No. 649,620. Patented May 15, 1900.

C. W. STEEL & W. A. NESBITT.

ELECTRIC BRAKE.

(Application filed Feb. 27, 1899.)

(No Model.) 2 Sheets—Sheet 1.

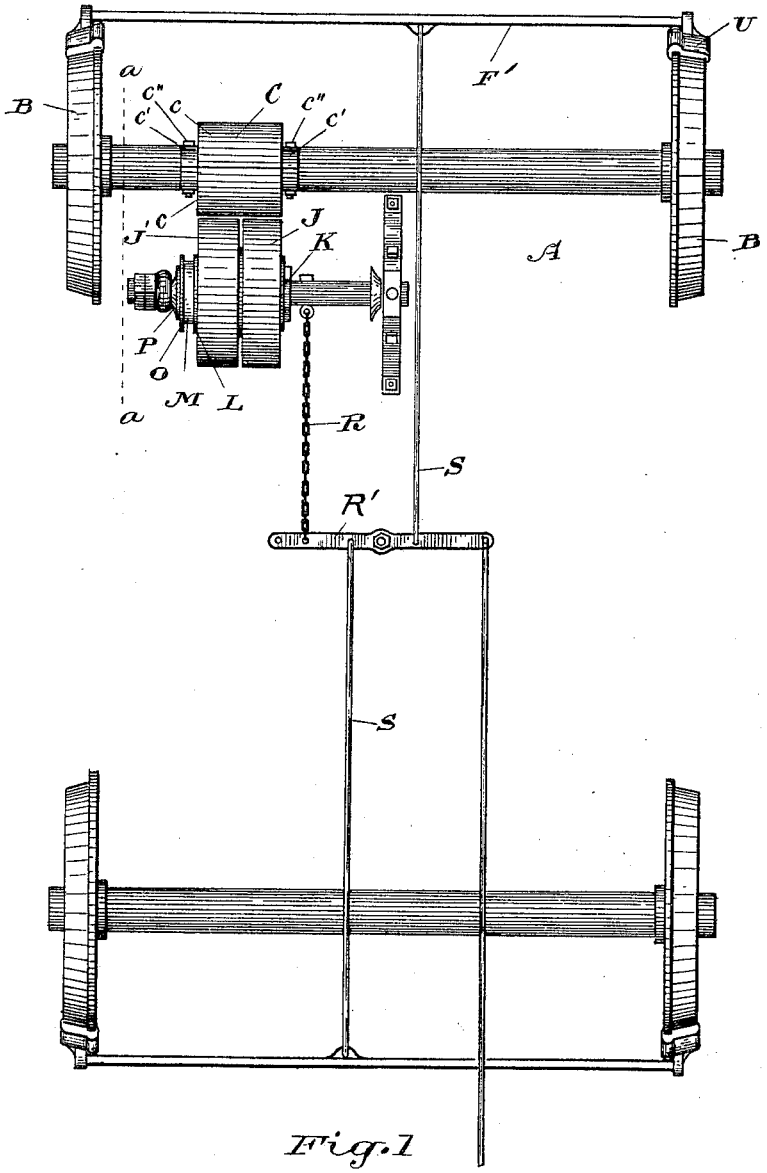

Fig. 1.

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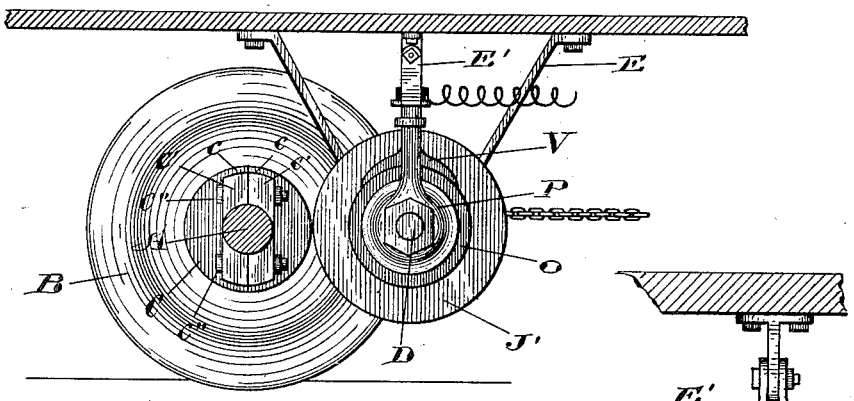

Fig. 2

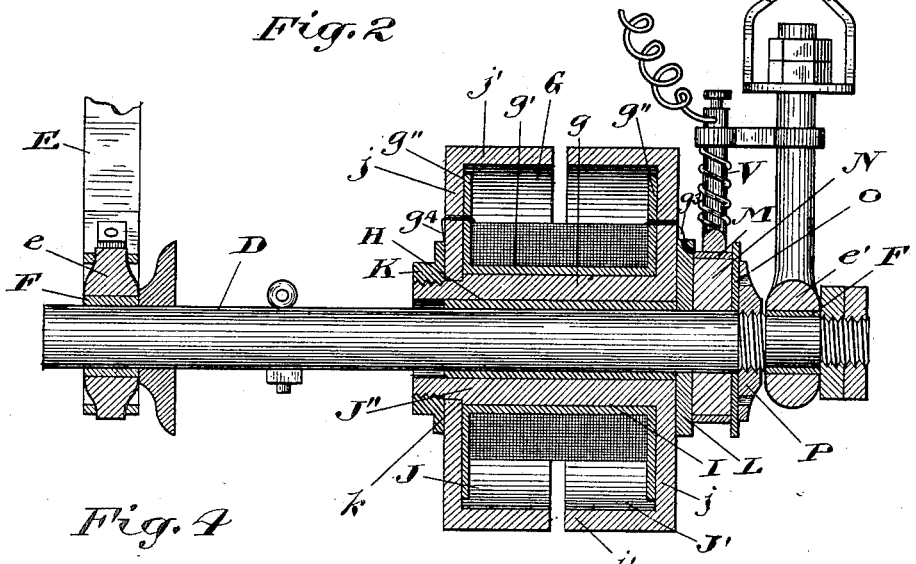

Fig. 4

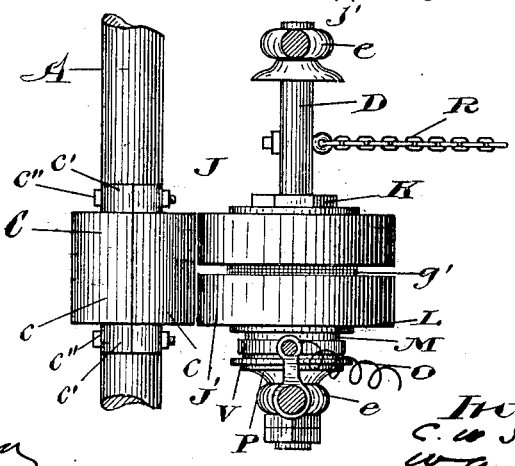

Fig. 3

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UNITED STATES PATENT OFFICE.

CHRISTOPHER W. STEEL AND WILLIAM A. NESBITT, OF TORONTO, CANADA.

ELECTRIC BRAKE.

SPECIFICATION forming part of Letters Patent No. 649,620, dated May 15, 1900.

Application filed February 27, 1899. Serial No. 707,106. (No model.)

To all whom it may concern:

Be it known that we, CHRISTOPHER WILMOT STEEL and WILLIAM ALEXANDER NESBITT, subjects of the Queen of Great Britain, and residents of the city of Toronto, in the county of York and Province of Ontario, Canada, have invented certain new and useful Improvements in Electric Brakes; and we hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to certain new and useful inprovements in electric brakes, and it relates more particularly to the peculiar construction of the operating parts and the manner in which they are assembled to constitute the brake; and the object of the invention is to provide the car with an electric brake by means of which the progress of the car can be easily controlled with but a small expenditure of electricity; and the invention consists, essentially, of a cylindrical armature rigidly mounted on and revoluble with the car-axle and a magnet of a peculiar construction opposed to the cylindrical armature, rigidly mounted on a shaft journaled in bearings suspended from the under part of the car contiguous to and parallel with the car-axle, one of the bearings being stationary and the other pivoted, as hereinafter more particularly set forth, and pointed out in the claims.

In the drawings, Figure 1 represents a plan view of the under side of a car, showing the relative positions of the various parts. Fig. 2 is a transverse sectional view taken on the lines *a a*, Fig. 1. Fig. 3 is a plan view of the cylindrical armature, magnet, and magnet-shaft. Fig. 4 is a transverse section through the magnet and shaft.

Like letters of reference refer to like parts throughout the specification and drawings.

A represents the axle; B B, the car-wheels, rigidly mounted on the axle A and revoluble therewith; C, a cylindrical armature rigidly mounted on the axle A intermediate the wheels B B and revoluble therewith.

The armature C consists of two semicylindrical sections *c c*, the ends of which are provided with lugs *c' c'* and clamping-bolts *c'' c''*, which pass through the lugs *c' c'* to rigidly lock the sections together.

D represents a shaft in alinement with and parallel to the shaft A, journaled in hanger-bearings E E', suspended from the under side of the car. The hanger-bearings E E' are provided with boxes *e e'*, in which are journaled the ends of the shaft D, and interposed between the boxes *e e'* and journals of the shaft D are bushings F, of Babbitt metal.

G represents a magnet which consists of a core *g*, side flanges *g'' g''* at the ends of the core *g*, and a coil *g'*, wound on the core *g* and held in position by the side flanges *g''*.

I represents a cylindrical casing for the magnet G, consisting of two independent sections J J', respectively. The section J' consists of a side disk *j*, a hub J'', projecting inwardly from the middle of the side disk *j*, and a peripheral flange *j'*, projecting inwardly from the perimeter of the side disk. The section J consists of a side disk *j* and a peripheral flange *j'*, projecting inwardly from the perimeter of the side disk *j*. The center of the side disk *j* of the section J is provided with a bore, through which passes the hub J'' of the section J'. The hub J'' on the outer side of the section J is screw-threaded to receive a locking-nut K to bind the section J tightly against a shoulder *k*, formed on the hub J'' on the inner side of the side disk *j* of the said section J. When the parts of the magnet are assembled in position, the core *g* is mounted on the hub J'', and the side flanges *g''* abut against the side disks of the casing. Passing through the bore of the hub J'' is the shaft D, and interposed between the shaft D and hub J'' is a metallic bushing H, which acts as a conductor of electricity. The sections J J' are separated from each other by a sufficient space to interrupt the magnetic current in order that the full width of the faces of their peripheral flanges may constitute the positive and negative poles of the magnet, respectively. Surrounding the shaft D, on the outer side of the section J', is a washer L, of non-conducting material, and mounted on the shaft D, on the outer side of the washer L, is a commutator M, the bore of which is provided with a bushing N, of non-conducting material, to prevent electrical contact between the commutator and shaft.

Mounted on the shaft D, on the outer side of the commutator M, is a washer O, of non-conducting material, against which is screwed

a nut P to lock these parts in position. One end g^3 of the magnet-winding g' is in circuit with the commutator M, while the other end g^4 is connected to the adjacent side of the flange g''. The current circuits from the commutator M through the magnet-winding g' to the side flange g'', thence through the side disk j of the adjacent section J to the lock-nut K, and thence to the shaft D through the bushing H, from whence it may be grounded in any ordinary way. The circuiting of the current through the magnet-winding g' energizes the magnet and establishes the positive and negative poles in the peripheral flanges j' of the sections J J', respectively. The sections J J' being separated from each other enable the poles to extend completely across the faces of the peripheral flanges j', so that the full face of the casing can be utilized for attraction purposes.

The top of the hanger E' is pivoted to the under side of the car to enable the adjacent end of the shaft to swing toward or away from the axle, there being sufficient play in the bearing of the other hanger to allow it to do so, so that when the magnet is energized it will swing toward the armature C. When the magnet is energized, its magnetic energy causes its attraction to the armature C and also causes it to revolve in unison with the car-axle, during which it revolves the shaft D.

Connected to the shaft D is one end of a brake-chain R, while the opposite end of the brake-chain is connected to a lever R'. Connected to the lever R' are the usual links S for the brake-beams F' of the brake-shoes U. The revolution of the shaft D winds up the chain R and causes the shoes U to be set against the wheels B B to stop their revolution.

The magnet in addition to setting the shoes against the wheels magnetizes the armature and arrests by magnetic force the revolution of the car-axle.

Embracing the commutator M is a brush V, which is suspended from the under side of the car and which is in circuit with a rheostat, by means of which the strength of the current can be controlled to the magnet. The current passes from the brush V to the commutator N and thence through the magnet-winding g' to the flange g'', from which it circuits to the disk j and shaft D to the ground in any ordinary way.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an electric brake a magnet embracing in its construction a core, a magnet-winding coiled on the core, a casing for the magnet-winding consisting of two side disks located one at each end of the magnet-winding, an inturned peripheral flange for each side disk, and a hub for one of the side disks located within the bore of the core and extending through the side disk of the other section, the peripheral flanges of the magnet-casing separated by a sufficient interval to interrupt the magnet-current, substantially as specified.

2. In an electric brake a magnet embracing in its construction a core, a magnet-winding coiled on the core, a casing for the magnet-winding consisting of two side disks located one at each end of the magnet-winding, an inturned peripheral flange for each side disk, a hub for one of the side disks located within the bore of the core and extending through the side disk of the other section, the peripheral flanges of the magnet-casing separated by a sufficient interval to interrupt the magnet-current, a swinging shaft passing through the bore of the hub of the magnet-casing, swung from the under side of the bottom of the core, opposed to an armature mounted on the car-axle, a brake-chain adapted to be wound on the shaft in combination with the brake-shoes, beam, lever and links, substantially as specified.

Toronto, Canada, February 18, 1899.

CHRISTOPHER W. STEEL.
WM. A. NESBITT.

In presence of—
C. H. RICHES,
THEODORE A. HUNT.