

(No Model.)

G. B. DAMON.
ELECTRIC CAR BRAKE.

No. 543,544.

Patented July 30, 1895.

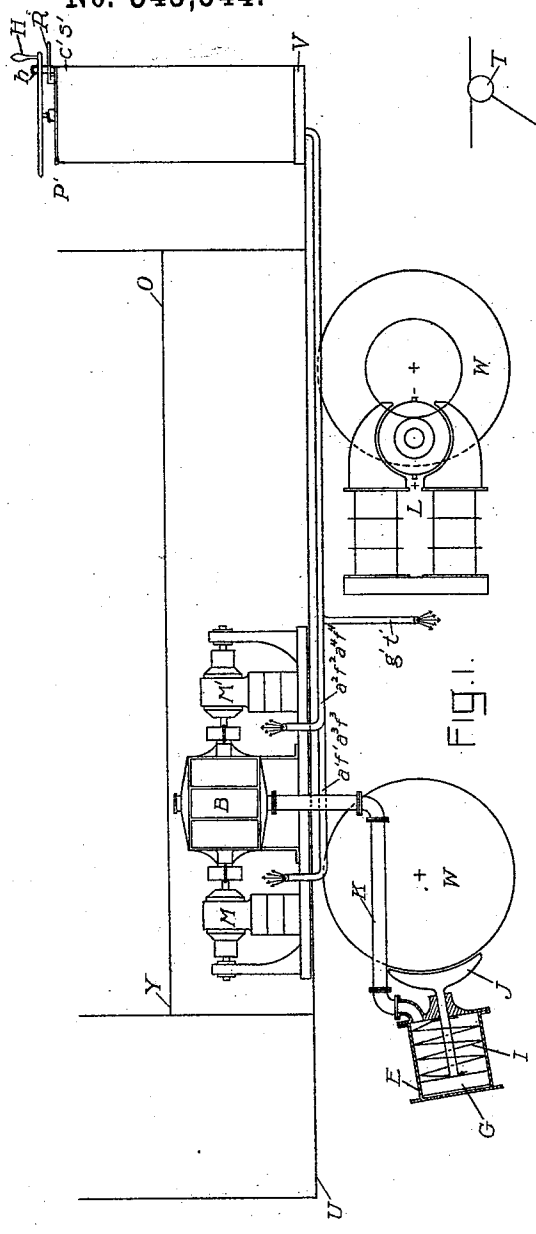


FIG. 1.

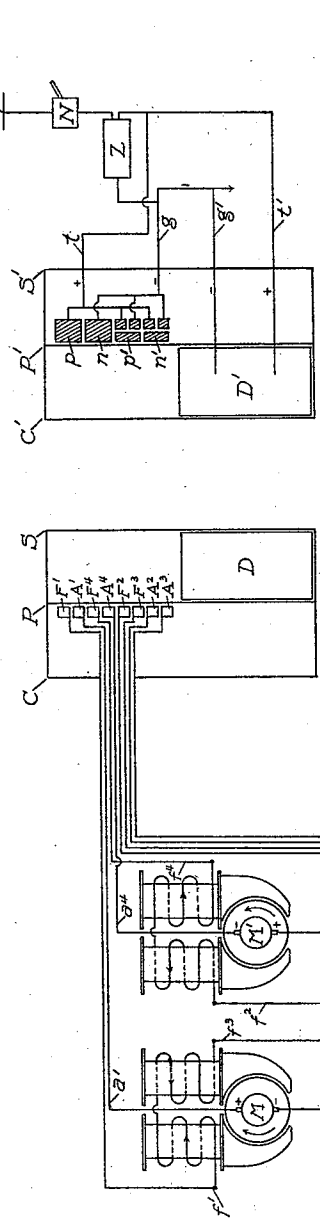


FIG. 3.

FIG. 2.

WITNESSES

John A. Gately
Charles W. Mason

INVENTOR

George B. Damon

UNITED STATES PATENT OFFICE.

GEORGE B. DAMON, OF LOWELL, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO GARDNER W. PEARSON, OF SAME PLACE.

ELECTRIC-CAR BRAKE.

SPECIFICATION forming part of Letters Patent No. 543,544, dated July 30, 1895.

Application filed April 9, 1894. Serial No. 506,829. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. DAMON, of Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and
5 useful Improvement in Electric-Car Brakes, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to a system of pneumatic brakes for electric railroads, which may be operated from the main controlling-stand by the same handle which controls the car-motors of the motor-car or from an independent brake-controlling stand, if desirable.

15 It consists of a controlling-stand or system of contacts, electric motors operating a blower which furnishes pressure for cylinders in which work the pistons connected with the brakes or brake-levers, and springs connected
20 with the brake or the pistons.

The objects of this invention are to provide a system of brakes which are not dependent upon the strength of the motorman or upon the distance traveled by the car for their operation, and which are ready to be applied at
25 any time when there is current in the line, which consists of a small number of parts, having no valves, storage-tanks, or accessories to give out or occupy space. If a single controlling-stand is used, the brake-motors and
30 car-motors are started in operation by one handle, thus allowing the motorman the free use of one arm, and the controlling-stand is so constructed that it is impossible for the
35 motorman to use current for the brake-motors and car-motors at the same time, thus preventing hard usage and accidents to the car-motors. I attain these objects by the mechanism illustrated in the following drawings,
40 in which—

Figure 1 shows the system applied to a single brake-shoe and represents the motors and blower as located beneath the seat of a car. Fig. 2 shows the wiring and connections between the brake-motors and the movable cylinders of the controlling-stand, the cylinder being developed to show this more graphically. Fig. 3 shows the wiring from the trolley or main circuit and the ground to the stationary cylinder of the controlling-stand and
50 represents the surface of that cylinder as de-

veloped and as it would appear if looked through in that condition.

In the actual controlling-stand C' lies over C, P' over P, S' over S.

55 If a single controlling-stand is used, it consists of two parts, one part a stationary cylinder C' P' S', carrying on its inner surface the stationary contacts—namely, on the upper right-hand side the stationary contacts *p*
60 *n p' n'* for the brake-motor and on the lower left-hand side the stationary contacts D' for the car-motors and reversing-switch. The other part is a movable cylinder C P S, which on its surface carries on the upper left-hand
65 side the contacts F' A' F⁴ A⁴ F² F³ A² A³ for the brake-motor, and on the lower right-hand side the contact D for the car-motors and reversing-switch R, in such a manner that if the cylinder is turned toward the left the con-
70 tacts of the lower right-hand side D engage with those of the lower left-hand side D', thus starting the car-motors, and if the cylinder is turned to the right the contacts of the upper left-hand side F' A' F⁴ A⁴ F² F³ A² A³ engage
75 with those of the upper right-hand side *p n p' n'*, thus starting the brake-motors M M' and applying the brakes, both turning directions taken from the zero-point P, a point at which no connection is made with either
80 motor. In the drawings are shown on the stationary and movable cylinder contacts for two blower-motors, one motor connected with each gear of the blower. The contacts are so arranged that turning to the first
85 notch on the right will start both motors in series and a farther turn to the second notch will connect the motors in multiple, thus doubling the speed. It is not necessary that two motors should be used with the blower;
90 nor is it necessary that the motors should be connected in the manner shown. The contacts and connections for the car-motors are not shown, as the wiring for them is determined by the manufacturer according to the
95 system used; but it is necessary that the contacts should be so arranged that current cannot be taken for the car-motors and brake-motors at the same time, and a suitable stop
100 *h* is so placed as to prevent the cylinder exceeding its intended movement.

The current necessary to operate the brake-

motors is a shunt from the main current, which operates the car-motors and passes through the brake-controlling stand by the wires $t g$, the contacts $p n p' n'$ and $F' A' F^4$ $A^4 F^2 F^3 A^2 A^3$, thence to or from, as the case may be, through the wires $a' f' a^4 f^4 a^2 a^3 f^2 f^3$, the motors $M M'$. This current operates electric motors $M M'$, of any usual construction, which are each connected with an axle of a blower B , of any usual construction, which will permit of its reversing when air re-enters through the port from which it is ordinarily expelled by the action of the blower and will allow the air to escape through the usual entry-port, that shown in the drawings being known as the "Root positive blower," and both motors and blower may be placed under the car-seat $Y O$, if desired, or otherwise properly protected from the weather, dust, &c.

The blower B is connected by proper pipes or passages K with cylinders E , in which work pistons G , directly connected with the brake-shoes J or brake-levers in such a way that when the brake-motor and blower are started the pressure created in the cylinders causes the pistons to move in the direction necessary to bring the brake-shoes in contact with the wheels of the trucks.

The working pressure may be compressed air or a vacuum, in the drawings the connection for a vacuum being shown, the cylinders and air-pipes being always so placed with reference to each other that when the brake-motor is started the air-pressure created will cause the brakes to be set.

When the brake-motors $M M'$ are stopped by means of the controlling-stand $P' C' S'$, the pressure, positive or negative, whichever is used, in the blower B , pipes K , and brake-cylinders E reacting on the blower reverses it and equalizes the pressure between the brake-cylinders and the outside air, and the brake-shoes are pressed away from the wheels by the springs I , attached to the pistons G , or to the brake-shoes themselves, or the brakes may be so hung that their weight keeps them away from the wheels when the air-pressure is relieved. Therefore when the pressure in the cylinders is sufficiently reduced, the brakes are released and are brought back to their normal position by the springs or by their own weight. If a separate controlling-stand is used, it is constructed in a manner similar to the section of the double controlling-stand described, which carries the contacts for the brake-motors, and is entirely distinct from the car-motor controlling-stand.

H represents the handle for moving the movable cylinder of the controlling-stand.

$U V$ represents the bottom of the car-body. T represents the trolley or other connection with the main circuit; N , the switch; Z , lightning-arrester; $g' t'$, the conductors for the current for the railroad-motors; L , car-operating motor.

It is not necessary that two brake-motors

should be used or that the connections and contacts be arranged in the precise manner shown. A single motor may be used and it may be connected with the controlling-stand by any well-known system of contacts which are independent from the contacts for controlling the car-motors.

What I claim for my invention, and desire to cover by Letters Patent, is—

1. In a system of brakes for electric cars, the combination of a controlling stand connected with the source of electric power and composed of an outer stationary cylinder and an inner movable cylinder with a handle for turning the same, each cylinder carrying two sets of contacts so arranged that a turn of the movable cylinder in one direction from a given point engages contacts on each cylinder which close the circuit for the car propelling motors and a turn in the other direction from said point engages contacts which close a shunt circuit, electric motors through which this second circuit passes, a reversible blower, as a source of pneumatic pressure, directly connected by proper shafting with the electric motors, a cylinder at one end of which pneumatic pressure from the blower is admitted by suitable pipes, a piston reciprocating within the cylinder, a brake shoe attached to the rod of the piston and a spring attached to the cylinder and bearing against the piston head so as by its pressure to keep the brake shoe away from the wheel of the truck; whereby when the shunt circuit is closed by the controlling stand, it starts the electric motor which starts the blower, causing pressure in the cylinder which forces out the piston and brings the brake shoe in contact with the wheel of the truck, overcoming the pressure of the spring and when the motor is stopped by the controlling stand the motor and blower are stopped and the spring acts to force back the piston, release the brake and reverse the blower and motor, permitting the escape of the air through the blower, as described and for the purpose specified.

2. In a system of brakes for electric cars, the combination of a controlling stand connected with the source of power and consisting of an outer stationary cylinder and an inner movable cylinder to the axis of which is attached a handle, said cylinders carrying contacts adapted to control the passage of the current through the circuit in which are the car propelling motors when the movable cylinder is turned in one direction from a given point and to control the passage of the current through a shunt circuit when the movable cylinder is turned in the other direction from the given point, electric motors lying within the last named circuit and energized by the current therefrom, and a reversible positive action blower producing pneumatic pressure directly connected by suitable shafting with the electric motors, as described and for the purpose specified.

3. In a system of brakes for electric cars, a

double controlling stand, consisting of an outer stationary cylinder, a movable cylinder revolving inside the stationary cylinder, a handle attached to the axis of the movable cylinder, both cylinders carrying on their upper adjacent surfaces contacts which engage when the movable cylinder is turned in one direction from a given point closing the circuit between the source of electricity and the car propelling motors, and on their lower adjacent surfaces contacts which engage when the movable cylinder is turned in the other direction from the given point closing a shunt circuit passing through brake motors; both circuits being open when the movable cylinder is in the position first indicated, as described, and for the purpose specified.

4. In a system of brakes for electric cars, the combination of a controlling stand connected by proper conductors with a shunt from the main source of electric power and adapted to cut off or permit the passage of the current thereof, electric motors through which said current passes after leaving the controlling stand, a positive action reversible blower for producing pneumatic pressure, operated by the electric motors and connected therewith by suitable shafting, a cylinder into which by suitable pipes the pneumatic pressure created by the blower is introduced, a piston reciprocating within the cylinder, a brake shoe attached to the rod of the piston, and a spring bearing against the piston head at one end and attached to the cylinder at the other end whereby its pressure holds the piston and brake shoe away from the wheel of the truck when there is no pneumatic pressure in the cylinder to overcome its resistance, as described and for the purpose specified.

5. In a system of brakes for electric cars, the combination of a positive action reversible blower for producing pneumatic pressure for actuating brakes, electric motors for operating said blower and connected therewith by suitable shafting, and a controlling stand, connected by suitable conductors with a shunt from the main source of electric power and with said motors and adjusted to regulate the supply of current therefrom to the said electric motors, whereby the creation of pneumatic pressure for operating brakes can instantly be created or stopped by the motion of the controlling stand as described and for the purpose specified.

6. In a system of brakes for electric cars, the combination of a double controlling stand composed of an outer stationary cylinder in which revolves a movable cylinder with a handle attached to its axis, each cylinder carrying two sets of contacts, so disposed on their adjacent surfaces that when the movable cylinder is turned in one direction from a given point, contacts engage which are respectively connected with the source of electric power and with the car propelling motors and when the movable cylinder is turned in the other direction from the given point, con-

tacts engage which are respectively connected with a shunt from the main electric current and with independent electric motors, and the last named electric motors for operating the brake system; whereby the circuit for the car propelling motors and brake motors cannot be both closed at the same time, as described and for the purpose specified.

7. In a system of electric car brakes, a positive action blower, for producing pneumatic pressure, of any usual construction which admits of its being reversed by the reentry of compressed air through the port from which it is ordinarily expelled by the action of the blower, electric motors for operating the blower to which they are connected by suitable shafting, a cylinder into which the blower by suitable pipes, forces compressed air when in action, a piston reciprocating within the cylinder, a brake shoe attached to the piston rod and a spring attached to the cylinder and bearing against the piston head in opposition to the pressure of the air from the blower, as described and for the purpose specified.

8. In a system of electric car brakes, the combination of a positive action blower, for rapidly producing pneumatic pressure, of such construction that the reentry of compressed air through the port from which it is expelled by the positive action of the blower, will reverse the blower, and electric motors directly attached to and for operating the blower as applied to and for producing pneumatic pressure in a system of air brakes as described and for the purpose specified.

9. In a system of brakes for electric cars, the combination of a cylinder, a piston reciprocating therein, a brake shoe attached to the rod of the piston, a spring attached to the cylinder and bearing against the piston head and a positive action blower, for producing pneumatic pressure in the cylinder through pipes by which the blower and cylinder are directly connected, thus setting the brake, the blower being so constructed and the spring so attached that when power is withdrawn from the blower, the pressure of the spring and the compressed air in the cylinder will reverse it and allow the air to escape and withdraw the piston and brake from the wheel of the truck, as described and for the purpose specified.

10. A controlling stand for electric cars consisting of a stationary cylinder, a movable cylinder turning therein provided with a handle attached to its axis and a stop so placed as to limit the motion of the cylinder; the cylinders carry on their upper portions, the stationary on the right of a certain point and the movable on the left of such point, contacts which, when the movable cylinder is turned toward the right, engage and close one circuit, and on their lower portions, they carry, the stationary on the left of the above point and the movable on the right of such point, contacts which when the movable cylinder is turned toward the left, engage and close another circuit, neither circuit being closed

when the movable cylinder rests at the above mentioned zero point, and it being impossible for both contacts to be closed at the same time, as described and for the purpose specified.

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11. In a system of electric car brakes, the combination of a positive action blower, for rapidly producing pneumatic pressure, of such construction that the re-entry of compressed air through the port from which it is expelled by the positive action of the blower, will reverse the blower, electric motors directly attached to and for operating the blower

and a brake cylinder connected by suitable pipes to the blower at the above mentioned port, as described and for the purpose specified. 15

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 6th day of April, A. D. 1894. 20

GEORGE B. DAMON.

Witnesses:

JOHN A. GATELY,
GARDNER W. PEARSON.