Correspondence.

To the Editor of the Scientific American:

I have made the simple electric motor and it works splendidly. I have it running two sewing machines in our show window. I have also made a smaller motor and car, and have it running on a track in show window. I supply the current through the rails. It makes a fine show. D. O. THAYER.

Sioux Falls, South Dakota, July 23, 1890.

To the Editor of the Scientific American:

I see in SCIENTIFIC AMERICAN of July 19 that you would like to know what we amateur electrical workers are doing: Well, first of all, I made "The Simple Electric Motor," described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641. Made it "plump up" to instructions. It works splendidly. I use it to run my No. 1½ Whitcomb lathe, and it does the work. I use the current from the Edison electric light wires. I then made German silver rheostat described in SCIENTIFIC AMERICAN, September 14, 1889. I use this in connection with the motor. With the rheostat I can regulate the motor for doing heavy or light work. I followed the directions in making, except I used another coil instead of straight wire to go back to the top. I also tried my hand on the "Watch Demagnetizer" described in SCIENTIFIC AMERICAN, October 2, 1886. With it I can magnetize or demagnetize a piece of steel at will. I then made a galvanometer; it has been used, in connection with a battery, to hunt broken electric light wires, and has proved a success. Have made electric bells from instructions given in SCIENTIFIC AMERICAN, and they have always worked all right. Have made other articles besides electrical, and with as good success. I have found, if you want to make anything that is described in the SCIENTIFIC AMERICAN, *read carefully* the instructions, and follow them closely, and you will have no trouble.

G. H. SPANGLE.

Chetopa, Kan., July 23, 1890.

Smokeless Powder.

Mr. A. Jaksch has had an opportunity of examining a new kind of powder sold by an English house under the name of "smokeless sporting powder." This powder is in grains that are nearly white and resemble semoule. It was found that it was a mixture of wood nitrocellulose with 4 per cent of nitrate of barytes. It burns with very little smoke and does not produce so strong a detonation as ordinary sporting powder does. An identical composition has been obtained by operating as follows:

Purified wood cellulose is gradually introduced into a very cold mixture of one part of fuming nitric acid and two parts of concentrated sulphuric acid until a thick pulp is formed. After six hours' contact, the pulp is washed, first with cold and then with warm and slightly ammoniacal water. The washed product is boiled in a concentrated solution of nitrate of baryta, gently compressed, and dried at 40° C. In order to granulate it (an operation that is not indispensable), machines devised for the purpose are necessary.

It is probable that this smokeless powder is the same that was offered two years ago, by an English house, to the Austrian and German governments, and refused after an examination.—*Le Moniteur Scientifique.*

Nickel Steel.

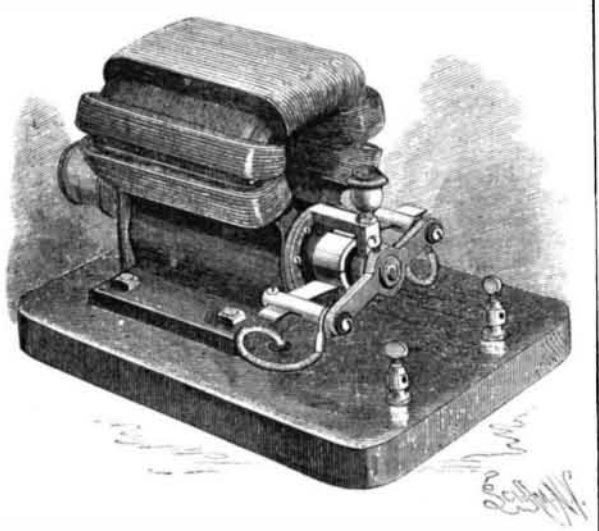
From experiments on samples of wire drawn from nickel steel containing 25 per cent of nickel and 74 per per cent iron, by the Steel Company of Scotland, the author finds that nickel steel can exist in two states, magnetic and non-magnetic, over a range of temperature from below freezing to 580° C. The wire becomes non-magnetizable after heating to redness, whether cooled slowly or by being plunged into water, but when cooled by solid carbonic acid it resumes its magnetizable state. The electric resistance is very different in the two states, and the change in resistance effected by cooling with solid carbonic acid is almost as remarkable as the change in magnetic properties.

Of five non-magnetizable samples, the highest breaking stress was 50·52 tons per square inch, the lowest 48·75; the greatest extension 33·3 per cent, the lowest 30. Of five magnetizable samples, the highest breaking stress was 88·12 tons, the lowest 85·76; highest extension 8·33 per cent, lowest 6·70. The broken fragments of both were magnetizable.—*J. Hopkinson.*

AMONG recent arrivals in New York came one of England's fastest amateur safety riders, Mr. H. E. Laurie. Mr. Laurie is but nineteen years of age, stands 5 feet 8½ inches in his stockings, and weighs 163 pounds. In appearance Mr. Laurie is the picture of health and vitality. His racing career began five years ago on a tricycle, and he has ridden the safety bicycle three years, on which machine he has been scratch man in all handicap events for the past two years, and has won 174 prizes. When seventeen years of age he rode 21 miles 125 yards inside the hour, which is still the English record

NEW VICTOR No. 0 ELECTROPLATING DYNAMO.

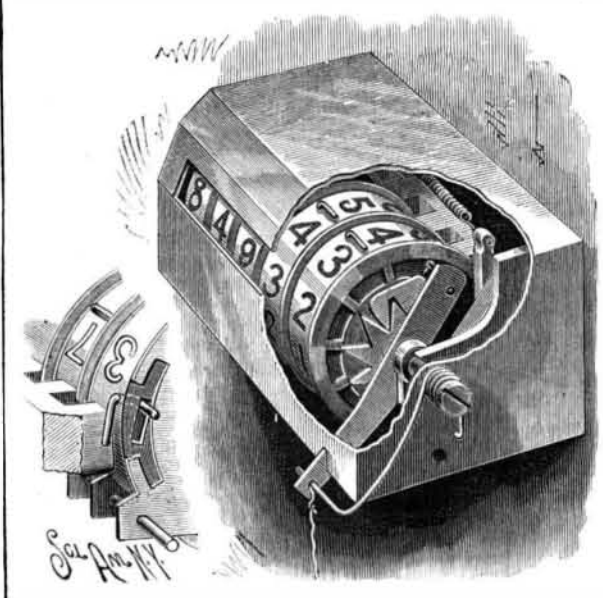
We illustrate herewith a new electroplating dynamo, which has just been brought out by Mr. Thomas Hall, of No. 19 Bromfield Street, Boston, Mass., and is furnished at a low price. He styles it the Victor No. 0. It is furnished with a switch board, and is a complete dynamo for electroplaters' use. It gives a current of 10 volts, and is suited for either gold, silver, or nickel plating. It is an excellent working machine, and will be found useful to manufacturers who wish to do their own plating, or others who wish a small dynamo for small work. These machines have many advantages over batteries: they are clean, require little attention, there is no unpleasant odor, as from acids used in batteries, and they are always ready to work. Mr. Hall has several sizes of dynamos for electroplaters and nickelplaters, but the No. 0 has been designed especially for beginners, or those who wish to use it on a small scale. A fully illustrated catalogue will be sent to those interested on application.



HALL'S ELECTROPLATING DYNAMO.

AN IMPROVED REGISTER OR COUNTER.

The device shown in the illustration has its counting or numbering wheels actuated by direct mechanical movement, without the use or aid of springs. It has been patented by Mr. Rudolph Ruhlman, of No. 167 Cooper Street, Trenton, N. J. In a suitable casing, having a longitudinal opening through which the numbers may be read, the numbering wheels are mounted to turn loosely on a fixed shaft held in brackets fastened to the back of the casing. On the end of the shaft next to the units wheel is a loosely swinging lever, the lower end of which extends through a transverse slot in the casing, where it is connected by a rope or other suitable device with the machine whose revolutions are to be counted, while its upper end carries a double-toothed pawl, to firmly grasp one of the teeth



RUHLMAN'S REGISTER FOR ENGINES OR MACHINES.

of a ratchet wheel on the outer face of the units wheel. This wheel has ten teeth, and ten strokes of the lever cause it to make one complete revolution. Ordinarily the machine imparts motion to the lever in only one direction, the return motion being made by a spring, but this movement may also be made directly by the machine, or by counterbalancing the lever. The pawl is a gravity pawl, and there is a pin on the lever to limit the outwardly swinging motion of the pawl when it moves backward over the teeth on the return stroke, while a friction brake is provided to prevent the units wheel from being moved too far by the motion of the pawl, this brake being spring-pressed against the outer face of the wheel. Each of the numbering wheels is provided with a lever, shown in the small view, composed of an arm extending normally longitudinally across the face of the wheel, a radially extending part which turns in the periphery of the wheel on its left side, and, on the inner end of this radial part, an arm standing at right angles to the arm first named, and free to turn in a recess within the wheel, so that when the outer arm is given one-quarter turn the inner arm will be thrown outward into engagement with the next numbering wheel. Fixed disks are arranged between each two adjacent numbering wheels, each disk having a segmental slot through which the inner arm of the lever is adapted to move. and on the right side of all the numbering wheels are flanges, each provided with ten radial arms. A fixed lug or projection, as shown in the small view, is arranged in the rear of each numbering wheel, adapted to engage its lever, extending longitudinally across the face of the wheel. With this arrangement, as the units wheel completes one revolution, the lug engages the outer arm of the lever, throwing its inner arm into longitudinal position, to engage a radial arm on the next wheel and move that wheel a distance of one tooth, the lever being turned back to its normal position by the fixed slotted disk between the wheels on the next forward stroke of the pawl. In this way, at every tenth revolution of the units wheel two wheels are moved, at every one hundredth three wheels, at every one thousandth four wheels, and at every ten thousandth five wheels, the movement being always positive and the several parts not liable to get out of order.

Effect of Lightning upon Trees.

It is a well known fact that the oak is very often struck by lightning, but it is not so well known that the beech is but very rarely struck.

From the standpoint of atmospheric electricity, the degree of danger attending the taking of shelter under a tree during a storm depends upon the height of the tree, the greater or less conductivity given it by its more or less abundant sap, and the degree of electric tension that may accumulate in it.

Mr. Werckert, of Bischofsheim, Alsace, has made some very simple experiments that seem to prove that the nature of the leaves is very important from the standpoint of electric action.

While the leaves of the common oak (*Quercus pedunculata?*) are entirely smooth, those of the beech (*Fagus sylvatica*) are very villous. Placed upon a glass plate electric machine, the branches of the beech, owing to the innumerable points that they possess, dissipate the electricity so well that but half the tension can be obtained that we reach when the branches of the beech are replaced by those of the oak.

It has likewise been remarked that a beech leaf placed upon a conductor charged with electricity dissipates the charge much more rapidly than an oak leaf does.

These experiments prove that the nature of the leaves has a great influence upon the danger that different trees present as objects of shelter, and that villous leaves, like those of the beech, appear to prevent the accumulation of electricity, while, on the contrary, they favor the slow neutralization of the fluid through the action of the innumerable small points with which they are provided.—*Annales Industrielles.*

American Built Cars for Europe.

The Jackson & Sharp Works, at Wilmington, Del., are building passenger cars for the railways in France, Spain and Austria. Mr. William Voss, writing about the cars after a visit to the works, says: They are a curious mixture of European and American practice, and are built according to complete sets of drawings sent over. Of course it is sectional work, like that sent to South America. These cars are about 50 feet long, some of them day coaches and others of the Manu boudoir style of sleeper. They have combination wood and iron sills, bogie trucks, the old country drawhook and buffers, etc. All the heater and water pipes are of copper, windows run in brass guides (a very good but expensive thing). There is a vestibule at each end, but they do not touch like ours, being about four feet apart when coupled, and iron aprons and railings form the bridge. The entrance is through the vestibule and steps like ours, but different. The exterior is mahogany, natural wood finish. Roof much like ours, and is covered with canvas and sheet copper on ends and eaves. Some of the cars have been shipped, six or twelve more are almost done, and a lot of six is just being erected.—*National Car and Locomotive Builder.*

Ocean Timber Rafts.

The steam schooner Noyo, from Noyo, lately arrived at San Francisco with a raft of 500 and odd piles in tow. They were consigned to the Southern Pacific Railroad Company, and are intended for the repair and construction of bridges on its lines.

This is the fifth or sixth trip with rafts of the Noyo, and each of its voyages has turned out successfully, so says the *Pacific Lumberman.* The rafts are constructed one deep. They are made of lots of thirty piles each. The piles are bored through, and a chain passed around the lot. Each lot in its turn is attached to the main chain by which they are towed.