

BELGIAN AND AMERICAN ELECTRIC LIFTING MAGNETS.

BY FRANK C. PERKINS.

The construction of an electro-magnet for lifting heavy pieces of iron and steel, and the design of the same, would seem to present no great difficulties; but up to the present, but few manufacturers have been successful in placing apparatus of this type on the market for this class of work. Lifting magnets have been designed by engineers in this country for handling steel plates and billets. These are now in operation at the works of the Otis Steel Company, as well as other iron and steel plants, and have given excellent satisfaction. These lifting magnets were designed and constructed by the Electric Controller and Supply Company, of Cleveland, Ohio. At Liege, Belgium, the electrical engineers of the Electrical works of the Compagnie Internationale d'Electricité, claim to have produced a most perfect electric lifting magnet for use in rolling mills, foundries, and iron and steel works, the accompanying illustration showing the type and method of operation of this class of apparatus.

The electro-magnet, when well designed and constructed, and successfully operated, has an advantage over the old method of lifting of saving a vast amount of manual labor and a great deal of time. Ropes and chains have always been employed heretofore for attaching the load to the hook of the crane, and this required the services of at least two or three men, on account of the heavy and awkward pieces of metal that have to be carried from one part of the foundry or iron and steel works to another.

By means of the electro-magnet, all of the operations are carried out by the attendant on the crane, entirely doing away with the ropes and the man required to fix the tackle. The crane driver simply lowers the magnet on to the piece of metal to be lifted, and excites it by means of the switch, which is placed near at hand. The driver lowers the load, and when it reaches the spot where it is desired, the current from the magnet is switched off, and the hook and magnet are again raised by the crane, and moved along for the next load.

A load may be picked up in an exceedingly short time, only two or three seconds being required for sufficiently magnetizing the lifting magnet, and the enormous saving thus made allows a greater output for each crane, so that fewer cranes are required to do the same amount of work. While it is a fact that there is a greater consumption of power, the amount of current used is so insignificant as to be hardly worth mentioning. An electro lifting magnet which is capable of sustaining 2½ tons, according to the data given by the Belgian engineers, requires about 750 watts.

At Liege there are two types of lifting magnets constructed, the single and the double, the latter being simply composed of two of the single-type magnets, one fixed at each end of a beam, which is suspended at the center from the crane hook. The International electro lifting magnet consists of two parts, the outside bell-shaped cover and the magnet proper, or coil. The cover is utilized to protect the inside mechanism from any shocks which might occur, and also allows it to be used in the open, without damage. It is stated that the magnet can also be employed for lifting very hot pieces of metal, thus

making it especially useful in foundries and rolling mills. The current is supplied by two conductors placed along the length of the crane, the connection being made by contact pieces attached to the crab. The electric lifting magnet will be no doubt more extensively used in the future, both in this country and in Europe, as the rapid introduction of electrically-oper-

Mathieu, starting at the epoch at which the physicist Charles made the first ascent in a hydrogen balloon, went on to describe the various types of balloons of the lighter-than-air class, leaving aside the servile imitations of the flight of birds. He showed how the desire to conquer the obstacles opposed by the wind gave rise to the question of the dirigibility of balloons

that has cost very many lives, but in our day is making great progress. He also pointed out the inconveniences of the spherical form from the viewpoint of progression, and the incessant attempts made since 1784 to elongate the dirigible types. He referred to the Julien fish-shaped dirigible with clockwork movement, of 1850; the experiments of Giffard, of 1852, and those of 1872. In 1883-4, the Tissandier brothers constructed a dirigible with an electric motor, and in 1884-5 the experiments of Capt. Renard were the talk of the world. The question was taken up again in 1897, and the aluminium type with rigid car was constructed in Germany, while in France were begun the experiments of Santos-Dumont, who has reached his tenth type of balloon. M. Lebaudy, with "Le Jaune," made the most remarkable experiments. Apropos of

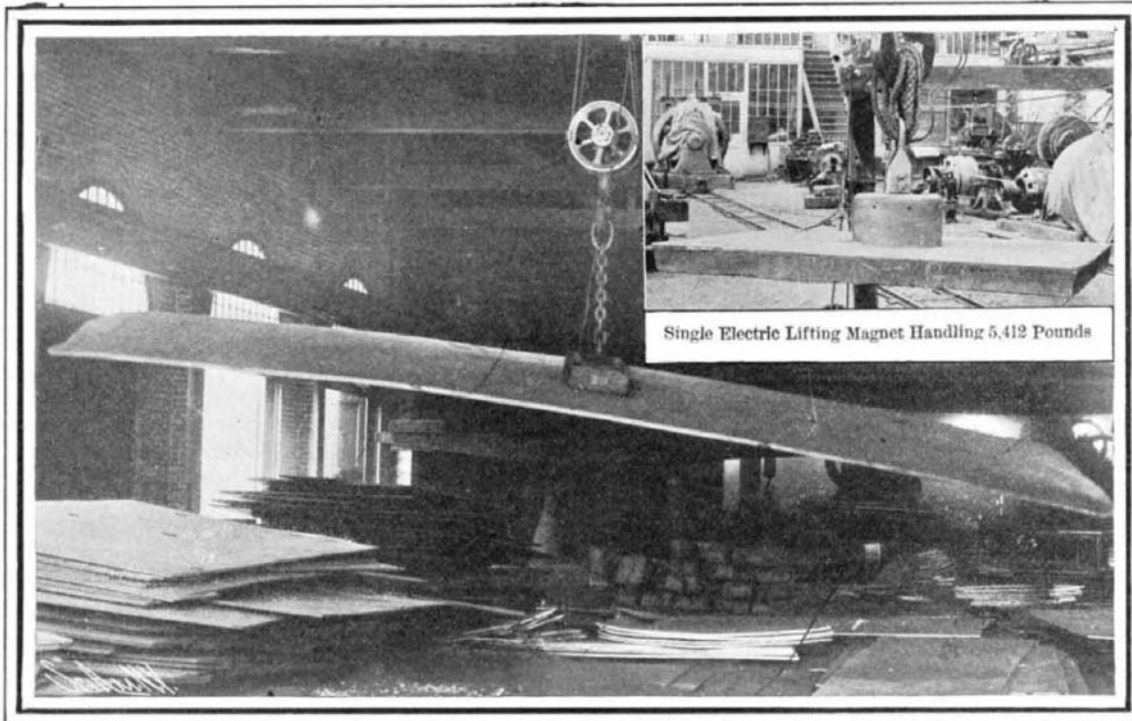
this, Capt. Mathieu predicted the victory of "Le Jaune" at St. Louis.

As for the future of dirigible balloons, the lecturer gave it as his opinion that these would never furnish an industrial energy sufficient for the carriage of passengers and merchandise; that it would always remain a means of transport for excursions, and especially for military explorations; and that it would never be possible to utilize it as an aerial torpedo machine. As regards spherical balloons, they have yet a long career before them, and are destined to render still greater services than they have in the past.

The lecturer then took his hearers on a couple of imaginary balloon trips, and gave them an idea of the varied impressions that are made upon the passenger in a free ascension.

The old home of Washington at Mount Vernon has been threatened for some time by the encroachment of a stream of water, which if it had been allowed to take its own course, would have undermined the mansion in a few years' time. This disaster has been averted by the action of a patriotic order of women, which has secured the money for the purpose of building a tunnel under the historic mansion, in order to divert the stream. This work is now being performed at a cost of seven thousand dollars, and will soon be completed. This same stream gave the Father of his Country considerable concern, and it is said that just before his death he had decided to move the burial vault on the grounds to a point a considerable distance away from the present location. The task of constructing the tunnel is a very simple one, passing directly under the old homestead. It will be of sufficient dimensions to carry off 50,000 gallons per day.

The largest wine cask ever made is exhibited in the Agricultural Building at the World's Fair. It is 17½ feet in diameter, and 17½ feet long, and will hold 14,000 gallons. It is made entirely of oak from Mississippi, Kentucky, and Tennessee. The staves of the cask are five inches thick. Experienced coopers were brought here from Nancy, France, to construct the cask.



Single Electric Lifting Magnet Handling 5,412 Pounds

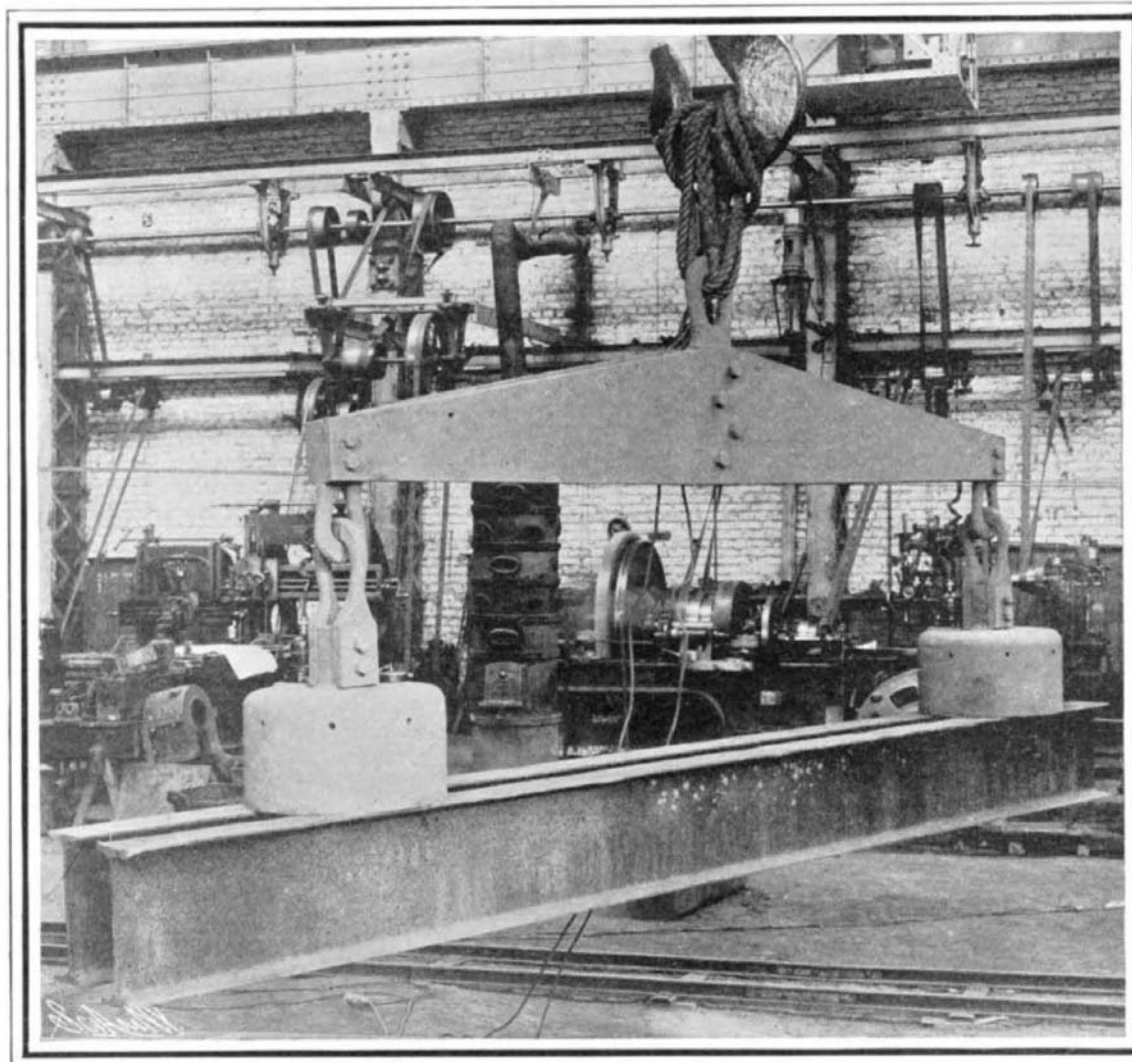
AN AMERICAN PLATE-LIFTING ELECTRO-MAGNET.

ated machine tools, electric cranes, and other motor-driven machinery insures an abundance of electric current for operating these and any other labor-saving devices, which may be brought out in order to save time and labor in detail operation. Every iron and steel plant, as well as all large machine shops and foundries, are now provided with an electric central power station of greater or less capacity, which not only supplies current for operating motors about the shops and works, but also supplies the necessary lighting service as well.

Free and Dirigible Balloons.

BY EMILE GUARINI.

Capt. Mathieu, of the Belgian engineer corps, a pro-



DOUBLE LIFTING MAGNET AT WORK RAISING TWO I-BEAMS.

fessor at the military school of Belgium, and a specialist in aeronautics, recently delivered a very interesting lecture upon free and dirigible balloons before the Belgian Society of Engineers and Manufacturers. After a rapid historical review of ballooning, Capt.

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