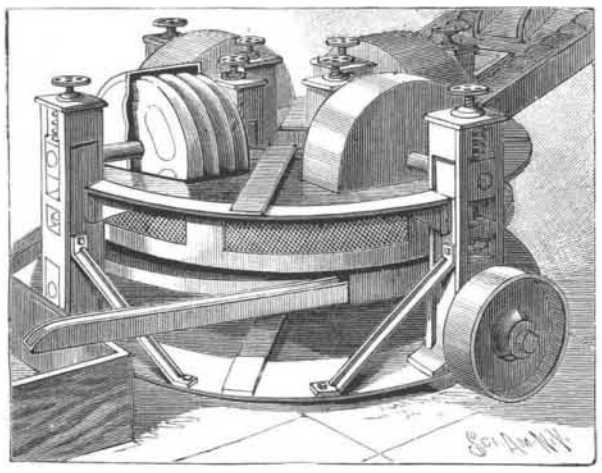
AN IMPROVED ORE CRUSHER.

This machine, adapted to crush gold, silver, or other ores, forms the subject of a patent recently issued to Mr. Frank Bishop, of No. 1265 Washington Avenue, Ogden, Utah. Its circular base carries four sets of posts, in which are journaled four horizontal radial shafts, two of these shafts having on their outer ends pulleys connected by belting with a suitable source of power. On each of the shafts is a step pulley, and on these steps of the four pulleys rest similar steps on the under side of a circular ring-shaped bed, near the outer edge of which, on the under side, is a gear wheel or rack in mesh with gear wheels on the power shafts. On the top of the bed is a facing on which the crushing of the ore or stone takes place, and in the facing

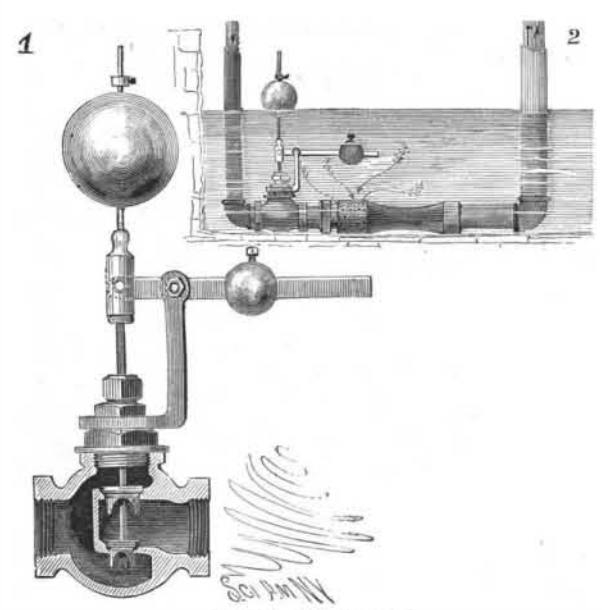


BISHOP'S ORE CRUSHER.

are concentric annular V-shaped grooves, corresponding to oppositely shaped ridges on the peripheries of the four crushing rollers. The latter are on radial shafts arranged in line with and supported by the four sets of posts in which are journaled the lower shafts, but the boxes in which are journaled the shafts of the crushing rollers have a vertical movement, springs being arranged to press upon the tops of the boxes with a tension which may be regulated by a set screw at the top of the post over each bearing, each roller, therefore, having such yielding movement as may be desired, according to the material being crushed. The upper half of each roller is inclosed by a suitable casing, one of the casings being partly broken away in the illustration, and the bed has an outer and inner annular flange, circular screens being attached to the upper edges of these flanges, against which the crushed material is thrown by the centrifugal force of the revolving bed, only that which is sufficiently fine being passed through the meshes of the screens. Scrapers suspended from the roller casings guide the material on to the corrugated facing in advance of the rollers, the material being fed from a hopper by means of screw conveyers, and introduced through suitable feed openings in the base. The outer lower edges of the screens extend into semi-ring shaped receiving troughs or spouts, which lead the material discharged to settling tanks. This machine is designed to crush a large amount of ore with a minimum expenditure of power.

AN AUTOMATICALLY OPERATING EJECTOR.

In the improvement shown in the illustration, patented by Mr. Nicholas Power, of New York City, the valve is perfectly balanced by an adjustable counterpoise to remain in whatever position it is placed by a float, which controls the action of the valve. Fig. 1 is a sectional view through the valve, and Fig. 2 shows the improvement in connection with an ejector, as it might be placed for draining cellars and similar purposes. The ejector may be of any of the well known types, connected at one end with a discharge pipe and at the other end with a supply or pressure pipe. The



POWER'S EJECTOR.

valve has an upper and lower seat, and the two valve disks are mounted on one stem, on the upper end of which is a block to which is coupled a rod carrying a float. The block is also attached to the inner end of an arm pivoted upon a bracket supported by the casing, the arm carrying an adjustable weight. The float on the rod coupled to the valve stem slides freely, its upward movement being limited by an adjustable collar on the rod, and its downward movement by the block on the upper end of the valve stem. When the float exerts upward pressure on the collar the valve will open, and it will close when the water lowers so that the float strikes the block.

Further information relative to this invention may be obtained of Mr. P. Braender, No. 263 West 118th Street, New York City.

The Stuff we are Made of.

Take the case of a lovely human face. It may be asked, "What can science say about this without detracting from its charm?" If beauty were only skin deep, we might dread her interference here. But science says that beauty is not skin deep. She can tell you that half the charm of that face—at least the expression—is a matter of little muscles and a complex labyrinth of nerves. That the curves of the lips, the glance of the eyes, the droop of their lids, are a matter of the prevalent use of certain small muscles in obedience to a prevalent aspect of the mind. Moreover, that the use of these organs of expression has come down long ancestral lines, and that the mould of the features themselves is a question of heredity. "What is life?" is a question with which men have puzzled themselves in vain from all time. We are not concerned with an inquiry after an entity which, perhaps, has no more separate existence than the old *phlogiston*, or principle of fire, of the alchemists. But what does concern us most truly is the process of living, and, in discussing the stuff we living beings—men, animals and plants—are made of, I shall try and lead my readers a little way into those mystic haunts tenanted by those tiny elves to whose ceaseless activity, from the dawn of life upon this globe to this day, are due all those embodiments, in endless variety, of energy and beauty, without which the world would be a desolate wilderness—a place, indeed, of blue sky and sea, of sunrises and sunsets, of majestic mountains and mirroring lakes, of rocky shores and foam-fringed beaches; of many colors and tints, indeed, but without verdure or blush of life, or any sound, save the beat of the waves and the sigh of the wind, like an endless lament that earth and sea had missed the purpose of their creation. A little child's idea of his body is that of a trunk, head (with mouth, etc.), legs and arms, and, practically, grown people—at least those who enjoy good health—go no further in their analysis. But the truth is that that which we call ourselves is the sum of a countless host of tiniest lives, each tiny life contributing its tiny share to the maintenance of that marvelous and complex organization known as a living body. As soldiers make the stuff of which an army consists, as citizens are the stuff of which a state is made, so the stuff which goes to make not only ourselves, men and women, but everything that has breath and life, and the stuff which goes to the moulding of those exquisite creatures of form and color and perfume—the flowers, as well as of the ancient fathers of the forest, that stuff consists of living particles.—*Sunday Magazine.*

Fireproof Buildings.

A writer in the New York *Recorder*, commenting on the destruction by fire of the Rev. Dr. Talmage's Tabernacle, in Brooklyn, adds:

What is fireproof?

Iron isn't, because it melts in fierce heat, and in less heat expands. Thus an iron beam between two walls may expand so much as to throw one of them down. Stone isn't, because in fierce heat it crumbles away to dust. The material which is most nearly fireproof is good brick. The more it's baked, the harder it gets. So the best fireproof buildings have brick terra cotta walls, floors of hollow brick, and doors and casings only of wood. Even then a fireproof building will burn if a very hot fire attacks it from the outside. But a fire starting in one of the rooms only burns up what's in that room and stops. It never gets very hot.

In such a fire as that in Chicago or Boston, the best of buildings would be damaged greatly, even if they did not fall.

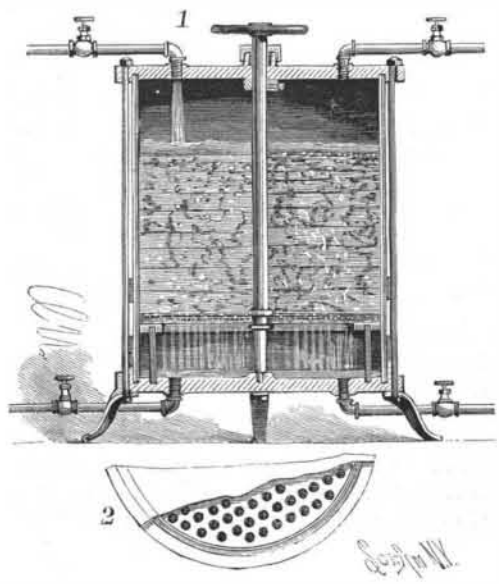
Wood, when it is thin, burns very rapidly, but in big beams it doesn't catch fire so readily.

So, in ordinary wooden buildings, it is the hollow spaces between the lath and the walls and floors that carry the fire out of sight like so many chimneys until it is ready to burst through. These hollow floors are one of the greatest dangers in fire. The stairway, with its wooden stairs, and the elevator shaft, if there is one, are the points of greatest danger, because they draw the fire up like chimneys.

That is why, in case of a fire pretty well started, it is always better to go out by the fire escape instead of the stairs.

A SIMPLE AND EASILY CLEANED FILTER.

The filter shown in the illustration is designed for either high or low pressure, and is especially adapted for filtering water used for drinking purposes, being arranged to facilitate the thorough cleaning of the filtering material whenever necessary. It has been patented by Mr. Frederick Bommarius, No. 784 N. Rampart Street, New Orleans, La. The cylindrical casing is closed by heads connected by screw bolts. Rods extending up a short distance from the lower head support a ring on which is seated a revoluble screen on a vertical shaft whose lower end turns in a step on the upper side of the lower head. The screen is readily removable, being held between a collar and jam nut on the shaft, on whose upper end is a hand wheel, by which the screen may be revolved, a collar secured on the shaft by a set screw abutting against the under side of the upper head, and preventing the screen from being unseated by upward pressure. The screen is preferably made of two perforated plates with a wire netting between them, as shown in Fig. 2, and on it is placed the filtering material. The water to be filtered is passed through one of the valved pipes into the upper end of the casing, the filtered water being withdrawn by a valved pipe leading out from the space beneath the screen. To clean the filter, the valves in

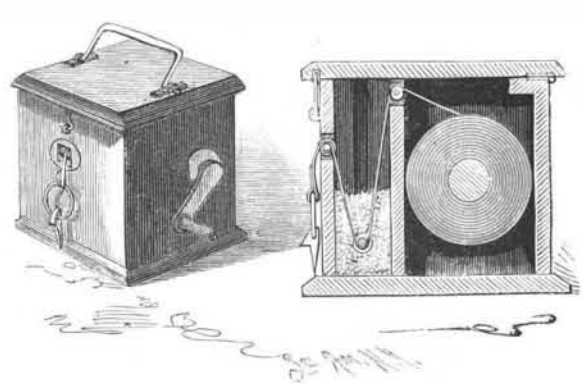


BOMMARIUS' FILTER.

both these pipes are closed, and water under pressure is admitted to the lower side of the screen from another valved pipe, the water passing upward and out through a corresponding outlet pipe at the top. While this process of washing is going on, the hand wheel is turned to revolve the screen, causing the loosening of the filtering material and the breaking up of previously formed channels.

A CONVENIENT LINE CHALKER.

This is a device for holding and keeping in a cleanly and compact way the chalk line used by carpenters, gardeners, and others, and automatically and evenly chalking the line. In practical work it has been found very satisfactory, having but few parts, being inexpensive to manufacture, and not liable to get out of order. The improvement has been patented by Mr. Carl E. Anderson, Wood's Holl, Mass. The box or casing is divided into two compartments, as shown in the sectional view, and journaled in one compartment is the reel or spool on which is wound the chalk line, on the outer end of which is a ring carrying a sharpened pin or peg—the ring to be hooked to a nail or other projection, or the peg for securing the end of the line to a wall, or the ground, etc., as may be desired. The other compartment of the casing contains the powdered chalk, and is narrowed at its bottom by inclined side strips, forming a V-shaped receptacle, so that the chalk always feeds down to the middle of the



ANDERSON'S LINE CHALKER.

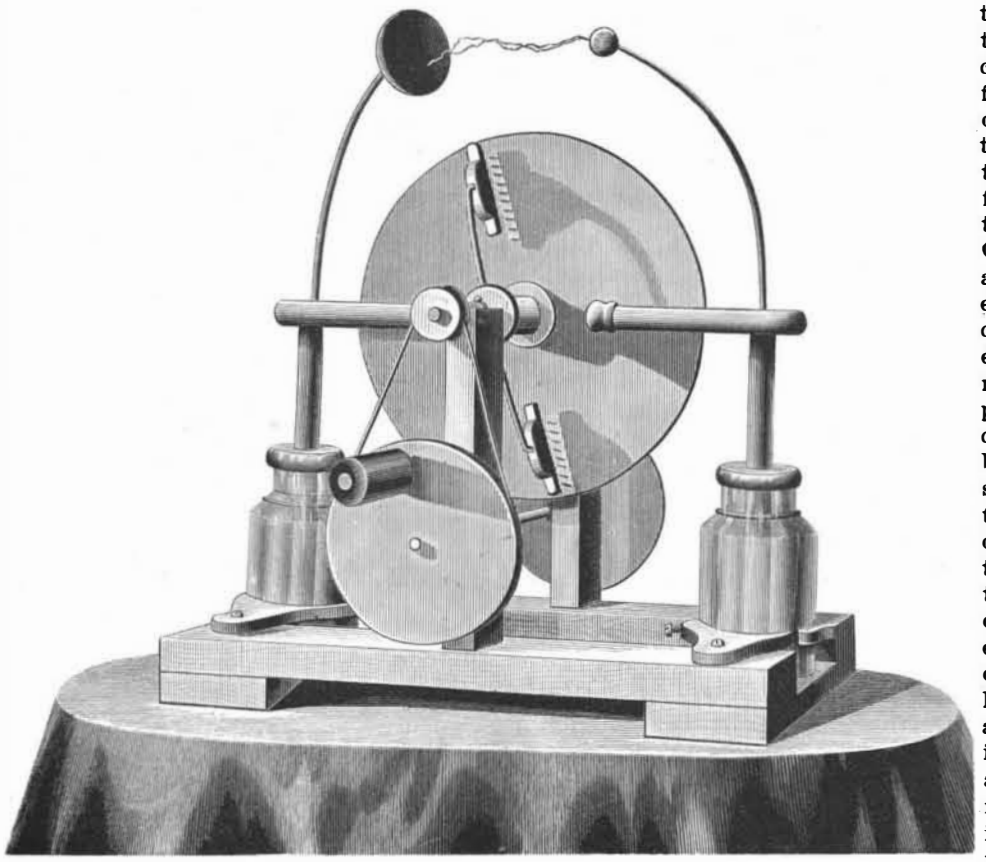
bottom. In a slot in the top of the partition between the compartments is a guide pulley over which the line passes, and thence down around a similar roller in the bottom of the chalk chamber, passing out of the box over a roller in its front wall. As the line rises out

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 invention 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.



PICOLET'S WIMSHURST'S INDUCTION MACHINE WITHOUT SECTORS.

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, 5¾ 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 facing 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.

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 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

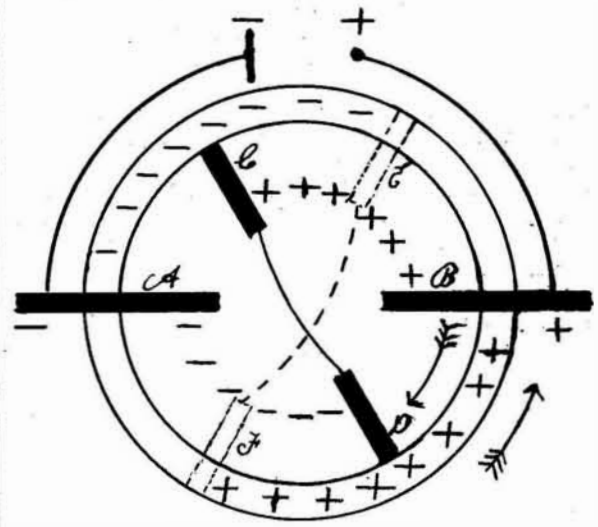


DIAGRAM ILLUSTRATING THE ACTION OF PICOLET'S MACHINE.

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

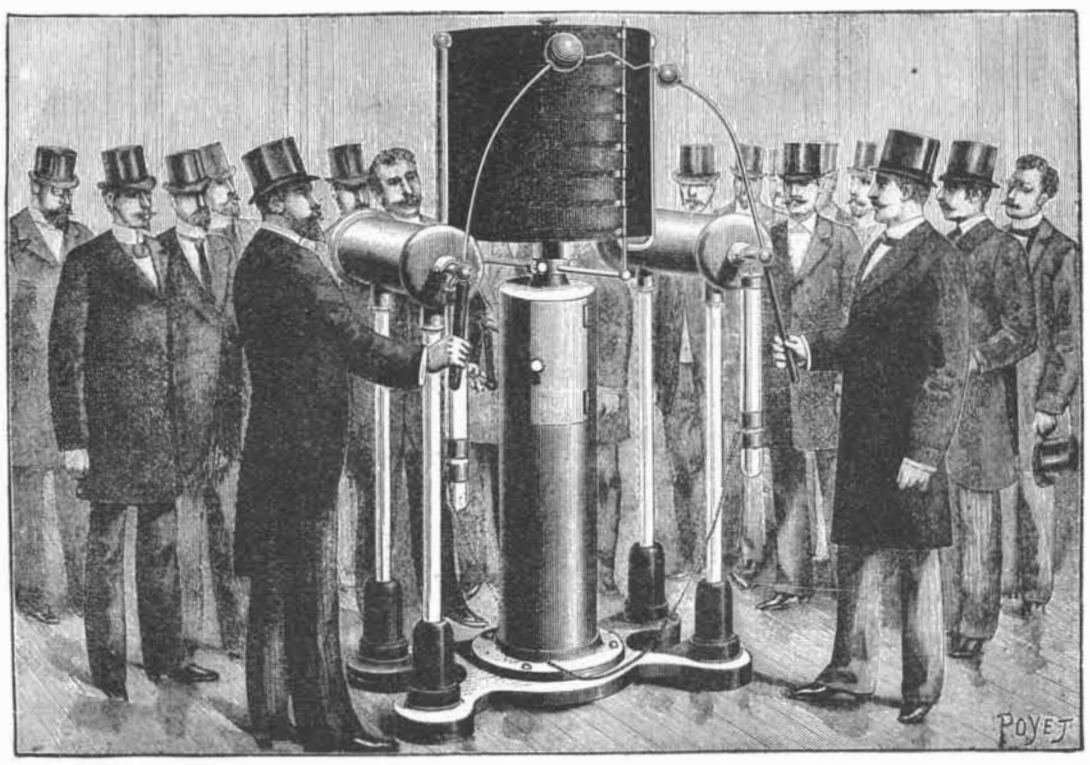


Fig. 1.—BONETTI'S CYLINDRICAL WIMSHURST MACHINE.

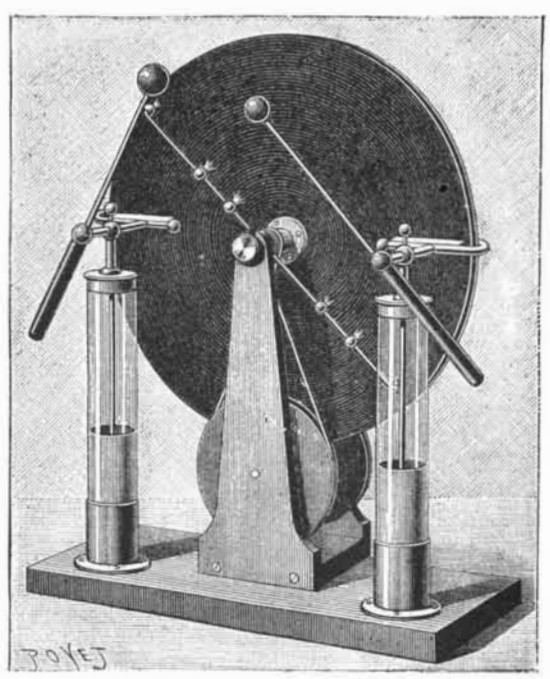


Fig. 2. ELECTROSTATIC INDUCTION MACHINE WITHOUT SECTORS.