

No. 801,532.

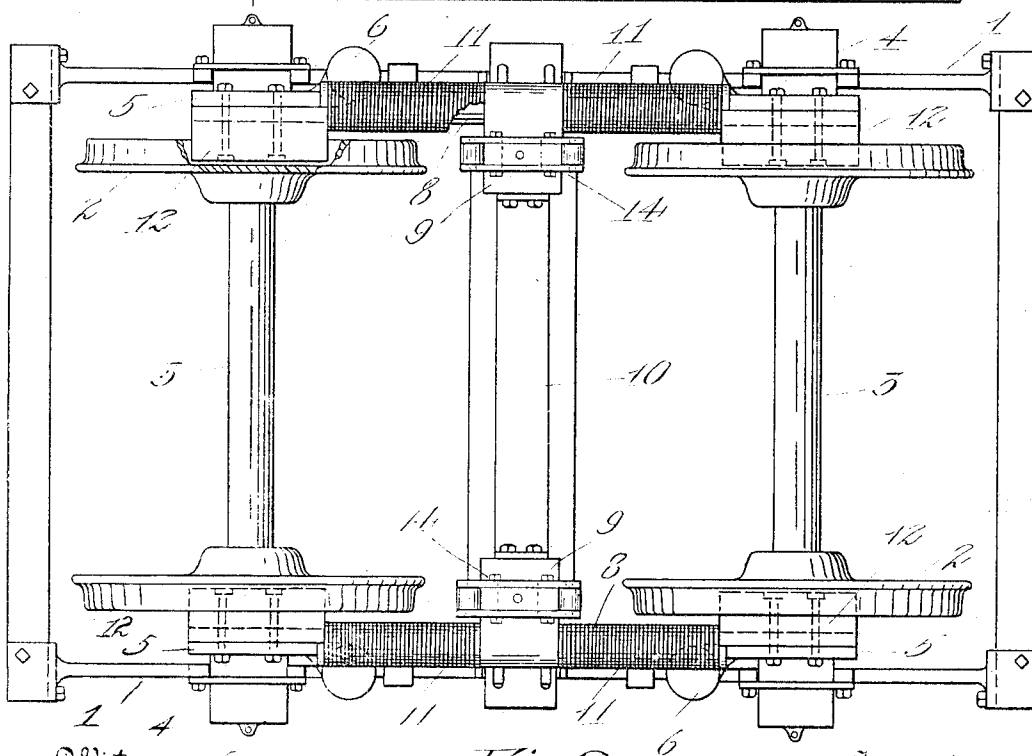
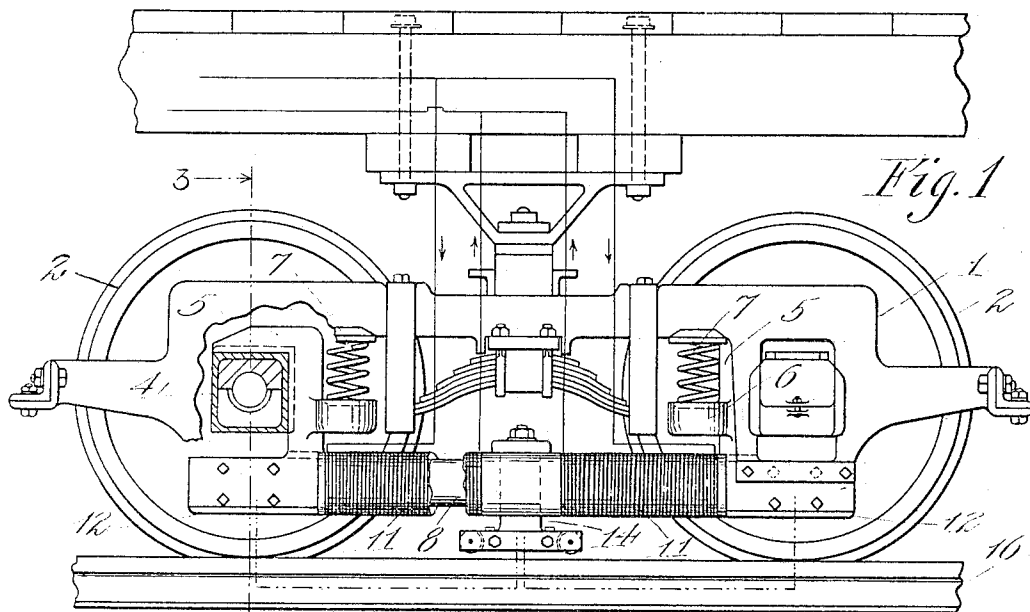
PATENTED OCT. 10, 1905.

R. C. LOWRY.

DEVICE FOR INCREASING THE ADHESION BETWEEN WHEELS AND RAILS.

APPLICATION FILED DEC. 5, 1904.

2 SHEETS—SHEET 1.



Witnesses
M. A. ...
Stephen H. Grady.

Fig. 2

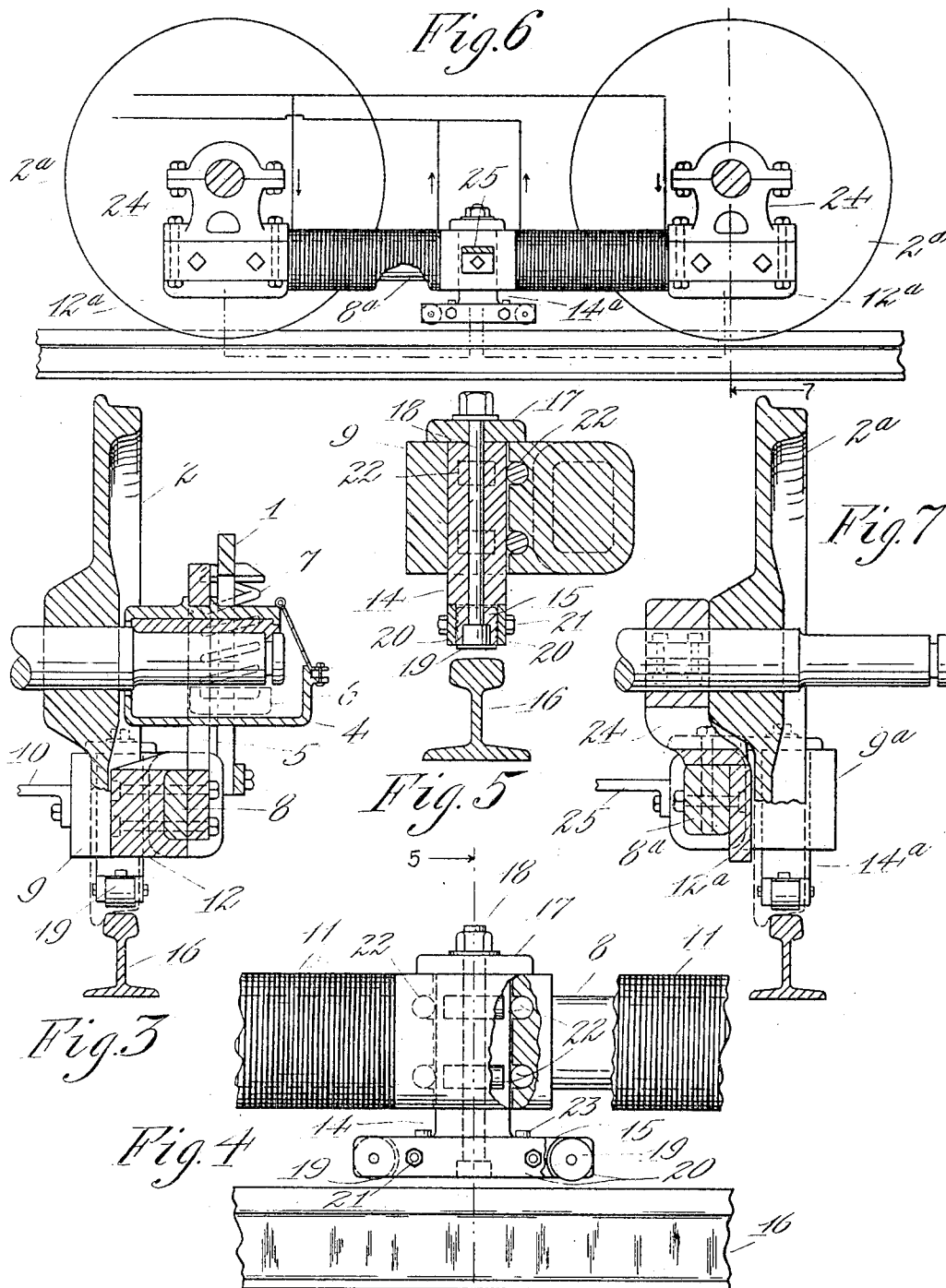
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DEVICE FOR INCREASING THE ADHESION BETWEEN WHEELS AND RAILS.

APPLICATION FILED DEC. 5, 1904.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

ROBERT CHARLES LOWRY, OF SEATTLE, WASHINGTON.

DEVICE FOR INCREASING THE ADHESION BETWEEN WHEELS AND RAILS.

No. 801,532.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed December 5, 1904. Serial No. 235,528.

To all whom it may concern:

Be it known that I, ROBERT CHARLES LOWRY, a subject of the King of Great Britain, residing at Seattle, in the county of King and State of Washington, have invented new and useful Improvements in Devices for Increasing the Adhesion Between Wheels and Rails, of which the following is a specification.

My invention relates to improvements in devices for magnetically increasing the adhesion between truck-wheels and the rails upon which they roll.

The object of my invention is to improve and simplify such devices.

My invention comprises the parts and combinations thereof which are particularly set forth in the claims terminating this specification.

The drawings forming a part of this specification illustrate my invention in forms which are now preferred by me.

With reference to the accompanying drawings, in which like reference characters designate corresponding parts throughout, Figure 1 is a side elevation of a truck with my invention disposed at the outer sides of the truck-wheels. Fig. 2 is a plan view of the truck inverted. Fig. 3 is a sectional elevation on line 3 of Fig. 1. Fig. 4 is a fragmentary elevation, on an enlarged scale, of one of the track pole-pieces and the attendant parts, parts being broken away. Fig. 5 is a sectional view on line 5 of Fig. 4. Fig. 6 is a sectional elevation showing two wheels of a truck on the same rail with my invention in modified form and disposed at the inner sides of the wheels, and Fig. 7 is a sectional elevation on line 7 of Fig. 4.

I will first describe my invention as shown in Figs. 1, 2, 3, 4, and 5. In this form it is shown applied to a four-wheeled truck, the frame 1 of which is supported by wheels 2, which are of magnetizable metal. The axles 3, to which the wheels are secured, are preferably of non-magnetizable metal and project from the outer side surfaces of the wheels to support the journal-boxes 4, which are provided with the usual bearing-brasses shown.

Related to frame 1 are supporting members, as hangers 5, preferably of non-magnetizable metal and which depend from the journal-boxes 4 and carry horizontal brackets 6, upon which are seated the spiral springs 7, bearing against suitable bosses on the frame 1 and serving to yieldingly support the latter, thus applying the weight of the frame, car-body,

and their attachments to the hangers and conveying it thereby through the brasses of the journal-boxes 4 to the axles 3.

Each hanger 5 comprises an upper and a lower horizontal portion and a vertical portion, the said upper portion resting upon the journal-box and the lower portion lying beneath said box, as clearly shown on the left in Fig. 1.

The journal-boxes are secured against movement longitudinally of the axles in the usual manner, as shown in Fig. 3, each box being provided with opposite shoulders which embrace the brass lengthwise and the brass having a flange engaging in a peripheral groove formed in the bearing-surface of the axle, and the vertical portions of the hangers 5 are engaged in suitable vertical grooves provided on said boxes, whereby said hangers are rigidly held from being moved laterally to or from the adjacent truck-wheels 2.

Reference character 8 (see Fig. 2) indicates magnet-cores which are identical in construction and application, excepting that they are disposed at the opposite sides of the truck. Consequently a description of one of said cores and its attendant parts will be sufficient for a clear understanding of both. Each core is composed of suitable magnetizable metal and preferably consists of a bar of the required length to extend between the hangers 5 at the same side of the truck and also along the inner side faces of the lower portions of said hangers, to which portions the bar is rigidly secured. At an intermediate point the bar or core is formed with an inwardly-projecting enlargement or support 9, which extends over the rail and to the inner face of which a rigid strut, as 10, preferably of non-magnetizable metal, is secured, this strut extending to and being secured to the inner face of the support 9 on the opposite core.

Upon the bar or core 8 are placed in succession a series of coils or helices 11, of properly-insulated electric wire, said coils or helices being so disposed as to be capable of producing in said bar a magnetic pole opposite each truck-wheel 2 and poles intermediate said wheels when said coils are energized, the latter poles lying on opposite sides of the enlargement 9.

The poles adjacent the truck-wheels 2 are provided with pole-pieces 12, lying closely adjacent but not touching the said wheels, these pole-pieces, as shown, being detachable from the bar 8. This, however, is not an es-

sential feature, as the same could be readily formed integral therewith without making a material alteration to the structure shown; but in any event it is desirable that each pole-piece be suitably formed to present to the side surface of the wheel a surface or face of large area relatively to the cross-sectional area of the core or bar 8, the said face conforming to but not touching the opposing wheel-surface, so that a narrow air-gap is left therebetween.

The enlargement or support 9 is formed with a vertical opening, preferably in alinement with the rail, in which is slidably mounted the shank or body portion of what I term a "track pole-piece" 14. The lower end of said body portion of the pole-piece is formed with an elongated horizontally-disposed foot 15, which is designed to lie close to but out of contact with the rail 16, being held from moving into contact therewith by a stop 17 of disk form, which normally bears on the upper face of the enlargement 9. This disk is secured on the upper end of said body portion by means of a bolt 18, which in the present showing passes entirely through the track pole-piece and has its head countersunk in the foot 15 thereof. Rollers 19 are mounted in the foot 15 and have their ends journaled in cheek-pieces 20, secured to opposite sides of the foot by suitable means, as bolts 21. These rollers project below the lower face of the foot and engage any unusual elevation in the rail when passing thereover, thus elevating the pole-piece to effect clearance of the foot. Rollers 22, of non-magnetizable metal, are journaled in the walls of the opening of enlargement 9 and project into said opening, so as to engage the shank of the pole-piece 14 and prevent magnetic contact thereof with those walls where the magnetic attraction is the greatest.

Secured to the foot 15 are upwardly-projecting studs 23, of non-magnetizable metal, which prevent magnetic contact between the foot and enlargement 9.

The modified construction shown in Figs. 6 and 7 is the same in principle as that described. In this case, however, the bar or core 8^a, which has secured to its ends the pole-pieces 12^a, is placed at the inner sides of the truck-wheels, and therefore the enlargement 9^a, in which the pole-piece 14^a is mounted, projects outwardly, so as to extend over the rail. This bar or core 8^a is carried by suspension members 24, of non-magnetizable metal, journaled directly upon the axles of the wheels. The suspension members are given a bearing against surfaces upon the inner sides of the wheels, and the bars or cores 8^a at opposite sides of the truck are connected by a brace 25, preferably of non-magnetizable metal, which prevents the bars, with their pole-pieces, from moving toward or away from the wheels 2^a.

In both forms shown the electromagnet-

coils between the track pole-pieces and the truck-wheels are wound or the electric current traverses the wire of which they are formed in opposite directions, so that the track pole-piece is of unlike sign or polarity to the pole-pieces opposite the said wheels. There are thus two magnetic circuits, each one of which pertains to one of the electromagnets and both of which have the enlargement 9, track pole-piece 14, and a truck-wheel in circuit, the length of rail immediately below each electromagnet forming a part of the circuit to which the electromagnet pertains.

The electromagnet-coils on the bars or cores at opposite sides of the truck are electrically connected with a suitable electric generator, and they are so wound or they are connected in such a manner with said generator that the pole-pieces lying at directly opposite points are of like magnetic polarity.

When the electromagnet-coils are energized, the track pole-piece becomes magnetized and is thereby attracted toward the rail, bringing a downward pull or pressure on the bar or core and thence on the truck-wheels through the bar-supporting members and the axles of the wheels.

It is evident that my invention may be embodied in other forms than herein shown. I do not, therefore, desire to be understood as limiting myself to the exact constructions shown and described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is—

1. In a device for increasing the adhesion between wheels and a track on which they travel, in combination with a rail and truck-wheels, a magnetizable bar extending between the wheels, electromagnet-coils arranged on said bar and adapted to produce poles therein opposite said truck-wheels and intermediate poles, and a track pole-piece between said intermediate poles having its lower end out of contact with the rail, said pole-piece being supported by the bar and being held from downward movement.

2. In a device for increasing the adhesion between the wheels and a track on which they travel, in combination with a rail and truck-wheels, a plurality of electromagnets rigidly connected together and extending between said wheels, and a slidably-mounted track pole-piece for transferring magnetic flux between the electromagnets and the rail when said electromagnets are energized, said pole-piece being normally held out of contact with the rail and prevented from downward movement.

3. In a device of the type set forth, in combination with a magnetizable support, a vertically-slidable pole-piece supported thereby, and being immovable downwardly therefrom when in its normal position.

4. In a device for increasing the adhesion be-

tween wheels and a track on which they travel, in combination with a rail and truck-wheels, a magnetizable bar extending between the wheels, electromagnet-coils arranged on said bar and adapted to produce poles in said bar opposite said truck-wheels and intermediate poles, said bar being formed with an opening between said last-named poles, and a track pole-piece slidably mounted in said opening.

5. In a device for increasing the adhesion between wheels and a track on which they travel, in combination with a rail and truck-wheels, a magnetizable bar extending between the wheels, electromagnet-coils arranged on said bar and adapted to produce poles therein opposite said truck-wheels and intermediate poles, said bar being formed with an enlargement having an opening between said last-named poles, and a track pole-piece slidably mounted in said opening.

6. In a device for increasing the adhesion between wheels and a track on which they travel, in combination with a rail and truck-wheels, a magnetizable bar extending between the wheels, electromagnet-coils arranged on said bar and adapted to produce poles in said bar opposite said truck-wheels and intermediate poles, said bar being formed with an opening between said last-named poles, a track pole-piece slidably mounted in said opening, and a stop carried by said pole-piece normally engaging said bar for limiting the downward movement of said pole-piece.

7. In a device for increasing the adhesion between wheels and a track on which they travel, in combination with a rail and truck-wheels, a magnetizable bar extending between the wheels, electromagnet-coils arranged on said bar and adapted to produce poles in said bar opposite said truck-wheels and intermediate poles, and a track pole-piece slidably mounted between said intermediate poles and having a foot on its lower end arranged close to but out of contact with the rail.

8. In a device for increasing the adhesion between wheels and a track on which they travel, in combination with a rail and truck-wheels, a magnetizable bar extending between the wheels, electromagnet-coils arranged on said bar and adapted to produce therein outer and intermediate poles, a track pole-piece supported between said intermediate poles, and rollers mounted in said pole-piece and projecting below the lower face thereof, said

rollers being normally out of contact with the rail.

9. In a device for increasing the adhesion between wheels and a track on which they travel, in combination with a rail and truck-wheels, a magnetizable bar extending between the wheels, electromagnet-coils arranged on the bar and adapted to produce therein outer and intermediate poles, a track pole-piece supported between said intermediate poles and having its lower end formed with a foot lying directly over the rail, cheek-pieces secured to opposite sides of the foot, and rollers mounted in said foot and having their ends journaled in said cheek-pieces, said rollers projecting below the lower face of said foot and being normally out of contact with said rail.

10. In a device for increasing the adhesion between wheels and a track on which they travel, in combination with truck-wheels and a rail, a magnetizable bar extending between the wheels, electromagnet-coils arranged on the bar and being adapted to produce in said bar poles opposite the wheels and intermediate poles, a track pole-piece slidable in said bar between said intermediate poles and having at its lower portion a horizontal foot arranged above the rail, and means to prevent magnetic contact between said foot and bar.

11. In a device for increasing the adhesion between wheels and a track on which they travel, in combination with truck-wheels and a rail, a bar extending between the wheels, electromagnet-coils arranged on the bar and being adapted to produce in said bar poles opposite the wheels and intermediate poles, a track pole-piece having a body portion slidably supported by the bar, rollers of non-magnetizable metal carried by the bar and bearing against the body portion of said pole-piece, a horizontal foot on the lower end of said body portion, a stop on the upper end of said body portion normally bearing on the upper face of said bar, and rollers journaled in said foot projecting below the lower face thereof, and being normally out of contact with the rail.

In testimony whereof I affix my signature in presence of two subscribing witnesses.

ROBERT CHARLES LOWRY.

Witnesses:

EDWARD BECK,
GEO. C. DAVIS.