A NOVEL TYPE OF ROTARY CONVEYER.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Various methods have been devised for the mechanical transportation of the top-soil or callow overlying iron from the excavating site to the dump. A belt or a tray conveyer is ordinarily employed. Unfortunately, the belt conveyer, while efficient, is somewhat expensive to install and its maintenance is costly, while the tray conveyer lacks sufficient capacity.

In order to overcome these deficiencies a novel type of transporter has been devised by an English engineer, Mr. A. R. Grossmith, of Kettering, Northampton. He has evolved a rotary type of conveyer, the general principles of which may be gathered from a reference to the front-page illustrations.

Prior to the adoption of this system the method was to drive a cutting through the ore bed, along which cutting railroad tracks were laid, so as to enable the ore to be dumped straight into the cars. The greatest difficulty experienced, however, was in the removal of the callow, which was invariably taken out by hand from one side of the cut, and transported by wheelbarrows running over temporarily laid planks to the opposite side, where the dump was formed. The adoption of large steam excavators, however, called for a more expeditious means of dealing with the spoil, and as the conveyer did not meet the situation to the best and most economical advantage the rotary system was invented.

As may be seen, the transporter itself comprises a huge wheel, 80 feet in diameter, built on the principle of a bicycle wheel. The rim is so designed as to offer a flat table on the horizontal face which measures 3 feet 6 inches in width, and which is made up of ⅛-inch steel plates. The vertical support on the inner side is also built up of ⅛-inch plate 2 feet in depth with a diagonal strut extending from the lower end of the outer face of the vertical member to the outer under edge of the horizontal table at frequent intervals around the periphery of the wheel, to insure the rigidity and strenght of the structure. In the center of the wheel is a light steelwork hub to which the rim is supported by 224 (112 top and 112 bottom) ⅝-inch steel wire radiating tension spokes disposed tangentially in precisely the same manner as in the ordinary bicycle wheel, these spokes being kept taut by means of eye bolts at the rim.

The lower extremity of the hub is carried on roller bearings. The mounting and balancing are such that the unloaded wheel, despite its weight and size, can be turned round by hand without effort. The wheel is mounted upon a substantial pedestal carrying the driving mechanism, which in turn is carried on a heavy-wheeled trolley, so that the whole machine can travel up and down the cut in either direction, as desired, upon an ordinary track. Moreover, the wheel can be rotated in either direction according to the forward or backward traveling motion of the machine.

Probably the two most important features of the plant are the loading and discharging facilities respectively. On the banks where the steam excavator works is a special form of mechanical hopper. This is circular in form and consists of four essential parts. A central annular disk, built up of mild steel plate ⅝ inch thick by 8 feet in diameter, forms the bottom. This is revolved by means of under bevel gearing. Around its outer periphery is fixed a vertical stationary steel guard 2 feet in height by ½ inch thick, completely inclosing the revolving section, except at that point opposite the annular table of the conveyer wheel, which is the discharge opening. There is another annular shield or ring, 3 feet 6 inches in diameter, disposed around the boss of the central hopper mounting. This ring is only 4 inches in height and is used to take the end thrust of the scraper, by means of which the material is shot on to the rotating transporter wheel. This scraper or plow has its outer extremity securely held by one end of the outer vertical wall of the hopper, and stretches diagonally across the revolving base plate so that its opposite end bears against the inner thrust ring. The plow is 6 inches in height. The hopper is mechanically driven from the mechanism of the transporter wheel, so that when the latter is stopped the revolution of the hopper is also brought to rest.

When the steam excavator bucket deposits its charge into the hopper the material is swung round by the revolving base until it comes into contact with the diagonal plow, which deflects the stream of ballast on to the transporter wheel, through the opening in the outer vertical wall of the hopper. Should a greater mass of material collect at this opening than the conveyer wheel can successfully handle, because the deflecting plow is only 6 inches in height it rides over the latter, is carried round again in the hopper, and is then shot out. Thus the hopper can maintain a steady, uniform feed onto the rotating conveyer wheel. Indeed, the uniformity of this discharge constitutes one of the most important features of the invention and is directly attributable to the design of the hopper, since its discharge can be adapted to the capacity of the conveyer to a nicety. By dumping the excavated material first into the hopper instead of straight on to the wheel, there is no disturbance of the load as the shock of the shovel dump is absorbed by the hopper and is not felt by the wheel owing to its flexibility and the fact that the rim is not connected at that end of the cantilever. Nor can any blocking ensue, such as, for instance, is often the case with the ordinary type of hopper, especially when dealing with wet clay.

Another equally important feature is the means of discharging the material from the revolving conveyer wheel at the desired spot. This comprises a small plow which can be easily and readily moved and placed in position at any point of the annular table, even to a point well beyond the diametrical position of the hopper or in excess of 180 degrees. The plow is mounted upon a carriage and stretches diagonally right across the width of the rim table. The top edge of the wheel rim is surmounted by a T-bar and there are a series of roller carriages arranged to run on it and to which the plow and a ⅜-inch wire control cord are attached. The inner point of the plow holds itself in position against this bar and cannot possibly move. An angle frame serves to keep the plow face rigid and at the angle a horizontal wheel runs on the T-bar, being kept there by the pressure of the ballast, and also serves to take the back thrust against the outer point of the plow. In order to prevent drag and to reduce friction the plow carriage is mounted on small wheels which engage with the surface of the revolving annular table of the conveyer. The control cord is supported by carriages mounted on hardened rollers engaging with the T-bar and may be varied in number as desired, but which insure the cord passing in a series of short tangents to the driving station. From this point either by paying out or winding in the cord the position of the plow can be set wherever desired, while the conveyer wheel is in operation. The conveyer in its revolution carries round with it the earth it has received from the charging hopper until it comes into contact with this scraper, which deflects the material off the table on to the spoil dump, and the simple means of varying the position of the discharging plow enables the spoil to be distributed evenly over a wide area. This is a most important consideration in many places, such as at Corby, since afterward the spoil dumps are reclaimed for agricultural purposes, which is an easy matter when the waste has been evenly distributed in such a manner as is possible by this means. The method of mounting the plow and the easy angle at which it is set serve to render it very efficient in its work, and the wear and tear upon the revolving table is practically *nil*. In fact, in one instance after the conveyer had been at work for six months continuously, handling from 400 to 500 cubic yards of sandy material per day, it was found that all the bloom had not been removed from the plates of which the table is built.

The large conveyer wheel is driven by a 1½-inch cotton rope which runs in a groove provided at the lower end of the vertical member of the rim table to which the spokes are attached. Owing to the absence of intricate mechanism, chains, rollers, idlers, and so forth, the power required to drive the installation is very small. The wheel, including the hub and platform, weighing 7 tons, is carried upon a horizontal cantilever arm which in turn is carried in trunnions. By means of these latter the arm, together with the wheel, can be raised and lowered to any desired level either to suit the excavator shovel or to permit railroad trains to pass beneath to and from the mines. The heavy pedestal frame upon which the whole is mounted is fitted with a turntable, a very convenient arrangement which permits the plant to enter narrow cuttings standing obliquely thereto, independent of the direction of travel. As the whole plant runs upon a three-wheel track it can be easily made to follow sideways in the track of the excavator as it eats its way into the hill, as well as follow it up and down the length of the cut. A small boiler and steam engine housed on the turntable provide the whole of the power for driving the hopper and wheel as well as propelling the conveyer along its track.

Simulated Disease Revealed by Electricity.

Some cases of apparent local paralysis are feigned or simulated. For example, long after a broken arm is healed, the patient may assert that he is unable to use the arm properly. It is then the duty of the physician to find whether a real paralysis exists, and where. Electrical energy may be compared to psychical energy, the battery to the brain, the wire to the nerve, and the electric bell, for example, to the member moved. A muscle contracts when a faradic current is applied to the corresponding nerve. If the muscle on the affected side of the body reacts as strongly as the corresponding muscle on the opposite side the partial paralysis is simulated. If the muscle on the wounded side reacts less strongly than its fellow there is a real disease of the nerve. Finally, if the muscle on the wounded side reacts more strongly than its fellow the seat of the paralysis is the central nervous system, the brain or the spinal cord.

Dr. Larat has devised an instrument which makes a graphical record of the muscular contraction. The curves thus obtained form important pieces of evidence in suits of damage for accident.

The Marblehead Race for Motor Boats.

The fifth Marblehead race, which has now become an annual function and bids fair to become considered the accepted Derby of the motor boat, took place on Saturday and Sunday, July 17th and 18th. There were twelve starters and only two failed to finish, one of which was unfortunately burned and sunk.

A start was made at 10:30 A. M. on the 17th from the pier of the Crescent Athletic Club at Bay Ridge in New York bay in perfect weather which continued throughout the run, being even calmer on Sunday and interrupted only by a slight squall that afternoon.

The "Kitcinque," built specially for the race and launched only four days before, was the largest and much the most powerful boat entered, having a 75-horse-power Sterling motor, while the "Josephine," which finished first, though an inch longer, has 4 inches less beam and only one-third of the power, being equipped with a 25-horse-power Jäger engine. The former was expected to beat all records for the course and bade fair to do so, being out of sight ahead of the second and third boats when they were hull down ahead of the rest of the fleet, and it was most unfortunate that she should have been so tragically lost, keen sympathy being felt for her owner and crew, who were fortunately rescued unhurt. The "Kitcinque" was off the Sow and Pigs lightship in Vineyard Sound when a stoppage of the gasoline pipe caused the engine to back-fire through the carbureter, setting fire to oil in the bilge. Efforts to smother the flame were fruitless, and the crew were compelled to abandon their vessel, some taking to the water and others to the small dinghy carried, which would only hold three, only just in time before the gasoline tank exploded. The "Josephine" was therefore the first boat to cross the line at Marblehead six hours after the burnt boat had been expected, at 6:36 P. M. on Sunday, her official time for the 285 miles run being 32 h. 1 m. 45 s. The second to arrive was the "Nimrod," the smallest boat entered, only 30 feet 2 inches long, with a 15-horse-power Atlantic engine, which received quite an ovation and has been highly commended, and would have been higher on the official list had she not lost an hour in putting in at Cottage City to replenish her gasoline supply. The "Elmo II," which finished seventh, was the official winner on time allowance, the latter being figured on a complicated proportion of engine power to measurement; she is 34 feet 2 inches long, 8 feet 9 inches beam, and has an 18-horse-power Standard motor, and her corrected time was 25 h. 24 m. 55 s. out of an elapsed time of 36 h. 32 m. 25 s.

The Current Supplement.

Perhaps the most distinguished physicist of our time is Prof. Svante Arrhenius. A splendid portrait of Arrhenius appears on the front page of the current SUPPLEMENT, No. 1753, and mention is made of his remarkable scientific work. Mr. Rufus P. Williams writes on an ancient duodecimal system. How a garden seat can be made is told by Mr. A. C. Horth. M. Kennett tells how electromagnets may be calculated. It is a well recognized fact that our present railway systems are very inadequate to the demands of modern traffic. Many railway men have studied the question of reform without finding a satisfactory solution. The latest proposition is that of the well-known Berlin publisher, August Scherl. Mr. Scherl's plan is fully described and illustrated in the current SUPPLEMENT. Lieut. John C. Soley writes on the Messina earthquake and the events preceding it. Everyone remembers the old-fashioned glass globe in which a few gold-fishes led a wretched existence. In its place we now use the aquarium, which is adapted to the conditions of piscine life, and which is an adornment to any room. Some ornamental fishes that can be kept in such an aquarium are enumerated and described by Berthold Koerting. Maria Parloa tells how fruit can be canned and preserved. Zeolites are a comparatively small group of silicates distinguished by the fact that they contain water as an essential constituent. That they play an important part in the economy of plants is pointed out by Prof. O. N. Witt.

A consular report dealing with the trade and commerce of Mozambique (Portugal), states that a light railway running from Matamba, in the Bay of Inhambane, to Inharrime, 50 miles to the southwest of that point, has been under contemplation for some few years past. This scheme, for which it is understood orders have now been placed for the rails and sleepers, is intended to develop the rich northern districts of Gaza, which are regarded as among the most valuable in the province. No work has yet been commenced, however, possibly because of a heavy rainy season.

SCIENTIFIC AMERICAN

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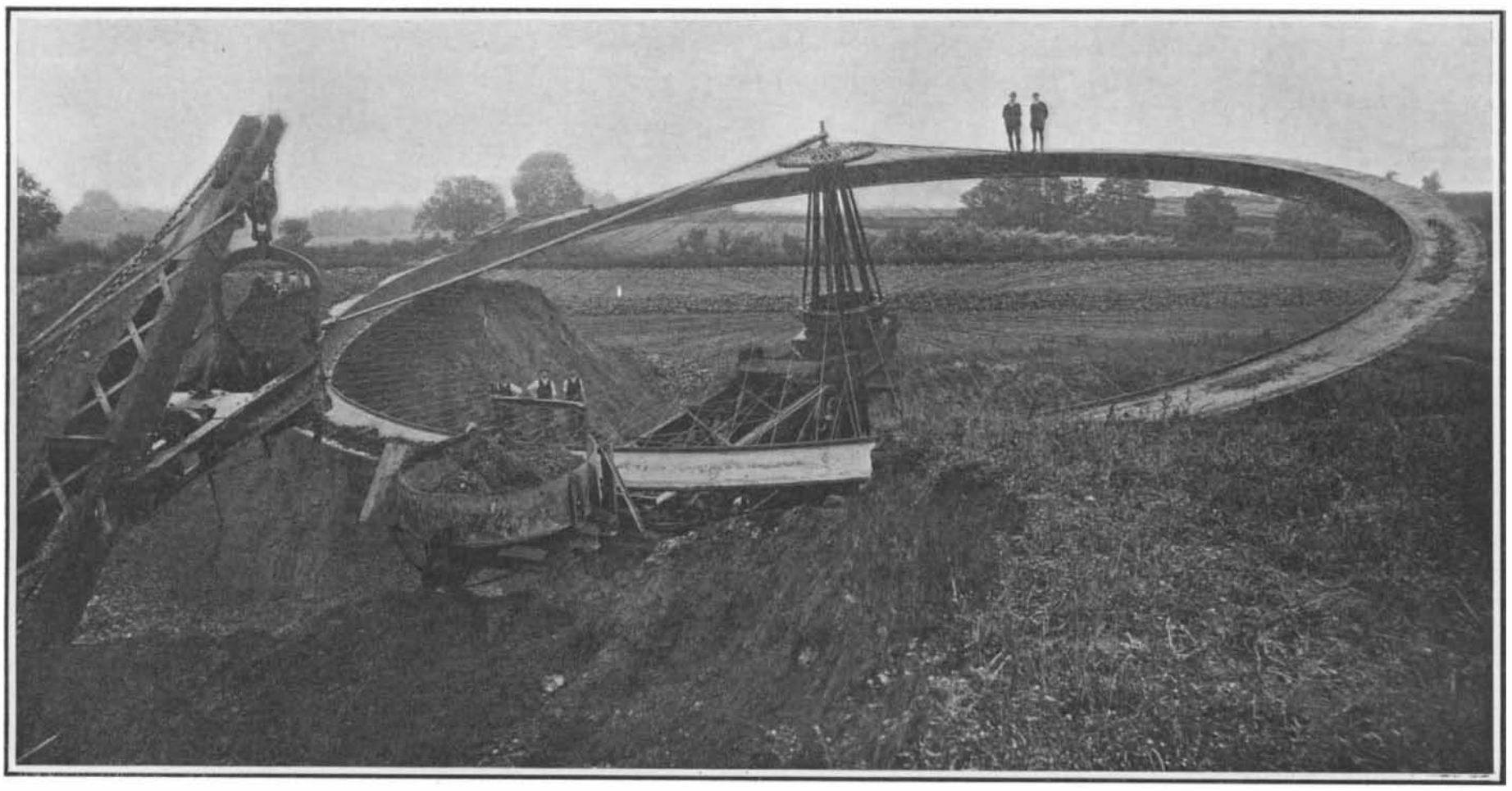
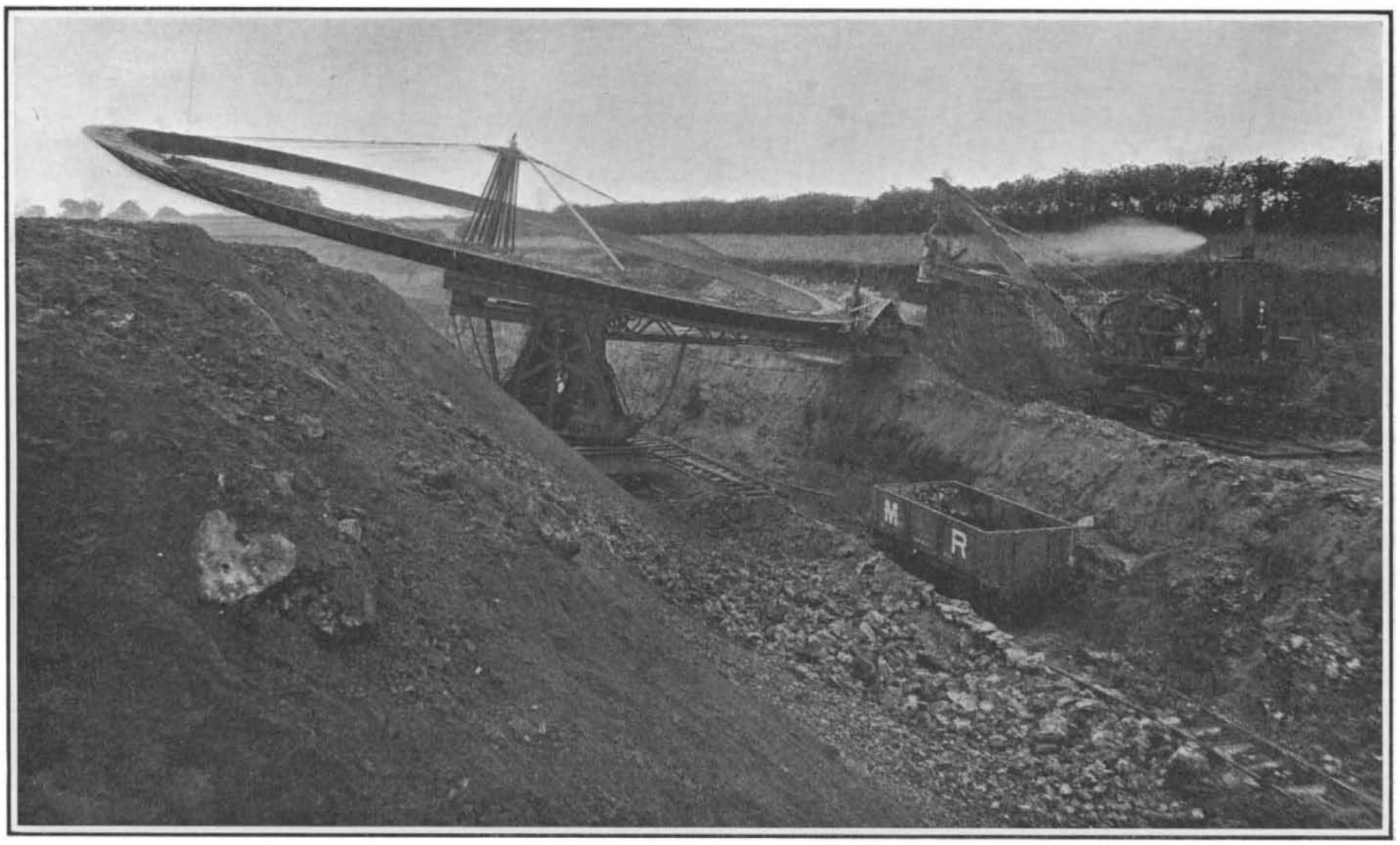
A POPULAR ILLUSTRATED WEEKLY OF THE WORLD'S PROGRESS

Vol. CI.—No. 6. ESTABLISHED 1845.] NEW YORK, AUGUST 7, 1909. [10 CENTS A COPY [$3.00 A YEAR.



Top view of rotary conveyer, showing table of wheel and special revolving hopper for charging.



Side view of the rotary conveyer. The conveyer is traveling from the observer.

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