(No Model.)

W. B. POTTER.

ELECTRIC BRAKE.

No. 542,309. Patented July 9, 1895

FIG. 1.

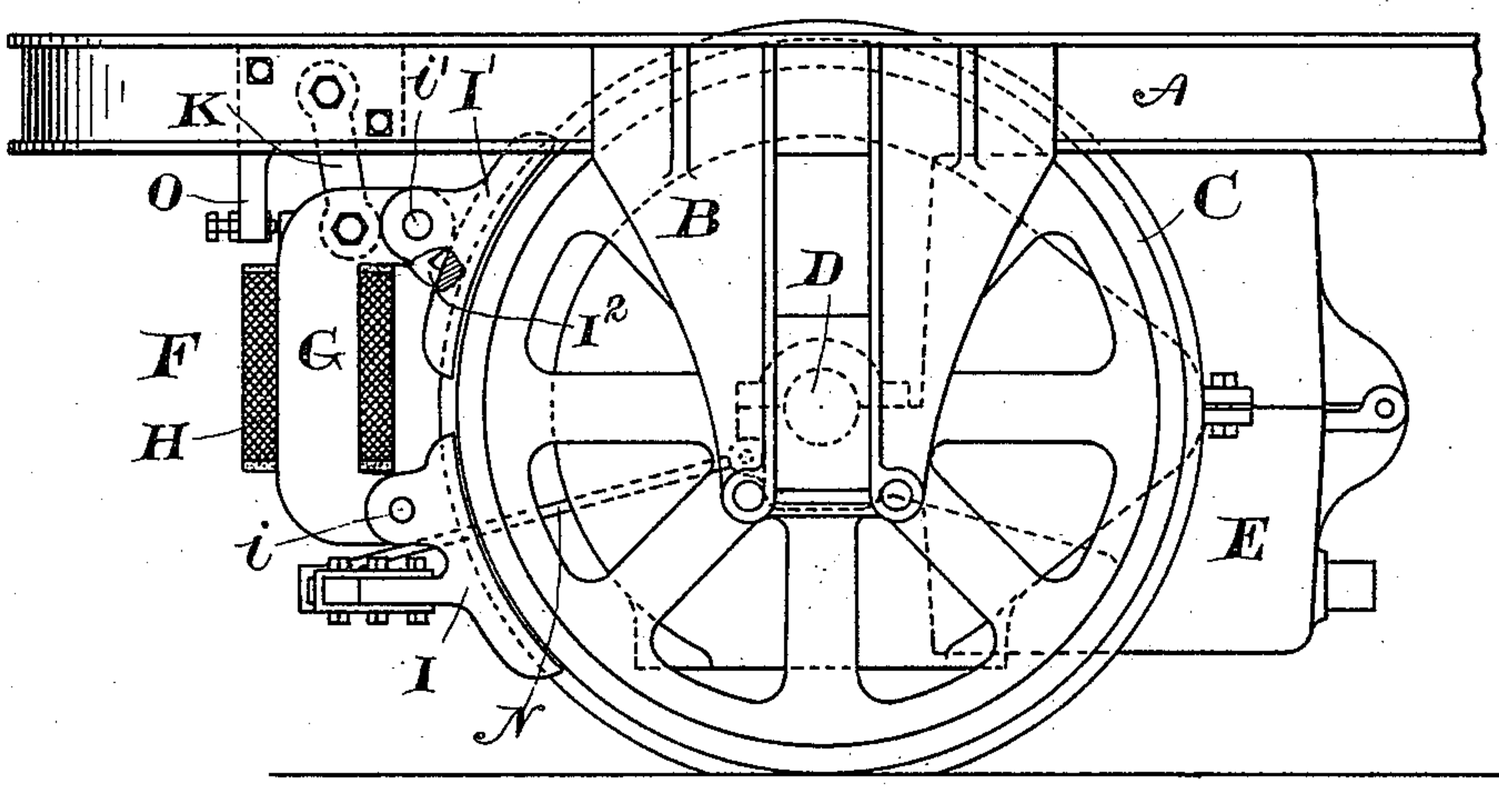


FIG. 2.

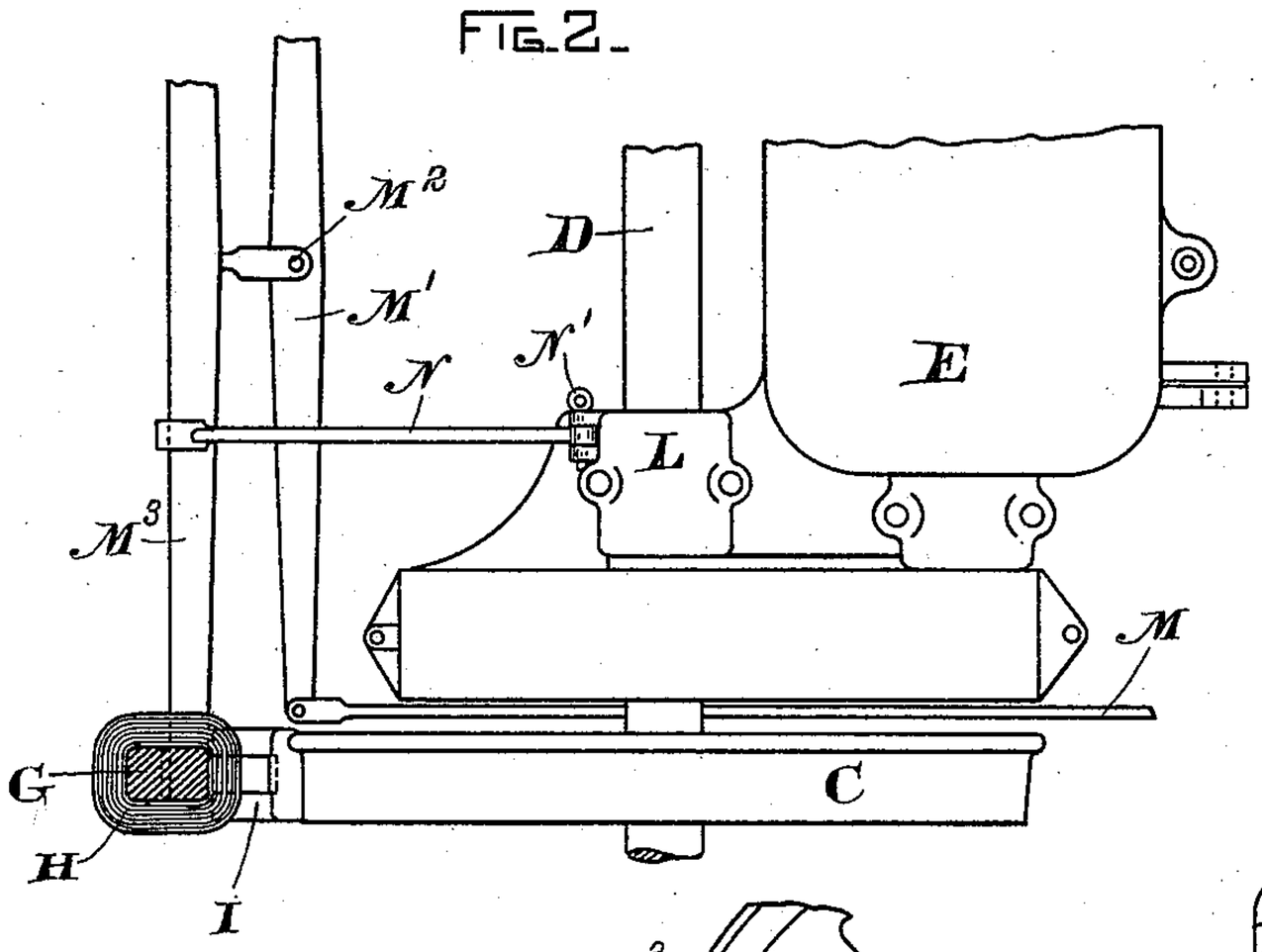


FIG. 3.

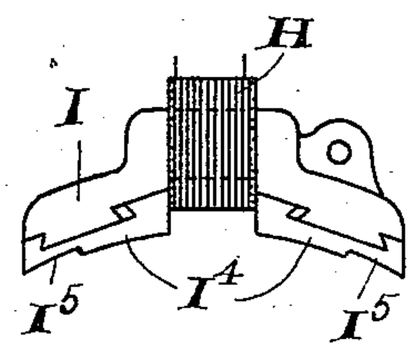
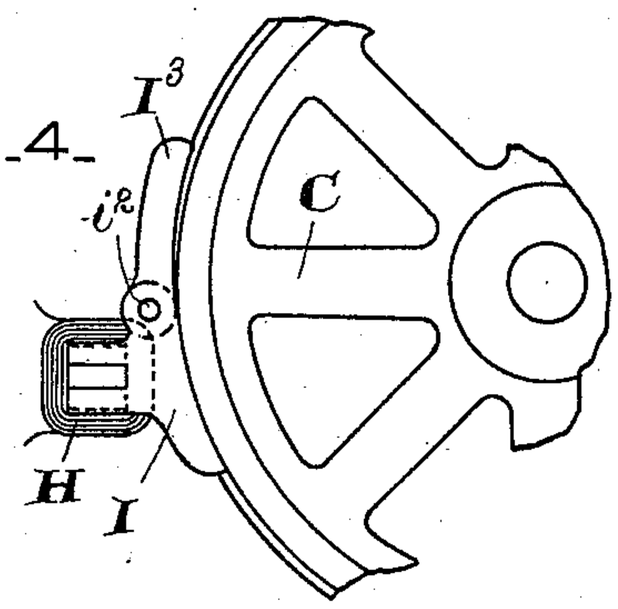


FIG. 4.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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ELECTRIC BRAKE.

SPECIFICATION forming part of Letters Patent No. 542,309, dated July 9, 1895.

Application filed March 20, 1895. Serial No. 542,492. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. POTTER, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Electric Brakes, of which the following is a specification.

My invention relates to electric brakes, particularly to the class of brakes in which the shoe is applied directly to the tread of the wheel; and it has for its object to so arrange the apparatus that the ordinary hand-brake may be effectually applied, and by means of the same apparatus electric power may be used, either for emergency or as a regular means of stopping the train, with the hand-brake held in reserve.

It has been found desirable (with some classes of traffic) to apply the shoe directly to the tread of the wheel and thereby maintain the shape of the tread unaffected by the wear of the rail, at the same time preserving the concentricity of the wheel. In the application of the electric brake to such shoes it is found that they do not present sufficient bearing-surface for the best effect electrically. It is therefore impracticable, ordinarily, to use the same brake-shoe for application by hand and by power, it having been found that only a certain arc of the wheel may be covered by the shoe when applied by hand. If any greater arc be embraced the shoe will chatter on the wheel and be ineffective in stopping it, as well as noisy and liable to cause accident by its vibration. On the other hand there is no practical limit to the arc of the shoe, which may be applied by electrical power, inasmuch as the magnetic attraction is substantially equal in all parts of the shoe, and the power is not, as in the hand-brake, applied at one point only and transmitted through the iron of the shoe.

To avoid the difficulty just pointed out, I have provided a shoe of which a portion only is applied when it is operated by hand, whereas the whole of the shoe is applied by the electric power.

It is manifest that this invention may take many forms. I may provide separate shoes, one of which is applied by hand and both or any number of which are applied by the electric power; or I may provide shoes a portion of each of which will be applied by hand and the whole applied by electric power; or I may combine the two in one apparatus. All of these different forms will be within my invention.

My invention further consists in certain details of construction hereinafter pointed out and specifically claimed.

The accompanying drawings show an application of my invention to one wheel of an ordinary truck, which may represent a tramway-car or one wheel of a train. It is of course to be understood that equivalent apparatus is applied to the other wheels, and necessarily I do not limit myself to a single truck of the class described.

In the drawings, Figure 1 is a side elevation, partly in section, of one wheel of a car equipped with my improved brake. Fig. 2 is a plan, also partly in section, of some of the parts shown in Fig. 1. Figs. 3 and 4 are side elevations of modified forms of shoe.

Referring by letter, A is the truck-frame, which may be of any suitable or appropriate form. B is the ordinary pedestal. C is the wheel, of which D is the axle. E is the electric motor of the now well-known iron-clad or waterproof type. All of these parts are old and well known in the art.

F is my improved electric brake, G being the core of the yoke-piece, surrounded by the coil H, serving to energize it. By preference the coil is energized from the current derived from the motor used as a generator, after the trolley-current has been cut off and the motor reversed in the ordinary way, it being driven by the momentum of the car. Any other source of electric current may be substituted, however, as this particular arrangement is not a limiting feature of my invention. In the particular form shown in Figs. 1 and 2 I attach to the ends of the core or yoke-piece G brake-shoes I I′, forming pole-pieces for the magnet, which, when energized, are strongly attracted to the rim of the wheel and stop it by magnetic attraction and frictional resistance. As illustrated in Figs. 1 and 2, the lower one of these two brake-shoes is pivoted at a point *i* above its center of gravity, and

this one of the shoes I have selected for application by hand. The means for so applying the shoe are best seen in Fig. 2, in which M is the hand brake-rod and M′ the brake-lever pivoted at M^2 to the brake-beam M^3.

Referring again to Fig. 1, the shoe I′ is pivoted at i' to the yoke. The position of this shoe is such as to necessitate some mechanical means for preventing its tipping over against the wheel. This is shown at I^2, and consists of a projecting lug from the yoke-piece G, against which the lower part of the shoe may bear.

The entire apparatus is hung on a link or links K, and its play to and from the wheel is limited by the stop O, affixed to any appropriate part of the truck-frame.

In order to maintain the brake-shoe I as close to the tread of the wheel as possible without touching it, I employ the stop N, reaching from the bearing L of the motor to the brake-beam M^3. This stop N consists of a bar engaging with the brake-beam loosely and secured by the pin N′ in a slot in the bearing at a point as near as possible to the axle D. The stop thus becomes independent of any lost motion in the truck, the brake beam moving coincidently with the axle, and therefore the brake-shoe I may, by properly choosing the length of the stop-bar N, be held at just the desired distance. It is of course essential for the application of the shoe as an electric brake that the air-gap be as small as possible, and some form of stop is therefore essential.

The modified forms of shoe shown in Figs. 3 and 4 provide in a single shoe the two contact portions required for application as a hand-brake and as an electric brake. In these the reference-letters refer to the same parts; but in Fig. 3 the tread of the brake-shoe is provided with projections I^4 I^4, engaging with the wheel, and only this part of the shoe is effective in stopping the wheel when applied by hand. When the electric current, however, is used, then the parts I^5 I^5 of the shoe also become energized, and act by a magnetic attraction to greatly increase the pressure upon the parts I^4 I^4, at the same time affording a magnetic resistance to the rotation of the wheel. In Fig. 4 the part I^3 of the shoe is hinged at i^2 to the part I, and this, when the shoe is applied by hand, does not touch the wheel C, but when the coil H is energized this part I^3 becomes a part of the pole-piece of the coil and is attracted to the wheel and bears against it.

It is manifest that many other modifications might be devised, all embracing the same principle of a smaller surface of application for the hand-brake than that employed for the electric brake, and it is this principle which forms the essence of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a braking apparatus and in combination, a wheel or other moving element, of the driven apparatus and a part co-operating therewith in arresting its motion, such part having a plurality of portions co-operating with and acting to stop the wheel, some only of which are actuated manually, and all of which may be actuated by power.

2. In a braking apparatus and in combination, a brake shoe normally engaging with a wheel or moving element when manually actuated, and having then a certain area of engagement, but co-operating with the moving element over a greater area when actuated by power.

3. In combination, in a braking apparatus, a wheel or moving element, a brake shoe or similar retarding means, manually actuated means for applying such shoe, such manually actuated means operating a part only of such shoe, and a power actuated mechanism connected with the entire shoe or retarding means, and applying the whole of it to the wheel.

4. In combination, in a braking apparatus, a wheel or moving element, a brake shoe or similar retarding means co-operating therewith, means for manually actuating the shoe, such means engaging with a part only of the shoe, an electric circuit, a source of power for such circuit, and means, actuated by the current from such source of power, for applying the entire shoe to the wheel or moving element.

5. In a braking apparatus, and in combination, a wheel or moving element, a brake shoe co-operating therewith in arresting its motion, means for manually actuating a part of the brake shoe, means for electrically actuating the entire shoe, and a stop preserving the relation of the shoe to the axle of the wheel; whereby the shoe may be maintained as close as desired to the tread of the wheel.

6. In a braking apparatus and in combination, a wheel or moving element, a brake shoe, means for manually applying part of the brake shoe to the wheel, an electric motor driving the wheel, and means, actuated by the current from the motor, for electrically applying the entire shoe to the wheel.

In witness whereof I have hereunto set my hand this 19th day of March, 1895.

WILLIAM B. POTTER.

Witnesses:
B. B. HULL,
A. F. MACDONALD.