THE VOLNEY W. MASON HOISTING MACHINERY AT THE GREAT HAY DEPOT OF THE NEW YORK CENTRAL RAILWAY, NEW YORK CITY.

The illustrations on our front page this week show the construction and operation of probably the most extensive collection of hoisting machinery ever assembled and operated in one establishment. We allude to the new hay depot, 33d Street and 11th Avenue, New York.

When this great structure was projected by the New York Central and Hudson River R.R. Co., its officials made careful investigations in respect to hoisting machinery, and finally decided upon the apparatus of Volney W. Mason & Co., of Providence, R. I. Their mechanism was held to be superior in all respects, and was promptly adopted. The practical results fully justify the wisdom of the selection. The long line of power hoisting machinery, by which the bales of hay are quickly transferred from a train of cars to the lofts, and the appliances through the means of which deliveries are readily effected therefrom to the dealers, all work with a smoothness and economy which, apparently, leaves nothing to be desired.

There are 61 hoisting machines driven by a main line shaft having its bearings in the top of each machine, there being fast on the shaft over each machine a paper friction wheel, while the hoisting machine below carries a winding drum, with a larger friction wheel on its side, which is caused to engage with the paper friction wheel over it by means of a double eccentric, *i. e.*, two cam bearings, one each side of the machine frame, connected by one lever. Pulling upward on the lever causes the drum and wheel to come into contact by a parallel movement toward the running wheel, friction contact causing the drum to wind up the hoisting wire rope as far as desired. On releasing the lever, it falls back, and the wheel drops on a leather brake shoe on the underside of the wheel, holding the load stationary, the lowering away being accomplished by lifting the lever off the brake between the brake and driving wheel—lowering away, hoisting, or holding the load being controlled, as required, by the movement of the lever, the load being always held at rest by the brake upon letting go the controlling lever.

The arrangement of the shafting presents an interesting feature, there being seven level lines, each eighty feet long, and each line one foot lower than the other from Eleventh Avenue toward the Hudson River, the lines each being connected, as shown in one of the views, by a pair of universal couplings and a piece of shaft six feet long, on an incline or angle dropping one foot in six feet. The power is furnished by two Westinghouse engines of 25 h. p. each, running at a speed of 390 revolutions per minute, on to two friction pulleys, 54 in. diameter and 8 in. face each, on the main shaft in the top story. By using these pulleys, which are a new style of balanced segment friction pulleys, designed by Messrs. Volney W. Mason & Co., and a detail view of which is given at the top of the page, either of the engines may be thrown on or off instantly, when running at speed or stopped, so that either engine can be used separately, or both together, to drive the main shafting, as required. This pulley was especially designed for running continuously on main line shafting, for driving electric light, dynamo, and other machinery, started and stopped from the main shafting, and many pulleys made after this pattern have been put in operation, giving great satisfaction.

The hoisting and delivering apparatus is shown in detail in one of the small views, the same apparatus sufficing for both purposes. The hay is hoisted from the cars or platform, on the north side of the building, into the several stories, as desired, and delivered to the dealers' teams, on the south side of the building. The storage capacity of the building is about six thousand tons, the new structure taking the place of an old one, destroyed by fire in June, 1887, and having all the latest improvements. The offices of the hay dealers are located in an adjoining building, on Eleventh Avenue.

Mr. Mason, of the firm of Volney W. Mason & Co., commenced the business of making friction pulleys in 1860, and personally attends to the designing of the new patterns continually required in the business, which has been one of steady growth from the start. The firm are located at Providence, R. I., and are manufacturers of friction pulleys, friction clutches for connecting shafting and gearing, hoisting machinery, and elevators with self-closing hatches. The contract for furnishing the entire hoisting apparatus for the new hay elevator called for the completion of the work in sixty days from the date of the approval of the plans, and the firm had the whole plant in place and ready for operation within the time specified.

New Artesian Wells at Paris, France.

The artesian well which has been in course of construction at the Place Hebert, Paris, France, for the past twenty-two years, has just been completed. The water bed lies at a depth of 719 m. 20 c. (about 2,400 ft.) from the surface of the soil. Paris now possesses three artesian wells, viz., at Grenelle, Passy, and the Place Hebert.

EXPERIMENTS ILLUSTRATING THE PRINCIPLE OF THE DYNAMO.

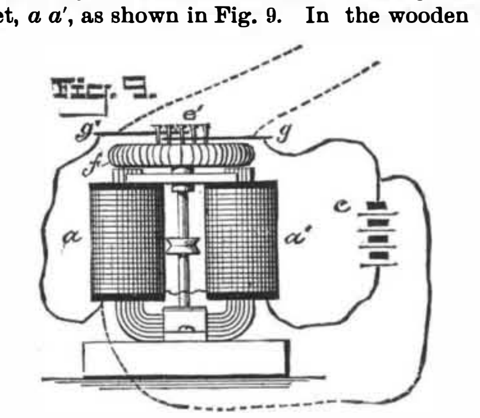
BY GEO. M. HOPKINS.

II.

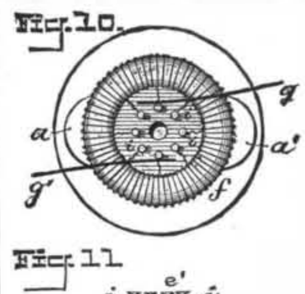
After noticing the effect of plunging a magnet into a coil of wire, it is not very difficult, in the light of present electrical knowledge, to understand how the process of induction is carried on in a continuous way in the armature of a dynamo.

The simplest form of armature for illustrating this point is undoubtedly that known as the Gramme ring armature. In the action of this armature the prime factor is magnetic induction. It is perhaps unnecessary to go into the details of the construction of the Gramme ring, as commonly used in dynamos. A very crude ring answers the present purpose. Its core is formed of a compact circular coil of soft iron wire, which, in cross section, may be circular or of any other form. The core is wrapped with tape and varnished to insure insulation.

Around this iron ring or core is wound an insulated copper wire, arranged in a spiral coil *f*, like the winding of an ordinary electro-magnet. The ends of the copper winding are joined by soldering, thus forming a closed coil. The ring is mounted upon a circular wooden support attached to a spindle, so that the armature may be revolved in front of the poles of a magnet, *a a'*, as shown in Fig. 9. In the wooden support, in a circle concentric with and near the spindle, are inserted six or eight wire nails, *e'*, arranged at equidistant points. The copper winding of the ring is spaced off into as many sections as there are nails in the circular row, and at the end of each section the insulation of the copper wire is removed a short distance, and a wire, *i*, is attached by soldering. These attached wires are each connected with one of the wire nails. Now, all that remains to complete the Gramme dynamo or motor is the application of two conducters, *g g'*, to the circular row of wire nails, as shown in Figs. 10 and 11.



GRAMME MACHINE FOR ILLUSTRATION.



DETAILS OF ARMATURE.

This dynamo has all of the essential features of the regular machine—the field magnet, the iron armature core, the conductor wound upon the core, the commutator cylinder formed of the wire nails, and the brushes consisting of wires held on opposite sides of the commutator cylinder.

This dynamo is constructed for illustration only, and not for practical use. It will generate a current, and may be driven as a motor by a current, but of course not with the same advantage as a more complete machine.

In investigating the phenomena of the armature, it is well to begin with the simplest case of magnetic induction. When a bar of soft iron is held before the poles of a magnet, as shown in Fig. 12, it becomes itself a magnet. The magnetism developed in the bar by the action of the magnet is opposite that of the magnet. That is, the magnetism developed in the end of the bar opposite the N pole of the magnet is S, and, similarly, the magnetism developed in the end of the bar opposite the S pole is N. The center of the iron bar is neutral.

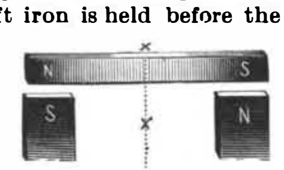


Fig. 12.—Magnetic Induction.

By substituting an iron ring for the straight bar, as shown in Fig. 13, the effect will be the same. The portions of the ring opposite the poles of the magnet acquire polarity by induction, as in the first instance, and the magnetism extends in the ring from the vicinity of the poles toward the neutral line, X X, which forms a right angle with a line joining the poles of the magnet. In the figure of the ring the location of the magnetism in the ring is indicated by the shading.

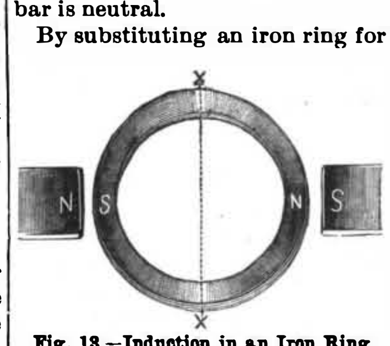


Fig. 13.—Induction in an Iron Ring.

By turning the ring upon its axis, the mass of the ring moves, but the polarity of the ring maintains a fixed position relative to the poles of the magnet.

When the ring carries a coil, as shown in Fig. 14, the magnetic poles of the ring remaining stationary, while the material of the ring and coil are revolved, there is a continual passing of the sections of the coil through the magnetic field surrounding the polarized portions of the armature core and the poles of the magnet, which is the same in effect as the passing of a magnetic bar through the coil of the armature.

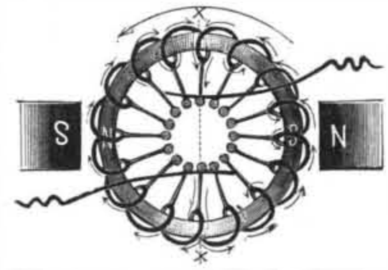


Fig. 14.—Armature in Magnetic Field.

Besides the inductive effect produced by the magnetization of the armature core, the passing of the conductor through the magnetic field of the inducing magnet augments the current.

Each half of the armature between the neutral points is practically a single coil of wire, terminating at two of the commutator bars—which in the present case are the two nails—at diametrically opposide sides of the commutator cylinder; all of the remaining commutator bars and their connections being idle.

In Fig. 9, two circuits are shown in connection with the machine—one in full lines, the other partly in dotted lines, both connected with the battery, *c*. When the circuit represented in full lines only is employed, the machine runs as a motor. When the wires shown by full lines are disconnected from the brushes, *g g'*, the rotation of the armature in the field of the magnet, *a a'*, produces a current in the manner already indicated, and this current is taken from the armature by the way of the wires, *i*, the nails, *e'*, and the brushes, *g g'*.

This machine when used as a generator is strictly a magneto-electric machine, although an electro-magnet is employed as a field magnet. A permanent magnet might be substituted for the electro-magnet.

For the sake of securing the greatest possible simplicity, certain modifications of the action of the armature have been omitted.

A Lost Locomotive.

"In the construction of the Kansas Pacific and Atchison, Topeka & Santa Fe railroads," said H. L. Carter, a railroad contractor of St. Joseph, the other day, "one difficulty of frequent occurrence was met with, which, as far as my experience goes, is unique in railroad history. I refer to the trouble arising from quicksands. From Western Kansas to the mountains, quicksands are to be found in nearly every stream, no matter how small, and to successfully bridge them required an expenditure out of all proportion to the size of stream to be crossed. We tried pile driving, but the longest piles disappeared without touching the bottom. Then filling with earth and stone was attempted, and met with equally poor success, as the quicksand was apparently capable of swallowing the entire Rocky Mountains. The only means of crossing was found to be to build short truss bridges across them. This was very expensive, but was the only thing to be done. As an instance of the practically bottomless nature of the quicksands, I may cite the case of an engine that ran off the track at River Bend, about ninety miles from Denver, on the Kansas Pacific. The engine, a large freight, fell into a quicksand, and in twenty minutes had entirely disappeared. Within two days the company sent out a gang of men and a wrecking train to raise the engine. To their surprise they could not find a trace of it. Careful search was made, magnetized rods were sunk to the depth of sixty-five feet, but no engine could be found. It had sunk beyond human ken, and from that day to this has never been discovered. Cattle and horses are frequently lost, the only animal that is safe being a mule—the only animal that never gets caught. No greater instance of the same intelligence of this much maligned quadruped can be cited than the skill and care with which it avoids all unsound bottom. As its hoofs are much smaller and narrower than those of a horse, it would mire down in places where a horse could safely pass. Recognizing this fact, whenever a mule feels the ground giving away under its feet, it draws back instantly and cannot be induced to advance a step, although a whole drove of horses may have immediately preceded. Those who think a mule is stupid are much mistaken."

Curious Alloy.

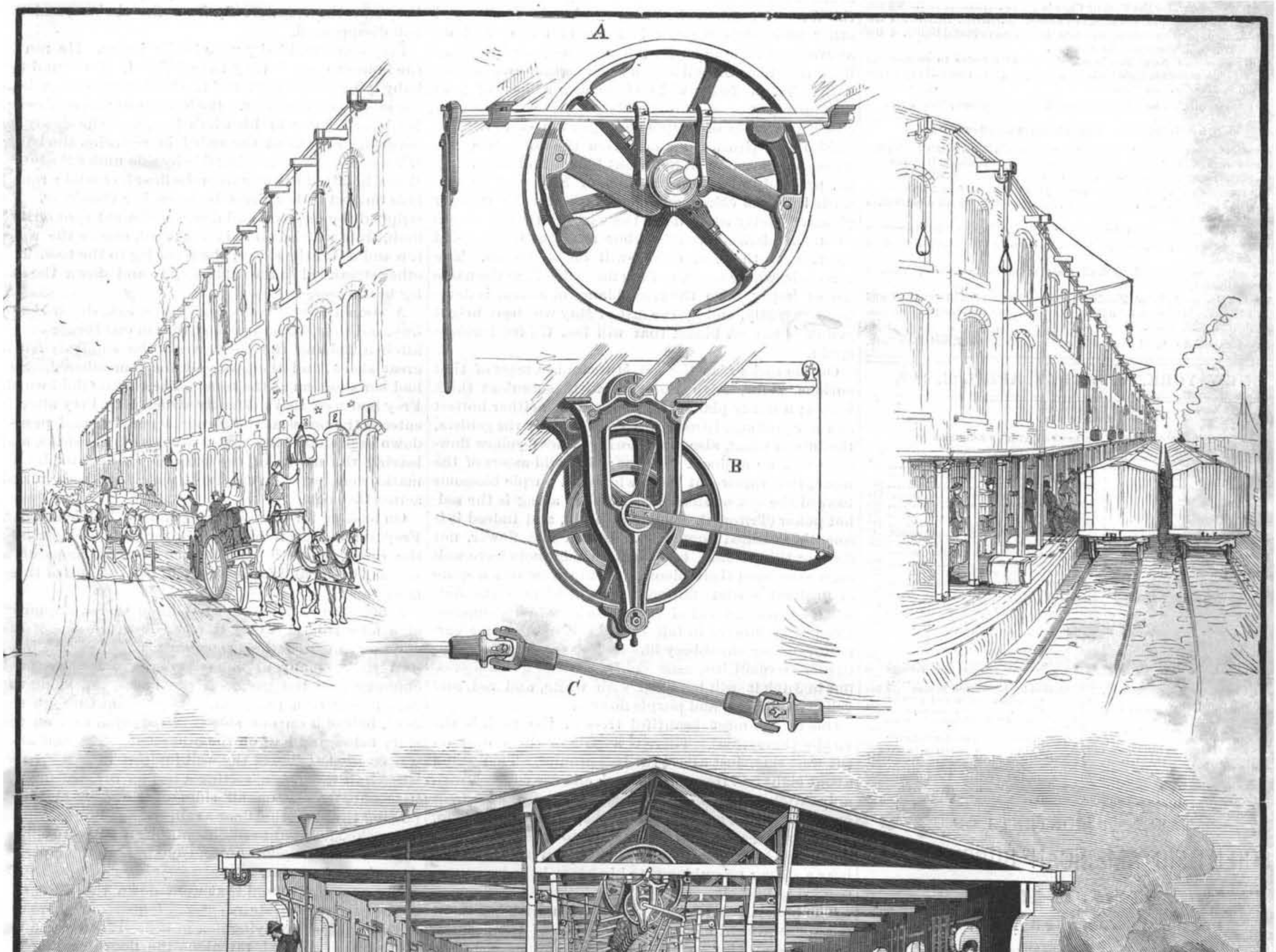
Put into a clean crucible an ounce of copper and an ounce of antimony. Fuse them by a strong heat, and pour the alloy into a mould. The compound will be very hard and of a beautiful violet hue. This alloy has not yet been applied to any useful purposes; but its excellent qualities, independent of its color, entitle it to consideration.

SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter. Copyrighted, 1888, by Munn & Co.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LVIII.—No. 16. [NEW SERIES.] NEW YORK, APRIL 21, 1888. [$3.00 per Year.



THE VOLNEY W. MASON HOISTING MACHINERY AT THE GREAT HAY DEPOT OF THE NEW YORK CENTRAL RAILWAY, NEW YORK CITY.—[See page 244.]