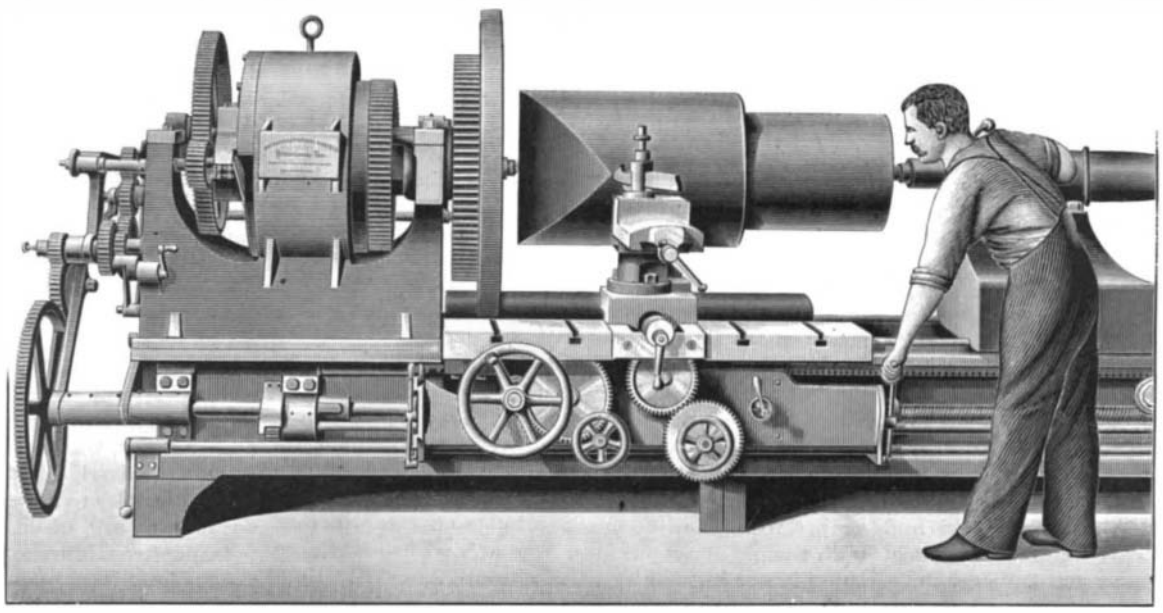
A DIRECT-CONNECTED MOTOR AND LATHE.

The accompanying engraving, which is made from an illustration and description which appeared in the Mining and Scientific Press, of San Francisco, shows a novel application of the electric motor to shop work, in which the customary overhead shafting is completely done away with, and its place is taken by a motor which is built into the headstock of the lathe—in this case a 46 inch Niles Tool Works lathe. Apart from the economy which results from directly applied motive power, the removal of the overhead shafting and belting allows a much freer disposition of the various tools in a shop, for the reason that they do not have to be located with reference to their accessibility to the overhead traveling crane. The motor runs in either direction at nine different speeds, which vary between 57 and 275 revolutions per minute. The speed is controlled by a lever at each end of the apron of the carriage; and it is so conveniently placed to the operator that, without changing his position in front of the tool, he can at will either stop the lathe or change the motion instantly from any speed in one direction to any speed in the opposite direction. The operator has no belt to shift in changing speed, as in the ordinary lathe; and, consequently, in facing off work he can keep the tool at all times cutting up to speed, as it travels toward the center. In chasing threads, he can make a quick return by utilizing the high speed. In order to gain two speeds without shifting a belt, it is usual in turret lathes to provide mechanism for quickly throwing in or out some clutch or gears; but by means of the direct-connected motor the lathe can be instantly run at any one of nine speeds by the operation of the above-mentioned controlling levers.

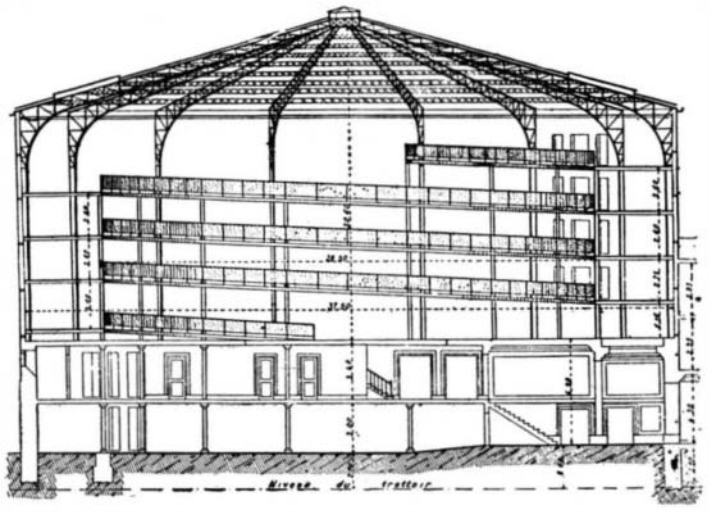


A DIRECT-CONNECTED MOTOR AND LATHE.

The motor is built by the Card Electric Motor and Dynamo Company.

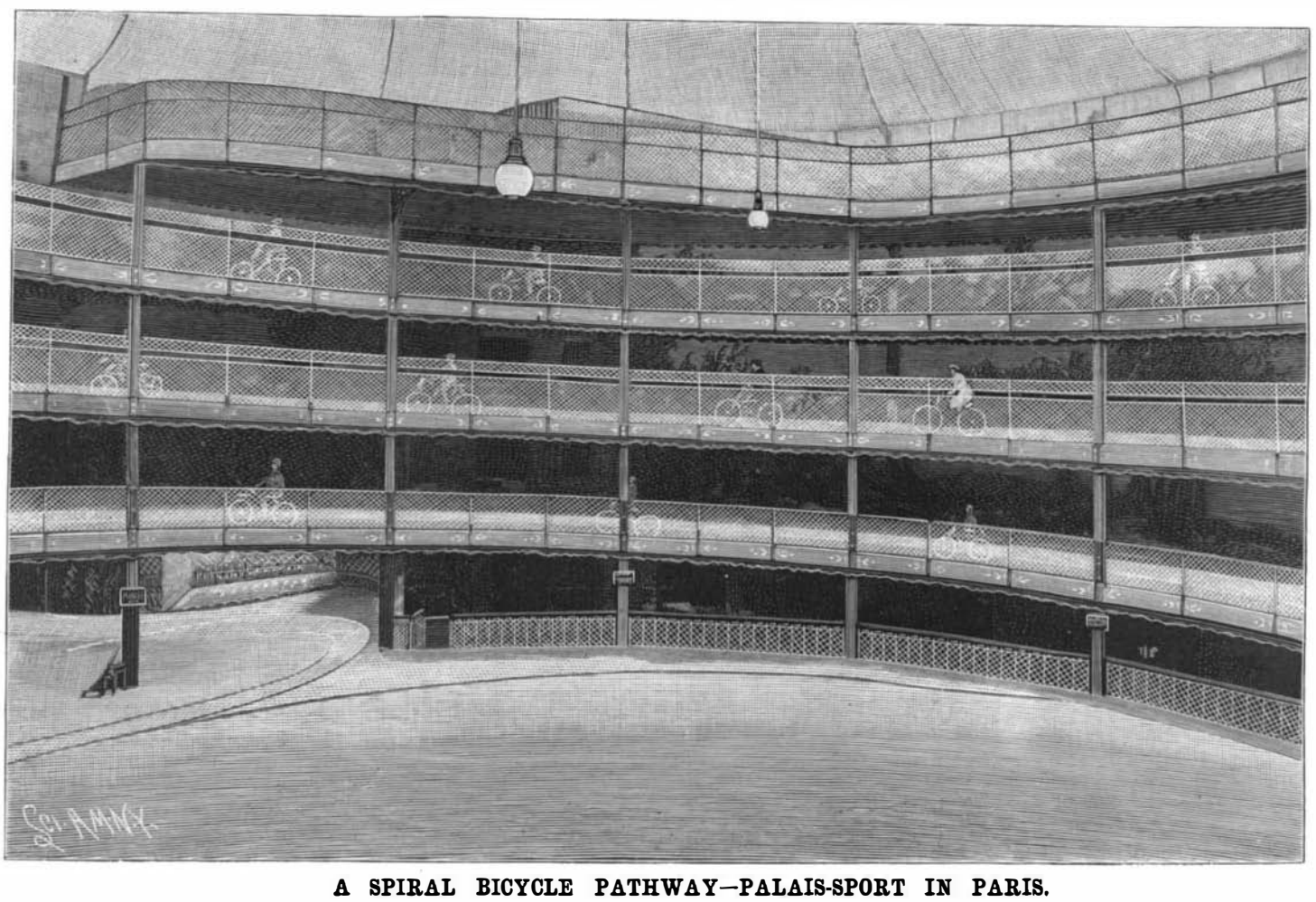
A COVERED SPIRAL BICYCLE PATHWAY IN PARIS.

With the enthusiasm and spirit characteristic of his race, the Frenchman has plunged into the sport of bicycling with an interest which almost casts into the shade our own devotion to this form of exercise. The bicycle is found everywhere in Paris, even in great numbers upon the most crowded thoroughfares. The Frenchman generally rides with great skill, and in the wheel he has found a friend particularly adapted to his restless nature. Men and women ride the somewhat willful tandem on the most crowded streets, and often at great speed, but, strange to say, accidents are less frequent than would be imagined. The winter months in Paris are naturally ill adapted to the sport, and the enthusiast is therefore driven under cover. Probably the greatest novelty in the way of a bicycle academy is the spiral path shown in the accompanying illustrations, for which we are indebted to the Genie Civil. This establishment is called the "Palais-Sport." The building was originally used for the military panoramas of the celebrated painters Detaille and De Neuville, representing the battles of Champigny and Rezonville. The projectors of the new establishment transformed the lower stories into various waiting, reading and dressing rooms, as well as private rooms where beginners can escape the eye of the curious. The various store rooms and repair rooms for the bicycles are also provided. The spiral pathway extends from the main floor of the academy to a point near the roof. The ascent is gradual, being about 2·5 to the 100, the total height being 36 feet. The pathway is divided into two paths by an inverted V-shaped board screen, the entire length of course, including the ascent and descent, being over a thousand yards.



DETAIL OF CONSTRUCTION OF THE PALAIS-SPORT.

The path is extended at the top into a spacious platform which enables the rider to make an easy turn before taking a long coast to the main floor below. A high screen protects the wheelman from being precipitated below in case of accident. A spacious room is reserved for spectators. The outer wall of the spiral is decorated somewhat elaborately with pastoral scenes, giving the effect of the country. The bicycles are brought to the main floor from the storage room by means of elevators.



A SPIRAL BICYCLE PATHWAY—PALAIS-SPORT IN PARIS.

Gas Engine Stations for Trunk Line Railways.

Mr. Westinghouse said in a recent speech that the strong argument heretofore used against the adoption of the electric system for main lines has been due to the fact that the investment required to make the change would be heavy, without materially decreasing the consumption of fuel and other costs of operation—an objection which it is believed can be met by the development and use of gas engines of large sizes instead of steam engines for the generation of the electric current. After presenting arguments to show that the gas engine would use but one-eighth the fuel of an ordinary locomotive to produce similar power, Mr. Westinghouse continued: "The Pennsylvania Railroad to-day, it is said, consumes about 5,000,000 tons of coal per annum on its lines east of Pittsburg, taking, approximately, 20 loaded trains each day for its transportation, and consequently the return of 20 empty trains, and requiring for the service of the company alone fully 3,000 cars and a proportionate number of locomotives. If this power were to be generated by gas engines, only about one-eighth, or 600,000 tons of coal per year, would be required, effecting a saving of over 4,000,000 tons of coal, now costing the railway company above $5,000,000—a saving which would justify a large enough capital expenditure to cover the complete equipment of the railway. To carry out an arrangement of this character, stations having electric generating plants with gas engines and producers could be located at intervals of from ten to twelve miles, so that there would always be two or three stations furnishing current for any particular part of the line."

Aluminum.

M. Henri Moissan has been investigating the contradictory results which experimenters have arrived at with reference to some of the properties of aluminum. M. Moissan ascribes these to the fact that all commercial samples of this metal contain impurities. The effects of nitrogen and carbon he has already dealt with, and having had occasion to analyze samples of aluminum from the works at La Praz (France), Neuhausen (Switzerland), and Pittsburg (United States), he has now discovered a new impurity—namely, sodium. This may be present to the extent of from 0·1 to 0·3 per cent, and renders the aluminum liable to be slowly attacked by water. The presence of a small quantity of sodium also completely alters the character of aluminum alloys.

THE Microscope gives this formula for an ink for writing on glass with a pen, as with ordinary ink: Bleached shellac 10 parts, Venice turpentine 5 parts, lampblack 5 parts. Dissolve the shellac with turpentine and stir in lampblack.