

of the chalk, all surplus chalk is removed by a loop-bar scraper. The roller in the chalk chamber may be readily removed when it is desired to use the device without chalking the line.

PICOLET'S WIMSHURST INDUCTION MACHINE WITHOUT SECTORS.

To the Editor of the Scientific American:

Having read an article in the French weekly *La Nature*, of April 14, stating that the Wimshurst machine made without sectors is something new in the way of influence machines, I take the liberty of asking your attention to a description of a machine of my in-

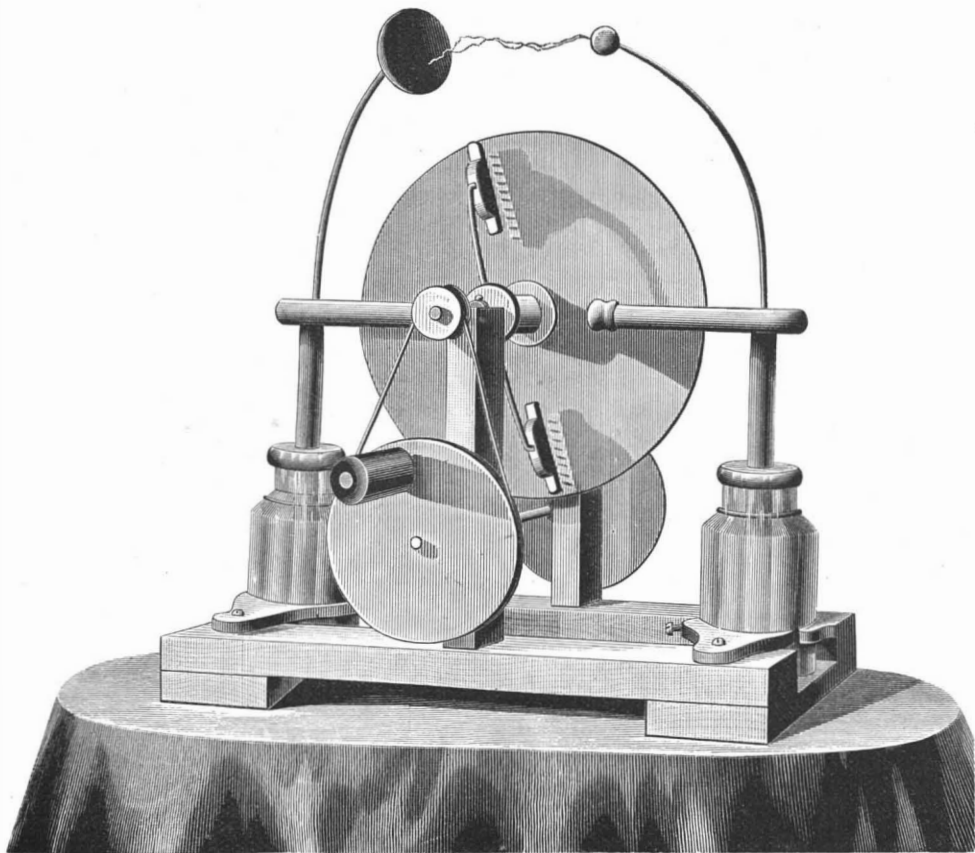
ing the front plate, and E and F the combs facing the back plate.

The machine can be started by holding a positively electrified body, an electrophorus for instance, near the front plate, opposite the comb, E, while the disks are revolving. This positively electrified body acts inductively on E, attracting negative electricity on to the plate opposite E, and repelling positive electricity through F on to the plate opposite F. By the rotation of the back plate, the negative electricity from E is carried to the collector A, and the positive electricity from F is carried to the collector B. Now, while the negative electricity is being carried to A it comes opposite C, and attracts positive electricity to the plate opposite C; and in the same way, while the positive electricity is being carried from F to B, it comes opposite D, and attracts negative electricity to the plate facing D. The positive electricity from C is carried to B, and the negative electricity from D is carried to A. The electricity that is now on the front plate acts on the combs facing the back plate in the same way as that on the back plate acted on the combs facing the front plate; and thus the electricity on one plate induces electricity on the other, so that they keep up a reciprocal action. This action is maintained as long as the plates are made to rotate, and is accompanied by a powerful discharge of sparks between the electrodes.

sectors of the disks and increasing the number of the brushes. It is the practical realization of an idea brought out for the first time, we believe, by Mr. George Pellissier in 1891 in the *Journal de Physique*.

The machine thus modified is represented in Fig. 2. We find therein all the elements of the Wimshurst machine, less the metallic sectors glued to the disks, plus supports that permit of making the brushes slide over the diametral conductors. The disks may be of glass or ebonite, but the latter material, which is less hard and fragile, is generally preferred. The machine is not excited automatically, but by rubbing one of the disks with the finger covered with a little mosaic gold. The direction of the current, once determined, cannot change. The machine is non-reversible. No inversion is produced while running unless the other disk is rubbed at a symmetrical point. This fixedness of the current and the facility of rapidly and surely effecting its inversion constitute valuable qualities in therapeutics.

The discharge also can be varied within wide limits



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vention which I constructed in 1892. It is like a Wimshurst machine of the disk type, only the plates have no sectors on them, and where the brushes of an ordinary sector machine would be combs are placed parallel to the plane of the brush-holders, and extending from near the edge to about the length of half the radius of the plates. The collectors cover the same part of the radius as the combs, and in other respects are like those on a Wimshurst machine. The positive pole terminates in a small ball, and the negative pole in a small disk.

As nothing touches the disks, I think that my machine, as respects wear and friction, is superior to Mr. Bonetti's, and although mine is imperfectly made, it gives very good results. The plates are 5 inches in radius, and the greatest distance that a spark can jump across is, under favorable conditions, 5 3/4 inches.

I inclose a diagram to illustrate how the machine works. In the diagram, the smaller circle represents the front plate of the machine, and the larger circle represents the back plate.

A and B are the collectors, C and D the combs fac-

The distribution of electricity on the two plates is shown in the diagram by plus and minus signs. The signs farthest from the center of the plates correspond to the electricity on the back plate, and the signs nearest the center to the electricity on the front plate.

May 4, 1894.

ANDRE J. PICOLET.

ELECTROSTATIC INDUCTION MACHINES WITHOUT SECTORS.

The improvement made by Mr. Wimshurst in electrostatic induction machines through the construction, in 1883, of the one that bears his name, is well known.

This machine is formed, in principle, of two parallel disks of insulating material, glass or ebonite, provided with numerous sectors. The disks have rapid rotary motion in different directions. The difference of potential developed manifests itself between two conductors connected with insulated combs arranged on diametrically opposite sides of the disks and embracing the two disks on each side. Mr. Bonetti has simplified the construction of the Wimshurst machine and increased its discharge by omitting the metallic

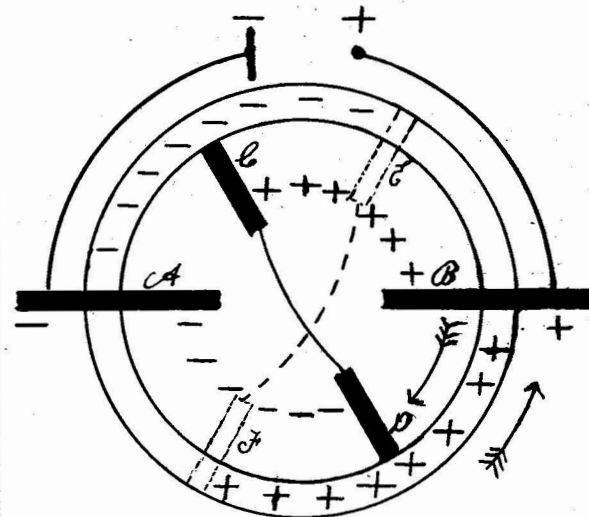


DIAGRAM ILLUSTRATING THE ACTION OF PICOLET'S MACHINE.

either by suppressing some of the brushes or by shifting their points of contact upon the disks. When the entire surface of the disk is brushed by the metallic pencils, the discharge is maximum. Measured by the Lane electrometer, it is, according to Mr. D'Arsonval, three times greater than that of a Wimshurst machine of the same dimensions provided with sectors. Upon shifting the brushes in order to make them touch the same zones, the discharge is reduced in proportion with the reduction of the surface brushed.

The suppression of the sectors has led to another advantage relative to the maintenance. The plates destitute of sectors are more easily cleaned, and the brushes last longer, since they do not rub against metallic sectors, which wear them away in themselves being worn away, and which become deteriorated and torn.

The principle of the Wimshurst machine without sectors has been likewise applied to a more powerful machine, represented in Fig. 1, and in which the disks are replaced by two concentric ebonite cylinders, whose mean diameter is 50 centimeters and whose common height is 50 centimeters. These two cylinders, separated by a distance of a few millimeters only, are mounted upon two thick ebonite disks fixed upon concentric shafts with ball bearings and actuated by friction wheels. Series of external and internal combs and brushes, arranged according to generatrices, replace the radiating combs and brushes of the disk machine. Fig. 1 represents the machine as it operated

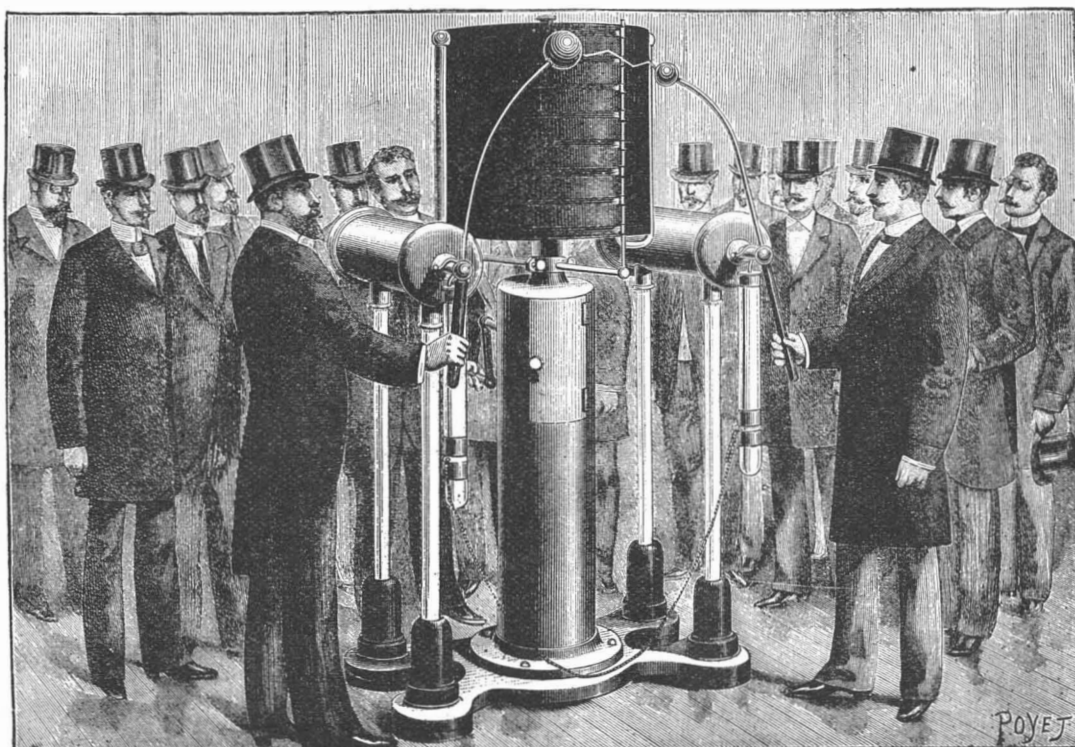


Fig. 1.—BONETTI'S CYLINDRICAL WIMSHURST MACHINE.

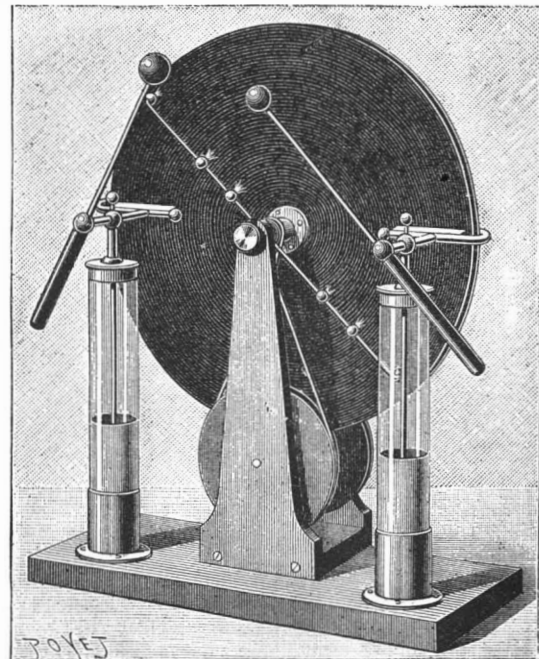


Fig. 2. ELECTROSTATIC INDUCTION MACHINE WITHOUT SECTORS.