O. JOHNSON.

COMPRESSED AIR SYSTEM FOR RAILWAY CARS.

APPLICATION FILED APR. 25, 1910.

971,896. Patented Oct. 4, 1910.

4 SHEETS—SHEET 1.

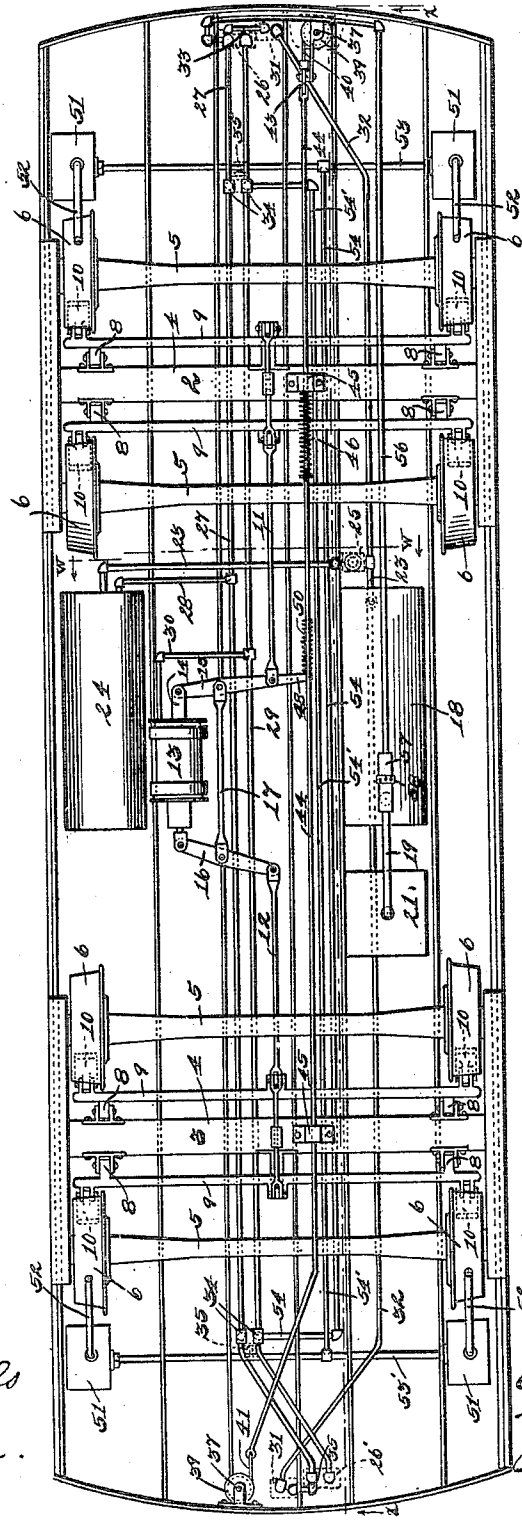

Fig. 1.

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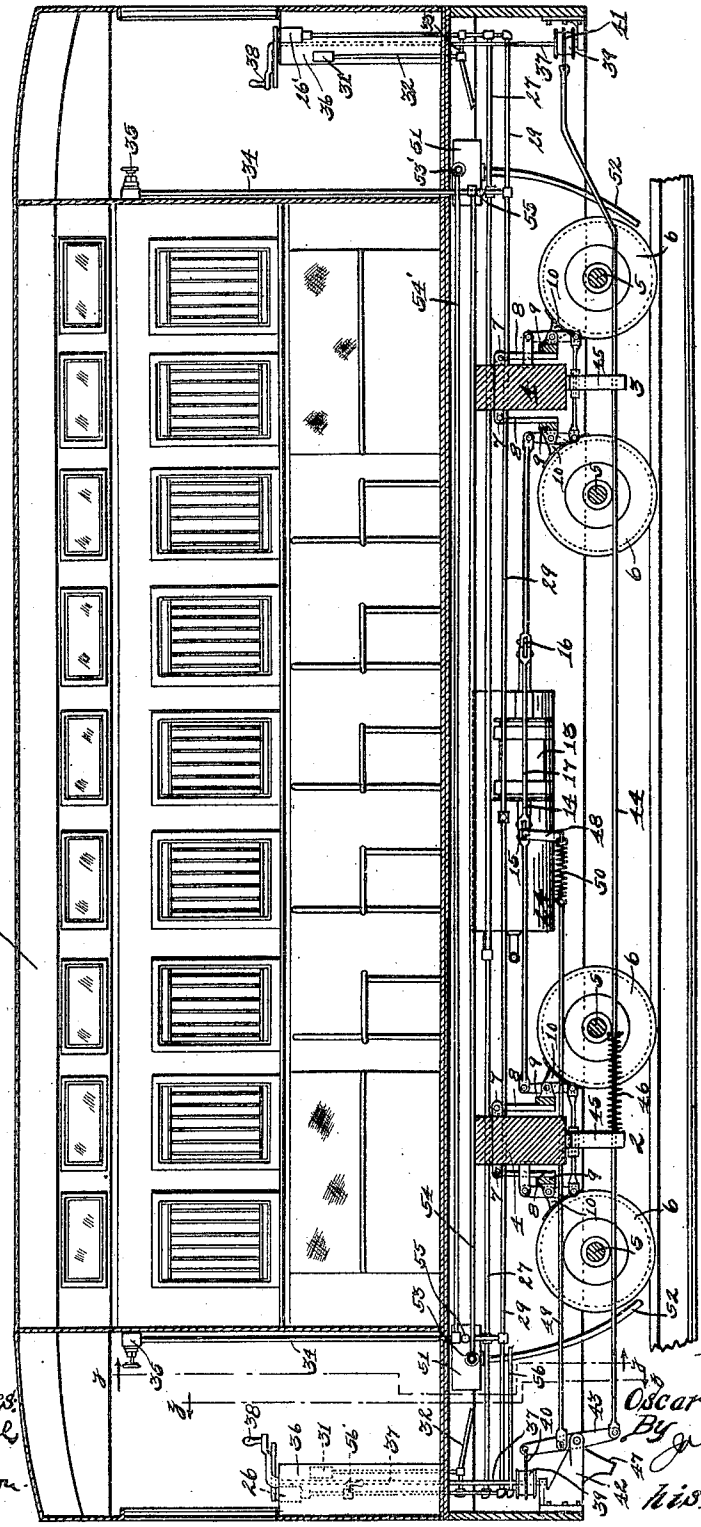
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

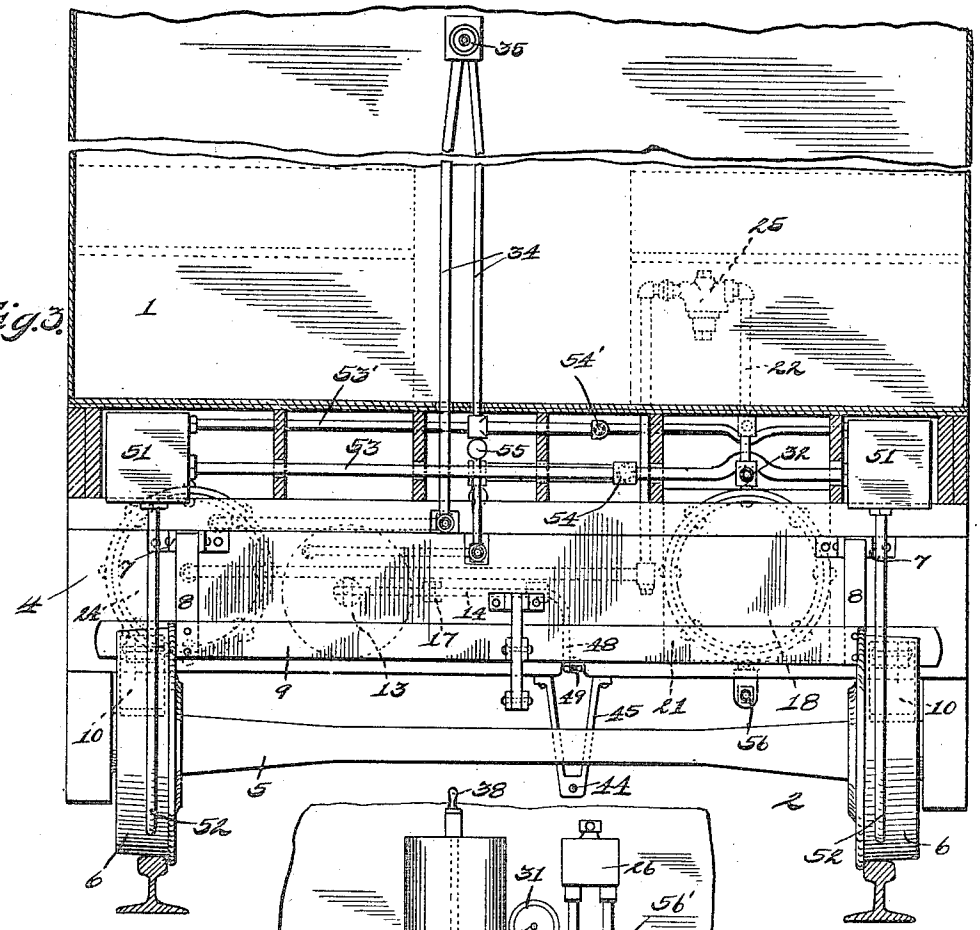
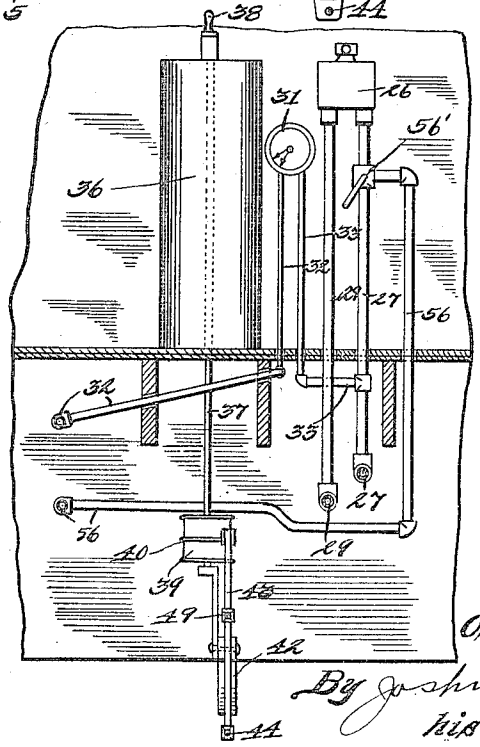


Fig. 4.



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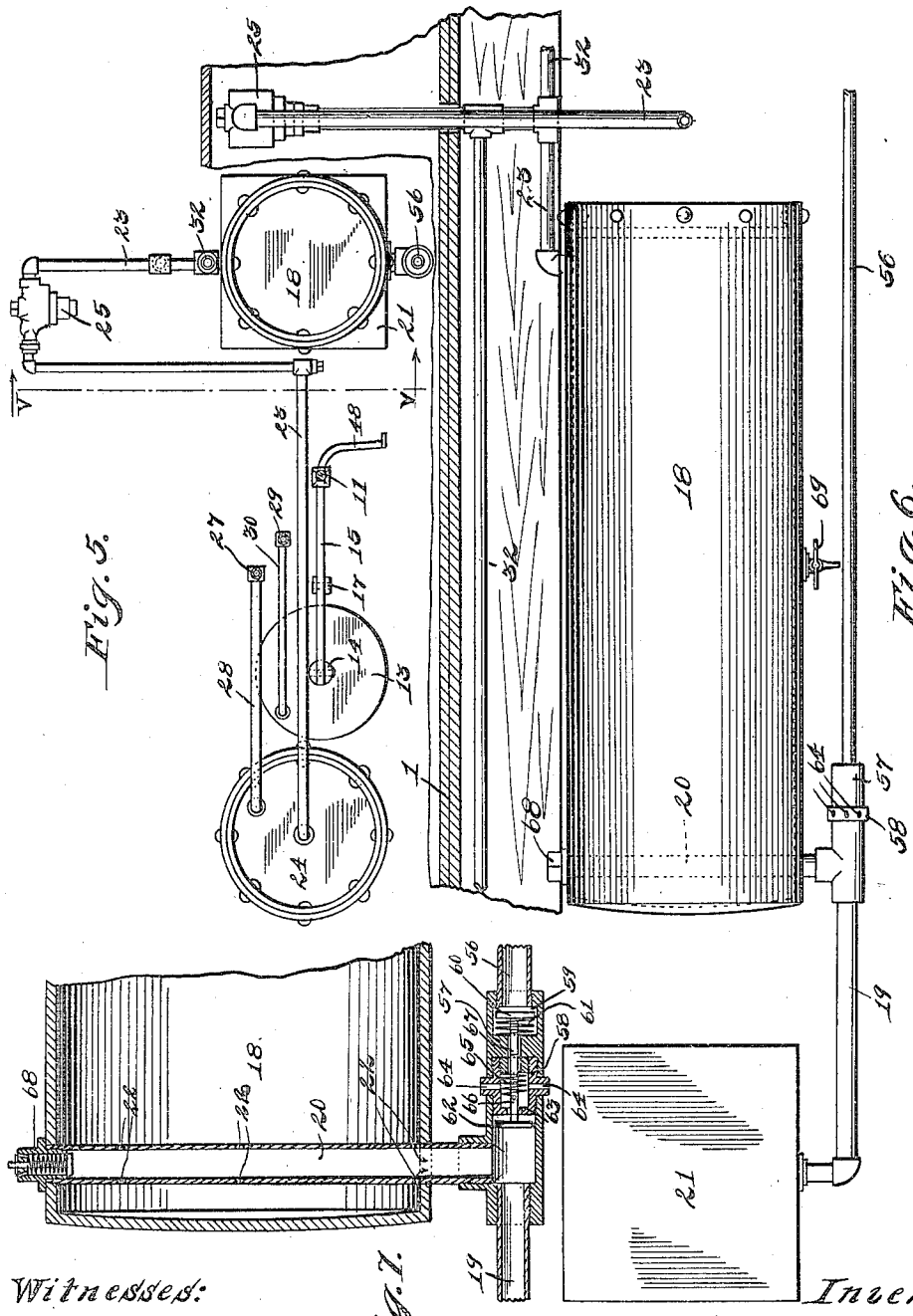

Fig. 5.

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

OSCAR JOHNSON, OF CHICAGO, ILLINOIS.

COMPRESSED-AIR SYSTEM FOR RAILWAY-CARS.

971,896. Specification of Letters Patent. Patented Oct. 4, 1910.

Application filed April 25, 1910. Serial No. 557,466.

To all whom it may concern:

Be it known that I, OSCAR JOHNSON, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Compressed-Air Systems for Railway-Cars, of which the following is a specification.

My invention relates to compressed air systems for railway cars and more specifically to that class thereof especially designed for employment in electric street cars.

The object of my invention is the production of an improved system of the character mentioned whereby either the car conductor, in case of emergency, from his station in the car, or the car operator or motorman, as ordinary, from his position may operate the car brakes.

A further object is the provision in the system mentioned of means whereby operation of the brakes will also effect the automatic returning to open position of the motorman's controller shaft.

A still further object is the provision in the system mentioned of means whereby operation of the brakes by the conductor will automatically effect the discharge of sand upon the rails forward of the front wheels of the car.

Other objects will appear hereinafter.

With these objects in view my invention consists in a compressed air system characterized as above mentioned and in certain details of construction and arrangement of parts all as will be hereinafter fully described and more particularly pointed out in the appended claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a bottom plan view of a car equipped with a compressed air system embodying the preferred form of my invention, Fig. 2 is a vertical longitudinal section thereof taken on line *x*—*x* of Fig. 1, Fig. 3 is a vertical transverse section on line *y*—*y* of Fig. 2, Fig. 4 is a fragmentary section taken on substantially line *z*—*z* of Fig. 2, Fig. 5 is a sectional detail taken on substantially line *w*—*w* of Fig. 1, Fig. 6 is an enlarged section on line *v*—*v* of Fig. 5, and Fig. 7 is an enlarged sectional detail of the reservoir shown in Fig. 6.

Referring now to the drawings, 1 indicates an electric car which may be of any ordinary or preferred design, and 2 and 3 the trucks at the respective ends thereof, each of the latter being of the double truck type comprising a bolster 4 and two parallelly extending axles 5 upon which are mounted wheels 6. Pivotally secured at 7 at their upper extremities to the opposite sides of each of the bolsters 4 are depending arms 8 at the lower ends of which are supported the ordinary truck beams 9. Carried at the extremity of the beams 9 are the brake shoes 10, adapted upon the outward rocking of said brake beams to frictionally engage the peripheries of the wheels 6. The beams 9 secured to each bolster are so connected that by the inward drawing of inwardly extending bars 11 and 12, the latter being connected respectively to the brake mechanisms at either end of the car, the shoes 10 carried by said beams will be rocked into operative position. 13 indicates an air brake cylinder, and 14 the piston rod of the piston mounted therein. The outer extremity of the piston rod 14 is connected by means of a lever 15 to the inner extremity of the bar 11, a similar lever 16 being fulcrumed at one end to the opposite extended end or head of the cylinder and being connected at its outer extremity to the inner extremity of the bar 12; said levers being connected intermediate their extremities by a link 17. The arrangement is such that upon outward reciprocation of the piston rod, the bars 11 and 12 will be drawn inwardly to effect the operation of the brakes at the ends of the car. This construction however is all old and well known, no claim being here made thereto, my invention being embodied in the following.

Supported substantially centrally upon the under side of the car at one side thereof is an air reservoir 18 which connects at its under side through pipes 19 and 20 with the air compressor 21, the pipe 20 extending diametrically through one end of the reservoir and being provided with a plurality of spaced ports or openings 22 which

communicate with the interior of said reservoir. A pipe 23 leads from the upper side of the opposite end of said reservoir and connects with an auxiliary air reservoir 24. Interposed in the pipe 23 is an adjustable automatic air pressure regulator or reducer 25, whereby the pressure in the reservoir 24 may be maintained constant notwithstanding a variable higher pressure in the main reservoir 18. The advantage of this expedient will be appreciated by those familiar with the operation of the brake systems. In order to protect the pressure regulator against the weather, the same, as clearly shown in Fig. 6, is preferably located at a suitable inconspicuous place within the car, such as under the seat thereof.

Located at either end of the car in the respective vestibules thereof are the ordinary air brake valves 26 and 26′, which are operated by the motorman or car operator. The pipe 27 communicates at its extremities with the inlet sides of the valves 26 and 26′, said pipe being connected to the outlet pipe 28 of the auxiliary air reservoir 24. A pipe 29 communicates at its extremities with the outlet sides of the valves 26 and 26′, said pipe being connected by means of a pipe 30 with the air brake cylinder 13.

Located in each vestibule adjacent the brake valve therein is a duplex gage 31. The gages 31 are connected by means of pipes 32 with the pipe 23, the pipes 32 being connected with said pipe 23 at a point therein intermediate the reservoir 18 and the pressure regulator 25; said gages being connected by means of pipes 33 with the respective ends of the pipe 27. Thus the motorman will be apprised of the pressures within both reservoirs since both pressures will be registered upon said gages.

Located in each of the car vestibules adjacent the conductor's usual station therein is a cut-off or by-pass pipe 34 which is connected at its respective extremities with the pipes 27 and 29. Interposed in each of said pipes 34 is a hand-operable stop cock 35 which is located in operative proximity with the conductor's station within the vestibule. With this provision it will be observed that the conductor, may, by simply opening the adjacently located stop cock, establish communication between the pipes 27 and 29, cutting out the brake valves, and operating the brakes. This means of operating the brakes is only a safe-guard, and will, it is understood, be resorted to only in case of emergency.

36 indicates the motorman's electric current controller, one of which is provided in each vestibule.

37 designates the revoluble shafts of the controllers 36 to which are attached the motorman's operating or controlling handles 38. The shafts 37 are extended downwardly below the floor of the car and to the lower end of each is secured a pulley 39. 40 and 41 indicate flexible cords one of the extremities of which are secured to said pulleys, portions thereof being adapted to wind about the peripheries of said pulleys; the arrangement being such that, when the shafts are revolved to closed position, said cords will be wound around said pulleys so that said shafts may be reversely rotated, that is, returned to open position, by drawing upon the ends of said cords.

Pivotally secured intermediate its extremities to a bracket 42 arranged at the end of the cord adjacent the cord 40 is a lever or rocker arm 43. To the upper extremity of said arm is secured the free end of the cord 40 and to the lower extremity thereof is connected one extremity of a longitudinally extending rod 44, the latter being slidably mounted in depending brackets 45 provided at the under side of the car. The other extremity of the rod 44 is connected to the free end of the cord 41. This construction is such that proper rocking of the arm 43 will effect the inward drawing of the cords 40 and 41, so that, with either or both of the controller shafts in closed position, by properly rocking said arm, as above stated, said cords will be uncoiled from the pulleys 39 to effect the retrograde revolving of said shaft or shafts to open position. A compression spring 46 carried by the rod 44 is arranged to normally hold said rod and the arm 43 in a position in which the cords 40 and 41 will be relaxed for winding upon the pulleys 39. Operative movement of the arm 43 is limited by means of a stop 47 formed at the under side of the bracket 42 for engagement by the lower end of said arm.

The outer end 48 of the before mentioned lever 15 is extended and bent downwardly, as clearly shown in Figs. 1, 2 and 5. A link 49 is connected at one extremity to the arm 43 above its pivotal point and at its opposite extremity said link is connected by means of a comparatively strong tension spring 50 to the extremity 48 of the lever 15. With this arrangement it will be seen that upon the movement of the lever 15 to operative or braking position, the arm 43 will be rocked to effect the rotation of the controller shafts to open position should either, at such time, be in closed position. Therefore, with the construction described, it will be seen, that upon the operative movement of the brake levers the controller shafts will be automatically returned to open position. This is of advantage especially in the event of the brakes being operated by the conductor through either of the cocks 35, since in this

operation, without such arrangement, were the motorman's controller shaft in closed position, the brakes would have but little retarding effect upon the wheels.

51 designates the usual compressed air operable sand boxes located at either end of the car, and 52 the sanding pipes depending therefrom into close proximity with the under side of the peripheries of the wheels, as indicated. The sand boxes 51 at one end of the car are connected to a pipe 53 and those at the other end of the car are similarly connected to a pipe 53′. The pipe 53 is connected by means of a pipe 54 to the cut-off pipe 34 at the opposite end of the car, and at a point in said pipe 34 beyond the cock 35 therein, that is, adjacent the junction of said pipe and the pipe 29; a pipe 54′ similarly connecting the other cut-off pipe 34 and the pipe 53′. Ordinary check valves 55 are interposed in the pipes 34 intermediate the connections of the pipes 54 and 54′ and the pipe 29 therewith, said valves being so arranged as to prevent upward passage through said pipes 34 from the pipe 29. With this provision it will be seen that upon either of the cocks 35 being opened, in addition in such event, to effecting the operation of the brakes and controllers as before described, air will be admitted to the sand boxes at the front end of the car to effect the automatic sanding of the rails. The advantage of this expedient is evident.

The pipe 56 is connected at one end with the pipe 27 adjacent one extremity thereof, that is, adjacent the brake valve 26 in one of the car vestibules and in operative proximity with the motorman's station in the vestibule. An ordinary stop cock 59 is provided at the juncture of the pipes 27 and 56, the same being normally adjusted to close the passage to the latter. The opposite end of said pipe 56 is connected, as clearly seen in Fig. 2, to the pipe 19 at the intersection of the pipe 20 therewith.

Interposed between the adjacent ends of the pipes 19 and 56 is a coupling 57 and a check valve 58. Formed in the coupling 57 is a cylinder 59, the latter communicating with the passage through said pipe 56. Mounted in said cylinder is a piston 60 which is normally held seated against the end of said pipe by means of a compression spring 61. The valve head 62 of the valve 58 is adapted to close the port 63 which establishes communication with the exhaust ports 64, said valve head being of a diameter less than that of the piston 60 so that, with equal pressures upon the valve head 62 and said piston, the valve head because of differential action will be forced to unseating position by said piston. A comparatively light compression spring 65 is arranged to normally hold said valve head unseated and consequently the passage through the valve open, said spring being, however, not strong enough to successfully resist the pressure in the reservoir when the car is in operation. The extremity of the stem 66 of said valve head extends into operative proximity with the extremity of the piston rod 67, so that depression or inward movement of the piston 60 will cause the moving of the valve head 62, as clearly shown in Fig. 7. A check valve 68 similar in construction to the valve 58 is arranged at the upper end of the pipe 20. The valves 58 and 68 are so arranged that when the reservoir is under pressure, the heads thereof will be held in closed positions by such pressure. The last described provision is made in order to effect the ready discharge of water of condensation which accumulates in the reservoir 18, the discharge of this water from the air reservoir of cars at the present time being, as is known, effected only with difficulty and inconvenience. With the arrangement disclosed, and with the reservoir under pressure, as is the condition when the car is in operation, it is only required, in order to effect the discharge of the water therefrom, to open the cock 56′ (the latter being positioned as before described in operative proximity with the motorman's station in the vestibule) so as to direct the air from the pipe 27 through the pipe 56. This being done, the air will act on the piston 60 and which in turn will act upon the valve head 62 to cause the unseating of the latter. This being done, the water contained in the reservoir will be forced out, because of the pressure thereon, through the openings 22 and thence through the valve 58. With the reservoir not under pressure, as is the condition thereof when the car is not in use, the valves 58 and 68 will be in opened condition, as before stated, in which event the reservoir will drain itself. A hand-operable cock 69 is also provided at the under side of the reservoir 18 which may be utilized in the event of failure of operation of the means above described.

While I have shown what I deem to be the preferable form of my compressed air system I do not wish to be limited thereto as there might be various changes made in the details of construction and the arrangement of parts described without departing from the spirit of the invention comprehended within the scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a compressed air system for railway cars, the combination with the car operator's

or motorman's brake valve and controller shaft, of a main air reservoir; a compressed air supply for said reservoir; an auxiliary air reservoir; a pipe connecting said reservoir; a pressure regulator interposed in said pipe; an air brake cylinder operatively connected with the car brake; a pipe connecting said auxiliary reservoir and said cylinder, said before named brake valve being interposed in said last mentioned pipe; a by-pass pipe in said last mentioned pipe, on opposite sides of said air valve; means controlling the passage through said by-pass pipe; and an operative connection between the car brakes and said controller shaft, whereby operation of said brakes causes the retrograde rotation of said shaft, substantially as described.

2. In a compressed air system for railway cars, the combination with the car operator's or motorman's brake valve and controller shaft; and the sand boxes of the car; of a main air reservoir; a compressed air supply for said reservoir; an auxiliary air reservoir; a pipe connecting said reservoirs; a pressure regulator interposed in said pipe; an air brake cylinder operatively connected with the car brakes; a pipe connecting said auxiliary reservoir and said cylinder, said before named brake valve being interposed in said last named pipe; a by-pass pipe in said last mentioned pipe, on opposite sides of said air valve; hand-operable means controlling the passage through said by-pass pipe, said means being located adjacent the car conductor's station in the car; a pipe connection between the said by-pass pipe and said sand boxes; and an operative connection between the car brakes and said controller shaft, whereby operation of said brakes causes the retrograde rotation of said shaft, substantially as described.

3. In a compressed air system for railway cars, the combination with an operator's or motorman's brake valve and controller shaft, and the sand boxes of the car; of an air reservoir; a compressed air supply therefor; an air brake cylinder operatively connected with the car brakes; a pipe connecting said reservoir and said cylinder, said brake valve being interposed in said last mentioned pipe; a by-pass pipe in said last mentioned pipe, on opposite sides of said air valve; hand-operable means controlling the passage through said by-pass pipe, said means being located adjacent the car conductor's station in the car; a pipe connection between the said by-pass pipe and said sand boxes; and an operative connection between the car brakes and said controller shaft, whereby operation of said brakes causes the retrograde rotation of said shaft, substantially as described.

4. In a compressed air system for railway cars, the combination with the car operator's or motorman's brake valve and controller shaft, and the sand boxes of the car, of an air reservoir; a compressed air supply for said reservoir; an air brake cylinder; a piston operating in said cylinder; an operative connection between said piston and the car brakes; a pipe connection between said reservoir and said cylinder, said before mentioned brake valve being interposed in said last mentioned pipe; a by-pass pipe in said last mentioned pipe, on opposite sides of said air valve; a stop cock controlling the passage through said by-pass pipe, said stop cock being located adjacent the car conductor's station in the car; a pipe connection between the said by-pass pipe and said sand boxes whereby opening of said stop cock effects the discharge of sand from said boxes; and an operative connection between the brake cylinder piston and said controller shaft, whereby operation of said brakes causes the retrograde rotation of said shaft, substantially as described.

5. In a compressed air system for railway cars comprising the car operator's or motorman's brake valve; an air reservoir; a compressed air supply for said reservoir; an air brake cylinder and piston; an operative connection between said piston and the car brakes; a pipe extending between said reservoir and said cylinder, said before mentioned brake valve being interposed in said last named pipe, said reservoir being provided with a drain opening, of a valve governing said opening; and compressed air-operable means for opening said valve, said means being in operative connection with said reservoir, substantially as described.

6. In a compressed air system for railway cars comprising the car operator's or motorman's brake valve; an air reservoir; a compressed air supply for said reservoir; an air brake cylinder and piston; an operative connection between said piston and the car brakes; a pipe extending between said reservoir and said cylinder, said before mentioned brake valve being interposed in said last named pipe, said reservoir being provided with a drain opening, of a valve governing said opening; compressed air-operable means for opening said valve; a pipe connection between said means and said before mentioned pipe extending between said reservoir and said cylinder; and means governing the passage through said last named pipe connection, substantially as described.

7. In a compressed air system for railway cars comprising the car operator's or motorman's brake valve; an air reservoir; a compressed air supply for said reservoir; an air brake cylinder and piston; an operative con-

nection between said piston and the car brakes; a pipe extending between said reservoir and said cylinder, said before mentioned brake valve being interposed in said last named pipe, said reservoir being provided with a drain opening, of a normally closed valve governing said opening; a compressed air-operable piston and piston rod for opening said valve, said piston being of greater diameter than the head of said valve; a pipe connection between said piston and said before mentioned pipe extending between said reservoir and said brake cylinder; and hand-operable means governing the passage through said last mentioned pipe connection, said means being located adjacent the before mentioned brake valve, substantially as described.

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

OSCAR JOHNSON.

Witnesses:
JANET E. HOGAN,
JOSHUA R. H. POTTS.