

974,849.

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UNITED STATES PATENT OFFICE.

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ELEVATOR-CONTROLLER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM D. BALDWIN, a citizen of the United States, residing in New York city, in the county of New York and State of New York, have invented a new and useful Improvement in Elevator-Controllers, of which the following is a specification.

My invention relates to elevator controllers and one of its objects is the provision of a single device for controlling the starting, stopping and running of an elevator car whether traveling upwardly or downwardly.

A further object of the present invention is the provision of a switch in the car for controlling the motor for lifting the car and for controlling at will a retarding device to effect a variation of speed of the car in one direction.

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

In the accompanying drawing I have shown my invention applied to a traction elevator system but it should be understood that it may have a general application. The retarding device in this instance limits the speed of descent of the car and comprises an element corresponding to the plunger of a plunger elevator system, thus combining safety with efficiency.

M designates the motor which drives the sheave 1, the latter being connected by means of the cables 2 and 5 to the car C. The cables 2 pass over the over-head sheave 3 and the cables 5 over the over-head sheaves 6 and 7. The counter-weight 4 is connected between the ends of the cables 2 and to one end of the cables 5, whereas the ordinary counter-weight W is connected to the car by means of the cables 8 which pass over the sheaves 9 and 10.

The motor M may be of any suitable type and is herein shown as an electric motor, preferably shunt wound. The motor-controlling apparatus may be varied as desired, but for the sake of simplicity I have shown a simple adjustable rheostat 11 preferably operated automatically by a series of electro-magnets in the well known manner.

In the car is a switch S the lever L of which when thrown to the left connects the segments 17 and 18 whereupon the brake magnet solenoid 13 will receive current to

lift the core 14 and release the brake B from the pulley 12. The current for the brake magnet 13 flows from the + main through wires 15, 20, solenoid 13, wire 21, contacts 18', 18, lever L, to the wire 19 and — main. The motor circuit is also closed through wire 15, windings of the motor, rheostat 11, wire 16, segment 17, lever L, to the — main. The motor may now start to lift the car.

Connected to the bottom of the car is a plunger P movable within the cylinder 22, which is filled with fluid. The cylinder 22 is connected to the tank T by means of the pipes 24 and 27, a check valve 23 being placed in the pipe 24 and a controlling valve 28 in the pipe 27. The tank T filled with fluid is depended upon to maintain the cylinder 22 filled with fluid for all positions of the plunger. A float F may be provided for automatically operating a valve to admit fluid from the supply pipe 25 into the tank T or the tank may be filled at any time by opening the spigot 26.

Attached to the valve 28 is a bell-crank lever 30, one arm of which carries a weight 29 and the other arm of which is pivoted to the link 31. Pivoted to the upper end of the link 31 is a core 32 movable within the solenoid 33 which is connected to the + main by means of the wires 20, 34, and to the variable resistance R of the car switch by means of the wire 35.

The operation of the apparatus illustrated in the drawing is as follows: When the car switch lever L is moved to the left, the brake is released, the motor receives current and the car is hoisted. When said lever is moved to the right the brake is also released, but in this instance the motor receives no current and the car must therefore descend by reason of its own load. In doing so the speed is controlled by means of the valve 28 as the check valve 23 opens toward the cylinder and therefore prevents any flow of fluid from the cylinder to the tank through pipe 24. When the lever L engages the contact 36, a circuit is closed across the main line through the magnet solenoid 33 and the resistance R. The core 32 will therefore be partially lifted and the valve 28 opened to a predetermined degree. The car will then descend at a corresponding speed. By further movement of the lever L to the right a section of the resistance R is cut out to effect a further upward movement of the

core 32 and a greater opening of the valve 28. The car may then descend at a greater speed. The sections of resistance R may be of any number to secure the desired refinement of variation of speed of descent of the car, and the valve operating mechanism may be varied as desired, the particular form here set forth being merely by way of illustration.

10 When the switch is moved to cause the car to ascend, the weight 29 automatically closes the valve 28 and fluid is drawn into the cylinder 22 from the tank T through the pipe 24. To allow a quick upward movement of the car the pipe 24 is made comparatively large.

15 If desired the pipe 24 and check valve 23 may be entirely omitted in which instance electric connection must be made between the left-hand portion of the switch S and the solenoid 33. Then when the switch lever is moved to the left the valve 28 will be opened wide at once to allow free upward movement of the car. Preferably, however, the pipe 24 with the check valve 23 is included in the retarding system to insure the cylinder 22 being filled with liquid at all times. For instance, failure of the valve-operating mechanism would produce a partial vacuum in the cylinder 22 and when the motor is released to allow the car to descend it would do so at a dangerous speed.

Obviously those skilled in the art may vary the details of my invention without departing from the spirit and scope thereof, and I desire therefore not to be limited to the precise construction herein disclosed.

Having thus described my invention, what I claim and desire to have protected by Letters Patent of the United States is:—

40 1. The combination with an elevator car and hoisting apparatus therefor, of a plunger directly connected to the car, a receptacle for receiving said plunger, means for regulating the flow of fluid from said receptacle upon the descent of the car, and a single device for controlling the hoisting apparatus and regulating means.

50 2. The combination with a car and hoisting apparatus, of a hydraulic retarding device separate from the hoisting apparatus, and electric mechanism for varying said retarding device.

3. The combination with an elevator car, 55 of hoisting apparatus therefor, a plunger attached to the car, a liquid-receptacle for receiving said plunger, means for regulating the flow of fluid to and from said receptacle to vary the retarding effect thereof on the movement of the car, and electric mechanism for controlling said regulating means.

65 4. The combination with an elevator car, of moving means therefor, a closed receptacle for containing liquid, a tank, connections between the receptacle and tank, means

independent of said moving means actuated by the car for drawing the liquid from the tank into said receptacle when the car ascends, and for forcing it into said tank when the car descends, and electric apparatus controllable from the car for regulating the flow on the descent. 70

5. The combination with an elevator car, of hoisting apparatus therefor, a plunger connected to the car and separate from the hoisting apparatus, a cylinder for receiving said plunger, a tank communicating with said cylinder, electro-mechanical means for regulating the flow of fluid to said tank and a single device for controlling both the hoisting apparatus and the regulating means. 80

6. The combination with a car, of hoisting apparatus therefor, a plunger connected to the car, a cylinder containing liquid and arranged to receive said plunger, a tank, 85 a pipe connecting the tank and cylinder, a check valve in said pipe and arranged to be opened toward the cylinder, an additional pipe connecting said tank and cylinder, a regulating valve in said additional pipe, 90 electro-mechanical operating mechanism for said regulating valve, and means for controlling said operating mechanism from the car.

7. The combination with an elevator car, 95 of hoisting apparatus, a supporting plunger connected to the car, a cylinder arranged to contain liquid and to receive said plunger, a receptacle for containing fluid, a pipe connecting the receptacle and cylinder, a check valve to prevent the flow of liquid to the receptacle from the cylinder, an additional pipe connecting the receptacle and cylinder, a valve in the latter pipe, electro-mechanical apparatus for operating said valve, and an 100 electric switch for varying the operation of said electro-mechanical apparatus.

8. In an elevator, the combination of a car, a motor, driving connections between the car and motor, a retarding device comprising a plunger and a cylinder, means for maintaining said cylinder filled with fluid, a valve for regulating the discharge of fluid from said cylinder, electro-mechanical apparatus for operating said valve, and a switch for 115 controlling such operation.

9. The combination with a car, motor and driving apparatus, of brake apparatus for the motor, a retarding device for the car and co-acting therewith, means for controlling said retarding device, a switch in the car, and circuits and connections to effect the operation of the motor and brake when moved in one direction, and to effect the operation of the said controlling means and brake when moved in the opposite direction. 125

10. The combination with a car and hoisting apparatus, of a brake, an electro-magnet for releasing the brake to permit movement of the car, a plunger connected to the car, a 130

closed cylinder for receiving said plunger, a tank, two pipes connecting said cylinder and tank, a check valve in one of said pipes and a regulating valve in the other, an
 5 electro-magnetic device for operating the regulating valve to permit the car to descend at varying speeds, a switch in the car, and circuits and connections co-acting with said switch to effect the lifting of the brake
 10 and the operation of the hoisting apparatus alternately with the lifting of the brake and the control of the regulating valve.

11. The combination with an elevator car, of moving means therefor including an electric motor, a plunger connected to the bottom of the car, a cylinder for receiving said plunger, a tank for containing fluid, a pipe establishing communication between said tank and said cylinder, a check valve in said
 20 pipe for permitting the cylinder to be maintained filled with fluid and for preventing flow of fluid from the cylinder to the tank, an additional pipe connecting the cylinder and tank, a normally closed valve in the latter pipe, an electro-magnetic device for opening said valve, a switch in the car for controlling the motor and for effecting the operation of said electro-magnetic device to place said valve in any one of a plurality
 30 of open positions.

12. The combination with a car, hoisting apparatus and motor, of a plunger attached to the car, a cylinder for receiving said plunger, means for maintaining said cylinder filled with fluid, an electro-magnetic
 35 device for regulating the speed of descent of the car, and a combined switch and rheostat in the car for controlling the motor and said regulating device.

13. The combination with an elevator car, of moving means therefor, a plunger connected to the car, a cylinder for receiving said plunger, means for controlling the flow of fluid to and from said cylinder, an electro-magnet associated with said controlling means, an electro-magnetic brake for said moving means, and mechanism in the car comprising a single movable member for controlling the moving means and said electro-magnetic brake when said member is in
 50 one position, and for controlling said first-named electro-magnet and said electro-magnetic brake when said member is in another position.

14. The combination with an elevator car, of hoisting apparatus therefor, an electric motor for driving said hoisting apparatus, electro-magnetic brake apparatus for said motor, a plunger connected to the car, a
 60 cylinder for receiving said plunger, means for controlling the flow of fluid to and from said cylinder, an electro-magnet associated with said controlling means, and a multiple electric switch in the car comprising a single

switch-lever for controlling the supply of
 65 current to the motor and for operating said electro-magnetic brake apparatus to release the same when said switch-lever is moved in one direction, and for effecting a variable supply of current to the aforesaid electro-
 70 magnet and for also operating said brake apparatus to release the same when said switch-lever is moved in another direction.

15. In an elevator, the combination with a car, of a motor, a brake, a retarding device, and a controller operative to release the brake and apply the retarding device while the brake is released.

16. In an elevator, the combination with a car, of a motor, an electro-mechanical
 80 brake, an electro-mechanical retarding device, and a switch controlling the circuits of both the brake and the retarding device to release one while the other is operative.

17. The combination with a car and hoisting apparatus, of an electro-mechanical
 85 brake, an electrically operated retarding device, means for varying the amount of retardation of said device, and a manual switch controlling the circuits of said brake
 90 and retarding device, and movable into positions to hold the brake released, and at the same time vary the retarding action of said device.

18. The combination with an elevator car, of hoisting apparatus therefor, an electric motor for driving said hoisting apparatus, a plunger connected to the car, a cylinder for receiving said plunger, means for controlling the flow of fluid to and from said cylinder,
 100 an electro-magnet associated with said controlling means, an electro-magnetic brake for the motor, and an electric switch in the car comprising a single electric connector for controlling the motor and brake in one
 105 position and the first-named electro-magnet in another position.

19. In an elevator, the combination with a car, of a plunger, means independent of the plunger for operating the car, a brake
 110 associated with said operating means, a retarding device for said plunger, and means carried by the car for effecting the operation of the brake and retarding device.

20. In an elevator, the combination of a
 115 car, an electric motor for raising and lowering said car, hydraulic means for retarding the descent of the car, and electrically operated means controlled from the car for varying said hydraulic retarding means.

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

W. D. BALDWIN.

Witnesses:

W. H. BRADY,
 EDMUND E. FIELD, Jr.