## AN EASILY-CONSTRUCTED ROTATING ANODE EQUIPMENT FOR RAPID ELECTRO-ANALYSIS.

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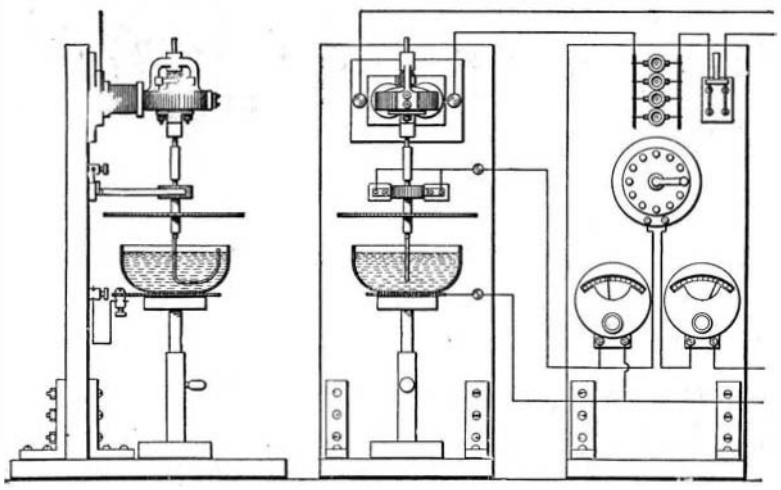
Having employed for some time past, with much success, a rotating anode for rapid electro-deposition, the construction of the equipment is deemed of sufficient interest to warrant its illustration. With such a piece of apparatus metals can be completely precipitated in a few minutes, whereas with a stationary anode it was necessary to employ such feeble electric currents that several hours were required. It may be stated that the effect of the rotating anode is to maintain a homogeneous electrolyte, by preventing concentration changes due to differential ion velocity. The construction of this outfit is exceedingly simple, as will be seen from the drawing, consisting of a vertical board firmly bolted to a heavy base by angle irons, and supporting an electric motor mounted with its shaft in a vertical position. A few words about this motor are necessary, for it will be the tendency of those making this apparatus to buy a very small battery motor, as in reality it has practically no work to do in rotating the platinum wire in the solution. A very small motor is very unsatisfactory, as it cannot be operated in connection with a lighting circuit, even by using a lamp bank. A large motor is easily controlled in speed and adjustment, and runs smoothly and without attention. Directly under the commutator, upon which copper or preferably carbon brushes feed, is a large metal disk to prevent any minute particles from falling into the solution. The platinum dish should rest upon a sheet of platinum supported on an adjustable stand, in order that the dish may be quickly lowered to remove the anode. At the extreme right in the illustration we have a panel board with the necessary electrical instruments for maintaining the proper electrical conditions for this character of work. In all reports upon electro-deposition it is necessary to state the current flow, the current density, the electrode tension, and temperature in addition to the character of the solution, etc. This illustration is taken from the author's series of articles upon "Experimental Electrochemistry," appearing bi-weekly in the SCIENTIFIC AMERICAN SUPPLEMENT, where a more detailed account of electro-analysis is given, and where those interested in this subject may turn for certain recent laboratory data.



AN EASILY-CONSTRUCTED ROTATING ANODE FOR RAPID ELECTRO-ANALYSIS.

## A HUGE ELECTRO-MAGNET FOR OPTICAL AND SURGICAL WORK.

The greatly increased speed of mechanical tools which has been made possible by the introduction of the "new steel," and the resulting increase in the velocity of particles of steel which by chance may strike the eye, have caused oculists to look for electro-magnets of far greater attractive force than those heretofore constructed for this line of work. To meet this demand, at the request of Dr. F. M. Wilson, the oculist on the medical staff of the Bridgeport, Conn., General Hospital, the author of this article designed and assembled the electro-magnet illustrated herewith, which, for the use of the profession, is probably the largest magnet thus far constructed.

On account of its great weight, it was not deemed advisable to make the instrument movable, as the necessary frame would occupy more space than could be given in a physician's office. The vertical position has not been found inconvenient, however, in actual use. The iron core of the magnet is four feet long and six inches in diameter. It is bolted to a base of oak, and its upper part is tapered so as to enable the oculist to conveniently observe the patient's eye with an ophthalmoscope. The point of the tapered portion of the core unscrews, so that it may be treated antiseptically, and on this point is a brass piece carrying a small brass ring. The patient rests his face on this ring, which is of such a height that the eyelashes just touch the extremity of the conical point. The magnet requires 30 amperes at 110 volts to completely saturate the core, which is wound in two halves with 235 pounds of No. 7 B. and S. gage copper wire wrapped with a special insulation of cartridge paper in place of the usual cotton thread. The powerful lines of force of the magnet are illustrated in a measure by dropping iron filings on a piece of cardboard placed on its top. The filings build up in a pile, being held in place by the magnetic attraction as shown in one illustration. Another picture shows how stray pieces of metal can be held against a person's face when the back of his head is placed against the magnet. The third photograph illustrates the method of procedure followed in drawing a piece of steel out of one's eye. The magnet is particularly useful in diagnosing cases in which a piece of metal is thought to have become lodged in the eye, but in which the oculist is not sure of it. By placing the eye of the patient above the magnet, as shown, and sending a small current through its coils, the presence of a piece of steel will be immediately felt by the patient, because of the magnet's attraction for the steel. The magnet may be used in surgery in the same way. If a piece of steel or iron has been driven into any part of the body, its location may be determined at once by simply approaching the magnetic field. Further, if the wound is recent, the piece of metal immediately returns by the same course it entered without any surgical interference.

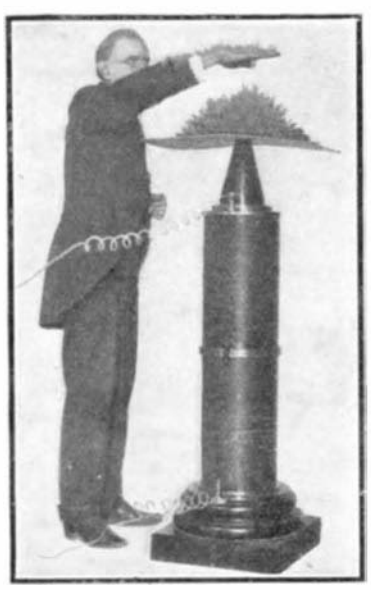
In one instance a piece of a hammer head had been driven into the muscles of the upper arm, and in another case a piece of a cold chisel into the forearm. In these two cases the surgeons advised no operations, trusting to the pieces working out of themselves; but the wounds became infected and the magnet was tried. The success of the method was complete, the pieces of metal appearing immediately on the polar piece. Possibly the operations on these were the first ever performed wherein a powerful electro-magnet had removed metallic pieces, if we except cases of the eye.

Since then, at the Bridgeport hospital, pieces of steel have been removed from the hand. In one case a chip of steel had been embedded in the palm of a man's hand for a year and a half, and in another a piece had been in the back of the hand for seven years. Both were encysted, but they immediately appeared on the magnet when the skin was slightly opened, a protuberance caused by the magnetic attraction indicating the locality.

A broken sewing needle that caused much pain and produced considerable swelling was instantly removed from the palm of a woman's hand. These cases, all of which were successful, would make it seem that powerful electro-magnets could be of great use in military hospitals for the removal of pieces of shells and steel bullets. As in the above-mentioned cases, which were of recent occurrence, the particles made their exit through the same trauma by which they entered, there would no doubt be a similar result in gunshot wounds, surgical interference with its numerous dangers thus being avoided.

Some further particulars regarding this magnet and the calculations involved in designing and building the same will be found in the current SUPPLEMENT.

Position of Patient When Removing Steel from the Eye.



Showing the Lines of Magnetic Force by Means of Iron Filings.

Pieces of Iron and Steel Held in Place by Magnetic Attraction.

A HUGE ELECTRO-MAGNET FOR OPTICAL AND SURGICAL WORK.

## Fraud in Furs.

As a people we are very fond of fraud. We don't much care for law, and we love to be fooled. In no line of commerce are we more regularly fooled and defrauded than in the retail fur trade. The ermine which my lady buys for the collar of her opera coat cost her some dollars a skin. She may pay $1 for the black tip of the tail of a single ermine skin. The trapper who caught the weasel from which came the ermine got, perhaps, ten cents for the skin; perhaps five; perhaps nothing. That is not so bad, and no one could object to a commercial transaction of that kind. A great many persons know that ermine is weasel. How many know that muskrat pulled and dyed is often sold as seal; that nutria similarly treated is sold as seal or beaver; that rabbit so treated is sold as seal or electric seal; that pulled and dyed otter is regularly sold as seal; that marmot dyed is sold as mink and sable; that fitch dyed is sold as sable, and rabbit also sold as sable; that hare and muskrat are sold as mink or sable, and white rabbit as ermine or chinchilla or fox; that goat is dyed and sold as bear; that many kinds of lamb are sold as Persian; that skunk is called Alaska sable; that American sable is sold as Russian crown sable; that monkey and lynx and dog and fox and polecat and muskrat and cat, and all sorts of different furs are sold under all sorts of high-sounding names; that white hairs are regularly inserted in fox skins and sometimes in sable skins? Surely not all of our readers were advised as to these details. There is a vigilance committee appointed by the London Chamber of Commerce whose duty is to spread information against these trade frauds. We presume we need nothing of that sort in America, for here we don't mind being fooled.—Field and Stream.

## Another Patent Granted to Cornelius Vanderbilt.

Letters patent have recently been granted to Cornelius Vanderbilt for an improved locomotive tender. The object of the invention is to provide a simple and economical form of water-tank with a low water-intake and large capacity, to shorten the length of the tank without increasing its height, and to improve the construction of the fuel-hood.

The water-tank is elliptical in cross-section and has its major axis in a horizontal plane. This shape was chosen because such a tank has a larger capacity than a circular one of equal height, and because its center of gravity is lower than that of a circular tank of equal capacity. To prevent the water from rushing from one end to the other on starting and stopping, a series of baffle-plates is provided extending toward the center from the top and bottom of the tank. The lower plates are provided with suitable openings for the passage of the water. The tank is interiorly braced by angle-iron stiffening members riveted to the shell and extending entirely around it. The baffle-plates are secured to these braces.

The rear wall of the coal-hood is in effect a continuation of the end of the tank. The hood is provided with side-walls, a distance apart equal to the major axis of the cross-section of the tank. The rear end has sliding doors with handles. In front of it is a platform on which the fireman may stand.

The underframing of this car consists primarily of two longitudinal draft-sills which are connected directly to the shell of the water-tank, and which have mounted between them ordinary draft-rigging.

In the earlier forms of the Laval steam turbines, a 5-horse-power motor, with a diameter of 12 centimeters, made about 30,000 revolutions per minute.