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ELECTRIC MOTOR ON THE NEW YORK ELEVATED RAILROAD.

Preliminary trials of a Daft electric motor, the Ben Franklin, have been in progress for some time past on a portion of the Ninth Avenue Elevated Railroad of this city, extending from 14th to 52d Streets. The dimensions of the principal parts of this motor are as follows:

Driving wheels, 48 in. diameter; trail wheels, 36 in. diameter; length over all, 14 ft. 6 in.; spread of wheels, 5 ft. 6 in.; diameter of armature, 25 in.; weight of armature, complete with shaft, 850 lb. Total weight of motor, 8¾ tons. Ratio of armature revolutions to drivers, 1 : 5·5. Ratio of peripheral speeds of armature and drivers, 1 : 2·8+. The reversing arrangements consist of four brushes attached with compound levers, and so connected that the direction of rotation must necessarily be that best suited to the proper contact and wear of the brushes. There is also abundant provision made for varying the points of contact in proportion to the load, speed, etc. The regulating switch consists of a sliding plate having metallic contacts arranged on its surface in such a manner that a number of spring contacts effect changes in the internal resistance of the machine, so as to regulate the speed without the use of idle resistances, none of which are employed; the highest economy is therefore obtained with light as with heavy loads. The electric brakes are of the pendulum type, which were first used on the Mt. McGregor motor in 1883, and are connected with a switch conveniently arranged to vary their power by variation of internal resistances. The mechanical brake consists of a compound lever attachment operated by a screw shaft through a thoggle mounted nut. Contact with the third rail, placed between the main rails, is effected by means of a phosphor-bronze wheel attached to a movable framework, which can be raised and lowered as occasion requires, by means of the lever shown in the side elevation, Fig. 3.

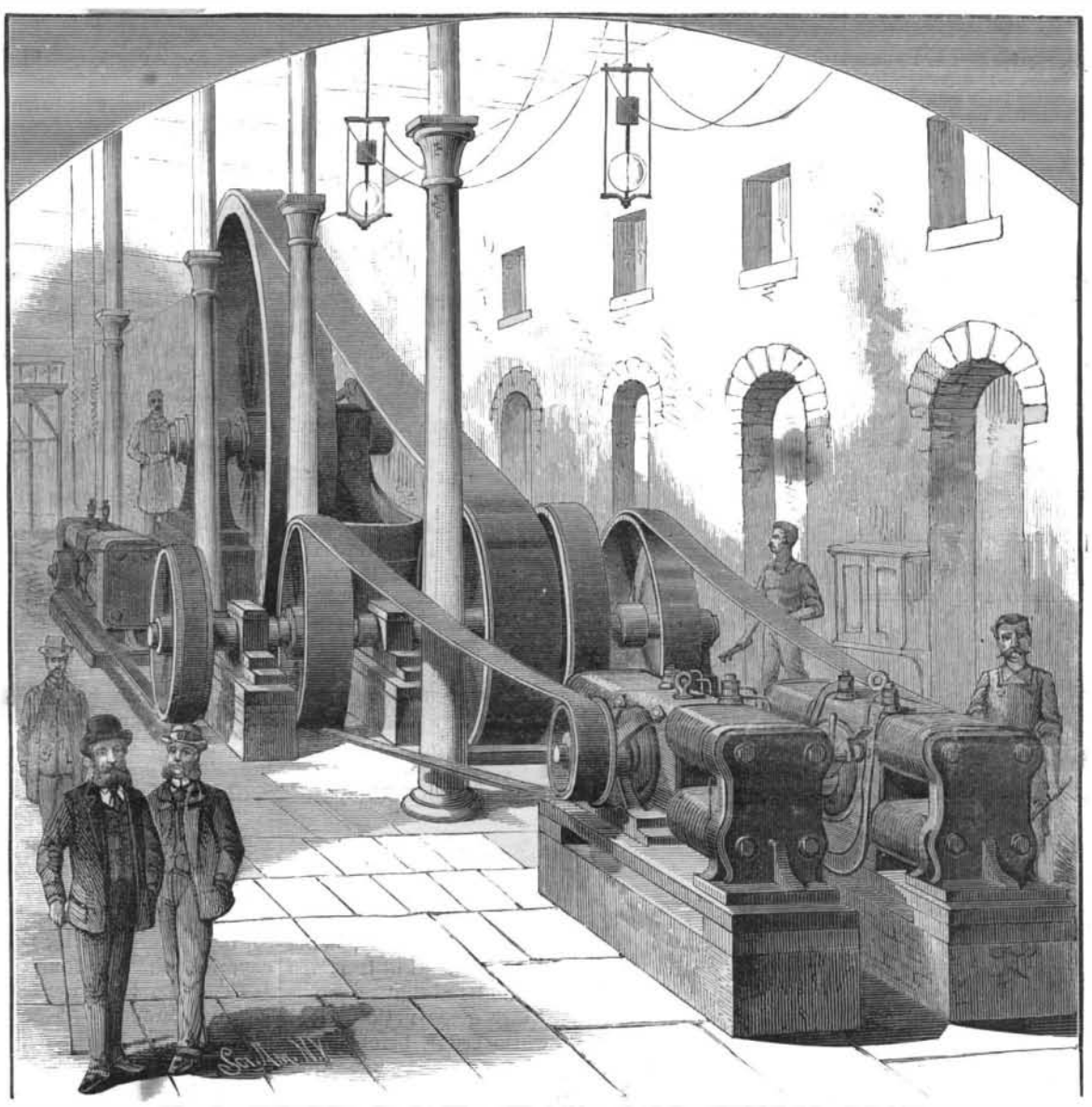

Fig. 1.—DYNAMO STATION OF THE DAFT ELECTRIC MOTOR.

Upon each end of the armature shaft is a small wheel, formed with corrugations on its face which fit in corresponding corrugations on the face of a larger wheel mounted at each end of the driving wheel axle. As will be seen by reference to the drawings, Figs. 3 and 4, the electro-dynamic machine is pivoted at one end in resilient bearings and attached to a vertical screw shaft at the other end, so as to enable the operator to vary the frictional contact between the friction gearing at will, and also affording an easy and convenient means for raising the whole machine to effect a change of armatures.

In order to avoid damage to the gearing and other parts of the electro-dynamic machine from shock, the whole machine is maintained in about equal resilience by means of alternating laminæ of iron and India rubber placed over the bearings of the drivers in lieu of the ordinary springs, and again in the pedestals at either end of

(*Continued on page* 326.)

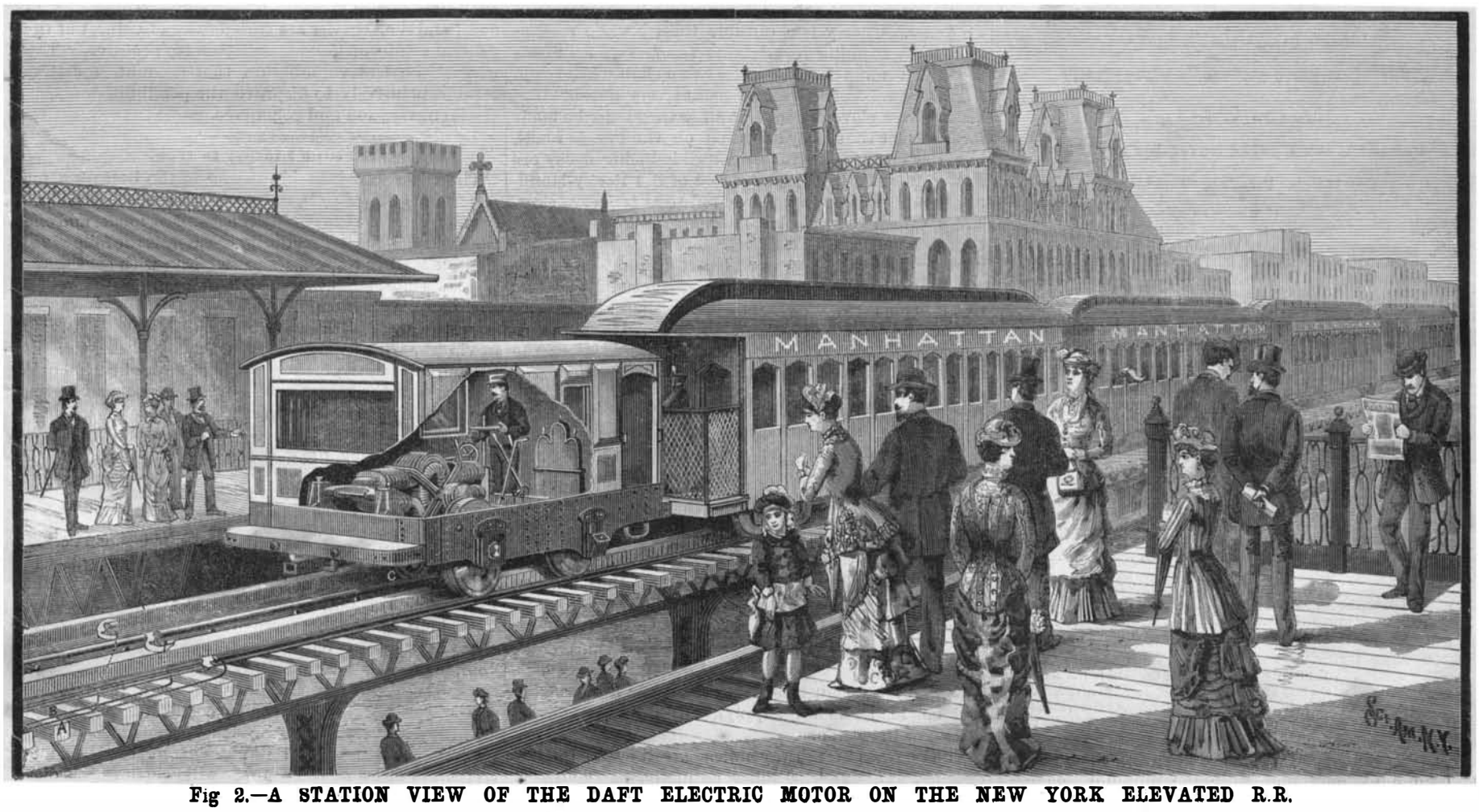

Fig 2.—A STATION VIEW OF THE DAFT ELECTRIC MOTOR ON THE NEW YORK ELEVATED R.R.

ELECTRIC MOTOR ON THE NEW YORK ELEVATED R.R.

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the electro-dynamic machine. The object of using these laminated cushions is to avoid the too considerable motion which would result from the use of the ordinary springs, and at the same time provide a degree of resilience which enables the machine to run over very rough roads without the least derangement of parts.

The cab contains also a voltmeter, which shows the engineer the difference of potential on the track, just as the ordinary pressure gauge now indicates the pressure in a boiler.

The rails are the ordinary 56 pound steel rail, insulated by means of the Daft insulator, which consists of an umbrella of cast iron with head so formed as to readily admit of locking the base of the rail by means of two cap screws and washers. The standard is formed of any suitable insulating material; the standard now in use on the elevated road consists merely of baked hard wood saturated with asphaltum, which has so far been found to afford ample insulation for all practical purposes — the leakage with four miles of track now involved (two miles of double track), plus the switches, being inconsiderable. The joints are made by drilling holes in the web of the rail, and riveting strips of copper from one to the other; this method has been found entirely satisfactory, both here and on the road now in operation in Baltimore—the resistance having thus been reduced to nearly the calculated line resistance.

No difficulty has been experienced in making the switches, though in some instances a considerable interval has to be bridged by momentum alone, due to the necessity for leaving out the third rail in order to permit the passage of the ordinary steam locomotives; this difficulty would of course be removed in the event of the entire road being operated electrically. The maximum gradient is one of 105 feet per mile between 23d and 34th Streets. This has been surmounted with ease with fairly well loaded trains, and on several occasions an average speed of 20 miles an hour has been attained.

The track is vitalized by dynamos (Fig. 1) situated at the main station on 15th Street, about 200 yards from the track, it having been considered desirable to place the vitalizing machines as near one end of the track as possible, so as to show the influence of distance in lowering the potential.

The effect of these two miles is, therefore, rendered equal to four miles where the station is centrally placed, and the loss of energy at the extreme end is barely observable. The vitalizing system at the station consists of three No. 5 Daft dynamos, actuated by a Wright automatic cut-off steam engine, having a cylinder 18 x 42 inches and a flywheel 16 feet by 26 inches. There is, in addition, a small arc-light Daft dynamo used for lighting the station and boiler room. The machines are connected with a switchboard, so that they can be placed in "parallel" or "series," as may be desired, and there is in addition an automatic cut-off, which operates in the event of a short circuit on the track, so as to open the circuit at a fixed point, and at the same time give the engineer notice by ringing an alarm. There is also an attachment to indicate when the short circuit is removed. The machines are connected to the track by means of 0000 copper wire, with Underwriter's line insulation suspended upon poles.

The motor has already run several hundred miles on the short track at 14th Street, making many hundred stops and starts, involving much severe work, hauling four cars for a considerable portion of the time, and also a two car train, for the purpose of making close observations as to the difference in consumption of fuel. With regard to this all-important question, the tests are as yet necessarily incomplete; but so far as they have gone, the indications are claimed to be eminently satisfactory. The extraordinary adhesive properties of a locomotive operated in this manner are evident. This feature is well illustrated on the line in Baltimore, which at one point has a curve of 75 feet radius on a gradient of 353 feet, and yet no difficulty has been experienced by the motor in ascending this grade with a loaded train. So successful has been the working of the Baltimore road that two more motors have been ordered, making a total of four.

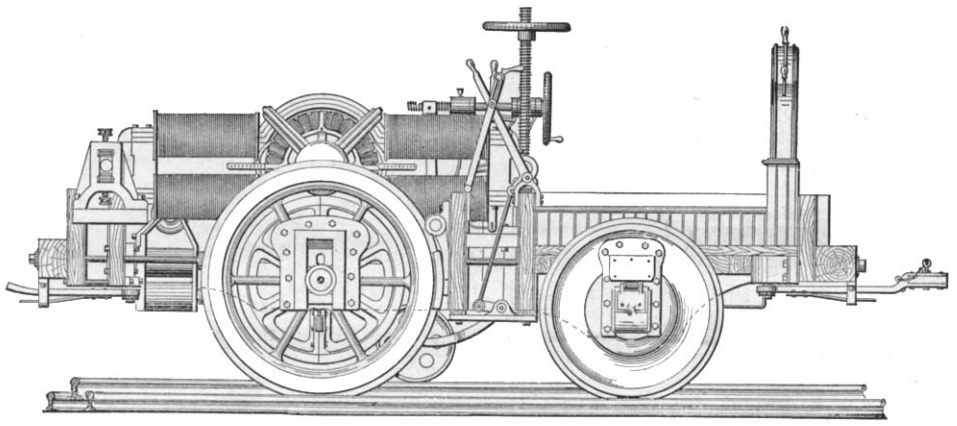


Fig. 3.—SIDE ELEVATION OF THE ELECTRIC MOTOR

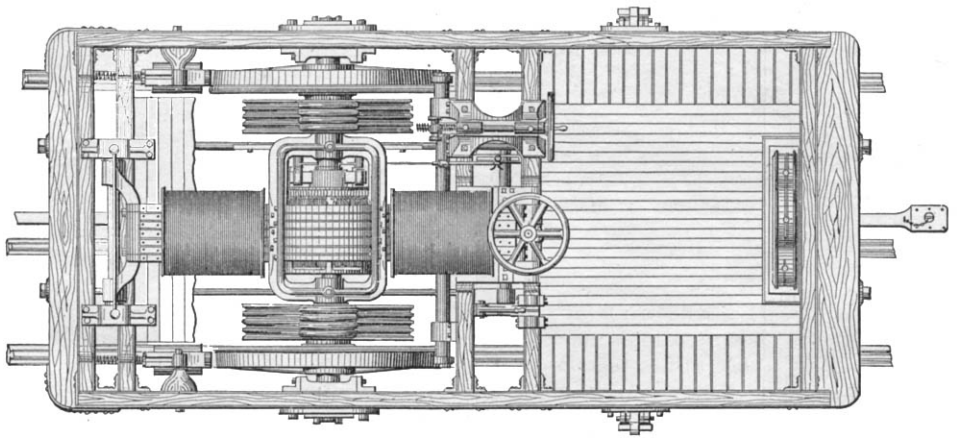
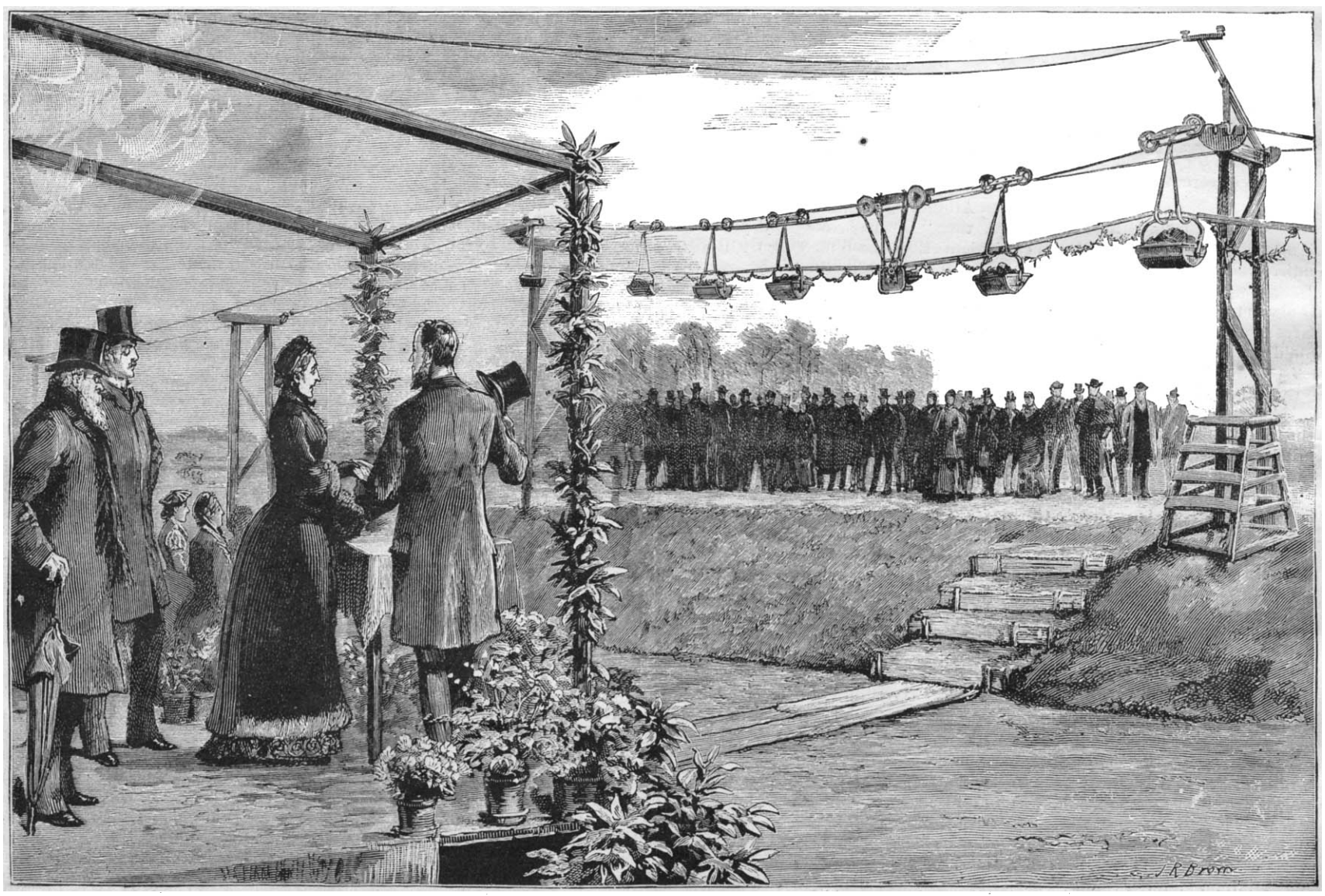


Fig. 4.—PLAN VIEW OF THE ELECTRIC MOTOR.

OPENING OF A TELPHER LINE.

The experimental telpher line at Weston, under the system of the late Professor Fleeming Jenkin, has resulted in the construction of a telpher line to do real work at Glynde, on the estate of Lord Hampden, near Lewes. Professor Fleeming Jenkin had begun the construction of the Glynde line, Mr. Arthur Brewtnall being his assistant. After the death of Professor Fleeming Jenkin in June last, Professor Perry was appointed his successor as the engineer to the Telpherage Company. The Glynde line has now been completed, and was opened October 17th, by Lady Hampden, who started a loaded train on the line electrically. The line is a double one, nearly a mile in length, and is composed of two sets of steel rods, ¾ inch in diameter, supported on wooden posts of T shape, and about 18 feet high. The wires are supported one on either end of the cross piece of the T, which is 8 feet long. The carriers, or skips, as they are technically termed, are iron



OPENING OF AN ELECTRICAL CABLE RAILWAY OR TELFER LINE AT GLYNDE, ENG.