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AIR BRAKE.

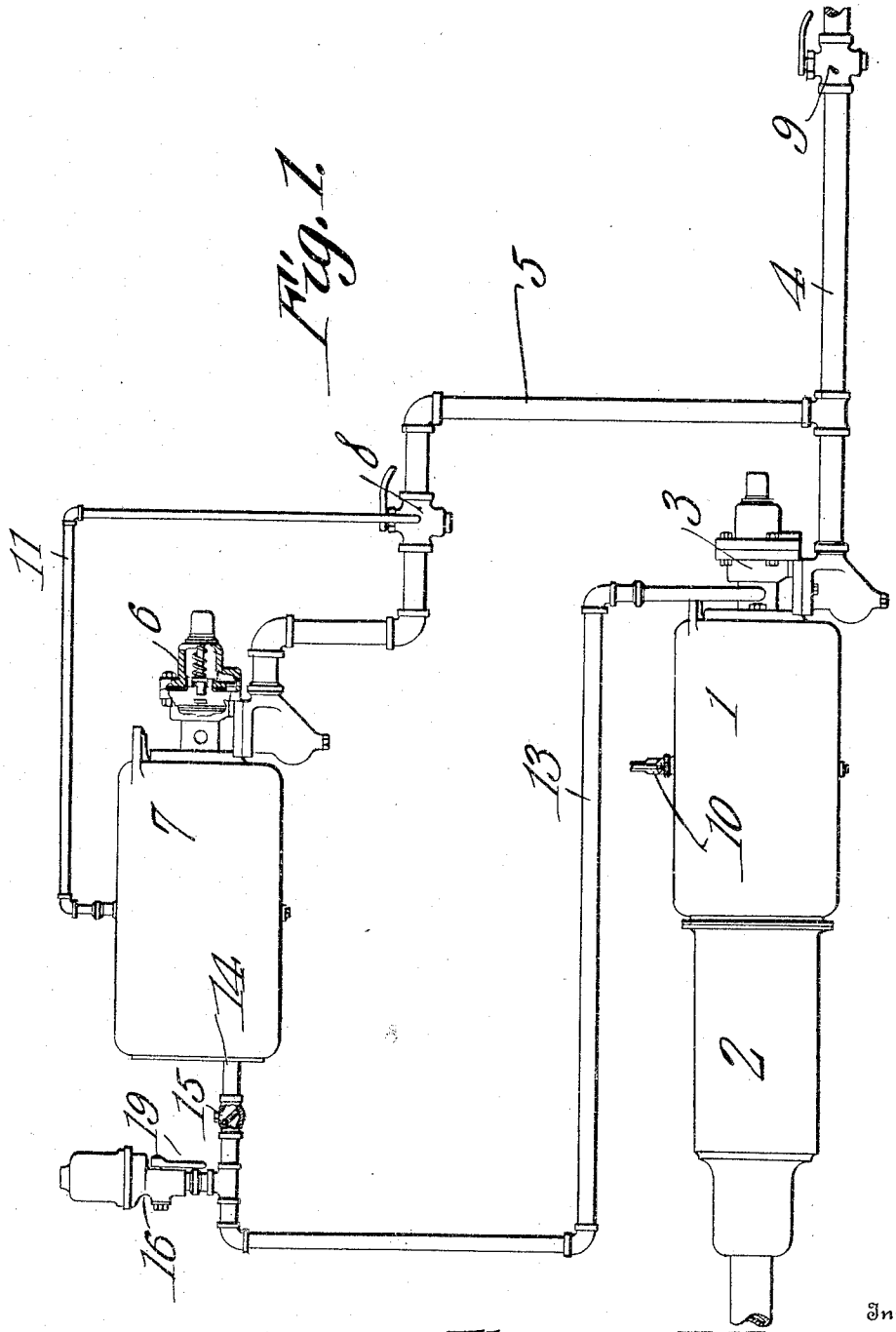
APPLICATION FILED NOV. 13, 1909.

959,010.

Patented May 24, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

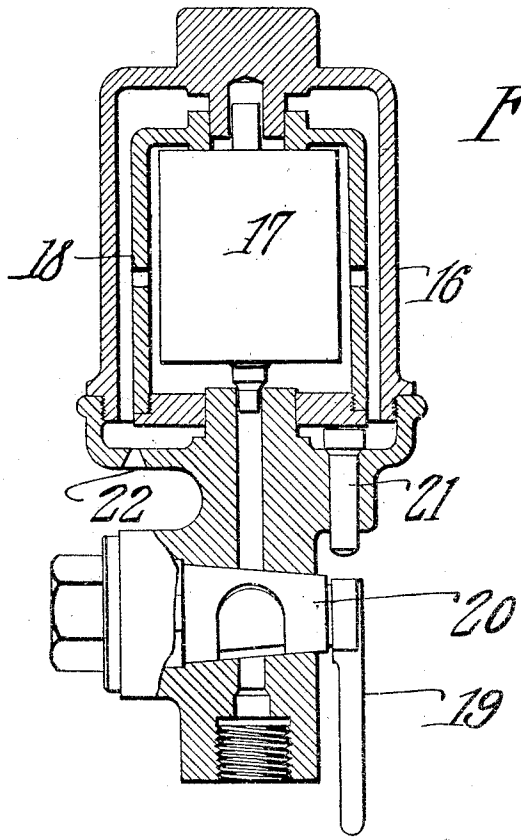

Fig. 2.

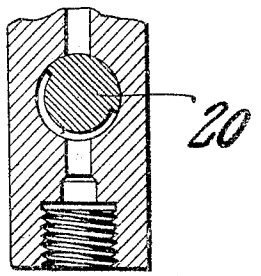

Fig. 3.

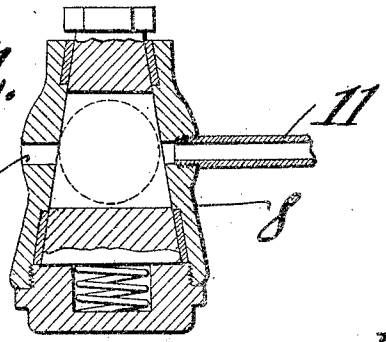

Fig. 4.

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3 SHEETS—SHEET 3.

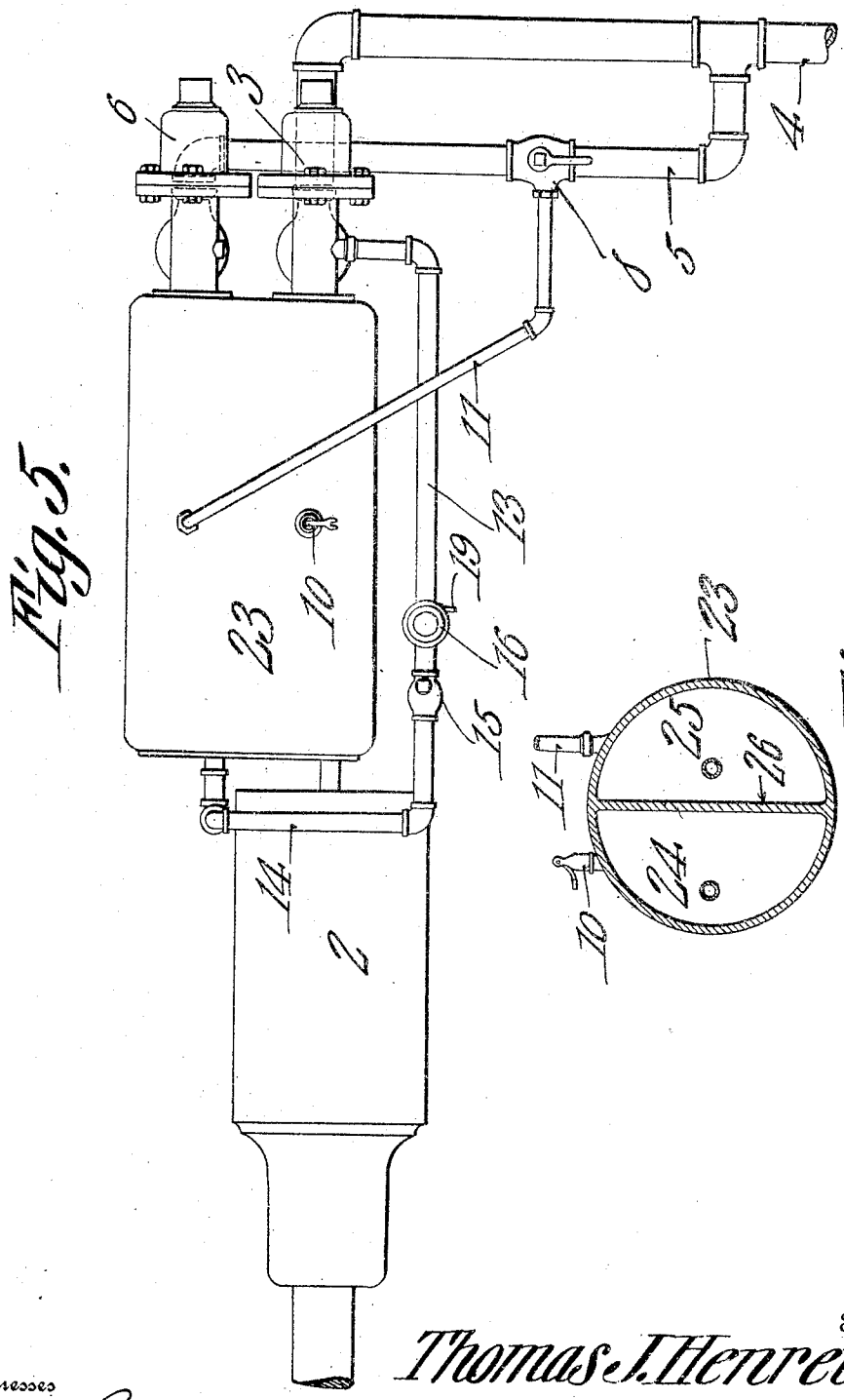

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

THOMAS J. HENRETTA, OF ROANOKE, VIRGINIA, ASSIGNOR OF ONE-HALF TO JOHN ROSE, OF ROANOKE, VIRGINIA.

AIR-BRAKE.

959,010. Specification of Letters Patent. Patented May 24, 1910.

Application filed November 13, 1909. Serial No. 527,909.

To all whom it may concern:

Be it known that I, THOMAS J. HENRETTA, a citizen of the United States, residing at Roanoke, in the county of Roanoke and State of Virginia, have invented a new and useful Air-Brake, of which the following is a specification.

This invention has reference to improvements in air brakes and is designed to provide means whereby the brakes after having been set will remain in such condition until the auxiliary reservoir shall have become fully charged so that the danger of the exhaustion of the auxiliary reservoir air supply on long down grades is obviated.

It frequently happens, especially in connection with freight traffic and on roads where the grades are steep and long, that the brakes must be frequently applied without there occurring sufficiently long intervals for the recharging of the auxiliary reservoirs and these reservoirs become depleted of their air supply so that it is not uncommon for the engineman to lose control of the train because of the lack of air in the auxiliary reservoirs on the cars. This is in part remedied by the use of retaining valves on the exhaust side of the brake cylinders, but such retaining valves only provide for a comparatively weak application of the brakes while the auxiliary reservoirs are being recharged and on some grades such application of the brakes is only partially effective. Furthermore it may under some circumstances become necessary even with the constant application of the brakes under reduced force to again apply the brakes at full force before the auxiliary reservoir is fully charged and consequently the re-application of the brakes is only partially successful.

By the present invention the brakes may be retained at full pressure while the auxiliary reservoirs are being recharged to their full normal capacity, or with the same apparatus a reduced brake pressure may be maintained, while in either case the brakes may be released to the full extent whenever desired. Furthermore the apparatus of the present invention may be rendered inactive at will without interfering in any manner with the normal operation of the air brake system.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings—

Figure 1 is a diagrammatic representation, with parts in elevation and in section and constructively shown, of a portion of an air brake system including the present invention. Fig. 2 is a sectional view of a type of retaining valve which may be used in connection with the present invention. Fig. 3 is a section of a portion of the structure of Fig. 2 at right angles to the section of said figure. Fig. 4 is a section of a cut-off valve shown in Fig. 1. Fig. 5 is a structural diagram of a slightly modified form of the system of Fig. 1. Fig. 6 is a cross section of the reservoir shown in Fig. 5.

Referring to the drawings and more particularly to Fig. 1 there is shown an auxiliary reservoir 1 and brake cylinder 2 together with a triple valve 3, all such as are commonly employed in air brake systems. Connected to the triple valve is the ordinary train pipe 4. Branched off from the train pipe is another pipe 5 leading to a triple valve 6 connected to a reservoir 7 which may be a duplicate of the reservoir 1, but so far as the present invention is concerned the reservoir 7 may, if desired, be of less capacity than the reservoir 1. In Fig. 1 the reservoirs 1 and 7 are shown as of substantially the same size. Included in the pipe 5 there is a cut-off valve 8 of ordinary construction and this may be the same type of valve as the ordinary end valves of the train pipe of the car, one of these valves being indicated at 9 in Fig. 1. The reservoir 1 is shown with the usual relief valve 10, but instead of supplying the reservoir 7 with such relief valve it is connected at this point with a pipe 11 leading to a passage through the casing of the valve in line with another passage 12 on the other side of the casing of the valve 8 so that when this valve is moved to a position to cut off communication between the train pipe 4 and the triple valve 6 the pipe 11 will be opened to the atmosphere through the passage or port 12 by way of the passage through the spigot of the valve 8. The exhaust port of the triple valve 3 is connected by a pipe 13 to another pipe 14 corresponding to the pipe or conduit usually connecting the triple valve with the brake cylinder and

this pipe 14 is connected to the same port of the triple valve 6 which usually opens to the brake cylinder. Between the pipe 13 and the pipe 14 there is interposed a check valve 15 opening toward the pipe 14 and in the pipe 13 there is included a retaining valve 16. The retaining valve 16 is of known type and contains two weights 17, 18, one of which is under the control of the handle 19 of the spigot valve 20, the construction being such that when the handle 19 is in one position the weight 18 will be lifted through the intermediary of a pin 21 out of engagement with the weight 17.

When the valve 20 is moved to one position air entering the retaining valve casing must lift the combined weight of the two members 17 and 18 before the air may escape through an exhaust port 22 in the casing, but when the handle 19 is in another position the weight 18 is lifted to an inactive position through the intermediary of the pin 21 and so the air has but to lift the weight 17 to find a way of escape through the port 22. This is the ordinary construction of retaining valves designed to open to the atmosphere at fifteen pounds or thirty pounds air pressure in accordance with the position of the handle 19 and spigot valve 20. In the ordinary construction of these valves there is a third position whereby the inlet to the valve 16 may be opened to the atmosphere. In the present construction this last named opening is omitted so that the valve is only operative to connect the pipe 13 with the atmosphere at fifteen pounds pressure or thirty pounds pressure as the case may be, while at another position of the valve 20 the passage way leading to the weights 17 and 18 is closed and air in the pipe 13 is then ineffective to the valve 16.

Let it be assumed that the valve 8 is in a position whereby the train pipe 4 is in communication with the triple valve 6, in which case the pipe 11 is cut-off from the atmosphere. Under running conditions there is established in the auxiliary reservoir 1 and in the reservoir 7 an air pressure of seventy pounds. If it be further assumed that there has been a service application of the brakes by an appropriate reduction of the train pipe pressure, then there is established in the auxiliary reservoir 1 and in the brake cylinder 2 a pressure of fifty pounds and in the pipe 14 there is established a pressure of seventy pounds, or approximately seventy pounds, the capacity of this pipe being so small as not to materially reduce the pressure in the reservoir 7.

When the piston of the triple valve 3 is moved to the position for releasing the brakes then the brake cylinder 2 is coupled up with the exhaust side of the triple valve, and the brake cylinder pressure is established in the pipe 13. If the retaining valve 16 be set to open at fifteen pounds pressure, then the brake cylinder pressure will reduce to fifteen pounds and be there held by the retaining valve since the air cannot pass to the pipe 14 because of the high pressure on the face of the check valve 15 remote from the pipe 13. If the retaining valve 16 be set to open at 30 pounds then the pressure within the brake cylinder will reduce to thirty pounds but no farther. If the retaining valve 16 be cut off from communication with the pipe 13 then the whole service pressure within the brake cylinder 2 is retained because of the superior pressure within the pipe 14.

Under the several conditions named the brakes may be maintained in the applied condition under service pressure or under the lesser pressure in accordance with the position of the spigot valve 20. In the meantime the pressure within the auxiliary reservoir 1 increases until the full normal pressure is restored.

Since the pressure within the reservoir 7 is seventy pounds or substantially seventy pounds, the piston within the triple valve 6 will not move to the exhaust position on the restoration of normal pressure in the auxiliary reservoir 1. By establishing a superior pressure within the train pipe the triple valve 6 will be moved to the exhaust position thus connecting the pipe 14 with the atmosphere and then the brake cylinder 2 will exhaust to atmospheric pressure through the check valve 15 and pipe 14 and the exhaust port of the triple valve 6.

The invention is particularly useful in connection with freight trains and the supplemental reservoir 7 may be used with or without the retaining valve 16, but when such a retaining valve is used its structure is modified to the extent of omitting the exhaust port opening directly to the atmosphere.

By the present invention provision is made for the full brake control of the train on long steep grades without drain on the auxiliary reservoir, and consequently after an application of the brakes the auxiliary reservoir may be recharged and so maintained indefinitely ready for subsequent brake operations.

When it is not desirable to use the reservoir 7 then communication between the same and the train pipe is cut off by a proper manipulation of the valve 8 and the contained air within the reservoir 7 exhausts through the port 12 and then the brake cylinder 2 will exhaust into the atmosphere freely through the pipes 13 and 14 and the exhaust port of the triple valve 6.

In Figs. 5 and 6 the auxiliary reservoir 1 and supplemental reservoir 7 are combined in one structure in the form of a double reservoir 23 divided into two compartments

24 and 25 by a web 26, each compartment being independent of the other and of the same size as indicated in Fig. 6, or, if desired, of different capacities. The remaining structures are the same as in Fig. 1 and are indicated by the same reference numerals. Since with seventy pounds pressure in the supplemental reservoir and fifty pounds pressure in the train pipe would cause the triple 6 to move to the emergency position and effect serially every triple on the train the graduating stem of the triple may be lengthened as indicated in Fig. 1 so as to arrest the emergency action of this triple, or a plain triple valve instead of such a modified quick acting triple may be used in connection with the supplemental reservoir.

What is claimed is:

1. In air brakes, an auxiliary reservoir, brake cylinder and triple valve, a supplemental reservoir and triple valve, and a conduit connecting the exhaust side of the first named triple valve with the brake cylinder connection of the second named triple valve and including a check valve opening toward the said second named triple valve.

2. In air brakes, a brake cylinder, a supplemental reservoir, and means for opposing the supplemental reservoir pressure to the exhaust from the brake cylinder.

3. In air brakes, a brake cylinder and means for establishing in the path of the exhaust from said brake cylinder a pressure superior to that of the exhaust.

4. In air brakes, a brake cylinder, means for retaining pressure on the exhaust side of the brake cylinder at a predetermined point, and means controlled by train pipe pressure for opposing superior air pressure to the exhaust or for causing the free escape of the exhaust to the atmosphere.

5. In air brakes, a brake cylinder, an auxiliary reservoir and triple valve for feeding the same, a supplemental reservoir, a triple valve for the supplemental reservoir, a connection therefrom to the train pipe, connections from the exhaust port of the brake cylinder to the brake cylinder port of the triple valve of the supplemental reservoir, said connection including a check valve, and a retaining valve included in said connection.

6. In air brakes, a supplemental air reservoir, a triple valve therefor connected to the train pipe of the air brake, and provided with an exhaust port opening to the atmosphere, and a connection between the exhaust side of the air brake cylinder and the brake cylinder connection of the supplemental reservoir triple valve, said connection including a check valve.

7. In air brakes, a supplemental reservoir and triple valve therefor, a connection between the triple valve and the exhaust port of the brake cylinder, a connection between the triple valve and the train pipe, a valve in the train pipe connection, and a connection between said valve and the supplemental reservoir for opening the latter to the atmosphere when the train pipe connection is closed by the valve.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

THOMAS J. HENRETTA.

Witnesses:

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BEVERLEY BERKELEY.