

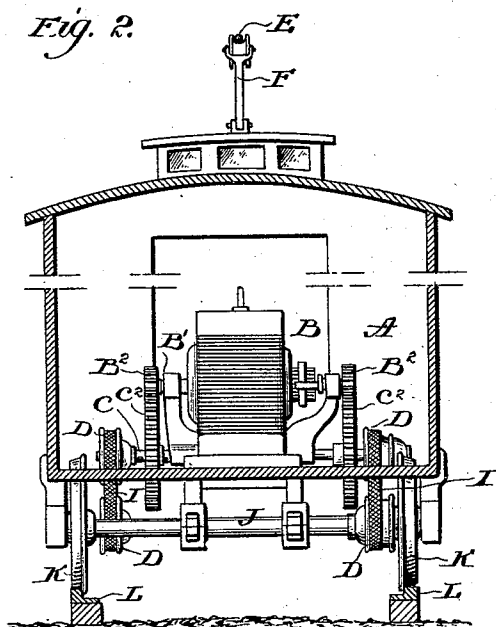
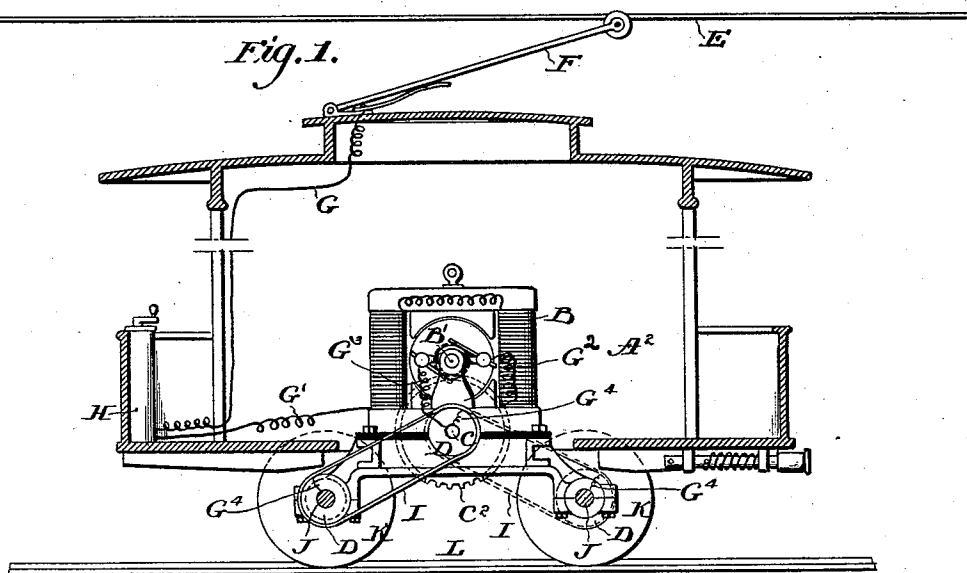
(No Model.)

2 Sheets—Sheet 1.

W. E. HARRINGTON.
ELECTRO MAGNETIC PULLEY.

No. 487,070.

Patented Nov. 29, 1892.



Witnesses:

Harry D. King

David S. Williams,

Inventor:

Walter C. Harrington

by his atty.

James T. Chambers

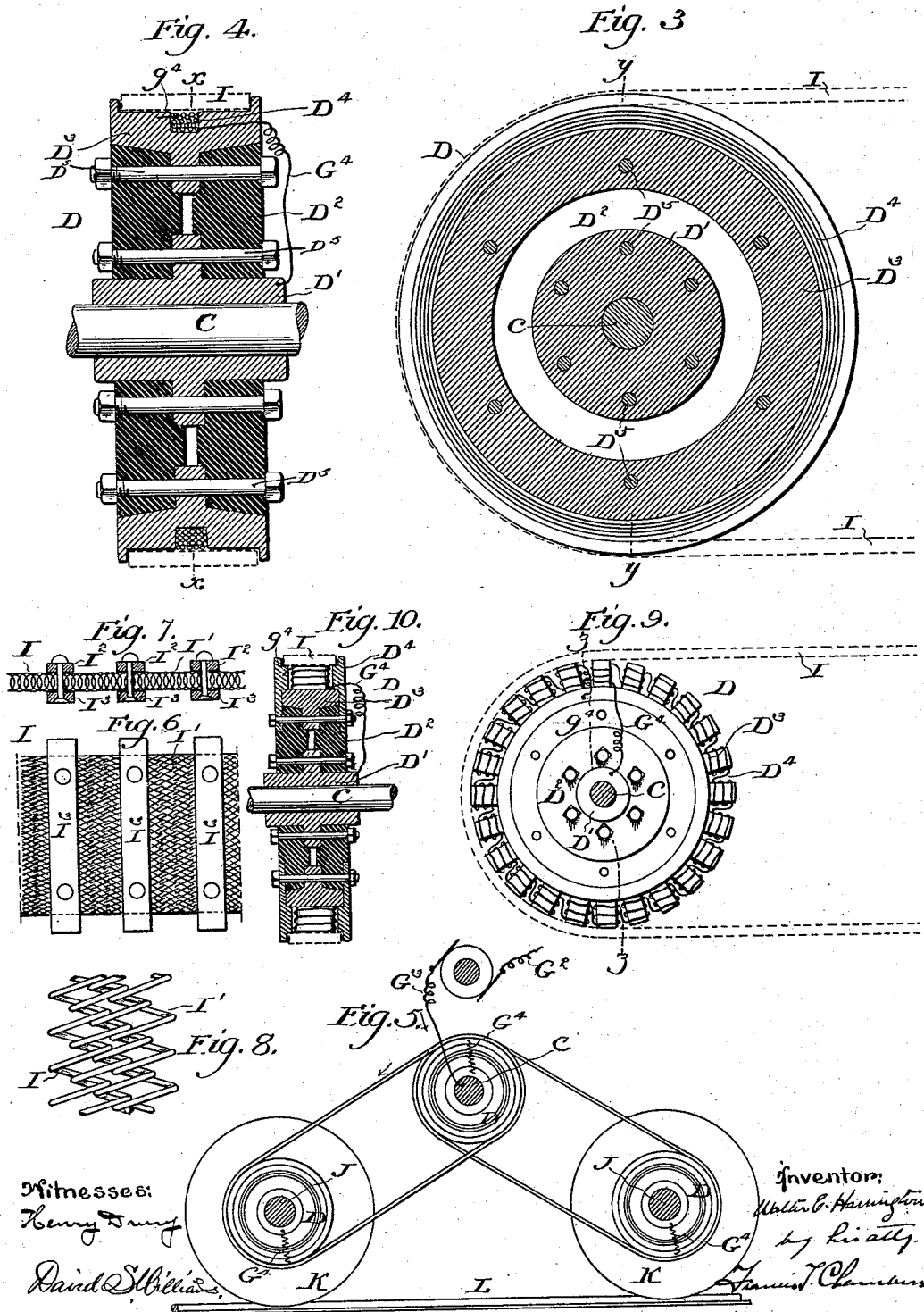
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UNITED STATES PATENT OFFICE.

WALTER E. HARRINGTON, OF ATLANTIC CITY, NEW JERSEY, ASSIGNOR TO
FRANCIS T. CHAMBERS, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRO-MAGNETIC PULLEY.

SPECIFICATION forming part of Letters Patent No. 487,070, dated November 29, 1892.

Application filed June 2, 1891. Serial No. 394,862. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. HARRINGTON, of Atlantic City, county of Atlantic, State of New Jersey, have invented a certain new and useful Electro-Magnetic Pulley, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the transmission of power through electro-magnetic pulleys, and is an improvement upon the device described by me in my application for Letters Patent, filed October 4, 1890, Serial No. 367,055.

The object of my present invention is to simplify and improve the construction and especially the mode of connection of the magnetic pulleys.

The nature of the invention will be best understood as described in connection with the drawings in which it is illustrated, and in which—

Figure 1 is an elevation showing a car propelled by an electric motor provided with my device for transmitting motion from the motor to the axles. Fig. 2 is an end view of the said car; Fig. 3, a side elevation of my improved magnetic pulley, taken on the section-line *x x* of Fig. 4; Fig. 4, a cross-sectional elevation taken on the line *yy* of Fig. 3; Fig. 5, an enlarged view or diagram showing the electrical connections between the commutator of the motor-armature, the pulleys, and track. Fig. 6 is a plan view of the belt used in connection with my motor; Fig. 7, an edge view of the same; Fig. 8, a diagram illustrating the mode of construction of the belt; Fig. 9, a side elevation of the modified form of electro-magnetic pulley, and Fig. 10 a cross-sectional view of the modified pulley on the line *zz* of Fig. 9.

A is the car; B, the electric motor; C, the driving-shaft, actuated by the motor; D D, electro-magnetic pulleys secured to the shaft C and also to the car-axles J.

E is the wire through which the electric current is carried; F, the trolley of the car; G, the wire leading from the trolley to the switch H; G', the wire leading from the switch H to the electric motor; G², the wire leading from the magnet-coils of the motor to the ar-

mature; G³, the wire leading from the armature to the shaft C.

Referring now to Figs. 3 and 4, which illustrate the construction of the electro-magnetic pulleys, D' is the hub of the pulley, made of iron or other conducting material and fastened to the shaft C or the axle J, as the case may be. D² is the pulley center, made of some non-conducting material, which is bolted to the hub D' and to which is bolted the pulley-rim D³, which is made of iron or other material which is an electric conductor, and which is made magnetic by the passage of an electric current through suitable windings upon or connected with it.

In the plan shown in Figs. 3 and 4 the pulley-rim is made magnetic by means of circumferential windings, as indicated at D⁴, and in the modified plan shown in Figs. 9 and 10 the rim is made magnetic by windings around projections extending out from the body of the ring, the latter device being that illustrated in my former application for Letters Patent. Any suitable windings which will have the effect of magnetizing the rim may of course be used. The windings upon the pulley-rim are connected at one end with the pulley center by means of a wire G⁴, and the other end of the rim-windings is connected with the rim itself, as indicated at g⁴. The shaft upon which the pulley is secured is of iron, steel, or other conducting material, and the pulley receives the current first through its hub, then through the wire G⁴ into its windings D⁴, and then through the wire connection g⁴ the rim itself is brought into the circuit.

As in my former application, a belt of iron or other conducting and magnetic material is placed over the magnetic pulley and preferably over a similar pulley upon the countershaft—as, for instance, the axle J. The electric current passes from the pulley-rim through the belt (indicated by I in the drawings) to the rim of the pulley on the countershaft, from the rim through connections g⁴ to the windings D⁴, then through connection G⁴ to the hub, thence to the shaft, as J, and thence through the wheels K to the track L, which serves as the return-conductor to the source of electrical supply. The belt which

I prefer to use and have found excellent for the purpose is made up of woven wire, as indicated at I' in the drawings, and along the inner face of this I rivet cross-bars I³, the
 5 rivets passing through the interstices of the wire, and preferably passing, also, through bars I² on the outer side of the belt. The bars I³ rest against the pulleys and are attracted to the faces thereof with a power pro-
 10 portioned to the amount of current passing through the windings, or, in other words, to the magnetic attraction of the rim. The current from the rim also passes through the bars, and thence from the woven-wire portion
 15 I of the belt to the pulley on the counter-shaft. It will be understood of course that the shaft C and axles J of the car must be insulated from each other, so that the current when passing through the pulleys must fol-
 20 low the path described. The simplicity of the arrangement which I have described is of course apparent and the advantages arising from my being able to electrically connect the pulley with the source of
 25 electrical supply through the shaft upon which it runs or through said shaft to the return-circuit are manifest and need not be particularly pointed out further than to call attention to the fact that I entirely dispense with collect-
 30 ing rings and brushes.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An electro-magnetic pulley having a rim
 35 of conducting material made magnetic by

suitable windings, a hub of a conducting material, a wheel center of non-conducting material, a connection from the hub to the windings of the rim, and a connection from the windings to the rim.

2. In a car, the combination of an electric motor, a driving-shaft actuated by the motor and constituting part of the motor-circuit, an electro-magnetic pulley secured on said shaft, said pulley having a hub and rim of conducting material, the rim being made magnetic by suitable windings, said pulley having, also, a center of insulating material, electric connection between the hub and rim windings and between the said windings and the rim, a car-axle having a similar pulley secured to it, and a belt of conducting material running over the two pulleys, all substantially as and for the purpose specified.

3. In combination with an electro-magnetic pulley, a belt I, of woven wire, having iron armature-bars I³ secured to its inner face by rivets passing through the interstices of the wire, substantially as and for the purpose specified.

4. In combination with an electro-magnetic pulley, a belt I, of woven wire, having iron armature-bars I³ secured to its inner face by rivets passing through the interstices of the wire and through bars placed opposite to the armatures on the outside of the belt.

WALTER E. HARRINGTON.

Witnesses:

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JOSHUA MATLACK, Jr.