

No. 707,797.

Patented Aug. 26, 1902.

M. OTTO.

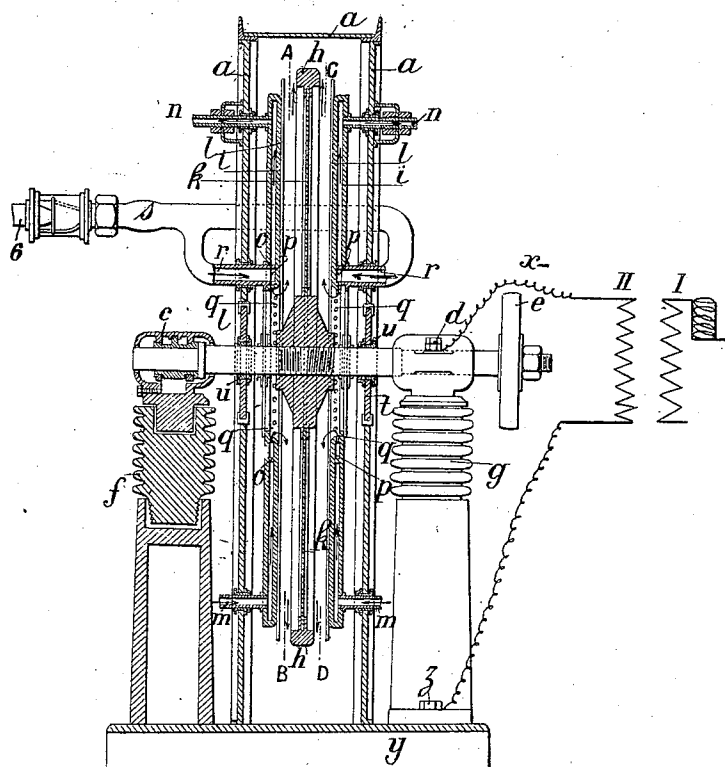
ROTARY APPARATUS FOR THE PRODUCTION OF DIFFUSED ELECTRIC DISCHARGES.

(Application filed Nov. 12, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1



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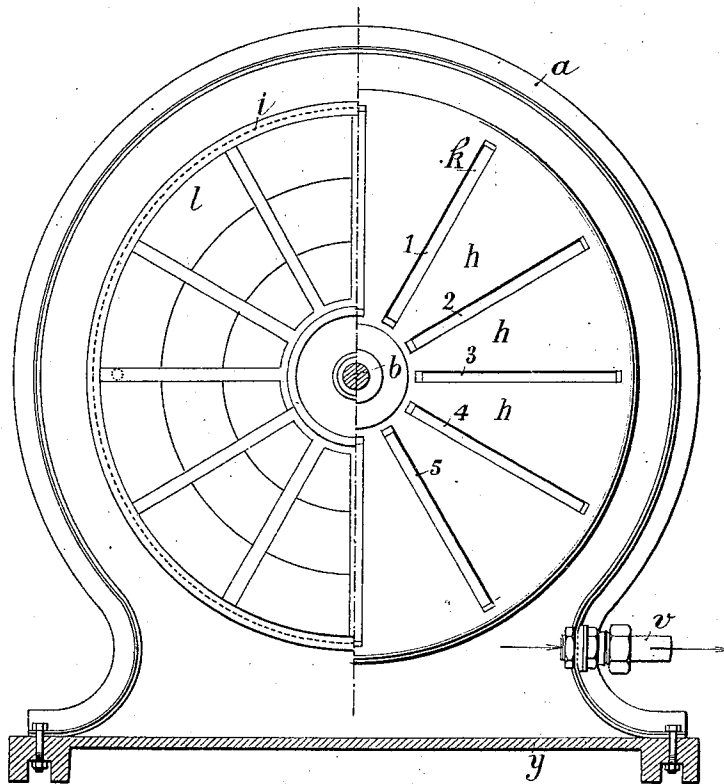
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(No Model.)

2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

MARIUS OTTO, OF NEUILLY, FRANCE.

ROTARY APPARATUS FOR THE PRODUCTION OF DIFFUSED ELECTRIC DISCHARGES.

SPECIFICATION forming part of Letters Patent No. 707,797, dated August 26, 1902.

Application filed November 12, 1901. Serial No. 82,030. (No model.)

To all whom it may concern:

Be it known that I, MARIUS OTTO, of No. 18 Avenue de Neuilly, Neuilly, Seine, in the Republic of France, have invented a certain
5 new and useful Improved Rotary Apparatus for the Production of Diffused Electric Discharges; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in
10 the art to which it appertains to make and use the same.

This invention relates to an improved rotating machine for effecting a continuous and uniform discharge of electricity across a space
15 through which a quantity of gas may be caused to pass in order that it may be subjected to electrical treatment.

In my previous patents, numbered 599,455 and 640,694, I have described an apparatus
20 capable of producing in a continuous manner diffused electric discharges. The principal characteristic of that apparatus consisted in an arrangement of the positive and negative electrodes relatively to one another in such a
25 way that the time is too short for the electric current to establish short circuits.

The method which I have indicated for automatically cutting the arcs which tend to be produced consists in making the electrodes
30 movable one relatively to the other or in placing between electrodes which are fixed separating-disks which are perforated and movable. In short, the means which I have employed to avoid the formation of conducting
35 arcs consists in not allowing the same parts of the positive and negative electrodes to face one another continuously. Under these conditions the electrodes which lend themselves best to the continuous discharge
40 of a uniformly-distributed electric current are metallic surfaces which are provided with points or other acute projections.

Although in my chief patent, numbered 599,455, I have pointed out the possibility of
45 employing even and smooth surfaces, it is still true that surfaces with projections, like those which I have represented in the various forms of the construction described, give results which are very much better. In certain
50 particular cases, for economical reasons, in order to reduce obstruction one may perhaps be induced to employ in preference elec-

trodes with an even surface—plane, cylindrical, or otherwise shaped—such, for example, as a simple disk. I have observed that
55 (subject of course to the condition that the principle of relative motion protected by my previous patent is adopted) the efficiency of such like electrodes was greatly facilitated by placing upon plane surfaces, or at least on
60 one of them, an insulated covering, which by preference is discontinuous, or, which amounts to the same thing, by the interposition between the electrodes of a very thin film of dielectric material. It is this discovery
65 which has led me to the new form of apparatus which is the subject of this present application for a patent.

Figures 1 and 2 show a representative example of such an apparatus which is specially
70 designed for the formation of ozone. Fig. 1 is a vertical section taken through the axis, and Fig. 2 represents, on the left-hand half, a section taken along the plane indicated by
75 A B in Fig. 1, while the right half represents a section taken along the plane indicated by C D, both being viewed in a direction from right to left.

Through a casing *a*, of any convenient form, an axle *b* is passed and is supported on two
80 bearings *c d*, which are secured to two blocks of insulating material *f g*. A pulley *e*, which is keyed to the axle *b*, receives a rotary motion, which it transmits to the said axle. Upon the axle is secured a metallic plate *h*,
85 of which one-half is shown in the right-hand half of Fig. 2. The plate *h* is perforated by a number of narrow radial apertures 1 2 3 4 5 &c., evenly separated. These apertures
90 are provided with insulating membranes *k*, preferably of ebonite. The disk *h*, which forms one of the electrodes of the apparatus, revolves between two fixed disks or plates *i*,
95 of which one is seen in half-elevation on the left-hand half of Fig. 2. The disks *i* are on the side toward the revolving plate *h* covered
100 by an insulated film or by a lining of appropriate dielectric material *l*, such as ebonite. These disks are hollow and are thus able to receive a current of cold air or refrigerated water, which circulates in the directions of the arrows, entering through the tubes *m m* and going out through the other tubes *n n*. These tubes enter the apparatus

through the casing *a* and form supports for the disks *i i*, which are open at their centers for the passage of the axle *b*. In the interior of the disk an annular partition *c* separates the space for the circulation of the water from a ring-passage *p*, of which the boundary edge at the central opening is pierced with orifices. These orifices provide a passage into the interior of the apparatus for the air which is supplied to each of the rings by one of the branches of the pipe *s*. The axle is insulated from the casing and plate *a*, which incloses the apparatus, by means of two disks *t t*, of insulating material, and fluid tightness is provided by two stuffing-boxes *u u*. The electric current is led to the apparatus by a conductor *x*, connected to one of the poles of a high-tension transformer, the other pole of which is connected to earth. A second conductor *z* places the base-plate *y* of the apparatus in connection with the earth. I designate the primary at low tension, which receives the current emanating from a self-inducting bobbin; *H*, the secondary at high tension, connected with the two ends of the apparatus producing diffuse discharges. After passing an indicator *6* to measure the flow, which is formed by a flap of aluminium free to turn on a horizontal axis and suspended in front of a conical mouthpiece, the air flows by the tube *s* around the branches *r* into the ring-chamber *p*, from which it escapes by the orifices *q* and spreads itself, as indicated by the arrows. The axle being set in motion, the air receives the diffused discharges which shoot across the space between the moving metallic plate *h* and the two fixed conducting-disks *i*, which are covered with a lining or coat of dielectric material *l*. The oxygen of the air is partially transformed into ozone, and the outflow of the ozone takes place through the tube *v*, Fig. 2. The dielectric which covers the disk *i* should be divided into parts, as is indicated in Fig. 2. In such a case the parts of the disk not covered

should be hollowed to prevent sparks shooting directly between the electrode which is in motion and that which is fixed.

It will be obvious that the same apparatus may be made to contain many elements similar to those which have been represented—that is to say, many moving disks each placed, respectively, between two fixed disks. The disks or plates may be arranged vertically upon a horizontal axle or horizontally upon a vertical axle. Lastly, the electrodes with even surfaces instead of being planes may be cylindrical surfaces surrounding one another, or any other form may be given to them consistent with small resistance and cost of construction.

What I claim is—

1. In an apparatus for producing distributed electric discharges, the combination with electrodes moving relatively to each other, of dielectric material interposed between said electrodes, substantially as described.
2. In an apparatus for producing distributed electrical discharges, a pair of stationary conducting-disks having each a covering or facing of dielectric material, and a conducting-disk movably mounted between the dielectric-covered faces of the stationary conducting-disks, substantially as described.
3. In an apparatus for producing distributed electrical discharges, a pair of hollow stationary conducting-disks arranged parallel to each other, means for supplying a cooling medium thereto, a covering or facing of dielectric material on the opposing faces of said disks, and a disk of conducting material rotatably mounted between said dielectric-covered faces, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

MARIUS OTTO.

Witnesses:

LOUIS GARDET,
EDWARD P. MACLEAN.