

Improved Electrical Machine.

The apparatus represented in the engraving is a novel device for generating frictional or static electricity. It is of simple and cheap construction, and is far more powerful than the ordinary machine. It is without doubt the most important addition to the apparatus for generating and illustrating static electricity which has been made since Franklin's time.

In appearance it resembles the ordinary plate machine. In fact the most prominent part is a glass disk which is mounted and revolved in the usual manner. But the plate is thinner—the thinner the better—and as it is desirable to revolve it very rapidly, a multiplying wheel is connected with the plate so that one turn of the crank shall give four or more revolutions of the plate.

The machine has no rubbers; it produces torrents of frictional electricity, but the electricity is not generated by friction; there is no friction about the machine except at the axle bearings. The plate revolves in free air, and nothing should touch it. In the place of rubbers are what are called inductors, which are strips of paper three or four inches long and about one inch wide. They are supported and insulated on pieces of glass which (in the figure) are of spear-head form. The inductor is made complete by pasting on to the paper pointed pieces of card board which project beyond the glass spear heads an inch or two. The spear heads are attached to the framework of the machine so that they shall be parallel and as near as possible to the plate on its crank side. In the figure, four inductors are represented, each having two card points all turned in the same direction.

Opposite the inductors, at the front of the plate, are the comb points which serve to collect the electricity and convey it to the conductors for use. Each inductor is furnished with its set of points. The combs are attached to brass rods terminated at their other ends by brass balls. The rods are fastened to the framework of the machine and are insulated from it. The balls at the ends of the rods may be connected to each other in any desired order by means of bent wires.

The machine is put in action by slightly electrifying any one of the inductors by means of an excited rod of hard rubber, glass tube, or otherwise, and turning the crank. Its power progressively increases for about a minute, and until it reaches the maximum, when it furnishes a steady supply of electricity as long as the disk is revolved. The amount of electricity which a disk of only two feet in diameter will yield is almost incredible to one who has not witnessed it. It rushes between the terminal balls or poles when arranged as in the figure, as a perfect but steady torrent of purplish blue fire, or by a slightly different adjustment, in balls of dazzling lightning, each discharge being accompanied by a report like a torpedo.

Now for the explanation of the action of the machine. There are three elements which are chiefly to be considered—the inductor, the plate, and the comb points. What are their relations towards each other? If a pointed wire be brought opposite an electrified body, as, for example, a prime conductor, we say that the electricity is discharged on the point, or that the electricity is attracted by the point. Or we may say the + electricity of the prime conductor attracts the — of the wire and repels its +, and a stream of — flows out of the wire at its point, while the + flows to the opposite direction. Now suppose a sheet of glass be interposed between the point and the conductor. The attraction of the + of the conductor for the — of the wire, is by no means lessened; the — is accumulated towards the point, and by reason of its higher tension flows out on to the glass. But the glass is impervious to the electricity, and it remains on its surface; the glass becomes electrified.

Now, in the Holtz machine we have the electrified body in the inductor, the wire point opposite, and the glass plate interpose. Suppose inductor No. 1 electrified +, this + attracts — out of the comb points on to the interposed plate. The plate moving on, the part electrified — comes opposite card points of inductor No. 2. Here — of the plate draws out of the card points + on to the glass, and inductor No. 2 becomes charged —, while the glass is — on the further side and + on the near side. Inductor No. 2 being charged — draws + out of comb points No. 2, and neutralizes the — drawn from comb points No. 1. Card points No. 3 discharge — on the plate, and inductor No. 3 becomes +, and like No. 1 draws — out of its corresponding comb point.

It will be seen that the alternate inductors are oppositely electrified, and that their corresponding comb points, give out or receive accordingly. By varying the manner of connecting the balls at the extremities of the comb points a considerable variety of changes in the relation of the quantity and intensity may be obtained. These variations are somewhat similar to those which are secured by varying the order of connecting the elements of the galvanic battery. The adjustment in the figure is that for greatest intensity. By connecting one of the poles with the ground the other may be used as a prime conductor for charging Leyden jars, etc. It is found advisable, in order to secure more perfect insulation, to varnish the plate and the inductors with shellac varnish.

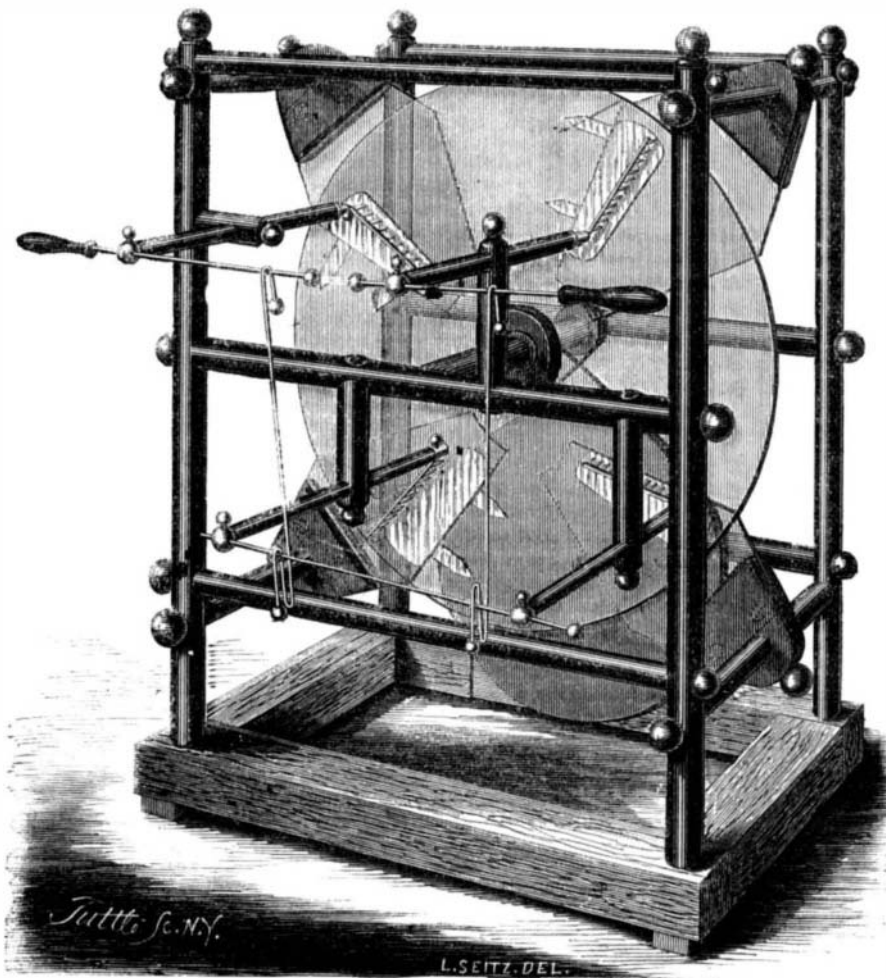
In the original Holtz machine the inductors were arranged on a disk of glass in which holes or windows were cut to per-

mit of the action of the card points. The new machine was invented in 1865, and it was briefly noticed in German publications in the fall of that year. The first complete description was published in Poggendorf's *Annalen*, in March, 1866. The inventor, W. Holtz, is a distinguished physicist, and resides in Berlin, Prussia.

The machine from which our drawing was made is an elegant specimen of workmanship and was constructed by Messrs. C. T. & J. N. Chester, of New York City. The base is wood and the framework hard rubber.

What is the Matter.

Notwithstanding the great number of patents issued weekly the back work of the office is not being brought up as it

**THE HOLTZ ELECTRICAL MACHINE.**

should be. The Commissioner has authority to appoint a sufficient number of Examiners to do the work of the office, why does he not do it? Inventors who applied for patents several months ago ask the question. Who can answer it?

IMPROVED STITCHING CLAMP.

The object of this invention is to obviate the objections made to the ordinary sewing clamp, that the jaws are obstructed by springs and straps, so that articles requiring depth of space, as dash boards, boot legs, etc., cannot be conveniently held; that the strap is liable to be broken in endeavoring to close the jaws, and that it is injurious to the



foot and leg of the operator. By the improvement represented in the engraving, articles one foot or more in depth can be inserted in the clamp; no spring is used, the tension of which must be overcome every time the jaws are closed; it has no ratchet teeth to tear the clothing, and it is self-retaining in all positions.

The horse, A, is of the usual style, having one firmly fixed jaw, B, and one movable one, C, hinged to B, just under the

seat. The lower end of C, is hinged to the treadle or lever, D, both ends of which project beyond the sides of the frame of the horse. To the under side of D, about in the center of the frame, the auxiliary lever, E, is hinged, and it is secured to the rocking bar, F, which turns on pivots in two of the legs, or it may be hinged to a permanent bar or brace. This arrangement of the treadles forms a powerful toggle joint.

It will be seen that a slight pressure of either foot on the projecting portion of E, or the projecting end of D, on the opposite side of the horse, will open the jaws, while pressure on the other end of D will close them. The lever, E, may be made adjustable, to fit thicknesses of work which vary greatly, by having it slide through the mortise in the bar, F, and securing it by a pin passing through the bar and lever. By a slight alteration in the position of the levers they may be attached to a foot block, supporting upright clamps for closing shoes, used by women and children sitting on a stool or chair. This machine is so simple that it may be made by any one capable of handling wood tools, as there is no iron work about it but three or four common butt hinges. For stitching buckle straps and other articles requiring frequent removal, this clamp is well adapted, as the jaws can be worked very rapidly.

Patented through the Scientific American Patent Agency Oct. 23, 1866, by William W. Taylor, whom address for rights, etc., 274 Broad street, Newark, N. J.

The Cholera.

From a recent report by Dr. Harris of the New York Board of Health we learn that about four weeks ago cholera reappeared in London and in Paris, but it is reported not to have spread to any extent. In the town of Elberfeld, near the Rhine, and about eighty miles southeastward from Rotterdam, the epidemic appeared and has spread to some extent. That town is in a region that sends many emigrants to New York by way of Rotterdam and Liverpool.

These facts can be understood by our people without awakening anxiety or fear, for "to be forewarned is to be forearmed," and although there may be numerous cases of cholera imported from the South and elsewhere, and though there may be repeated outbreaks in the lower regions of the Mississippi, the means of sanitary protection are definite, ample, and easily applied. But wherever, in places that are ready for the kindling of the epidemic, the true means of sanitary protection are not applied, the pestilence may yet make deadly ravages. The

watchword of the Metropolitan Board of Health, "timely, active and preventive measures," should be adopted by every city and town to which the epidemic can come.

Scientific chemists and experimenters, and all well-informed sanitary officers now agree that saturated solutions of copperas and carbolic acid are at once the best and cheapest disinfectants that can be used against cholera.

Preparing Oxygen.

We may call the attention of our readers to a process for preparing oxygen which is very simple and inexpensive. It was proposed some time ago, by Mr. Mallet, to take advantage of the well-known fact that subchloride of copper, when exposed to the air, absorbs a large quantity of oxygen, producing an oxychloride of the metal. The latter when gently heated, readily parts with the oxygen which it has absorbed, and returns to its original condition. Thus, by alternate exposure to the air and heating, it can be made to play the part of an effective separator of oxygen from the atmosphere. We will now give a few details of the new process.

PREPARATION OF SUBCHLORIDE OF COPPER.—This salt is prepared with moderate facility by digesting four parts of finely-divided metallic copper and five of the common black oxide of the metal in hydrochloric acid. Prolonged digestion is required in order to effect this object, together with the presence of a sufficient excess of acid. The whole is evaporated to dryness as quickly as possible, and the dry residue preserved for use.

PREPARATION OF OXYGEN.—The subchloride of copper, prepared as above, is very finely powdered and intimately mixed with half its weight or rather more, of fine white sand. A little water is then added, and the mixture well agitated in a large vessel. After a few hours it will have absorbed all the oxygen from the air which it is capable of doing; and, when required for use, the mixture should be placed in a suitable gas-generating vessel, and gentle heat applied. Oxygen is then steadily given off in considerable quantity, and may be collected in the usual way.

The residue in the retort, when moistened with water and exposed to the air as before, absorbs a fresh quantity of the gas, which may be obtained again by heating, and this succession continued for a considerable time.—*British Journal of Photography.*

A TOBACCO POUCH WANTED.—A correspondent from Maryland, evidently an admirer of the "filthy weed," wants inventors to conjure up a better tobacco pouch than is to be found in the market. He says it should be neat and handy, having a mouth of metal, and should be so constructed as to fill a pipe without spilling the tobacco.