

(No Model.)

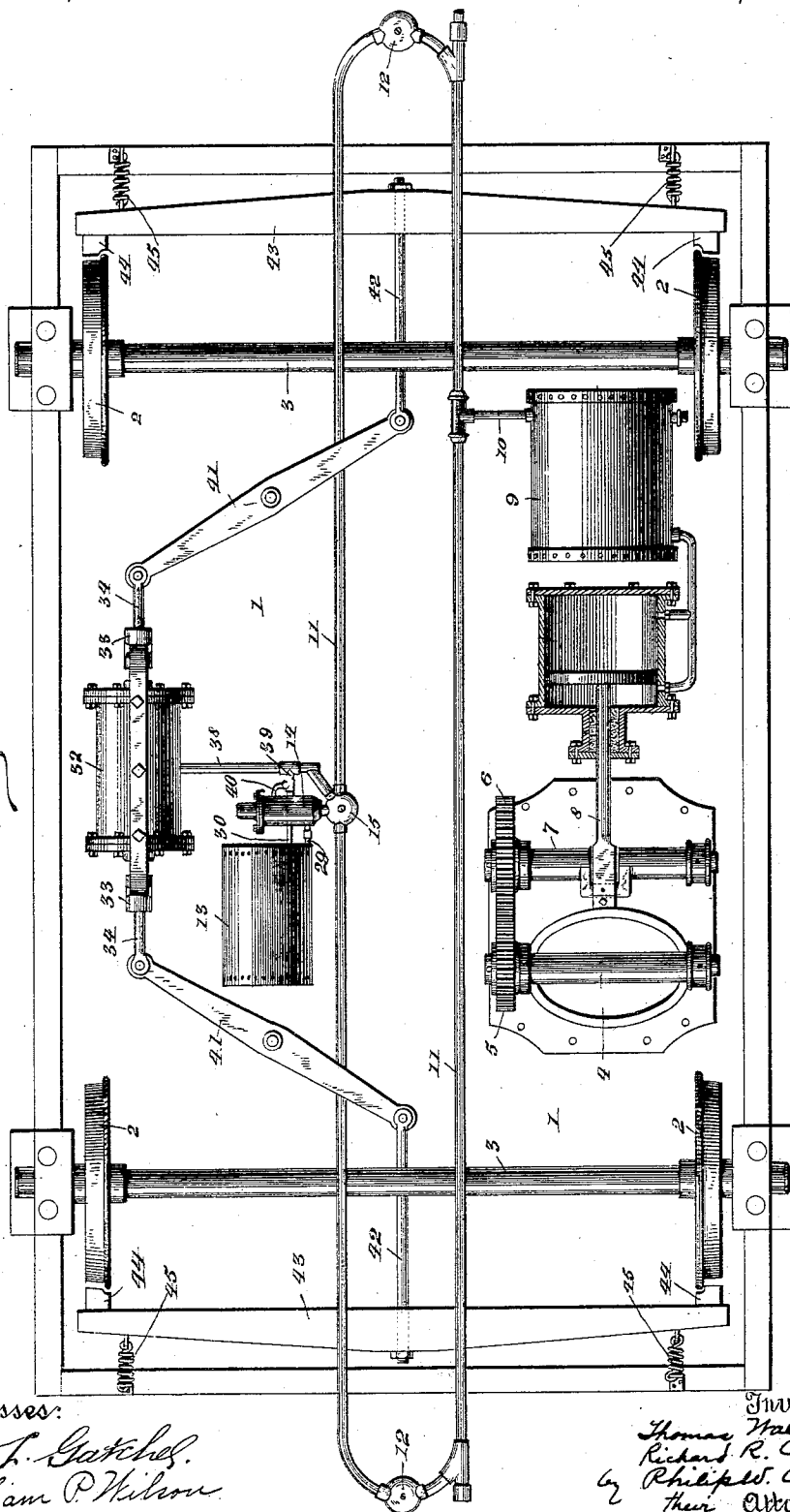
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T. WALKER & R. R. COOK.
AIR BRAKE.

No. 569,258.

Patented Oct. 13, 1896.

Fig. 1.



Witnesses:

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

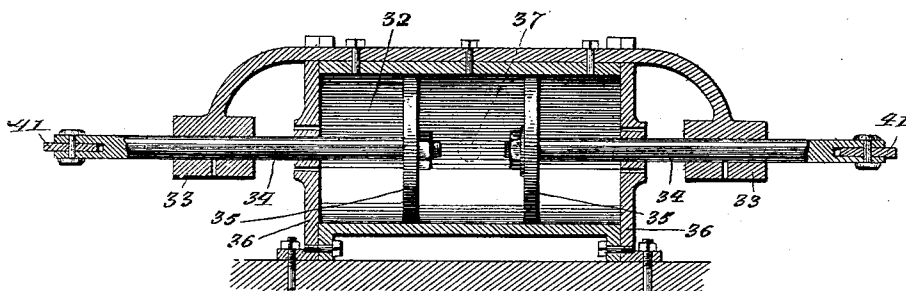
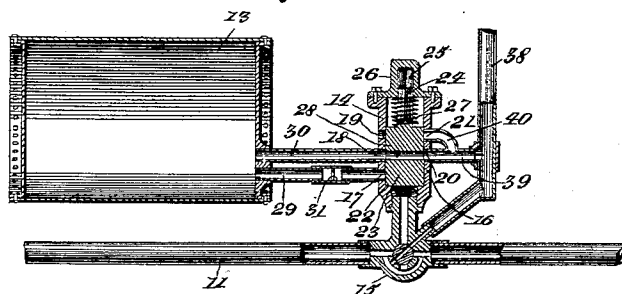


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS WALKER AND RICHARD R. COOK, OF PHILADELPHIA,
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AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 569,258, dated October 13, 1896.

Application filed June 3, 1895. Serial No. 551,537. (No model.)

To all whom it may concern:

Be it known that we, THOMAS WALKER, a subject of the Queen of Great Britain, and RICHARD R. COOK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Air-Brakes; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in pneumatic brakes, and its object is to provide a brake of this character especially adapted to be used upon street-railway cars operated by electricity, either by straight air or by air from an auxiliary reservoir, aiming to simplify and cheapen the construction of air-brakes now in use, at the same time producing one which is more efficient in operation.

The invention consists of a main air-reservoir located on the motor-car and adapted to be charged by an air-pump of ordinary construction. Leading from the main reservoir is a main supply-pipe provided with a three-way cock at the ends of each car, which may be operated by the motorman. On the under side of the motor-car and each trailer we locate an auxiliary tank having suitable connections, through a triple valve of peculiar construction, with the main supply-pipe and with the brake-cylinders.

Our triple valve consists of a casing having an internal shoulder at a point near its lower end and with three openings on one side and two on the opposite side, which are in alignment with the upper and central openings opposite thereto. Fitting this casing is a valve-head having a single diametrical opening therethrough, which head is adapted to be raised and lowered for the purpose of opening or closing the alined passages through the casing. The lower end of this casing is connected, through a suitable pipe, with the main supply-pipe, a three-way cock being provided at this point. The lowest of the three openings referred to on one side of the casing leads to the auxiliary tank and is provided with a check-valve which prevents a back-

ward flow of air from said tank. The central opening leads from the auxiliary tank, through the opening in the valve-head, out through the lower opening on the opposite side of the valve-casing, thence to the brake-cylinder. The upper alined openings on the two sides of the casing furnish a release-passage for the exhaust-air from the brake-cylinders.

Our brake-cylinder is supported by a strap having overhanging ledges at each end in which are formed bearings for the outer end of the piston-rods of two pistons moving in said brake-cylinder. The heads of the cylinder are perforated to prevent cushioning of the pistons against said heads, and a central opening is provided in the cylinder, by means of which air from the auxiliary tank or air from the main supply-pipe may be admitted between said pistons for the purpose of forcing the same outward to operate the brake-beams.

The invention also consists in other details of construction and combinations of parts, which will be hereinafter described and claimed.

In the drawings forming a part of this specification, Figure 1 represents a bottom plan view of a motor-car, showing our improvement applied thereto. Fig. 2 is a vertical sectional view through the brake-cylinder. Fig. 3 is an enlarged sectional view of the triple valve and auxiliary tank.

Like reference-numerals indicate like parts in the various views.

By reference to the drawings it will be seen that 1 represents the bottom of an ordinary electric car, 2 representing the wheels thereof mounted upon suitable axles 3; 4, an electric motor of ordinary construction, having a cog-wheel 5 on the outer end of its main shaft which meshes with a similar cog-wheel 6 upon the outer end of a crank-shaft 7, to the crank portion of which is attached the piston-rod 8 of an air-pump of ordinary construction adapted to fill the main reservoir 9 with compressed air.

Leading from the main reservoir 9 is a pipe 10, connected to the main supply-pipe 11 on the under side of the car, which is adapted

to be connected to similar pipes on the under side of adjacent cars by any suitable form of coupling.

At the ends of each car is located in the
5 main supply-pipe 11 a three-way cock 12, which is operated by the motorman for the purpose of opening or closing the passage through said pipe.

13 represents an auxiliary tank of ordinary
10 construction, having suitable connections, through a triple valve 14, with the main supply-pipe 11, a three-way cock 15 being provided at the juncture of said supply-pipe 11 and the pipe leading to said triple valve.

15 Our triple valve 14 consists of a cylindrical casing 16, having openings 17, 18, and 19 on one side thereof and openings 20 and 21 on the opposite side thereof, the said openings
20 openings 18 and 19 on the opposite side. The said cylinder is provided with an internal shoulder 22 at a point near its lower end, and in the said cylinder fits a cylindrical block 23, which forms a valve-head, which block is
25 provided with an upwardly-extending stem 24, rectangular in cross-section, which fits a rectangular recess 25 in the cap 26 of said casing, this construction being provided to prevent turning of the valve-head 23 independent of the casing 16.
30

27 represents a coiled spring inserted between the upper end of the valve-head 23 and the cap 26 for urging said valve-head normally downward. The said valve-head 23 is provided
35 with a transverse opening 28 for a purpose which will hereinafter appear. Pipes 29 and 30 lead from the auxiliary tank 13 to the triple valve 14, entering the casing 16 thereof through the openings 17 and 18, respectively. When the valve-head 23 is in its
40 lower position, it rests against the internal shoulder 22 in the casing 16, and at such time the opening 28 therein is in line with the openings 30 and 20, the remaining openings in
45 said casing being closed by the solid portion of said valve-head or block 23.

The pipe 29 is provided with a check-valve 31 to prevent back pressure from the auxiliary tank 13.

32 represents our brake-cylinder secured in any suitable manner to the under side of the car 1, and having a strap secured to one side thereof, with overhanging arms at each end provided with bearings 33, through which
55 the piston-rods 34 34, connected to the pistons 35 35 in said cylinder, are adapted to pass.

The heads 36 of the cylinder 32 are provided with a series of openings for the purpose of preventing cushioning of the air between said
60 heads and said pistons.

It will be observed that two pistons 35 are provided in each cylinder and that the inlet-opening 37 in the said cylinder is located centrally and between the inner ends of said
65 pistons. By this construction the entrance of the air into the cylinder will force both pistons 35 outwardly at the same time. A

pipe 38 connects the inlet-opening 37 of the cylinder 32 to the opening 20 in the valve-casing 16. Said pipe is further continued
70 downward and is connected to the main supply-pipe 11 at the point of connection of the three-way cock 15 therein. The connection between the opening 20 in the valve-casing 16 and the pipe 28 is made through a short
75 pipe 39, which has a branch portion 40, connected to the opening 21 in said valve-casing.

The outer ends of the piston-rods 34 are connected to one arm of a lever 41, fulcrumed to the under side of the car 1 and having
80 other arms connected to rods 42, secured to the brake-beams 43 43, having suitable brake-shoes 44 thereon. Suitable springs 45 may be provided for connection with the brake-beams 43 for the purpose of withdrawing the brake-
85 shoes 44 from contact with the wheels 2 when said brake-beams are released. It will thus be seen that an outward movement is imparted to the pistons 35, which will draw the brake-shoes 44 against the wheels 2, and that
90 as soon as the pressure is relieved from the inner ends of said pistons 35 the springs 45 will withdraw the brake-shoes 44 from said wheels.

Our device has now been sufficiently described, it is thought, to enable the operation thereof to be readily understood.

The three-way cock 12 being so turned that air is admitted from the main supply-pipe 11 to the triple valve 14, and if two or more cars
100 are in a train to the extension of the main supply-pipe 11, under a head of, say, forty pounds pressure, the valve-head 23 will be in its upper position against the force of the
105 spring 26, the opening 28 therethrough being in alinement with the openings 19 and 21 of the upper part of the valve-casing 16. In this position air is admitted to the auxiliary tank 13, filling the same to the same pressure as that in the main reservoir 9, and the air from
110 the brake-cylinder 33 is allowed to escape through the release-opening 19 on the casing 16. The piston-rods 35 are now in their inner position and the brake-shoes 44 are out of contact with the wheels 2. To operate the
115 automatic, the three-way cock 12 is turned so as to completely shut off the air from the main reservoir 9 through the pipe 11, thereby decreasing the pressure on the under side of the valve-head 23 and permitting the same to
120 drop to its lower position by the force of the spring 27. This brings the opening 28 in the valve-head 23 in alinement with the openings 18 and 20 in the casing 16, closing the
125 openings 17, 19, and 21 and permitting the air from the auxiliary tank 13 to be discharged through pipes 30 and 38 to the center of the brake-cylinder 32, thereby throwing outwardly the pistons 35, which, through the parts
130 connected thereto, draw the brake-beams 43, having the shoes 44 on the outer ends thereof, into engagement with the wheels 2. To release the brakes, the three-way cock 12 is turned so as to admit the inner pressure of

air from the main reservoir 9 through the pipe 11 into the valve 14. This forces the valve-head 23 upwardly, closing the passage from the auxiliary tank to the brake-cylinder, bringing the opening 28 into alinement with the openings 19 and 21, discharging the air in the brake-cylinder and at the same time filling the auxiliary tank 13 through the pipe 29.

10 The release of the brake-cylinder releases the pressure upon the brake-beams 43, and they are withdrawn from contact with the wheels 2 through the force of the springs 45.

15 If from any cause the automatic brake mechanism should get out of order, straight air may be employed to operate the brakes by turning the three-way cock 15 so that the opening in the under side of the valve 14 is closed and the opening from the main pipe 11 and the pipe 38 is opened, when, upon the actuation of the three-way cock 12, air is admitted direct from the main reservoir 9 to the central portion of the brake-cylinder 33, operating the brakes in the manner heretofore described.

25 In the drawings we have illustrated a simple means of charging the main reservoir from an electric motor of any form of construction.

30 Having thus described the invention, what is claimed as new is—

1. In an air-brake, the combination with a main reservoir, main supply-pipe, auxiliary tank and a brake-cylinder having means for admitting air centrally thereto and having its head perforated, of a triple valve consisting of a casing with three openings on one side thereof and two openings on the opposite side in alinement with the central and upper opening on the opposite side thereof, a valve-

40 head fitting said casing having a single lateral opening therethrough, connections between said auxiliary tank and said central and lower opening and connections between said brake-cylinder and the two openings on the opposite side thereof, and the valve 23 provided with the straight passage-way 28, substantially as and for the purpose described.

2. In an air-brake, the combination with a main reservoir, main supply-pipe, auxiliary tank and brake-cylinder having means for admitting air centrally thereto and having its heads perforated, of a triple valve consisting of a casing having a series of three openings on one side thereof and two openings in alinement with the central and upper opening on the opposite side thereof, a valve-head fitting said casing having a single opening extending laterally therethrough, a rectangular stem extending upwardly from said valve-head fitting a rectangular opening in the cap of the said casing, a spring between said cap and said valve-head, connections between said auxiliary tank and the central and lower of the series of three openings on one side of said casing and connections between said brake-cylinder and the two openings on the opposite side thereof, and the valve 23 provided with the straight passage-way 28, substantially as and for the purpose set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

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RICHARD R. COOK.

Witnesses:

JAS. F. HACKETT,
WILLIAM C. GORMLEY, Jr.