No. 775,835. PATENTED NOV. 22, 1904.

R. C. LOWRY.

ELECTROMAGNETIC BRAKE.

APPLICATION FILED AUG. 13, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

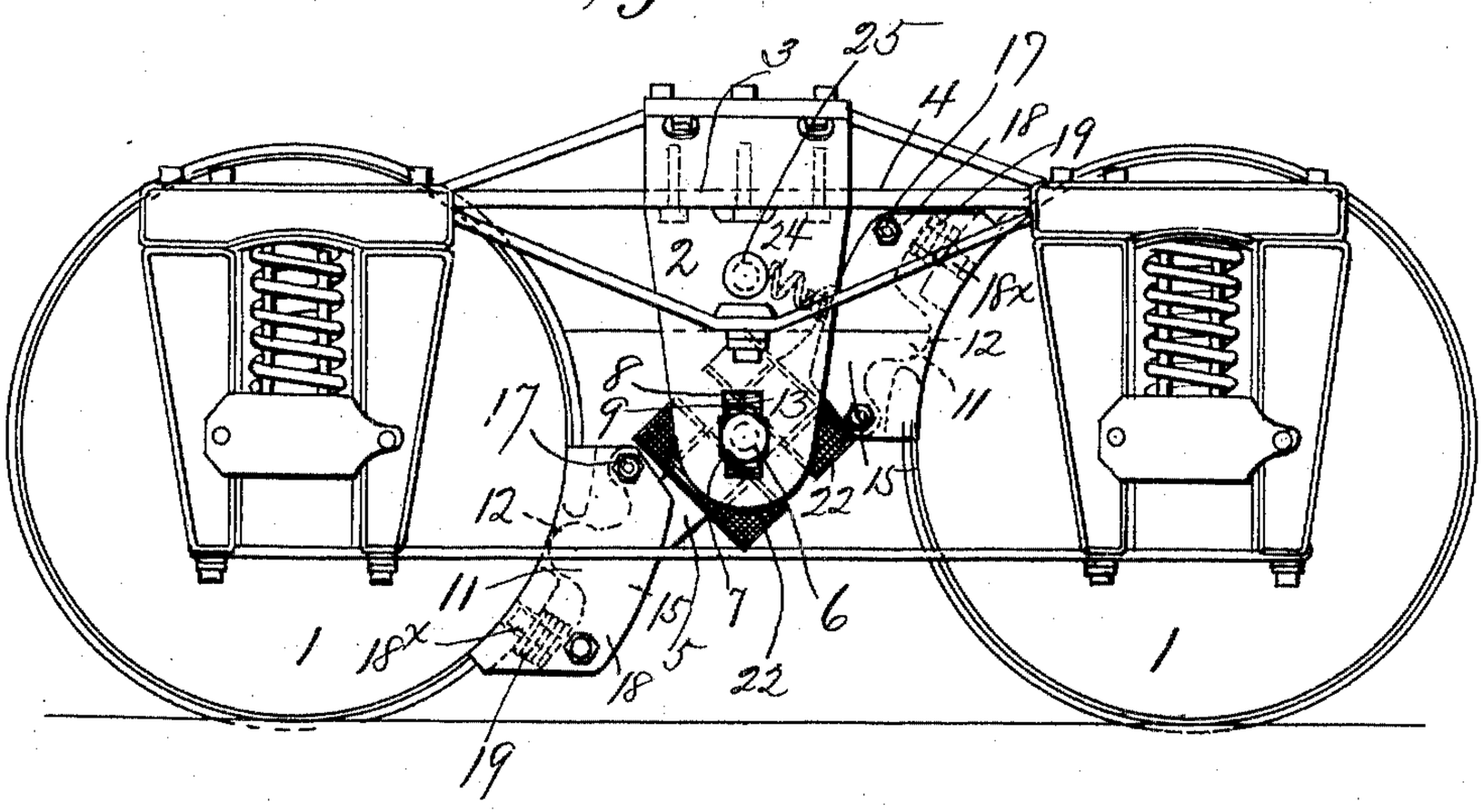


Fig. 2.

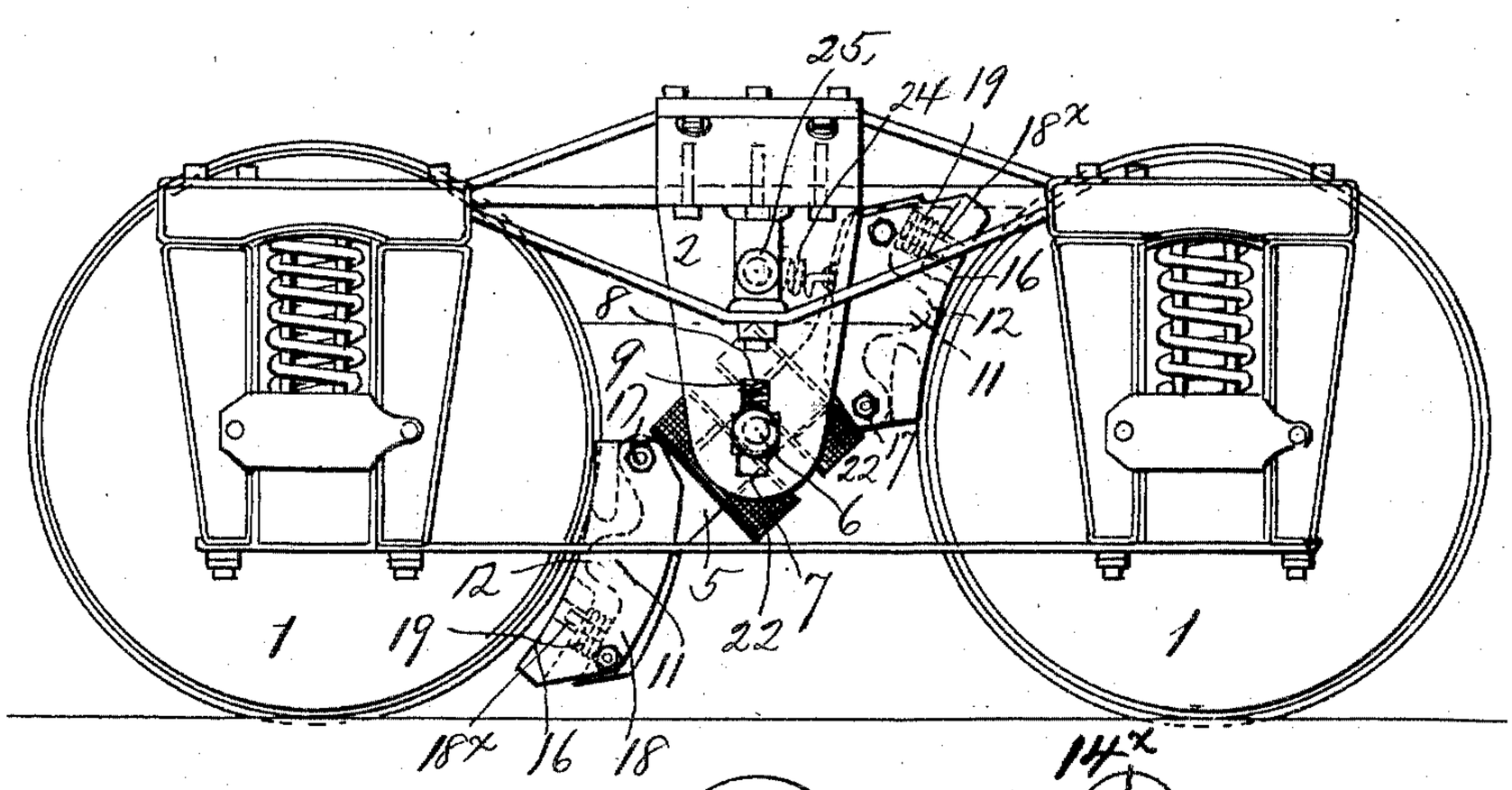


Fig. 4.

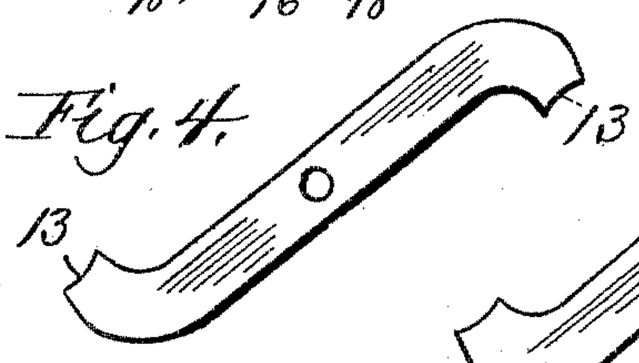
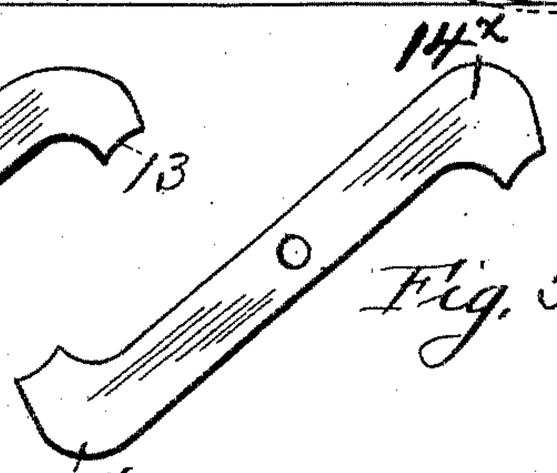


Fig. 5.



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APPLICATION FILED AUG. 13, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

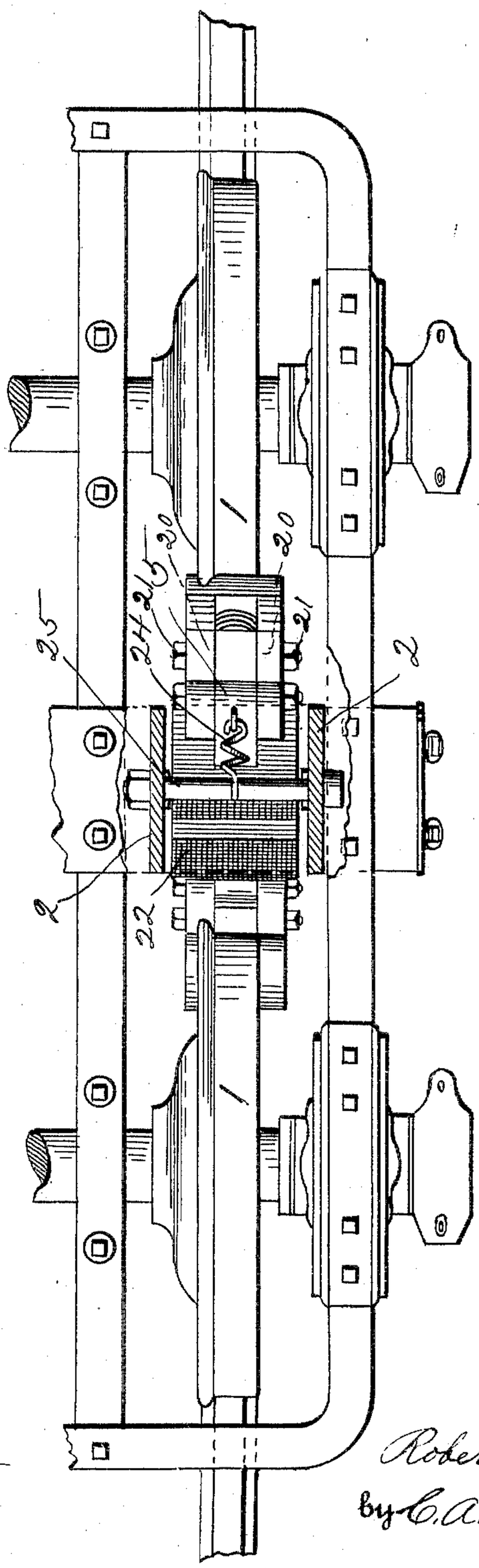

Fig. 3.

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No. 775,835. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

ROBERT C. LOWRY, OF NEW WESTMINSTER, CANADA.

ELECTROMAGNETIC BRAKE.

SPECIFICATION forming part of Letters Patent No. 775,835, dated November 22, 1904.

Application filed August 13, 1903. Serial No. 169,388. (No model.)

To all whom it may concern:

Be it known that I, ROBERT C. LOWRY, a subject of the King of Great Britain, residing at New Westminster, in British Columbia, have invented certain new and useful Improvements in Electromagnetic Brakes, of which the following is a specification.

My invention relates to electric magnetic brakes for railway rolling-stock.

Among the objects of the invention is to provide a compact, cheap, and powerful electric brake of variable force applicable to the magnetized wheels of vehicles moving on or over rails.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings.

The invention consists in the novel construction, arrangement, and combination of parts, as hereinafter fully described, illustrated in the drawings, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a car-truck, showing my improved brake device in the position it assumes when the brake is applied. Fig. 2 is a similar view, the parts being in the position they assume when the brake is off. Fig. 3 is a plan view of the parts seen in Fig. 1. Fig. 4 is a side view of a slightly-modified form of coherer-bar. Fig. 5 is a similar view of a further modified form of coherer-bar.

In the drawings, 1 indicates the wheels of a car-truck on the same rail, said wheels being magnetized and of opposite polarity or sign. No claim is herein made to any specific means for magnetizing the car-wheel. This may be accomplished in any suitable manner—such, for instance, as by means of coils thereon. Arranged intermediate the car-wheels on one side or both sides of the truck is a suspending device adapted to support the brake mechanism. This suspending device comprises in the present instance cheeks or hangers 2, preferably of non-magnetic metal, which may be supported by any suitable means from the car-body or from some part of the truck. For instance, I show the cheeks as depending from a plate 3, bolted to beam 4 of the truck.

5 indicates a bar which is of magnetizable metal, such as mild steel, and this bar, which I term the "coherer," has a pivotal connection with the cheeks of the suspending device. I also provide a means whereby the coherer-bar will have a movable or yielding connection with the cheeks, whereby the said bar will always maintain the same relative position to the car-wheels notwithstanding the usual up-and-down movement of the car-body or of the trucks when the car is moving over the road. For attaining this object I provide a bolt 6—of steel, for instance—extending transversely of the cheeks of the suspending device. The ends of the bolt are seated in slide-boxes 7, which are adapted for up-and-down movement within vertical slots 8, provided in the cheeks of the suspending device. Coiled springs 9 are arranged within the slots and bearing upon opposite sides of the slide-boxes, whereby to provide a yielding connection of the slide-boxes with the cheeks or hangers.

The coherer-bar 5 is arranged in the oblique position shown, with its opposite ends lying respectively above and below the centers of the car-wheel axles. The bar is provided toward each end with a projection 11, the face of which toward the periphery of the adjacent car-wheel is curved. I preferably provide a projection of semicircular shape 12, though the shape of this projection may be varied. For instance, in Fig. 4 I show the bar as terminating in a bearing edge or surface 13, said surface being concave to fit and be in contact with a portion of periphery of wheel. The general shape of the bar seen in Fig. 4 may be slightly modified, as shown in Fig. 5, where I show it as being thickened at the points $14^{\times}$, whereby to strengthen the bar at the points where it is subjected to the most strain when the brake-shoes are applied. Any other form of bar might be used instead of the forms shown, and I do not wish to be limited to any particular form.

15 indicates brake-shoes pivotally carried one at each end of the coherer-bar. The shape of the brake-shoes may be somewhat varied, though in the present instance I show each shoe as having a long curved bearing or brake

surface 16, which is adapted to come into contact with the periphery of the car-wheel, the shoe being formed with cheeks, which fit against sides of coherer-bar. Each brake-shoe is pivotally carried on the coherer-bar by a bolt 17, on which bolt the brake-shoe is adapted to rock. Each brake-shoe is of some non-magnetic material. Thus the brake-shoes do not become magnetized when the magnetic current is passed through the device, and in this respect my present invention differs from other brake devices of this character.

A lug or projection 18 is provided on each end of the coherer-bar. Fixed in this lug is a guide bolt or pin $18^{\times}$ of circular section, which passes into a hole of slightly-larger diameter in the brake-shoe. Carried by the bolt and encircling it are coil-springs 19, which press against the lug 18 and the brake-shoe. When the brake is applied, these springs become compressed and the brake-shoe acts with greater or less frictional effect on the truck-wheels, the effect being in proportion to the strength of the magnetism in the latter; but as soon as the coherer-bar assumes the position shown in Fig. 2 the springs will relax and rock the shoes on their pivotal bolts 17. To permit and limit the swinging movement of the brake-shoes on the coherer-bar, I provide slots 20 in the cheeks of each shoe, so that the bolts 21, affixed to coherer-bar, which extend through the cheeks of the shoes and have a bearing in the said slots, may ride freely in said slots.

Mounted upon and surrounding the coherer-bar are demagnetizing-coils 22. These are coils of insulated copper wire wound continuously, and their ends are in practice to be connected through a suitable controller with a source of electricity. Neither controller nor electric source is shown, as it is not necessary for the purpose of illustrating my invention, it being sufficient to state that a current of electricity has to be turned into these coils to demagnetize the coherer-bar when it is desired to throw the brake out of action. The current and circuit may be derived or taken from any suitable source. To apply the brakes, all electric current is cut out of the demagnetizing-coils on the coherer-bar, and the wheels of the trucks being magnetized the ends of the coherer-bar approach said wheels and bring the brake-shoes into contact with the peripheries of said wheels, and friction between brake-shoes and said peripheries ensues. When the truck-wheels are more strongly magnetized, the attraction between the latter and the coherer-bar increases, and the approach of the two together is resisted by the springs reacting on the brake-shoes, causing increased friction between shoes and wheels. If stronger braking effect is desired, the magnetization of truck-wheels is increased, and the ends of the bar will then pass through the brake-shoes completely and come into direct contact with the peripheries of the wheels, stopping the revolution of the latter.

It will be understood that one object for my employing the demagnetizing-coils 22 is to eliminate the effect on the coherer-bar of residual magnetism in the truck-wheels. In magnetic wheels of cast-iron, for example, such magnetism will generally be present. The coils 22 will be so wound that each pole or end of the coherer-bar will be of like magnetic polarity or sign to that in the wheel with which such end comes in contact. After cutting out the current magnetizing the wheels a current of electricity will be sent through the demagnetizing-coils, and the ends of the coherer-bar will no longer be attracted to the truck-wheels. A spring 24, which I provide, will then pull the end of the coherer-bar out of the magnetic range, and so hold it back. This spring 24 is secured at one end to the coherer-bar and at its opposite end to a bolt 25, which is seated in the cheeks or hangers 2.

The coherer-bar, it will be understood, is by means of such spring held back out of contact with the wheels. Another object for my employing the demagnetizing-coils 22 is to prevent the approach of the coherer-bar to the wheels when magnetism of the latter is desired and brake action is not wanted. In this case it will be necessary to have a flow of current through the demagnetizing-coils as long as the wheels are to remain magnetized and the brakes to be kept off them.

It will be seen from the construction described that the action produced by gradually increasing magnetism in the wheels (which magnetic effect, it is assumed, is under control) has the effect ultimately not only of securing the resistance due to a frictional shoe pressing upon the periphery of each wheel, but also gives a very powerful resistance on periphery when the end of coherer-bar comes into contact with said wheel and conducts lines of magnetic force, affording a brake of the strongest possible character, which will bring the car to a standstill within a short space. The particular manner of arranging the coherer-bar and brake-shoes in connection with magnetized wheels enables me to obtain a very effective braking action. The wheels brake on each other and at the same time on the rails, and there is no appreciable strain in the body of the car or in the axles due to the action of the brake, as is the case with the usual construction of brakes of this character. It will be noted, too, that in my construction I dispense with brake-beams, rods, or other attachments such as are usually found in brake devices.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an electromagnetic brake a bar arranged between and adapted to come in direct contact with the peripheries of the wheels as described, brake-shoes carried by said bar, a

suspending device, and means to permit the bar to have a movement relatively to the suspending device, for the purpose set forth.

2. In an electromagnetic brake, a bar arranged between the wheels as described, brake-shoes carried by said bar, a suspending device and means acting on the bar to cause its ends to move away from the peripheries of the wheels when the polarity of said bar is changed.

3. In an electromagnetic brake, a bar arranged between the wheels as described, non-magnetic brake-shoes carried by said bar, the ends of said bar being adapted to come in direct contact with the peripheries of the wheels.

4. In an electromagnetic brake, a bar arranged between the wheels as described, depending cheeks or hangers provided each with a vertical slot, slide-boxes adapted to travel in said slots, a bolt having its ends seated in said boxes and upon which bolt the said bar is mounted and springs arranged to bear upon opposite sides of the slide-boxes.

5. In an electromagnetic brake, a bar arranged between the wheels as described, brake-shoes pivotally mounted on the bar and each provided with a slot through which an end of the bar is adapted to project so as to come into contact with the periphery of a wheel.

6. In an electromagnetic brake, a bar arranged between the wheels as described and coils mounted upon the bar and adapted to demagnetize the bar when the car-wheels are magnetized or for magnetizing said bar when said wheels are magnetized.

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

ROBERT C. LOWRY.

Witnesses:
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ROLLO WHITCOMB.