ELECTRIC LIFTING MAGNETS.

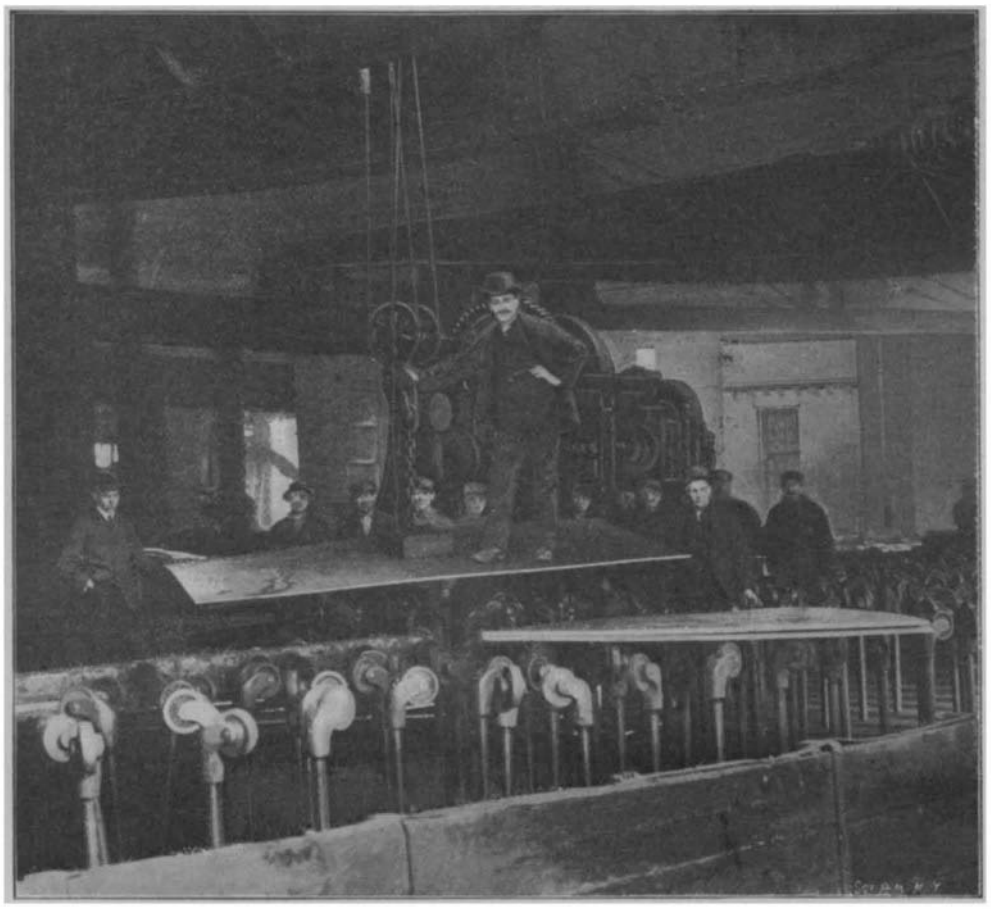
One of the newest and most ingenious devices for the speedy and economical handling of material in great manufacturing plants which has been introduced in the industrial world is the lifting magnet. There are several different types of the apparatus, but they differ only in detail. These magnets are, to a certain extent, a development of the idea embodied in the toys with which children pick up needles and other bits of steel, but each is directly connected with an electrical power transmission line which furnishes the current for holding the metallic material against the face of the magnet while the latter is being raised or lowered or moved from place to place. The magnets are now employed not only in the ordinary handling of steel and iron plates, bars, billets, etc., but also in stacking or placing them in racks and in loading them into or unloading them from railroad cars.

The operation of the magnets is simple in the extreme. The magnet is attached to the hook of a crane and connected to the main wires of a crane circuit, or if preferred it can be installed on an independent circuit, direct-connected with the dynamo. The magnet is lowered on to the material to be lifted, the current turned on and the hoist raised, whereupon the plate, billet, or other form of material is lifted by the magnet. When the load has been brought to the proper place it is lowered into position, the current cut off and the magnet raised, or if desired the load can be dropped without the magnet being lowered.

A very striking example of the possibilities of the new lifting devices is afforded at the yard of the New York Shipbuilding Company at Camden, N. J., where all the cranes designed for use in handling ship plates are equipped with electro-magnets, the magnet in each case being controlled by the engineer of the crane. Thus, instead of its being necessary, as has heretofore been the case in shipyards, to employ a gang of half a dozen laborers to lift with crowbars each plate to be moved while a chain is slipped underneath, and then go with the plate to its place of deposit and release the chain by a similar process, only one man is required in addition to the engineer. The latter brings the electro-magnet over the plate, turns on the current, and the plate, now the armature of the magnet, may be lifted and carried to any part of the shop. At the outset of the experiments with the lifting magnets it was found that there was a remote possibility of danger always present, from the fact that the current might at any time be cut off in the dynamo room without warning, but this is guarded against in most plants by the use of current from a storage battery.

In many cases a crane operator can load and unload material by means of the magnets without any assistance whatever from other operatives. The saving in time and labor in the handling, stacking, loading and unloading of steel or iron plates, bars, slabs, billets, ingots, etc., is variously estimated at from fifty to seventy-five per cent, although in the handling of plates a still greater saving is attainable. Otherwise expressed, the utilization of one of these labor-saving devices ordinarily means a saving of the services of from three to five men, and the work may be performed in less than half the time. In many minor ways, too, the new plan of handling material is an improvement. For instance, there is no necessity for the loss of time consequent to shifting the chain in order to get the load to balance, as commonly had to be done under the old system of handling plates, and moreover experiment has proved that magnets will actually lift and handle material where a chain would slip.

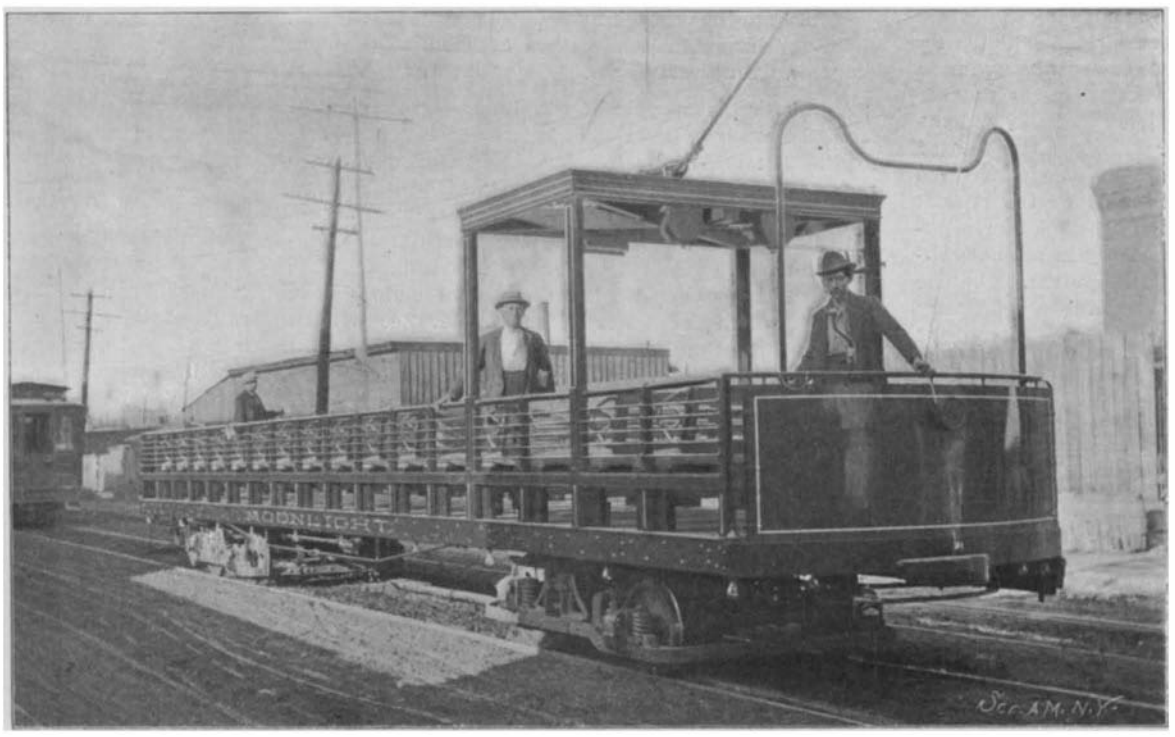
In handling billets or other material of similar shape, two, three, four or even more pieces, up to the full length of the magnet, can be picked up and handled at one time. In handling small thin plates, the current from the magnet will pass through a number of them, lifting several plates at a time. If, on the other hand, a magnet picks up more plates than required, the excess can be dropped off, one at a time. If desired, also, the magnet may be so designed as to only pick up one plate at a time.



HANDLING PLATES AT THE SHEARS BY LIFTING MAGNETS.

In plants where the electro-magnets have been introduced, a rather unique method has in some instances been followed in handling boiler heads and other thin plates. Piles of plates lying flat have been tilted to one side, so that the lifting-face of the magnet could come in contact with the edges of the material, and thus quite a number of pieces have been transferred from one place to another simultaneously. In handling long plates two or more magnets are used, in order to prevent bending or sagging. It has been discovered also that by the exercise of a little care magnets may be dropped on a plate in such a manner as to raise the plate from a flat to a vertical position and successfully handle it in this position or deposit it in a rack.

The ordinary magnets have a lifting capacity of five tons each. However, they are seldom if ever taxed to their full capacity. At a recent test a single magnet lifted five billets, each weighing 240 pounds, and later lifted a billet 15 inches by 15 inches by 5 feet in size and weighing 3,820 pounds. Then four billets, each weighing 145 pounds, were moved by the magnet, after which three billets, each weighing 730 pounds, were moved; and finally six billets, each weighing 730 pounds, were raised and transported. Owing to the size of the material, three magnets were utilized to lift a 3,000-pound steel plate over twenty-seven feet in length and nearly a yard wide, and the three magnets also raised a plate of this size from a flat position preparatory to placing it in a rack on edge.



ST. LOUIS NIGHT EXCURSION CAR "MOONLIGHT."

A NIGHT EXCURSION CAR.

There seems to be no end to specialties in the way of cars for street railways. The increase of mileage around our great cities has resulted in creating a great demand for excursions, and it is possible in many places to travel eight or ten miles for five or ten cents, and the trolley has even invaded Fairmount Park, passing through some of the most delightful sections of that great pleasure ground.

The St. Louis Transit Company has constructed a special roofless summer car, for hot weather service, running to Creve Cœur Lake each evening. The car is appropriately named "Moonlight" and is built much on the lines of the ordinary summer car, except that no part of it comes between the passengers and the sky. It was built under the supervision of the master mechanic of the St. Louis Transit Company in the shops of the company, and is 46 feet 5 inches long and 8 feet 2¼ inches wide. It is equipped with sixteen cross seats and can comfortably accommodate ninety-six passengers.

The tower which supports the trolley stand is not roofed over; this enables every passenger to have an unobstructed view. No lights are used above the seats, except a small cluster to illuminate the registers. The remaining lights are placed underneath the car body, parallel to the running board. The registers are operated by bell cords running parallel to the footboard and with cords extending up to the side posts. Electric bells are also provided on each post, and there is also an electric bell for the conductor to signal the motorman, and one for the motorman to signal the conductor. The car makes two trips every evening and the distance covered is 20 miles. We are indebted to Mr. J. Boyle Price, of the St. Louis Transit Company, for the foregoing particulars and for our photograph.

New Range Finder.

At the meeting of the British Association for the Advancement of Science in Glasgow, Prof. George Forbes described a new folding range-finder for infantry. This device is of the type known as a "one-man portable-base range-finder" and is eminently accurate up to 3,000 yards. Although founded upon the Aidi instrument it possesses none of the disadvantages which characterized the latter apparatus. The British Navy is provided with the Barr and Stroud finders, which are stated to supply the requisite accuracy. A one-man instrument convenient in weight, shape and portability, has long been deemed necessary. It should be so accurate that at a range of 3,000 yards the possibility of error in the hands of a capable man should not exceed 2 per cent, and should be so simple and easy to comprehend that only a short training would be necessary to enable the manipulator to understand and to handle it capably. The Forbes range-finder is a small folding aluminium base 6 feet in length and a field glass. A square tube constitutes the base, with a hinge in the center, and at each end of the base there is a doubly reflecting prism. In use the rays of light reflected from a distant object strike the outer prisms, are then transmitted along the tube, and strike the center prisms, and are reflected into the two telescopes of the binocu-