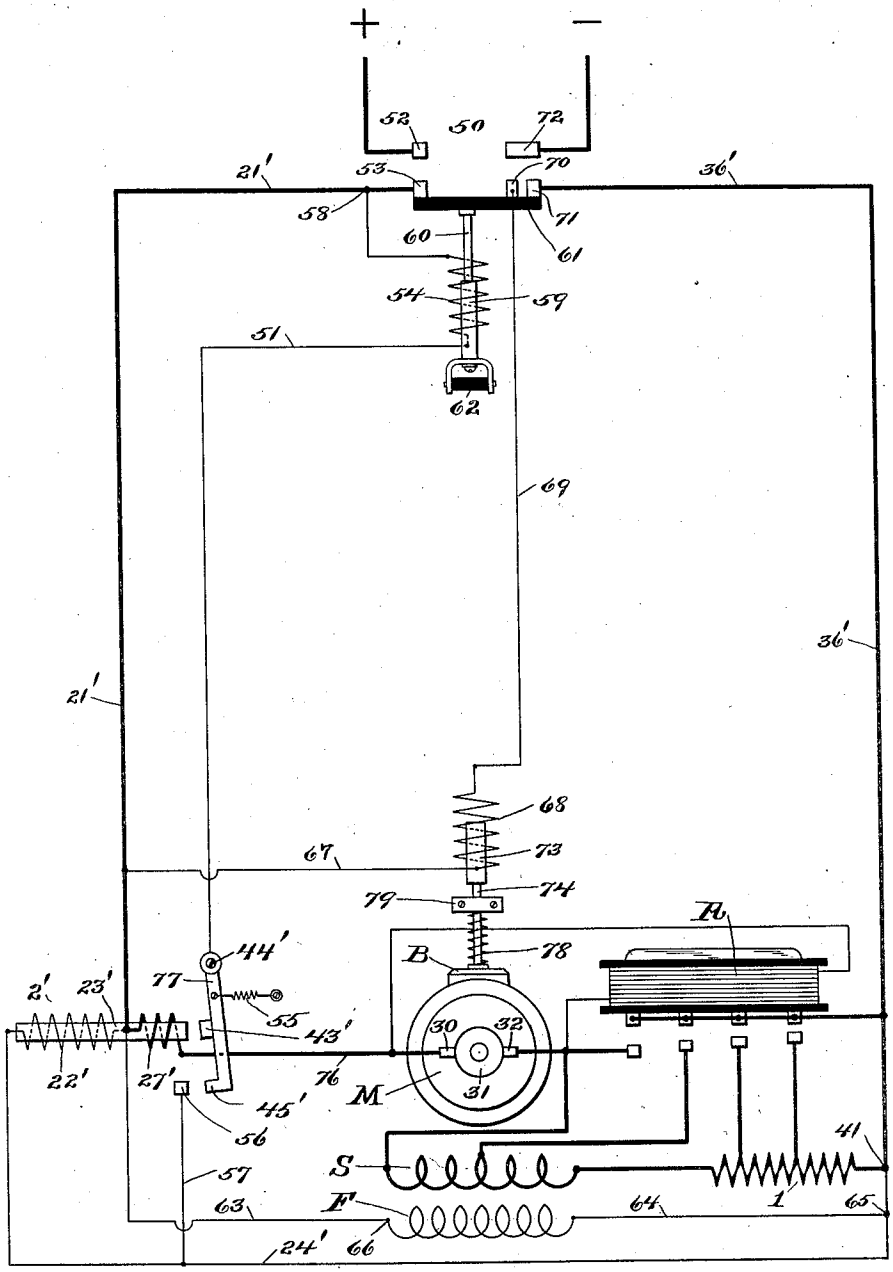
No. 893,536. PATENTED JULY 14, 1908.

F. W. NEWELL.

ELECTRODYNAMIC BRAKE.

APPLICATION FILED DEC. 5, 1906.



Inventor

Frederick W. Newell

Witnesses:

Walter C. Strang

James L. Bethell

By C. M. Nissen Attorney

UNITED STATES PATENT OFFICE.

FREDERICK W. NEWELL, OF HASTINGS-UPON-HUDSON, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ELECTRODYNAMIC BRAKE.

No. 893,536. Specification of Letters Patent. Patented July 14, 1908.

Original application filed November 13, 1905, Serial No. 286,998. Divided and this application filed December 5, 1906. Serial No. 346,391.

To all whom it may concern:

Be it known that I, FREDERICK W. NEWELL, a citizen of the United States, residing at Hastings-upon-Hudson, in the county of Westchester and State of New York, have invented a new and useful Improvement in Electrodynamic Brakes, of which the following is a specification.

My invention relates to motor-controlling means and is a division of my application for an improvement in automatic motor-controlling apparatus, patented June 18, 1907, No. 857,191.

One of the objects of my invention is the provision of simple and efficient means for stopping an electric motor when the same is being driven as a generator.

Other objects of the invention will appear hereinafter, the novel combinations of elements being pointed out in the claims.

In the accompanying drawing which represents diagrammatically a system of circuits and apparatus to illustrate an application of the invention, 2′ designates a relay for controlling the operation of the motor M.

50 designates a main line switch, which in this instance is shown provided with manual means 62 for initially closing said switch by moving the contacts 53, 70 and 71 into engagement with the fixed contacts 52 and 72.

68 designates a brake magnet solenoid, F the shunt field of the motor, and S the series field thereof.

1 designates the starting resistance and A the accelerating magnet for controlling said resistance to vary the current flowing through the armature 31.

When the main line switch 50 is closed, a current will flow from the +main to contacts 52 and 53, and by way of wire 21′ through solenoid 22′ and wire 24′ to wire 36′, and thence through contacts 71 and 72 to the −main. The core 23′ of the relay 2′ will therefore be magnetized to attract its armature 43′ against the action of the spring 55 to move the contact 45′ into engagement with the fixed contact 56. The lever 77 carrying the armature 43′ is pivoted at 44′ and normally held in its right-hand position, as shown, by the spring 55. By the closure of the switch 50, a circuit will also be established through coil 27′, wire 76, brush 30, armature 31, brush 32, series field S, sectional resistance 1, and thence by way of wire 36′ to the −main. The winding 27′ is of low resistance while that designated 22′ is of comparatively high resistance, and the winding 27′ is wound to normally assist the winding 22′ in magnetizing the core 23′. As soon as the contacts 45′ and 56 are placed in engagement with each other a circuit is closed from the point 58 through the coil 54, wire 51, armature lever 77, contacts 45′ and 56, wires 57, 24′ and 36′, to the −main. This circuit constitutes a retaining or holding circuit for the switch 50, for, as soon as the switch 50 is closed manually by means of the handle 62, the relay 2′ is operated to effect the excitation of the coil 54 which then acts on its core 59 to hold the same in its uppermost position, and consequently the contacts of the switch 50 in firm engagement with each other. The movable contacts 53, 70 and 71 are insulated from each other by the bar or plate of insulation 61 to which they are secured and by which they are carried. This bar or plate 61 is rigidly attached to the upper end of the stem 60 which is carried by the core 59. When the switch 50 is closed and held closed in the manner stated, a circuit is also established from the +main through wire 63, shunt field F and wires 64 and 36′ to the +main. Also a circuit is closed from the +main through wire 67, brake-magnet solenoid 68, wire 69, to the −main. The excitation of the coil 68 will cause its core 73 to be lifted to release the brake B by means of the stem 74 which is connected between the core 73 and the brake shoe. The brake apparatus may be of any well known type, and the brake-applying means is in this instance shown as a spring 78 encircling the stem 74 between the brake shoe and the fixed bracket 79.

The motor may now start and as the counter-electro-motive force of the motor increases the accelerating magnet A will receive more current to effect a gradual cutting out of the resistance 1 and the series field S, so that the motor may start with a strong torque as a compound-wound-motor, and after being started and run to full speed, thereafter operate as a shunt wound motor.

Should the load connected to the motor M, as for instance an elevator car and hoisting mechanism therefor, operate such motor as a generator, current would be sent by said gen-

erator through the coil 27′ in an opposite direction and thence back into the line. Part of such current would be shunted through the coil 22′, but it should be noted that when the current passes through these two coils 27′ and 22′ in series instead of in parallel, as normally, these coils will neutralize each other's magnetism and the spring 55 will, therefore, disengage the contacts 45′, 56, and deënergize the magnet which holds the switch 50 closed while the motor M is acting as a motor. It will now be seen that the doubly wound-magnet of the relay 2′ in reality is a differential magnet. Upon the opening of the switch 50, the brake magnet will also be deënergized and effect the application of the brake and the consequent stopping of the motor in an obvious manner.

Although I have herein shown but a single form of my invention, it is obvious that those skilled in the art may make various modifications in the details and arrangement of parts without departing from the spirit and scope thereof. I desire therefore not to be limited to the exact construction herein disclosed.

What I claim is:—

1. The combination with a motor, of controlling apparatus therefor, a differential relay having a winding connected directly across the mains, and means controlled by said relay for effecting a positive stop of said motor when the same acts as a generator.

2. The combination with a motor, of an electro-magnetic main line switch therefor, a brake-magnet, a doubly-wound magnet having a winding connected directly across the mains, and means controlled by said doubly-wound magnet for effecting the opening of the main line switch and deënergization of said brake magnet when the motor acts as a generator.

3. The combination with an electric motor, of a main line switch therefor, an electro-magnet for holding said main line switch closed, a differential relay having a winding connected directly across the mains, and means controlled by said relay for deënergizing said electro-magnet to effect an opening of the main line switch when the motor attains an excessive speed.

4. The combination with an electric motor, of a main line switch, means for holding said main line switch in closed position, a differentially wound magnet having one winding connected across the mains and the other winding in series with the motor armature, and means controlled by said magnet for effecting the opening of the main line switch.

5. The combination with an electric motor, of a main line switch therefor, means for operating said switch, a doubly wound magnet having one winding connected permanently across the mains and the other winding permanently in series with the motor armature, and means controlled by said magnet for effecting an opening of the main line switch.

6. The combination with an electric motor, of controlling apparatus therefor, a differential relay having one winding of low resistance and the other winding of comparatively high resistance connected directly across the mains, and means controlled by said relay for normally holding the main line circuit closed and effecting an opening of the same when the motor acts as a generator.

7. The combination with an electric motor, of a main line switch and controlling apparatus for said motor, an electro-magnet for holding said main line switch closed, a brake magnet a differentially wound magnet having one winding connected between one of the mains and the motor-armature and having the other winding connected between the two mains, and means controlled by said differentially-wound magnet for closing the circuit for the holding electro-magnet during the normal operation of the motor and for effecting the opening of the main line switch and the deënergization of the brake-magnet when the motor attains an excessive speed.

8. The combination with an electric motor, of motor-controlling apparatus, electro-magnetic brake mechanism, an electro-magnetic main line switch, and a differential relay having its windings connected respectively directly across the mains and in series with the motor armature for controlling said main line switch and brake mechanism.

9. The combination with an electric motor, of a brake magnet, a main line switch, a brake magnet switch, a differential relay, and means controlled by said relay for effecting the operation of said switches.

10. The combination with an electric motor, of a brake magnet, a main line switch, a brake magnet switch, an electro-magnet for operating the main line switch and brake magnet switch, an additional switch in circuit with the last-named electro-magnet, and a doubly wound magnet controlling said last-named switch.

11. The combination with an electric motor comprising a shunt field winding, of a main line switch, a differentially wound magnet having a winding connected directly in parallel with the shunt field winding, and means operated by said magnet for controlling said switch.

12. The combination with a compound wound motor, of electro-magnetic brake mechanism, a differentially wound magnet having its windings connected in series and directly in shunt, respectively, with the series and shunt field windings, and means operated by said magnet for controlling the brake mechanism.

13. The combination with an electric

motor, of brake apparatus therefor comprising a brake magnet, a main line switch, a magnet for controlling said main line switch, a differential relay controlling said magnet, and an auxiliary switch comprising an isolated contact co-acting with said main line switch to control the brake magnet.

14. The combination with an electric motor, of electro-magnetic brake apparatus therefor, a main line switch, an isolated contact connected to the brake magnet and co-operating with said main line switch, a potential magnet for holding the main line switch closed, and a differential relay for controlling said potential magnet, one of the windings of said relay being in series with the motor armature, and the other winding being connected directly across the mains.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK W. NEWELL.

Witnesses:
WALTER C. STRONG,
CHARLES F. WHEATON.