(No Model.)

C. J. VAN DEPOELE.

ELECTRO MAGNETIC RAILWAY BRAKE.

No. 348,360. Patented Aug. 31, 1886.

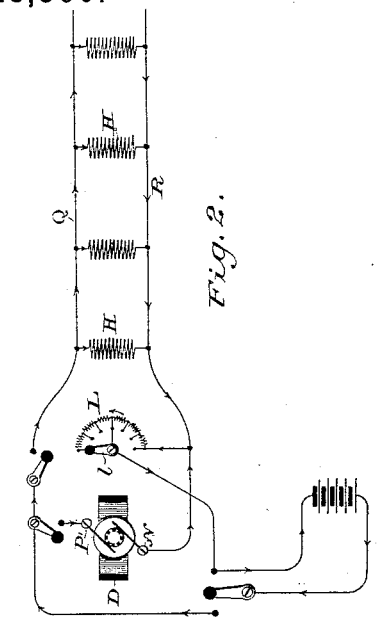

Fig. 2.

Fig. 1.

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ELECTRO-MAGNETIC RAILWAY-BRAKE.

SPECIFICATION forming part of Letters Patent No. 348,360, dated August 31, 1886.

Application filed April 28, 1886. Serial No. 200,468. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Electro-Magnetic Railway-Brakes, of which the following is a description.

The present invention relates to improvements in electro-magnetic brakes designed for use more particularly on railway-trains propelled in whole or in part by electricity; and it consists in so arranging a system of brakes in connection with the motor or motors by which the car or cars are propelled that the brake-actuating magnet will be energized and caused to lift the brake-shoes away from the wheels when the motor is in operation, either during the run of the train or when it is desired to start, and when the current is cut off from the motor that it shall also be cut off from the brake-magnet, freeing the brake mechanism and allowing a weight or spring or other suitable device to set the brakes and stop the train or materially retard and regulate its speed.

In the accompanying drawings, Figure 1 is an elevation, partly in section, showing an electric-railway motor-car and a portion of a second one attached thereto, the motor and its connections, a diagram of the circuits including the brake-actuating magnets connected in series, resistance devices for use in connection with regulating the operation of the apparatus, and switching devices by which the various combinations, hereinafter referred to, are effected. Fig. 2 is a diagram showing the brake-actuating magnets in multiple arc.

A represents the track.

B B are the wheels of the car C, and *b* is a wheel supporting the front portion of a second car, C′, the rear portion of which is not shown. A motor, D, is mounted upon the car C, and is connected with the wheels D thereof by belts *d*, or in any other suitable and convenient manner.

E E E are the brake-shoes which bear against the wheels B *b*, and are supported by suitable links, *e*, secured to their upper extremities and to the under side of the car or track. Thrust-rods F are pivotally connected to the lower ends of the brake-shoes E, and at their inner ends to the extremity of an extension, *g*, depending from an iron plunger or rod armature, G. A solenoid, H, is secured to the under side of each car in any convenient position and to any convenient part thereof, within which solenoid the plunger G moves. A powerful spiral spring, I, is placed upon the extension *g*, between the end of the solenoid and the thrust-rods F, tending to force the plunger downward and set the brake-shoes against the wheels. The spring I may be replaced by a weight or any other equivalent mechanical device; or some well-known form of automatic brake may be substituted therefor, and so arranged that it will be thrown into action whenever the plunger G is released.

A suitable switch-board is provided where, by means of the switch-levers J K, the circuits through the apparatus can be arranged as desired. A rheostat, L, is also provided, the coils of which are brought to the commutator M, and by means of which and the rotating brush *l*, preferably located on top of the motor D, the resistance of the brake and motor circuit can be adjusted as desired, or the circuit of either the brake or motor broken, and such other combinations be made as may be found useful in the operation of the system.

O Q are contact-brushes extending from the car to the source of electricity. They are in this instance shown as in contact with the track, but will of course be arranged according to circumstances. From the entering contact O, the current passes by conductor 1 to the switch-board, and, as shown, through arm J and conductor 2 to the solenoid H, on car C′. From here it passes by conductor 3 to solenoid H, on car C, thence by conductor 4 back to the switch-board, through arm K and conductor 5 to the rheostat L, thence to the positive binding-post of the motor, through brush *l* and conductor 6, thence from the motor by conductor 7, through a switch, *m*, placed in the main circuit, and conductor 8, to the negative terminal Q, and back to the source of electricity. An additional conductor, 9, is provided leading from the brush *l* to the switch *m*, whereby the motor can be entirely cut out while the brake-circuit is closed, and at the same time,

by means of the resistance L, the amount of current flowing therethrough can be regulated as desired.

It will be readily understood that by means of the switch-board and other circuit-controlling devices, as shown and described, the brake-circuit can be made to include the motor and the resistance L, or the resistance L without the motor, and that it can be arranged to be made and broken simultaneously with that of the motor, and at the same operation.

In operation the brake-magnet will ordinarily be in the same circuit as is the motor, and on closing the circuit for the purpose of starting the motor, the solenoids H all through the train will become energized and raise their plungers, withdrawing the brake-shoes from the wheels and allowing the motor to start the train. A diminution of current passing through the motor arising from the reduction of the power required therefrom or a total interruption of the current, as when the the motor is cut out for the purpose of stopping the train, will cause the liberation of the plungers G, when the springs I, or other devices provided for that purpose, will at once apply the brakes to the wheels and stop the train. Should the train break apart, the conductors 2 and 3 will be severed, in which event also the solenoids H, being deprived of current, will release the cores G, the brakes will be applied, and the train or portions of the train brought to a standstill.

As shown, the solenoids H are connected in series; but I may also connect them in parallel circuit, as is clearly shown in Fig. 2, in which D is the motor; L, the resistance; Q R, the line-wires throughout the train, and H the solenoids by which the brake mechanism is raised. Suitable switches and connections are provided, as just described with reference to Fig. 1, the principal difference being that the solenoids H are in multiple arc instead of in series, as there shown.

The arrangement shown in Fig. 2 is also applicable to the present steam-railroads, as well as to those operated by electrically-transmitted power, the motor D being arranged to work as a generator and connected to the axle of some one of the cars or of the locomotive, and also connected direct to a small separate steam-engine on the locomotive, by which it can be driven at any desired speed, so as to furnish current to lift the brakes at starting, after which the motion of the train will, through the motor-connection to the axle, develop current sufficient to raise the brakes and free the wheels. Whenever it becomes necessary to stop the train, the current can be diminished and the brakes will apply themselves, as explained. By these means a train of cars equipped with the apparatus and in the manner just described can be readily, conveniently, and economically operated on either an electric or a steam railway, or may pass from one to the other, the electric arrangement displacing the air-brake when the train is on a steam-railway.

It will be obvious that various modifications and changes may be made in the devices and means heretofore described, without any way departing from the spirit of the invention—as, for instance, an electro-magnet may be substituted for the solenoid in the brake-controlling circuit, and, as before suggested, any kind of automatic brake may be used to set the brakes when the circuit including the magnets or solenoids is broken or interrupted purposely or by the breaking apart of the cars.

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

1. An electro-magnetic railway-brake system consisting of the combination of a series of cars, suitable brakes therefor, and means for automatically operating the same, a solenoid for each of the brake mechanisms, the plunger whereof is connected directly thereto and adapted when acted upon by the solenoid to withdraw and hold the brakes away from their operative positions, and circuits and connections, substantially as described, whereby the solenoids are energized and the brakes withheld, as set forth.

2. An electro-magnetic brake system consisting in the combination with a suitable car, brake mechanism, and means for automatically setting said brakes, of a motor on said car, and connections between the motor and the driving-wheels thereof, and a solenoid and connections between the core thereof and the brake mechanism, said solenoid being in circuit with the motor and arranged to receive current while the motor is in operation, as set forth.

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

CHARLES J. VAN DEPOELE.

Witnesses:
JOSEPH A. GABOURY,
CHARLES STEPHENSON,