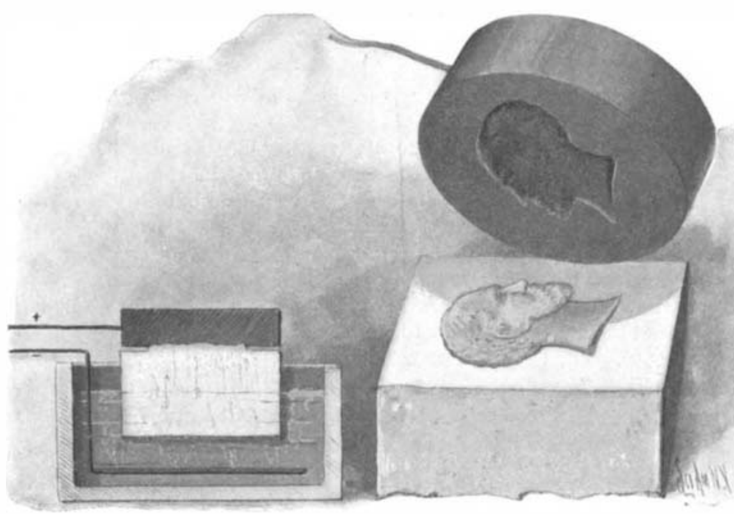
THE RIEDER ELECTRO-ENGRAVING APPARATUS.

On the first story of the Gallery of Machines of the Exposition there may be seen, in the German section, the first specimen of a very curious apparatus invented by Herr J. Rieder, of Leipzig. It is a machine that permits of electrically sinking the steel dies employed for striking medals and coins or embossing sheet metal, leather, or cardboard. With the ordinary processes, the production of such dies requires special skill on the part of the artisan, and their net cost is consequently very high. So, for a long time, there has been sought a mechanical process of manufacture that should do away with, or at least reduce the manual labor. The object of Herr Rieder's apparatus is to solve the problem by effecting the progressive corrosion of a plate of steel through electrolysis, that is to say, through the action of an electro-chemical bath.

The principle of the operation is represented in the diagram given in the accompanying figure.

The block of plaster (Gipsblock), bearing at its upper part a raised impression of the figure to be reproduced, is half immersed in a solution of chloride of ammonium. Upon the relief of the block of plaster is placed the steel plate (Stahlanode) that it is desired to engrave. This plate is connected with the positive pole of a source of electricity, and consequently constitutes what is called the anode. The negative pole, or cathode, consists of a sheet of copper immersed in the solution and arranged beneath the block of plaster. The electric circuit is closed through the intermedium of the bath of chloride (electrolyte), which, as a consequence of the porosity of the plaster, soon ascends through capillarity to the steel plate. As soon as the current is turned on, the chloride is decomposed, and the chlorine that is set free attacks the steel plate at the points where it is in contact with the plaster relief. The chloride of iron thus formed is dissolved and the plate is gradually hollowed out. Other points of the relief come successively into contact with the metal, and there is finally obtained a steel mould of the plaster model.



METHOD OF ELECTRO-ENGRAVING AND SAMPLE OF WORK.

We shall not enter into the details of all the difficulties met with by Herr Rieder in the application of this ingenious process and which he had to surmount in order to reach the remarkable results obtained with his apparatus. It will suffice for us to make known the principle of it. The first experiments showed that the steel to be engraved must not be applied to the model permanently, since the insoluble substances, such as carbon, contained in the metal deposit in the form of a black adherent powder that must be periodically removed. To this effect, there is given to the apparatus a to and fro motion that separates the steel from the block of plaster every twelve seconds and replaces it, after the cleaning (which is likewise automatic), in the mathematically exact position that it previously occupied.

With the Rieder apparatus, the engraving of an 8×12 inch steel plate requires about fifteen hours, while it often takes more than a month to do the same work by hand.

The apparatus permits of the reproduction of any model of plastic material, such as wax, plaster or wood, and preserves in the mould, with absolute fidelity, the most delicate details created by the hand of the artist.

At the Exposition, the operation of the apparatus is entirely electric, the machine being actuated by a motor that receives the current from the general distribution of electricity.

Let us add that since the surveillance of the automatic operation is very simple, it is possible for one man to run several apparatus at once, and thereby effect a great saving in manual labor.

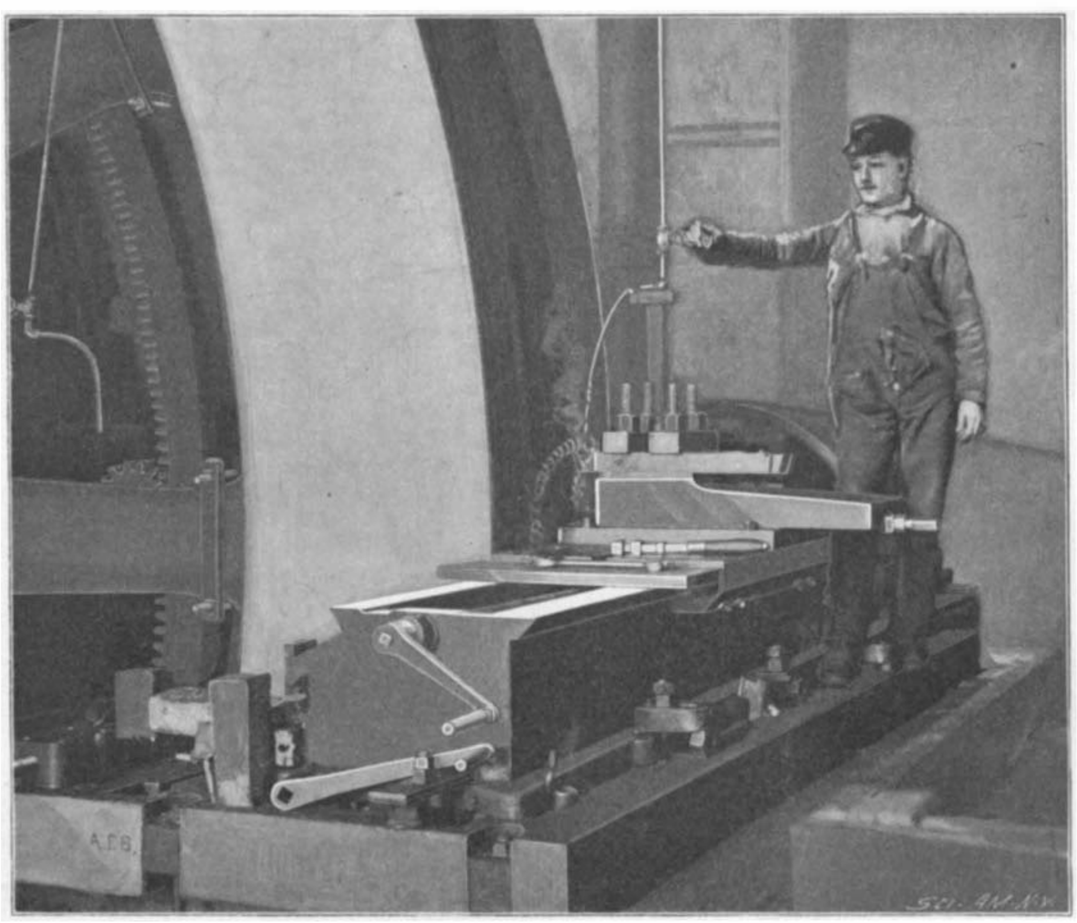
After the operation is finished, it requires but a few retouches executed by the hand of an engraver to remove all the traces left by the plaster model.

The field of the applications of this process is very vast, since it embraces all the industries that manufacture ornaments obtained by stamping, and, in the first rank, the cardboard, leather and metal industries.—L'Illustration.

THE CONSTRUCTION OF A 150-TON FLYWHEEL.

We have already in a previous issue given a description of the great power house at Ninety-sixth Street and the East River, New York city; and it will be sufficient to merely state a few of the leading features of this most remarkable installation, before describing the construction of the huge flywheels, one of which forms the subject of the accompanying illustration.

The power plant, which occupies an imposing structure measuring 279 feet by 200 feet, consists of forty-eight boilers of the Babcock & Wilcox type, and eleven Allis vertical cross-compound condensing direct-connected engines, which have a capacity at 50 per cent overload of 6,600 horse power each, making a total capacity for the whole engine room of about 70,000 horse power. The engines are set up in two parallel rows, which extend the full length of the engine room, one row containing five units and the other six. The high-pressure cylinders are 46 inches in diameter, the low-pressure 86, and the common stroke is 60 inches. The engines are run ordinarily at a speed of 75 revolutions per minute, at which the piston speed is 750 feet per minute. All the wearing parts are of very liberal proportions. Thus, the main bearings are 34 inches in diameter by 66 inches in length, and the crossheads and crank pins measure 14 by 14 inches. Each engine is direct-connected to a three-phase generator whose normal capacity is 3,500 kilowatts. Current is transmitted to the substations at a pressure of 6,600 volts. Between the engine and the generator is a massive flywheel weighing 150 tons.



TURNING THE RIM OF A 150-TON FLYWHEEL.

On account of their great size and weight, considerable interest attaches to these flywheels, and there are certain novel features in their construction and the way in which the massive rims were built up and finally trued up to form. Each wheel was cast in ten sections, each section consisting of an arm and a rim. The arms are bolted to the hubs, and the rim segments are connected by heavy links of steel, 5 inches deep by 10 inches wide, which were shrunk on in suitable recesses formed in the rim. After the wheel was erected, the cast steel rim, which is 29 inches in depth by 10 inches in width, was widened out by building up on each side of it eight circles of 1⅛-inch steel plates which were riveted on with 3-inch steel rivets. When the riveting was complete, the rim was in a necessarily rough condition, and it was turned to shape by means of a special lathe driven by a portable electric motor. A heavy bed plate (see engraving), which surrounded the rim on three sides, was bolted to the floor of the engine room. On this was placed a lathe-carriage and tool-rest. The rest carried two tools placed side by side, the firs of which took off the roughing cut and the other the finishing cut. The flywheel was rotated by means of a large segmental spurwheel, which was clamped to the arms of the wheel, and a pinion mounted directly on the shaft of a portable electric motor. After the rim had been turned on both faces and the periphery, it was polished with a big emery block.

The arrangement worked satisfactorily, and the perfect truth with which these huge wheels are now running is one of the attractive features of these very imposing and handsome engines.

A Substitute for the Term "Indian."

There is no satisfactory denotive term in use to designate the aboriginal tribes of America. Most biologists and many ethnologists employ the term "American;" but this is inappropriate, since it connotes, and is commonly used for, the present predominantly Caucasian population.

The term "Indian," first used (in the Spanish form "indio") by Columbus, in the belief that the lands which he had discovered in the West were on the confines of India, in Asia, is universally used in popular speech and writing, and to some extent in ethnological literature, but is objectionable in that it perpetuates an error, and that it connotes, and so confuses, distinct peoples. Such an error was excusable at the time at which it originated, but there is no reason for its continuance, and it evidently would be well if the term "Indian" could be supplanted by some appropriate scientific designation.

During a discussion of the subject at a meeting of the American Anthropological Society on May 23 of last year, Major J. W. Powell advocated the use of the name "Amerind," an arbitrary compound of the leading syllables of the frequently used phrase "American Indian." The proposed term carries no implication of classific relation, raises no mooted question as to the origin or distribution of races, and perpetuates no obsolete ideas. So far as the facts and theories of ethnologists are concerned, it is purely denotive. The term is sufficiently brief and euphonious for all practical purposes, not only in English, but also in the languages of Continental Europe. It may be readily pluralized in these languages, in accordance with their respective rules, without losing its distinctive sematic character. Moreover, it readily lends itself to adjectival termination in two forms, viz., "Amerindian" and "Amerindic," and is susceptible also of adverbial termination; while it can be readily used in the requisite actional form "Amerindize," or in relational forms, such as "post-Amerindian."

The term is proposed as a designation for all the aboriginal tribes of the American continent and adjacent islands, including the Eskimo.

The working ethnologists in the society were practically unanimous in approving the term for tentative adoption, and for commendation to fellow students in this and other countries. As the working specialists form the court of last resort, it cannot be doubted that any term acceptable to them may be expected to come into use with considerable rapidity, and be eventually adopted by thinkers along other lines.

THE experiments which have been carried on by the South Metropolitan Gas Company with American coal are proving to be very satisfactory, and it is superior to the best English gas coal. It is found to be freer from sulphur and more easily purified. The cost of the American coal is, however, much higher, being $8 a ton on board ship, and the freight is $4.