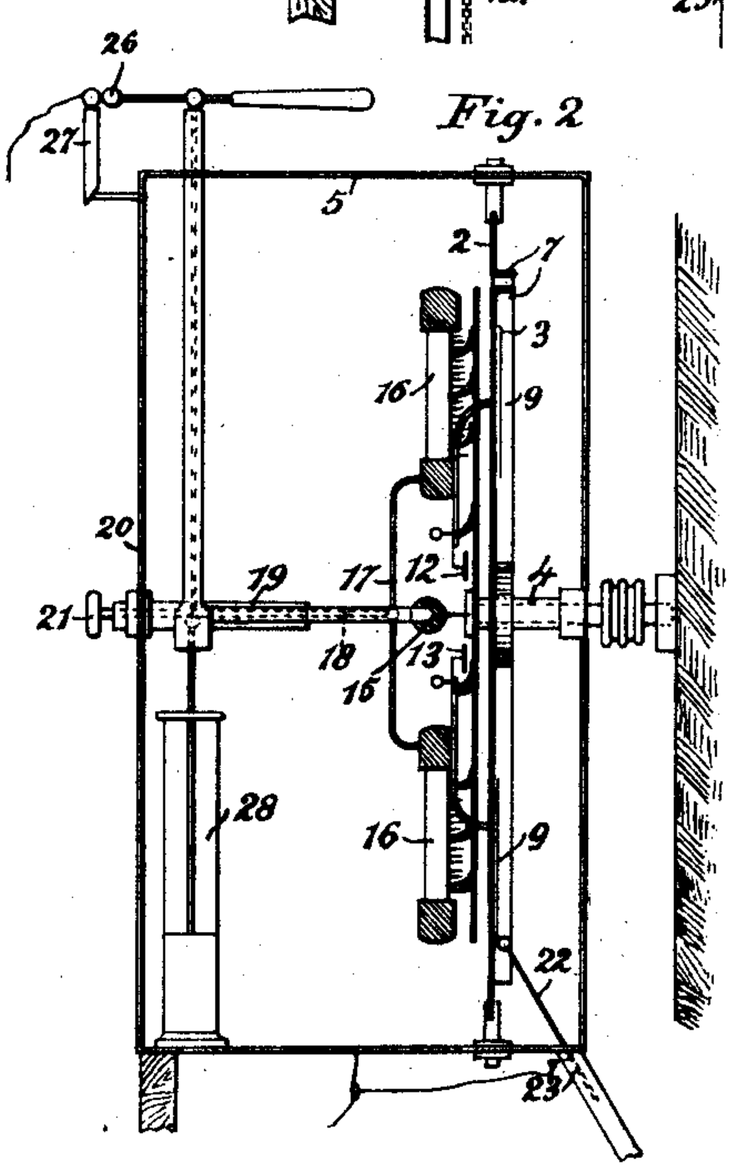
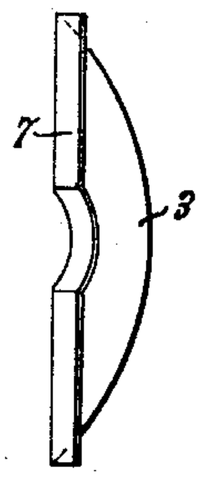


Fig. 3



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UNITED STATES PATENT OFFICE.

FRANCESCO GHILARDUCCI, OF ROME, ITALY.

ELECTROSTATIC MACHINE.

1,011,939. Specification of Letters Patent. Patented Dec. 19, 1911.

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To all whom it may concern:

Be it known that I, FRANCESCO GHILARDUCCI, a subject of the King of Italy, residing at Rome, Italy, professor at the Roman University, have invented certain new and useful Improvements in Electrostatic Machines, of which the following is a specification.

My invention relates to electrostatic machines, as they are used for producing Röntgen rays, for space telegraphy and in electro-therapeutics, and has for its object to make certain improvements in electrostatic machines of a well-known type, such as the Holtz machine.

My invention more particularly consists in making the stationary disk in two parts, supported by the insulating casing, and provided with flanges at their opposite straight edges, and mounting the rotatable disk on a shaft, supported independently of the casing upon a wall or other rigid structure. The most important advantage obtained by this improvement is the prompt and certain self-excitability of the machine under any atmospheric conditions, and in addition an enormously superior output is obtained from my machine as compared with other machines of equal dimensions, because the rotatable disk can be operated at an extraordinarily high speed, whereas the support for the stationary disk can be made of glass, which is a good insulating material. On account of the gap between the two parts of the stationary disk and on account of the flanges provided at their opposed straight edges, a most perfect insulation of the two parts of the stationary disk is effected. My machine, moreover, works perfectly even in a humid atmosphere and is therefore always ready to perform any radio-telegraphic and electro-therapeutic operations.

In the accompanying drawing, Figure 1 is a front view of an electrostatic machine of the well-known Holtz type with my new improvements; Fig. 2 is a side view of the machine as shown in Fig. 1; Fig. 3 a perspective view of a section of the stationary disk.

1 designates the rotatable disk, which is made of hard rubber, or glass, or the like, and is mounted on a shaft 4, which shaft has no support at its front end, but is journaled in a bearing provided in a socket of a wall or other rigid body, so that a very rapid rotation of about 3,000 revolutions per minute may be given to the disk without setting up oscillation therein. By thus journaling the shaft 4, carrying the rotatable disk 1 in a bearing independent of the casing, the bottom plate of the latter may be made of glass, since it is not subjected to any strains, which would occur, if the shaft 4 were journaled in the casing. This arrangement results, at the same time, in a great gain in insulation. The casing is therefore made entirely of glass, and the sections 2 and 3 of the stationary disk are supported each from the top 5 and the bottom plate 6 of the casing, so as to leave a gap of at least one centimeter between their straight edges, as clearly shown in Fig. 1. In the center of their straight edges, the sections 2 and 3 are recessed, so as to form a circular opening, through which the shaft 4 supporting the disk 1 passes. The sections 2 and 3 of the stationary disk are also made of hard rubber, or preferably of glass, and are each provided at their straight edges with an upright flange 7 at right angles to the planes of the sections and preferably about eight centimeters high. The distance between the two flanges is about 1 centimeter. Each section is provided with a tinfoil armature 8, which is covered with paraffin paper 9. The armatures 8 are connected with the brush-carriers 10 and 11, which are adapted to slide on the front face of the disk 1, while the latter rotates. By a metal rod 14 there is connected to each brush-carrier a small capacity 12 and 13 respectively. By the arrangement of these capacities, the inductive effect of the machine is increased and a corresponding potential increase is effected. The capacities are preferably so located that their rims are about three centimeters away from the collecting combs 15. The collecting combs 15 are supported from the top 5 of the casing and terminate in small knobs 26, which are adjustable by means of brass-rods provided with ebonite handles, so that the knobs 26 can be moved nearer to and farther away from other knobs 27, whereby a variable spark gap may be formed. The two sections of the stationary disk can be brought into contact with the ground by means of two metal rods 22, adapted to slide in insulating tubes 23, secured to the under side of the bottom plate 6 of the casing. Contact is made between the said metal rods and

the armature by the pulling of a cord 25, whereby the armatures of the two sections of the stationary disk are discharged, and the polarity of the machine is reversed. Thus the polarity of the machine may be changed even at a distance. The grounding of the discharges is effected by means of metal chains 24, which, as shown in Fig. 1, are connected to the metal rods 22.

As seen from Figs. 1 and 2, a neutralizing rod is provided, provided at each of its metallic terminals 16 with three brushes. The said terminals are connected by a bent wire 17, which is bow-shaped and fixed at its center to a metal rod 18, adapted to slide in an insulating tube 19, secured to the front plate of the casing. By means of a handle 21 attached to the rod 18, the latter can be turned to give a right or left hand inclination to the neutralizing rod, the effect of this being to vary the tension, or to reverse the polarity of the machine. The polarity is reversed by giving the neutralizing rod a maximum right hand inclination and then returning it to its normal position, shown in Fig. 1. By moving the neutralizing rod nearer to the disk 1, or farther away therefrom, also the electric tension of the machine can be varied.

By making the stationary disk of two sections, as described and shown, and providing a neutralizing rod, the machine can be easily and promptly deënergized by giving the neutralizing rod a turn to move it from its normal position shown in Fig. 1 into a position in which it will lie above the gap formed between the straight edges of the two sections 2 and 3. The deënergizing of the machine can also be obtained by establishing a metallic connection between the two armatures 8 of the sections 2 and 3 of the stationary disk. As soon as the neutralizing rod is returned to its normal position, or after the metallic connection between the armatures has been interrupted, the machine immediately becomes again energized.

In conjunction with the knobs 26 above referred to, two condensers 28 of adjustable capacity may be provided to increase the strength of the electric discharges.

I claim:

1. In an electrostatic machine of the Holtz or a similar type, the combination with an insulating casing of a rotatable ebonite disk supported independently of the said casing, a stationary disk made of insulating material, and comprising two independent sections, forming a gap between them and supported each by the top and bottom of said casing, an armature on each of said sections and brushes connected to said armature and adapted to slide on the front faces of said rotatable disk.

2. In an electrostatic machine the combination with an insulating casing, a rotatable shaft journaled independently of said casing, an ebonite disk mounted on said shaft, a stationary disk made of insulating material, and comprising two sections, forming a gap between them and supported each by the top and bottom of the said casing, an armature provided on each section, brushes connected to said armatures and adapted to slide on the front face of said disk during its rotation, collecting conductors, a neutralizing rod, a plurality of brushes carried at its terminals, an insulating tube carried by the front plate of the casing, a rod carrying said neutralizing rod and capable of adjustment in said insulating tube, an operating handle for moving said metal rod in said tube both longitudinally and axially.

3. In an electrostatic machine the combination with an insulating casing, a rotatable shaft journaled independently of said casing, an ebonite disk mounted on said shaft, a stationary disk made of insulating material, and comprising two sections, forming a gap between them and supported each by to the top and bottom of the said casing, an armature provided on each section, brushes connected to said armatures and adapted to slide on the front face of said disk during its rotation, collecting conductors, a neutralizing rod, a plurality of brushes carried at its terminals, an insulating tube carried by the front plate of the casing, a rod carrying said neutralizing rod and capable of adjustment in said insulating tube, an operating handle for moving said metal rod in said tube both longitudinally and axially, and insulating tubes attached to the bottom of the casing, and metal rods adapted to slide in said insulating tubes and to connect the armatures of the two sections of the said stationary disk.

In testimony whereof I have affixed my signature in presence of two witnesses.

FRANCESCO GHILARDUCCI.

Witnesses:

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ZLAMELLE PERSON.