

J. E. NORMAND.

QUICK ACTION AUTOMATIC RELEASE MECHANISM FOR AIR BRAKES.

APPLICATION FILED APR. 28, 1903.

902,161.

Patented Oct. 27, 1908.

3 SHEETS—SHEET 1.

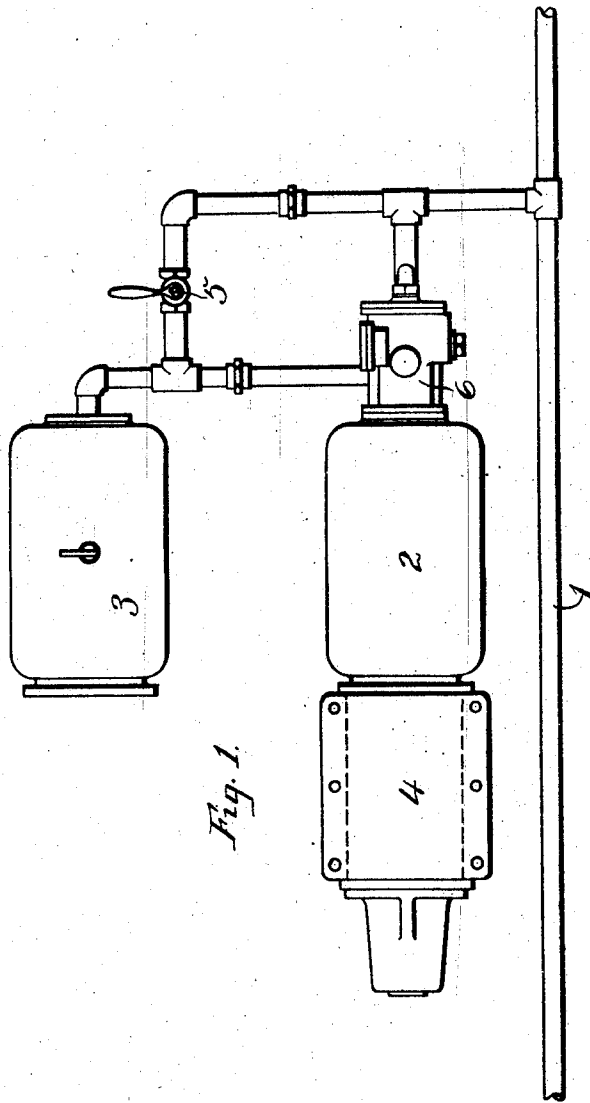


Fig. 1.

Joseph E. Normand

Inventor

Witnesses

John J. Sand
John W. Roche

J. E. NORMAND.

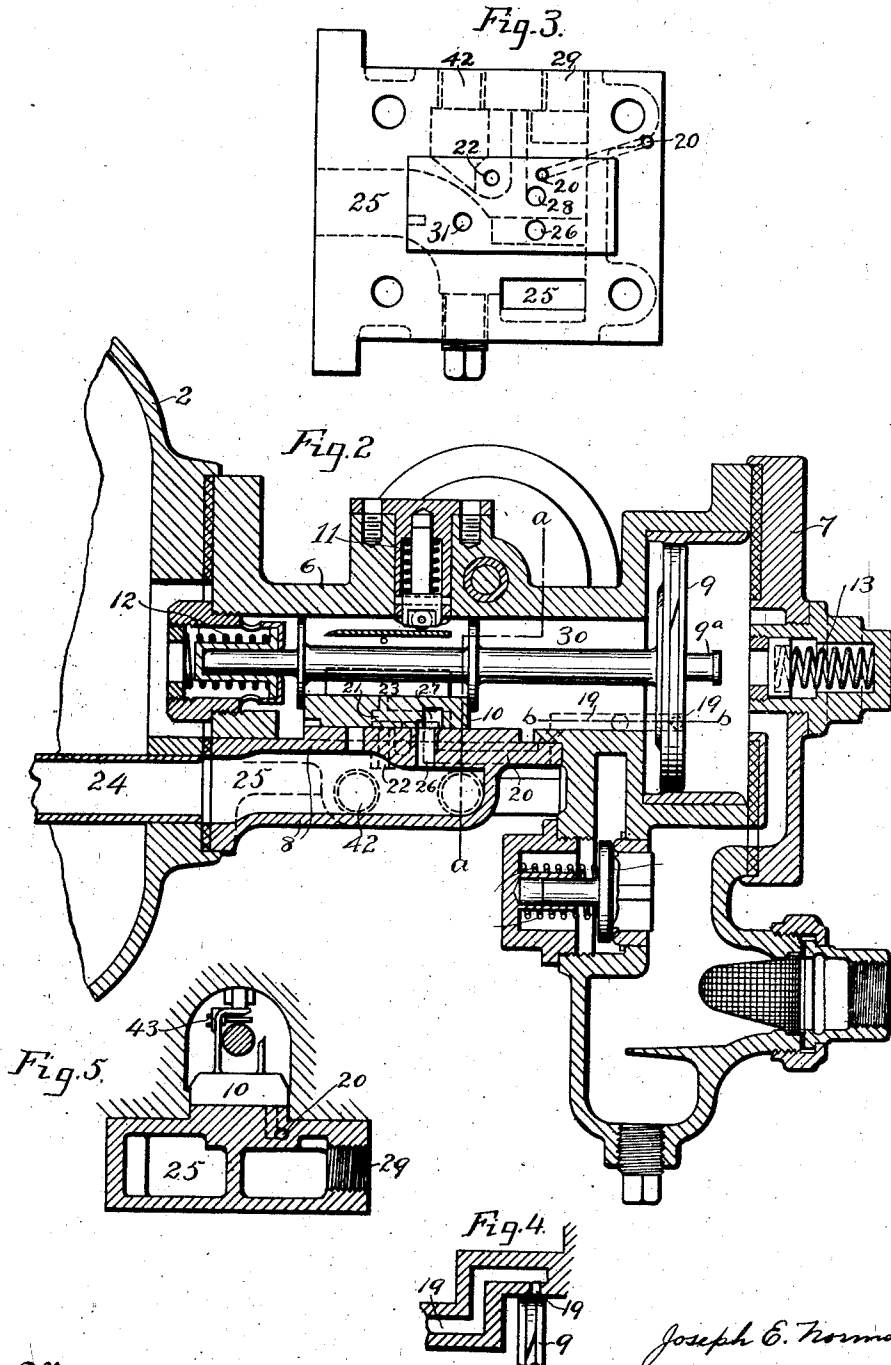
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Joseph E. Normand
Inventor

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John J. Brand
John W. Bache.

J. E. NORMAND.

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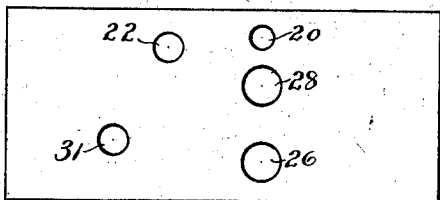


Fig. 5^a

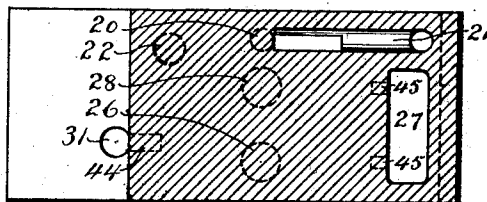


Fig. 6.

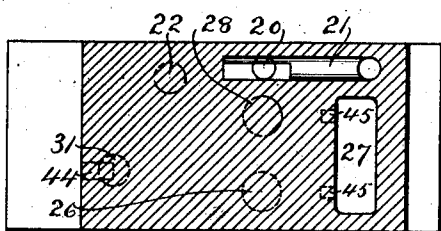


Fig. 7.

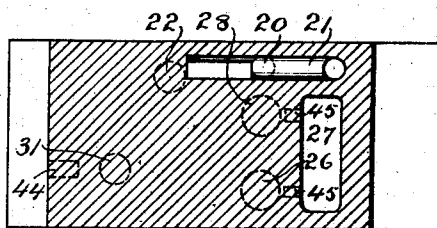


Fig. 8.

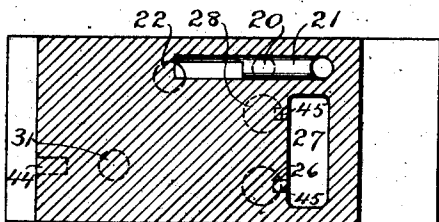


Fig. 9.

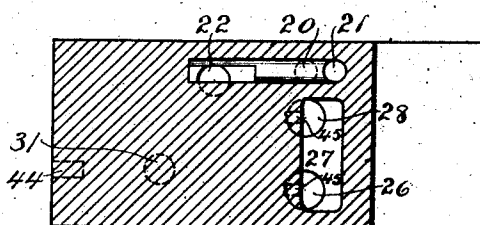


Fig. 10.

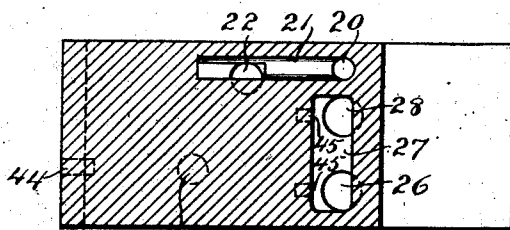


Fig. 11.

Witnesses.

John J. Bland
John D. Brels

Joseph E. Normand

Inventor

UNITED STATES PATENT OFFICE.

JOSEPH E. NORMAND, OF HOBOKEN, NEW JERSEY, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

QUICK-ACTION AUTOMATIC RELEASE MECHANISM FOR AIR-BRAKES.

No. 902,161.

Specification of Letters Patent.

Patented Oct. 27, 1908.

Application filed April 28, 1903. Serial No. 154,706.

To all whom it may concern:

Be it known that I, JOSEPH E. NORMAND, citizen of the United States, and resident of Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Quick-Action Automatic Release Mechanism for Air-Brakes, of which the following is a specification.

This invention relates to fluid pressure brakes, and more particularly to a valve mechanism for securing a quick serial release of the brakes throughout the train.

The main object of my invention is to provide means operating upon an increase in train pipe pressure for opening communication from a supplemental or reinforcing reservoir on each car to the train pipe, whereby the train pipe pressure is locally increased and causes the quickened serial action of the next succeeding triple valve device, and so on similarly throughout the train.

Another feature of my improvements consists in providing means on the car for releasing the brakes, independently of the locomotive.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating my invention applied to a car air brake equipment; Fig. 2 a central sectional view of a triple valve device embodying my improvements; Fig. 3 a plan view of the main slide valve seat of the triple valve device, showing the location of ports and pipe connections; Fig. 4 a part section on line *b-b* of Fig. 2; Fig. 5 a part section on line *a-a* of Fig. 2; Fig. 5^a a plan view of the main slide valve seat on an enlarged scale; and Figs. 6 to 11 inclusive diagrammatic views illustrating the relative position of the main slide valve on its seat in emergency application, service application, lap, partial or graduated release, full release, and quick serial release positions, respectively.

My improvements are preferably embodied in a triple valve device such as shown in Fig. 2, comprising a casing 6 having a piston chamber containing the triple valve piston 9 and valve chamber 30 containing main slide valve 10. The main slide valve seat is provided with an exhaust port 28 leading to the atmospheric exhaust 29, brake cylinder port 26, connected to passage 25

leading to the brake cylinder 4, and brake cylinder supply port 31 also opening to passage 25, port 22, opening into passage and pipe 42, which leads to the supplemental or reinforcing reservoir 3, and port 20 which is connected to a passage 19 which opens into the piston chamber of the triple valve piston 9. The main slide valve is provided with a groove 44, adapted to register with the port 31 in service application position, a cavity 27 for connecting the brake cylinder port 26 with the exhaust port 28, and a port 21 adapted to connect the port 20 with the supplemental reservoir port 22, and also provided with a through port opening 23, connecting the port 20 with the valve chamber 30 and the auxiliary reservoir.

When air is admitted to the train pipe, the triple valve piston is shifted to a position in which the port opening of passage 19 is uncovered and air from the train pipe then flows through said passage and the port 20 to port 21 in the main slide valve, which registers with port 20 in this position, and thence through the port opening 23 to the valve chamber 30 and the auxiliary reservoir. Air also flows through the passage 20 to the port 22 and thence to the supplemental reservoir 3. The reservoirs are thus charged to the normal standard train pipe pressure, and the brake cylinder is connected with the atmosphere by way of port 26, cavity 27 in the main slide valve 10, and exhaust port 28. If it is desired to apply the brakes, a reduction in train pipe pressure is made and the triple valve parts move over to service position in the usual manner. In this position, as shown in Fig. 7, the brake cylinder exhaust is closed and the brake cylinder supply port 31 is in register with the groove 44 in the valve, so that air from the auxiliary reservoir is admitted to the brake cylinder. Upon the usual substantial equalization of pressures, the piston and main slide valve are moved back to lap position, as shown in Fig. 8. By venting a small quantity more air from the train pipe the main slide-valve may now be moved outwardly to increase the brake pressure, or by slightly recharging the train pipe the main slide-valve may be moved till the ports 26 and 28 are partially in communication through port 27 and grooves 45 in

the valve 10 and the air in the brake cylinder allowed to leak slowly to the atmosphere. Fig. 9 illustrates the ports in this position. When the ports are in this position the air will leak but very slowly from the brake cylinder to the atmosphere resulting in a gradual decrease of pressure in the brake cylinders; at the same time the ports 22 and 23 are brought into communication and air flows from the reinforcing reservoir to chamber 30. This flow of air from the supplemental reservoir will raise the pressure in the chamber 30 above that in the train pipe, and the piston 9 and valve 10 will be moved outwardly until it cuts off communication between supplemental reservoir and chamber 30 thereby equalizing the pressure in said chamber 30 and the train pipe and closing the brake cylinder exhaust. When the valve is in this position, in order to again move the valve to the position of Fig. 9 and thus open the brake cylinder to the exhaust, it is necessary to slightly increase the pressure in the train pipe until it rises above that in the service reservoir, when the valve will return to the position illustrated by that figure and the operation already described will be repeated. A still further slight increase of pressure in the train pipe will cause a still further momentary exhaust from the brake cylinder and a repetition will result in a gradual release of the brakes. The engineer is thus enabled to grade his brake pressure up and down at will, by venting a small quantity of air from or into the train pipe at the engineer's valve.

The small screw 43 through the wings of the valve 10 is for the purpose of locking the valve to piston 9. The small groove 44 is for the purpose of limiting the time of service application; the small groove 45 is for the purpose of limiting the time of gradual release.

For a quick and positive release the engineer will admit quickly a large quantity of air into the train-pipe from the main reservoir on the locomotive, or the trainman through the hand valve 5 from the supplemental reservoir, the effect of which is to force the piston 9 and the slide valve 10 to its full stroke inwardly. When in such a position as illustrated in Fig. 11, supplemental reservoir air is admitted in the train pipe through ports 22, 21, 20 and 19, and at the same time into the auxiliary through 22 and 23, causing the wave of induction which will pass instantly along the main pipe to the succeeding valve of the series, being intensified as it advances.

It will be observed that the passage 23 should be much smaller than passage 22, 21 and 19, so as to raise the train pipe pressure in advance of the auxiliary reservoir pressure. After the equalization of the train pipe, supplemental reservoir and aux-

iliary reservoir has taken place a spring 12, adapted to act on the triple valve piston, is provided for returning piston 9 and valve 10 in their normal position as illustrated in Fig. 2.

The hand valve is for the purpose of normally controlling communication from the supplemental reservoir to the train pipe, whereby the brakes may be released on a train without bleeding an auxiliary reservoir, and also for the purpose of charging a train made up at a terminus.

Numerous modifications of my improved device may be resorted to without departing from the spirit and scope of my invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is as follows:

1. In a railway air-brake system, the combination with a triple valve and train pipe, of a supplemental reservoir; and means whereby the release action of said triple valve will permit air to flow from supplemental reservoir to the train-pipe whereby to assist in the restoration of air-pressure in the latter to release the brakes.

2. In a railway air-brake system; the combination with the triple valve and train-pipe, of a supplemental reservoir; and means whereby the release action of one triple valve will open communication between said supplemental reservoir and the next succeeding section of the train-pipe, as and for the purpose set forth.

3. In a railway air-brake system; the combination with a triple valve and train-pipe connected therewith, of a supplemental reservoir connected with the train-pipe, a valve mechanism interposed between said supplemental reservoir and train-pipe; and means whereby the release action of the triple valve will establish communication between said supplemental reservoir and train-pipe as set forth.

4. In a brake mechanism, the combination with a train-pipe a supplemental reservoir, of a hand valve controlling communication between said supplemental reservoir and train-pipe for the purpose of charging a long train when it is made up at a terminus, substantially as set forth.

5. In a brake mechanism, the combination with a train-pipe a supplemental reservoir, of a hand valve controlling communication between said supplemental reservoir and train-pipe, for the purpose of releasing the brakes on a long train without the aid of the locomotive, and without bleeding the auxiliary reservoir, substantially as set forth.

6. In a fluid pressure brake system, the combination with an unobstructed train-pipe, an auxiliary reservoir, a triple valve, a brake-cylinder and a supplemental reser-

voir, of means operated by an increase in train-pipe pressure for opening communication from the supplemental reservoir to the train-pipe.

5 7. In a fluid-pressure brake, the combination with a train-pipe, auxiliary reservoir, triple valve, brake-cylinder and supplemental reservoir, of means for holding said supplemental reservoir closed upon a reduction of train pipe pressure to a point above atmospheric pressure, and a release valve mechanism operated by an increase in train-pipe pressure for opening communication from the supplemental reservoir to the train-
15 pipe.

8. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir, brake cylinder, and a supplemental reservoir, of a triple valve device operating upon an increase in train pipe pressure for opening communication from the supplemental reservoir to the train pipe.
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9. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir, brake cylinder, and a supplemental reservoir, of a triple valve device operating upon a reduction in train pipe pressure for opening communication from the auxiliary reservoir to the brake cylinder and adapted upon an increase in train pipe pressure to establish communication from the supplemental reservoir to the train pipe.
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10. In a fluid pressure brake the combination with a train pipe, brake cylinder, auxiliary reservoir, and a supplemental reservoir, of a triple valve device operating upon an increase in train pipe pressure to open communication from said supplemental res-

ervoir to the train pipe and means for then returning said valve device to close said communication. 40

11. In a fluid pressure brake, the combination with a train pipe, brake cylinder, auxiliary reservoir, and a supplemental reservoir, of a triple valve device operating upon an increase in train pipe pressure to open communication from said supplemental reservoir to the train pipe and also to the auxiliary reservoir side of the triple valve device and a yielding spring device for returning said triple valve device to a position closing said communication upon substantial equalization of fluid pressures on opposite sides of the triple valve device. 45
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12. In a fluid pressure brake, the combination with a train pipe, brake cylinder, auxiliary reservoir, and a supplemental reservoir, of a triple valve device comprising a piston subject to the opposing pressures of the auxiliary reservoir and train pipe, and valve means operated by said piston upon an increase in train pipe pressure for opening communication from the supplemental reservoir to the train pipe and also to the auxiliary reservoir, and a spring operating to return the valve to close said communication upon equalization of pressures on the piston. 55
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Signed at New York in the county of New York and State of New York this 24th day of April A. D. 1903. 70

JOSEPH E. NORMAND.

Witnesses:

JOHN J. BOLAND,
JOHN N. BACHE.