

RHEOSTATIC MACHINE

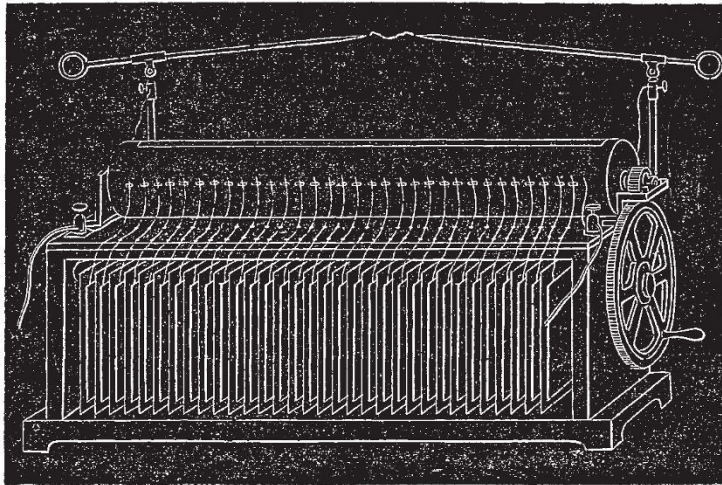
IT is known that Franklin made use of a series of Leyden jars or fulminating plates, arranged in the form of a cascade, to obtain strong discharges of static electricity; that, on the other hand, Volta, Ritter, Cruikshank, &c., were able to charge condensers by means of the pile, and that these results gave rise to researches, conducted both by calculation and experiment, on the part of a great number of physicists.

I have been led to study, in my turn, the static effects of voltaic electricity, by means of a secondary battery of 800 couples which I at present possess; and I have devised an apparatus which shows the intensity that these effects may acquire.

After having proved how easy it is with this battery to charge rapidly an insulating plate condenser, sufficiently thin, of glass, mica, guttapercha, &c., I combined a certain number of condensers, formed by preference of mica covered with tinfoil, and arranged them as couples of the secondary battery itself, so as to be easily charged in quantity, and discharged in tension.

All the pieces of the apparatus must be carefully insulated. The commutator is formed of a long cylinder of hard caoutchouc, provided with longitudinal metallic bands, intended to unite the condensers at the surface; and traversed at the same time by copper wires, bent at their extremities, for the purpose of uniting the condensers in tension. Small plates or metallic wires formed into springs are placed in connection with the two armatures of each condenser and fixed on an ebonite plate on each side of the cylinder, to which a rotatory movement can be given.

If we put the two sides of the apparatus into communication with the secondary battery of 800 couples, even several days after having charged it with two Bunsen elements, and if we set the commutator in rotation, we obtain, between the branches of the excitor, on which the armatures of the extreme condensers abut, a series of sparks entirely similar to those given by electric machines provided with condensers. By employing an apparatus of only thirty condensers, each of three square decimetres of surface, I have obtained sparks four centimetres in length.



The tension of a secondary battery of 800 couples is not necessary to produce marked effects with this apparatus. By putting in action only 200 couples, we have sparks of eight millimetres, and we may, without doubt, by diminishing still more the thickness of the insulating plates and multiplying the number of condensers, obtain effects with a source of electricity of less tension.

It is to be remarked that the discharges of static electricity, furnished by this apparatus, are not in directions alternately positive and negative, but always in the same direction, and that the loss of force resulting from the transformation must be less than in the induction apparatus; for, as the voltaic circuit is not closed a single instant on itself, there is no conversion of a part of the current into heat.

We may maintain the apparatus a long time in rotation and produce a considerable number of discharges without the secondary battery appearing sensibly weakened. This is because each discharge employs only a very small quantity of electricity, and because, as above stated, the circuit of the battery is not closed by a conducting body. The electricity of the source simply spreads over the polar surfaces presented by all the condensers, in proportion as they are discharged. This emission constantly repeated must nevertheless end by discharging a certain quantity of electricity; and when the instrument is charged by a secondary battery, we must ultimately exhaust, under the form of static effects, the limited quantity of electricity which the current of the battery can furnish.

Thus then, by another method than that of induction, properly so-called, by means of a simple effect of static influence renewed without cessation, we effect the transformation of dynamic electricity, so that this apparatus may be designated by the name of "rheostatic machine."

GASTON PLANTÉ

GEOGRAPHICAL NOTES

THE Berlin Geographical Society celebrated in characteristic German fashion the fiftieth anniversary of its foundation last week. Berlin, as our readers know, is not the only German city possessing a geographical society; indeed it has two. In Hamburg and Bremen are two excellent societies of this class, while the Continent, generally, is overrun with them. Russia has about a dozen, Belgium has at least two, Brussels and Antwerp, Holland one if not more, France at least half a dozen, Italy two or three, and the Scandinavian countries their own share. We do not consider it a disadvantage that in maritime countries there should be more than one geographical society, and we think it might be beneficial if even in our own country associations corresponding to the French societies of commercial geography were established in our chief ports, Liverpool, Glasgow, Bristol, Leith, Dundee. These might be branches of or affiliated to the London society, and might catch much that never reaches the latter. They might, moreover, do considerable service in encouraging the