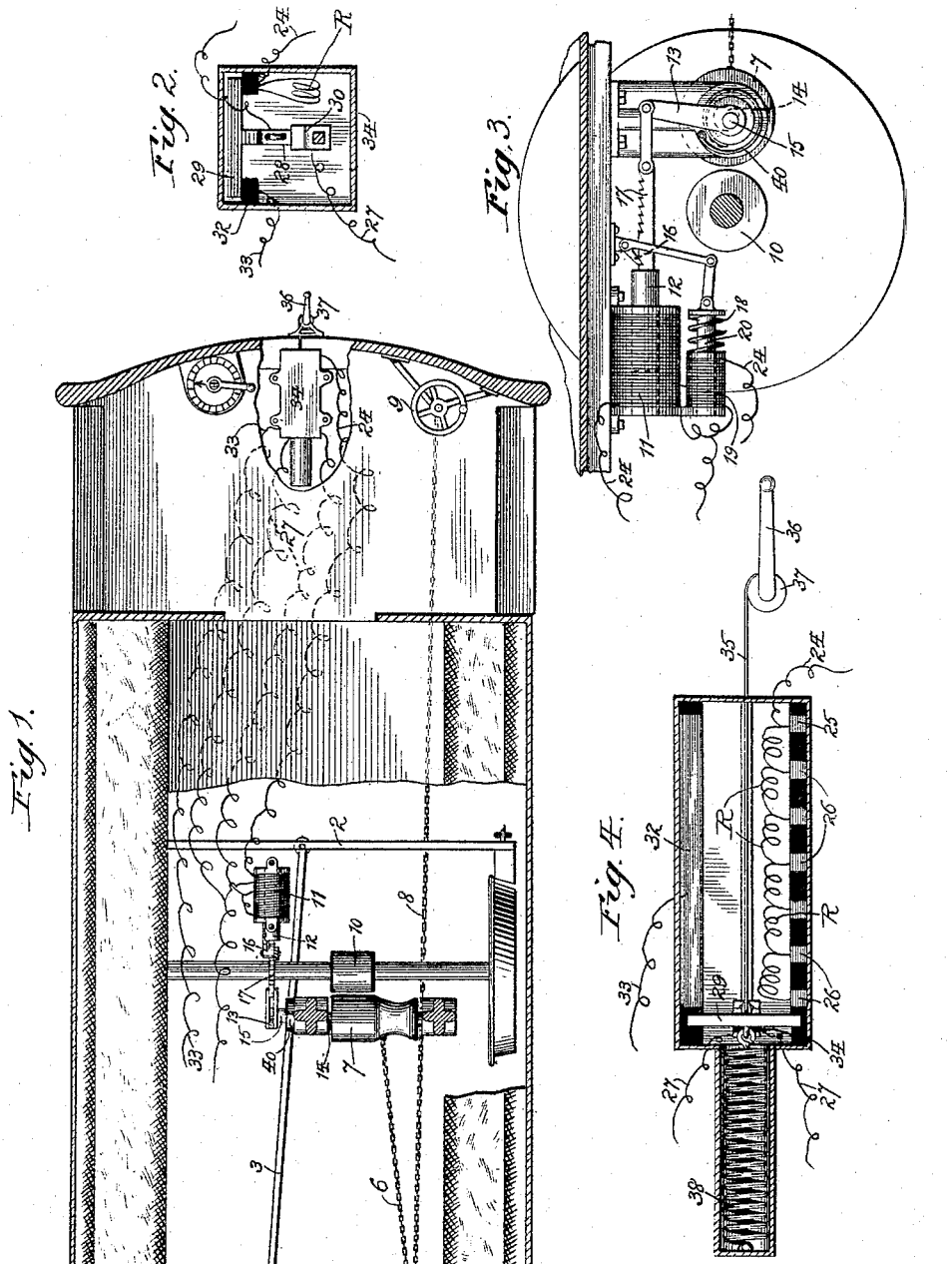
(No Model.) 2 Sheets—Sheet 1.

W. C. FLETCHER.

ELECTRIC CAR BRAKE.

No. 492,492. Patented Feb. 28, 1893.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3a.

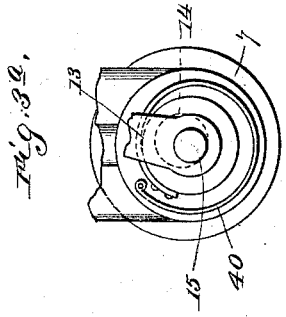


Fig. 5

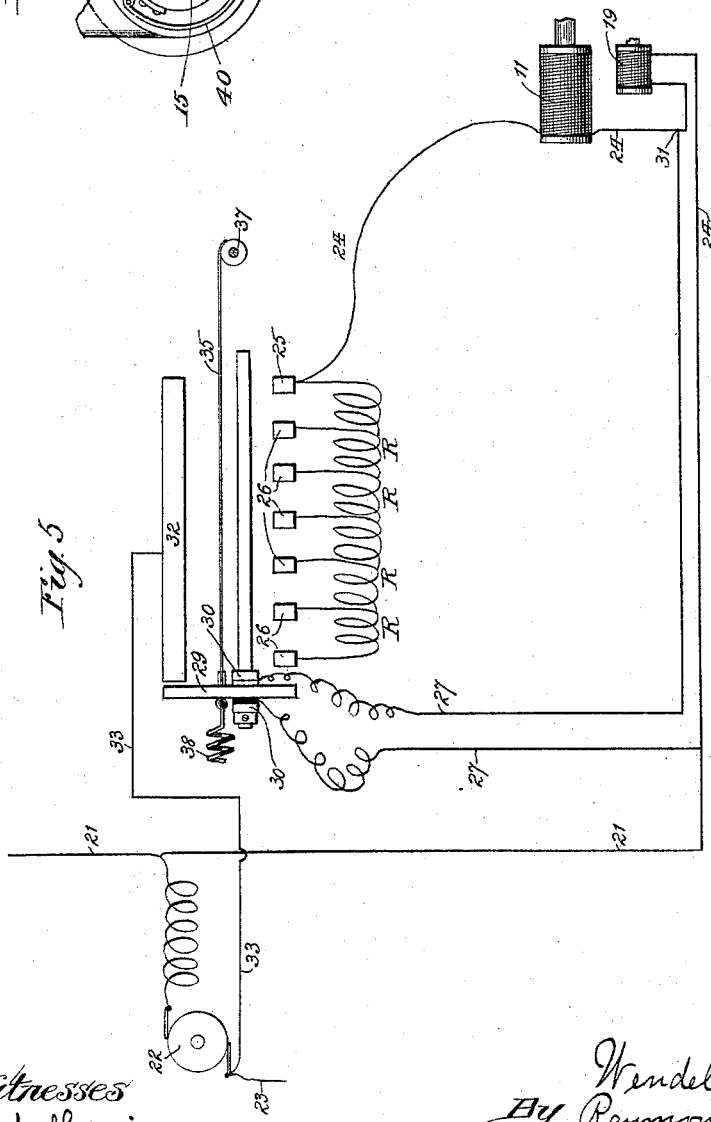
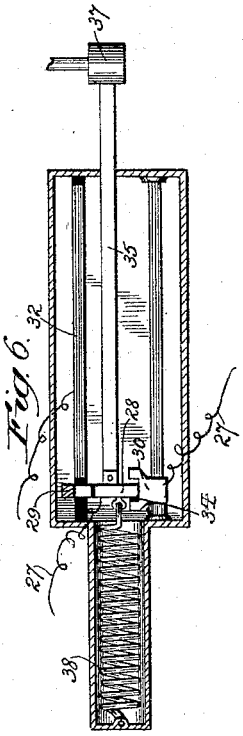


Fig. 6.



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UNITED STATES PATENT OFFICE.

WENDELL C. FLETCHER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO NORMAN P. WILLARD, TRUSTEE, OF CHICAGO, ILLINOIS.

ELECTRIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 492,492, dated February 28, 1893.

Application filed April 15, 1892. Serial No. 429,251. (No model.)

To all whom it may concern:

Be it known that I, WENDELL C. FLETCHER, a citizen of the United States, residing at St. Louis, in the State of Missouri, has invented certain new and useful Improvements in Electrical Car-Brakes, of which the following is a specification, reference being had to the accompanying drawings.

My invention is shown as applied to an electrically propelled street car, as that is the use to which it can be most conveniently put. It is applicable, however, to cars having any motive power, if an electrical circuit be provided for the braking apparatus.

My invention is intended to provide means for applying the brake with a regulated degree of force and to provide means for holding the brake on, independently of the electrical circuit, when it has once been applied. The application and release of the brake is controlled by a single operating device.

In the drawings: Figure 1 is a horizontal section of a car to which the brake is applied, a portion of the car bottom being broken away to show the apparatus beneath. Figs. 2, 3 3ª and 4 show details hereinafter explained. Fig. 5 is a diagrammatical view showing electrical connections. Fig. 6 is a sectional view showing the operating device, Fig. 4 being a similar section but on a plane at right angles to that of Fig. 6.

Referring to Fig. 1, 2 is the brake beam.

3, 4 and 5 are brake levers.

6 is a chain or cable connecting the brake lever 4 to the drum 7.

8 is a chain connecting the lever 4 to the hand brake wheel 9.

10 is a friction drum on the car axle which operates to wind up the drum 7 when the two are brought in contact by the operation of the electro-magnet 11 controlled by electrical circuits hereinafter described. The electro-magnet 11, when a current is brought through it, actuates the soft iron core 12 (Fig. 3.) which is connected to an arm 13. Said arm 13 operates an eccentric 14, which carries the shaft 15 (shown in dotted lines) of the drum 7. The view shown in Fig. 3ª shows the construction of the eccentric bearing more plainly. The turning of the eccentric bearing 14 in its supporting hanger will shift the shaft 15 and the drum 7 carried thereon. The partial revolution of the eccentric thus brings the drum 7 in contact with the drum 10 and thereby applies the brake.

The mechanical operation of the braking apparatus just described, is merely illustrative and any form may be used, my invention being concerned with the electrical devices by which it is controlled.

A pawl 16, engaging with a rack 17, connected to or forming a part of the core 12, maintains the contact of the drums 7 and 10 and thus keeps the brake on. A spring 18 keeps the pawl in engagement with the rack, and a magnet coil 19 provided with a soft iron core 20 connected to the pawl 16 serves to retract the latter when a current is passed through the coil.

The diagrammatic view, Fig. 5, shows the method of controlling the currents through the coils 11 and 19. 21 is the wire through which the current from the trolley enters. 22 represents the motor which is operated in the ordinary manner. The wire 23 leads to the return circuit. From the wire 21 extend two circuits the first, marked 24, passing through the coils 11 and 19 which are connected in series and thence to the contact block 25. A series of resistance coils R R is connected to the blocks 26 26 &c. which are arranged in line with the block 25. The second circuit 27 is so connected as to cut out the coil 19 when desired. It is attached to the circuit wire 21 before it reaches the coil 19 and extends to an arm 28 (Fig. 6) carried by a sliding bar 29, the arm being insulated from the bar as shown in Fig. 6. Contact is made between the arm 23 and the slide 30; and thence the circuit 27 is continued to a point 31 in the circuit 24, said point being between the coils 11 and 19. Parallel to the series of contact blocks 26 is a bar 32 which is made of conducting material and connected by the wire 33 to the return circuit 23. At the rear of the slot in the top of the slide 30 into which the arm 28 projects, is an insulating block 34. Attached to the arm 28 is a cord or strap 35 by which it may be drawn forward through the intervention of the crank

36 (Figs. 1 and 4) carrying the drum 37. At the other side of the arm 28 is attached a spring 38 which serves to retract it.

The operation is as follows: The normal position of the device is as shown in Figs. 4 and 6 in which the arm 28 is retracted by the spring and rests against the insulating block 34 at the rear of the slot in the slide 30. When it is desired to apply the brake the crank 36 is revolved so as to draw forward the arm 28. At the beginning of its movement it makes contact with the front side of the slide 30 and thereby completes the circuit 27, the magnet coil 19 being thus short-circuited, so that very little current passes through it,—not enough to overcome the spring 18. The magnet coil 11, however, is included in the circuit and when the bar 29 has advanced far enough to make connection between the first contact block 26 and the bar 32, the current flows through the magnet coil 11, and the core 12 is thus drawn in and the brake applied. As the bar 29 is drawn farther forward, contact is made with the second block 26 and a portion of the resistance being thus cut out a stronger current flows and the brake is applied with greater force. When the contact block 25 is reached, all the resistances R have been cut out and the brake will be applied with its maximum force. When it is desired to release the brake, the spring 38 is allowed to retract the arm 28; the beginning of the reverse movement of the arm 28 breaks the circuit 27, and the whole current is compelled to pass through the coil 19. The pawl 16 is thus released, and as the successive resistances R are introduced, the force with which the brake is held, is correspondingly diminished and its full release is finally effected upon the restoration of the arm 28 and its connected parts to their original positions. A spring 40 may be used to assist the release of the brake.

I claim—

1. The combination with a car brake of an electro magnet whereby said brake is applied; a device for controlling the flow of current through said electro-magnet; a retaining device by which the brake is held when applied; a second electro-magnet by which said retaining device is released; a circuit controlling said second electro-magnet; and devices connected to the circuit controller for the first electro-magnet adapted to render the second electro-magnet inoperative when the controller is moved to apply the brake and to bring said second electro-magnet into operation when the controller is moved to release the brake, substantially as described.

2. The combination with a car brake of an electro-magnet whereby said brake is applied; a device for controlling the flow of current through said electro-magnet; a retaining device by which the brake is held when applied; a second electro-magnet by which said retaining device is released, said magnet coils being connected in series; a short circuit extending around the coils of said second electro-magnet and devices connected to the circuit controller for the first electro-magnet adapted to complete said short circuit when the controller is moved to apply the brake and to break said circuit when it is moved to release the brake, substantially as described.

3. The combination with a car brake of an electro-magnet whereby said brake is applied; a device controlling the flow of current through the coils of said magnet, said device consisting of a bar 29 adapted to complete the circuit through said magnet; a series of resistance coils R arranged to be successively cut out of said circuit as the bar is moved forward; a pawl and ratchet by which said brake is held when applied; a second electro magnet by which said pawl and ratchet may be released, the coils of the second electro-magnet being connected in series with the coils of the first; a short circuit extending around the coils of said second electro-magnet; an arm 28 connected to said bar 29 but insulated therefrom; a slide 30 provided with a slot into which said arm extends; said slide having an insulating block upon one side of the slot and said arm and slide being connected to the two parts of said short circuit, all combined substantially as and for the purpose set forth.

WENDELL C. FLETCHER.

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