W. V. TURNER.

TRIPLE VALVE.

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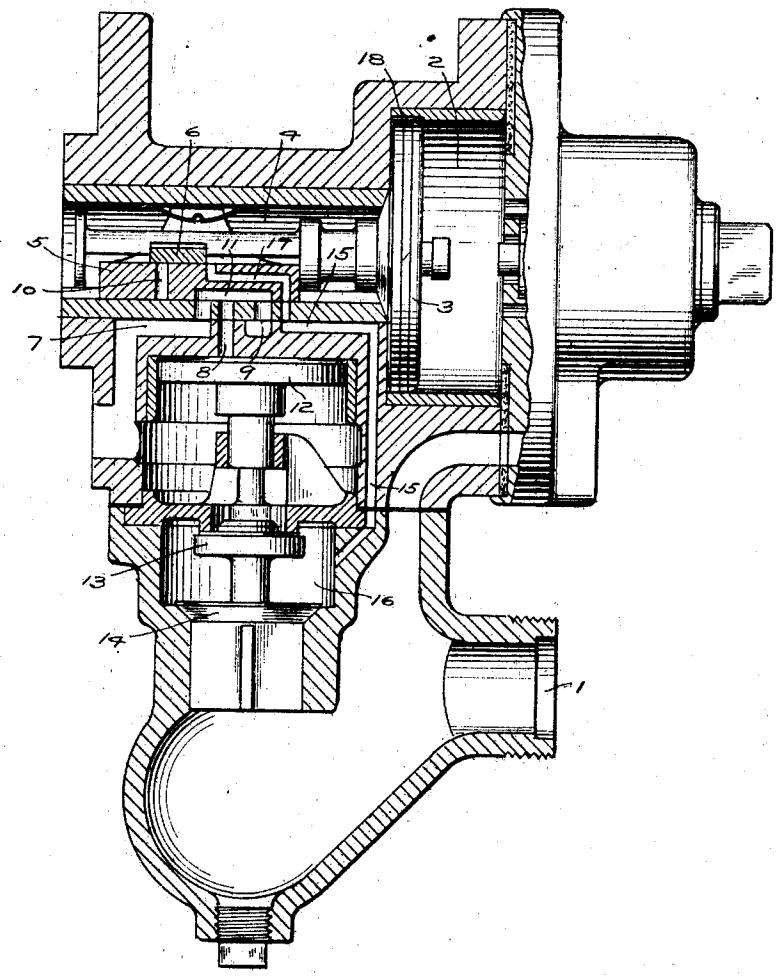
907,199. Patented Dec. 22, 1908.




WITNESSES

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# UNITED STATES PATENT OFFICE.

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## TRIPLE VALVE.

No. 907,199. Specification of Letters Patent. Patented Dec. 22, 1908.

Application filed April 25, 1905. Serial No. 257,365.

*To all whom it may concern:*

Be it known that I, WALTER V. TURNER, a citizen of the United States, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Triple Valves, of which the following is a specification.

This invention relates to triple valve devices for air brakes, and has for its object to provide improved means for controlling communication between the train pipe and the auxiliary reservoir, whereby a rapid recharge of the auxiliary reservoir at the time of releasing brakes may be obtained.

One feature of my invention comprises a large feed passage leading from the train pipe around the triple valve piston to the auxiliary reservoir, and means for controlling said port by the graduating valve of the triple valve.

Another feature consists in the combination with the large feed passage of means, such as a small feed groove around the triple valve piston in release position, for permitting a slow equalization of varying pressures from one side of said piston to the other without moving the piston, whereby a very slow reduction in train pipe pressure which may occur, due to train pipe leakage, will not operate to move out the triple valve piston and set the brakes.

While my improvement may be applied to any desired form of triple valve device, I have illustrated the same in connection with a standard quick action triple valve of the Westinghouse type, as shown in section in the accompanying drawing.

According to this construction, the triple valve device comprises the usual casing having train pipe connection 1, piston chamber 2 containing piston 3, valve chamber 4 adapted to communicate with the auxiliary reservoir and containing main slide valve 5 and graduating slide valve 6. In the valve seat are the brake cylinder port 7, quick action port 8 leading to the emergency piston chamber, and the exhaust port 9, while the main slide valve is provided with service port 10 and exhaust cavity 11. The emergency piston 12 operates the usual emergency valve 13 and check valve 14, all of which may be of the ordinary standard construction, the operation of which is well known.

The usual feed groove which has heretofore been located in the bushing around the triple valve piston for supplying air from the train pipe to the auxiliary reservoir has necessarily had a very limited capacity in order to prevent the auxiliary reservoir pressure from equalizing back into the train pipe without moving out the triple valve piston when a service reduction is made in the train pipe for applying the brakes on long trains, consequently the charging of the auxiliary reservoir from the train pipe with the triple valve in release position has been slow and requires a much longer period of time than is sometimes desirable.

According to my improvement, a large feed port or passage 15 is provided for opening communication from the train pipe to the auxiliary reservoir around the triple valve piston and this passage is preferably controlled by the graduating valve of the triple valve device, so as to be closed by the first part of the movement of the triple valve piston from release position toward service application position. As shown in the drawing, this port 15 leads from the chamber 16 above the check valve 14 to the main slide valve seat, where it communicates with port 17 in the main slide valve when in release position, this latter port being controlled by the graduating valve 6, which is operated by the piston and has a movement relative to the main valve. By connecting the port to the check valve chamber 16, the check valve 14 not only performs its usual function of preventing back flow from the brake cylinder to the train pipe after the emergency valve has opened to vent air from the train pipe to the brake cylinder in emergency applications, but also serves the purpose of preventing back flow from the auxiliary reservoir to the train pipe through the large feed passage 15.

In order to provide for the equalization of slight differences of pressure which may occur between the train pipe and auxiliary reservoir, due to slight leakage from the train pipe or other causes, I employ a restricted port or opening for establishing communication from the auxiliary reservoir to the train pipe in release position of the valve, and this is preferably in the form of a restricted groove 18 located in the bushing around the triple valve piston.

When the train pipe pressure is increased for releasing brakes and recharging the auxiliary reservoir, the triple valve moves to re-

lease position, in which the graduating valve opens the port 17 and the auxiliary reservoir is charged rapidly from the train pipe through the large feed passage 15, a small amount of air also passing through the restricted groove 18 around the triple valve piston.

After the train pipe and auxiliary reservoir are charged to the normal degree, any slight differences of pressure, due to slight train pipe leakage or other causes, may equalize around the triple valve piston through the restricted groove 18 without affecting the triple valve.

When a service reduction is made in train pipe pressure for applying the brakes, the first movement of the piston with the graduating valve toward service position closes the feed passage 15, so that even should there be back leakage through the check valve 14 the feed passage would be tightly closed by the slide valve and remain closed in all other positions of the triple valve.

As the graduating valve moves out to cover port 17, it also opens the service port 10, which registers with brake cylinder port 7, as the main slide valve moves out to service position in the usual manner. It is understood that the port 15 is located at one side of the line of the exhaust port, so that the cavity 11 does not register with the feed port when the main valve moves out to service position. The large feed passage 15 is therefore closed at the main slide valve seat in all except the release position of the valve.

One important advantage derived from my improvement is that the large feed passage is closed upon the preliminary movement of the piston and graduating valve from release position and without moving the main slide valve. As it sometimes happens that the check valve may leak to a certain extent, due to foreign matter lodging upon its seat, or from some other cause, it is important that this large feed passage should be closed upon a slight reduction in train pipe pressure, since, if it was necessary to move the main slide valve to close this port, it would often happen on long trains that the rate of reduction in train pipe pressure would not be sufficient, owing to this back leakage, to cause the piston to move the main slide valve and set the brake.

It requires only a slight wave of reduced train pipe pressure, however, to move out the triple piston and graduating valve to close the feed passage according to my improvement, and consequently a leaky check valve would not prevent the desired action of the triple valve.

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

1. A triple valve device comprising a piston, a main valve, a feed passage for establishing an open communication from the train pipe around said piston to the auxiliary reservoir, an auxiliary valve operated by said piston and having a movement relative to the main valve for controlling said feed passage.

2. A triple valve device comprising a piston, a main valve, a feed passage for establishing communication from the train pipe around said piston to the auxiliary reservoir, an auxiliary valve operated by said piston and having a normal release position for fully opening said feed passage.

3. A triple valve device having a piston, a main valve, a graduating valve operated by the piston and having a movement relative to the main valve, a feed passage from the train pipe to the auxiliary reservoir around the piston and controlled by said graduating valve, and a check valve in said feed passage.

4. A triple valve device comprising a piston, a main valve having a feed port for supplying air from the train pipe to the auxiliary reservoir, a check valve for preventing back flow, and a graduating valve controlling said port.

5. A triple valve device comprising a piston, a main slide valve having a feed port for supplying air from the train pipe to the auxiliary reservoir in release position of the valve, and a graduating valve operated by the piston and having a movement relative to the main valve for controlling said port, and adapted to fully open the same in the normal release position of the valve.

6. A triple valve device having a large check valve controlled feed passage from the train pipe to the auxiliary reservoir around the triple valve piston and controlled by the slide valve of the triple valve in service applications, and a restricted port or groove for permitting a slow equalization of pressure from the auxiliary reservoir to the train pipe.

7. A triple valve device having a large check valve controlled feed passage from the train pipe to the auxiliary reservoir around the triple valve piston and controlled by the slide valve of the triple valve in service applications, and a restricted port or groove around the triple valve piston when in release position.

8. A triple valve device having a vent valve for opening communication from the train pipe to the brake cylinder, a check valve for preventing back flow from the brake cylinder to the train pipe, a large feed passage leading from said check valve to the auxiliary reservoir, means for closing said passage in service applications, and means for permitting a restricted flow from the auxiliary reservoir to the train pipe in the release position of the triple valve.

9. A triple valve device having a vent valve for opening communication from the

train pipe to the brake cylinder in emergency applications, a check valve for preventing back flow from the brake cylinder to the train pipe, a large feed passage leading from said check valve to the auxiliary reservoir, and a restricted port or groove for opening communication from the auxiliary reservoir to the train pipe around the triple valve piston when in release position.

10. A triple valve device comprising a piston, a main valve, a graduating valve having a movement relative to the main valve, a feed port or passage from the train pipe around the piston to the auxiliary reservoir and controlled by said graduating valve, a vent valve for opening communication from the train pipe to the brake cylinder, and a single check valve for preventing back flow through said feed passage and from the brake cylinder to the train pipe.

In testimony whereof I have hereunto set my hand.

WALTER V. TURNER.

Witnesses:
R. F. EMERY,
J. B. MACDONALD.