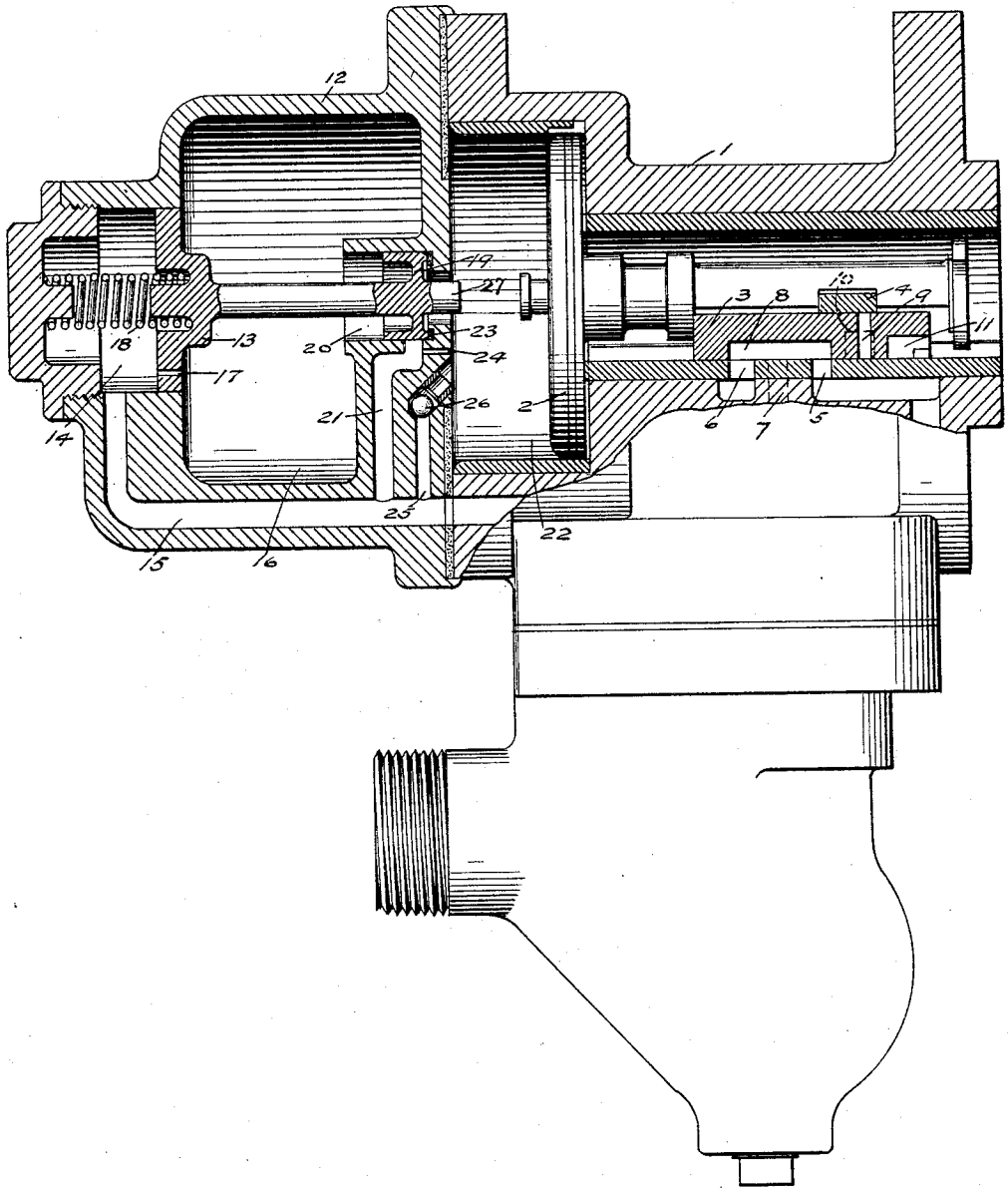
F. B. FARMER.

TRIPLE VALVE DEVICE.

APPLICATION FILED MAY 6, 1909.

1,114,741. Patented Oct. 27, 1914.



WITNESSES

Wm. M. Cady

J. L. Curtin

INVENTOR

Fred B. Farmer

by E. H. Wright Att'y.

UNITED STATES PATENT OFFICE.

FRED B. FARMER, OF ST. PAUL, MINNESOTA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

TRIPLE-VALVE DEVICE.

1,114,741. Specification of Letters Patent. Patented Oct. 27, 1914.

Application filed May 6, 1909. Serial No. 494,392.

To all whom it may concern:

Be it known that I, FRED B. FARMER, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented new and useful Improvements in Triple-Valve Devices, of which the following is a specification.

This invention relates to triple valve devices, and more particularly to those known as the quick action type. With this class of triple valve devices, as at present constructed, it occasionally happens that, by reason of a sticky triple piston or other cause, the triple valve parts will make the full traverse to emergency position upon a service reduction in train pipe pressure and thereby cause an undesired operation of the well known serial quick action feature to shift all the other triple valves in the train to emergency position when only a service application of the brakes is desired. This often results in annoying delays and sometimes causes accidents.

The principal object of my invention is to provide means for preventing full traverse of the triple valve parts to emergency position upon gradual or service reductions in train pipe pressure.

For this purpose my improvement consists in providing means adapted to restrict the flow of air from the triple valve piston when only a gradual reduction in train pipe pressure is made, so that air in the triple piston chamber acts on the dash-pot principle to retard the movement of the piston and thereby prevent the same from making full traverse to emergency position, said means being operated, however, by a sudden reduction in train pipe pressure to open a free communication from the triple valve piston to the train pipe, so as to permit an emergency operation of the triple valve when desired.

The single figure in the accompanying drawing is an elevational view, partly in section, of a standard quick action triple valve device, showing my improvement applied thereto.

As illustrated in the drawing, the triple valve device is of the usual standard construction, comprising a casing 1, triple valve piston 2, main slide valve 3, and graduating valve 4. The seat of the main slide valve is provided with the usual brake cylinder port 5, exhaust port 6, and port 7, leading to the emergency piston, which it is not deemed necessary to show, as its operation is well understood by those familiar with air brakes. The main slide valve is provided with the usual exhaust cavity 8, graduating or service port 9, quick action port 10 and emergency application port 11.

The means for preventing undesired quick action is preferably located in the triple valve cap section 12 and comprises a movable abutment 13 contained in a piston chamber 14, into which train pipe passage 15 opens. The chamber 16 at the opposite face of the abutment 13 has a restricted communication with the train pipe through a small port 17 in the abutment 13, and a spring 18 acts on said abutment and tends to maintain the same in its inner position. The abutment 13 is connected to a piston valve 19 operating in piston chamber 20 and adapted to control communication between a passage 21 leading to the train pipe passage 15 and triple valve piston chamber 22. The piston valve 19 is adapted to seat in its inner position on a gasket ring 23 so as to prevent any leakage from the piston chamber 22 to the train pipe. A port 24 forms a restricted communication from the piston chamber 22 to the train pipe passage 21 and is of such size as to permit of gradual reductions in pressure in the piston chamber 22 at a rate sufficient for effecting the movement of the triple valve parts to service application position under normal conditions and should be slightly larger than the feed groove around the triple valve piston. A large passage 25 also forms a communication from the train pipe to the piston chamber 22 and this passage contains a check valve 26 adapted to permit free flow of air from the train pipe to the piston chamber but preventing back flow from the piston chamber.

In operation, fluid under pressure supplied to the train pipe flows through passage 25 past check valve 26 into piston chamber 22 and thence through the usual feed groove around the triple valve piston 2 charging the auxiliary reservoir to normal standard pressure in the usual manner. Air also flows to the outer face of the movable abutment 13 and equalizes through the restricted port 17 into the chamber 16, so that the pressures upon the opposite sides of said abutment become equal to the standard pressure and the spring 18 then maintains the abutment

and the valve 19 in the inner position closing communication between the piston chamber 22 and the train pipe passage 21. Upon making a gradual reduction in train pipe pressure to effect a service application of the brakes, air can only flow from the piston chamber 22 by way of the restricted port 24, the passage 25 being closed by the check valve 26 and the passage 21 by the valve 19. Ordinarily, the triple valve parts will then move to service application position in response to the reduction in pressure produced through the port 24. But if the piston 2 should stick, the pressure in piston chamber 22 will then continue to reduce until a sufficient differential of pressure is produced to start the piston. With the ordinary standard triple valve, under such conditions, the sticky triple valve piston having once been started, is very apt to shift over to emergency position, but with the present construction, as the only outlet for air from the piston chamber 22 is through the restricted port 24, the movement of the piston 2 will be resisted by the air pressure in the piston chamber 22, and this pressure consequently acts on the well known dash-pot principle to prevent rapid or excessive movement of the piston. When the triple valve piston has moved out to service application position, as limited in the usual manner by the graduating stem 27, the spring 18 serving as the graduating spring, communication is opened from the auxiliary reservoir to the brake cylinder through ports 9 and 5, and the consequent reduction in auxiliary reservoir pressure by flow of air to the brake cylinder together with the resistance of the spring 18 then checks further outward movement of the triple valve piston. When gradual reductions in train pipe pressure are made, fluid in chamber 16 will flow back to the train pipe through restricted port 17 with sufficient rapidity to maintain the opposing fluid pressures on the abutment 13 substantially equal, and consequently said abutment and valve 19 will be maintained in their inner closed position by the spring 18. The brakes may be readily released by increasing the train pipe pressure, the large release passage 25 permitting an ample flow of air to the triple valve piston, so that the same is at once shifted to release position. When an emergency or sudden reduction in train pipe pressure is made, the port 17 is so restricted that the fluid pressure from chamber 16 cannot flow back into the train pipe with sufficient rapidity to maintain equilibrium of pressures on the abutment 13 and consequently, the pressure in said chamber soon preponderating over the train pipe pressure, the abutment is thereby shifted outwardly, causing the valve 19 to move from its seat 23 and open the large train pipe passage 21 to the piston chamber 22. A rapid reduction in pressure in piston chamber 22 then follows, and the triple valve piston is immediately shifted to the extreme emergency position, thus operating the quick action mechanism and producing an emergency application of the brakes. As the fluid pressures on piston 13 equalize, the spring 18 returns the parts to their normal closed position.

It will now be apparent that I have provided means whereby movement of the triple valve parts to emergency position is prevented when a gradual reduction in train pipe pressure is made, while retaining the usual facility of operation of the triple valve for all normal movements.

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

1. In a fluid pressure brake, the combination with a triple valve device comprising valve means for controlling the brakes and a piston contained in a piston chamber for actuating said valve means, of a restricted port communicating directly with said chamber for limiting the flow of air from said piston chamber to the train pipe to prevent sudden movement of said piston upon a gradual reduction in train pipe pressure.

2. In a fluid pressure brake, the combination with a triple valve device comprising valve means for controlling the brakes and a piston contained in a piston chamber for actuating said valve means upon a gradual reduction in train pipe pressure to effect a partial traverse and upon a sudden reduction in train pipe pressure to effect a full traverse, of a restricted port leading directly into said chamber for restricting the flow of air from said piston chamber to the train pipe when a gradual reduction in train pipe pressure is made, to thereby prevent full traverse of said piston.

3. In a fluid pressure brake, the combination with a triple valve device comprising valve means for controlling the brakes and a piston contained in a piston chamber for actuating said valve means upon a gradual reduction in train pipe pressure to effect a partial traverse and upon a sudden reduction in train pipe pressure to effect a full traverse, of a restricted port connecting the piston chamber with the usual triple valve cap chamber for limiting the rate of flow of air from said piston chamber to the train pipe when a gradual reduction in train pipe pressure is made to prevent full traverse of said piston and means operating upon a sudden reduction in train pipe pressure to open a communication for permitting free flow of air from said piston chamber.

4. A quick action triple valve device comprising a valve and piston operating upon a gradual reduction in train pipe pressure

to make a partial traverse in service applications and upon a sudden reduction in train pipe pressure to make a full traverse in emergency applications, a constantly open restricted passage from the piston to the train pipe for limiting the flow of air from said piston during a gradual reduction in train pipe pressure, a second passage forming a communication between said piston and train pipe, a valve for controlling said second passage and a movable abutment subject to the opposing pressures of the train pipe and a chamber for maintaining said second passage closed during a gradual reduction in train pipe pressure, said abutment being operated upon a sudden reduction in train pipe pressure for opening said valve.

5. A quick action triple valve device comprising a valve and piston operating upon a gradual reduction in train pipe pressure to make a partial traverse in service applications and upon a sudden reduction in train pipe pressure to make a full traverse in emergency applications, a valve for controlling communication from said piston to the train pipe, a movable abutment, subject to the opposing pressures of the train pipe and a chamber having a restricted communication with the train pipe, for controlling said valve.

6. A quick action triple valve device comprising a valve and piston operating upon a gradual reduction in train pipe pressure to make a partial traverse in service applications and upon a sudden reduction in train pipe pressure to make a full traverse in emergency applications, a constantly open restricted passage for permitting a limited flow of air from the piston to the train pipe, a valve for controlling a second passage from the piston to the train pipe, a spring tending to close said valve, and a movable abutment, subject to the opposing pressures of the train pipe and a chamber having a restricted communication with the train pipe, for operating said valve upon a sudden reduction in train pipe pressure.

7. In a quick action triple valve device, the combination with valve means and a piston adapted upon a gradual reduction in train pipe pressure to make a partial traverse in service applications and upon a sudden reduction in train pipe pressure to make full traverse in emergency applications, of means adapted during gradual reductions in train pipe pressure to restrict the flow of air from said piston to the train pipe and operated by a sudden reduction to open communication for permitting free flow of air from said piston to the train pipe and a passage adapted to supply air to said piston in releasing the brakes and provided with a check valve for preventing flow of air from the piston to the train pipe.

8. In a triple valve device, the combination with valve means and a piston operating upon a reduction in train pipe pressure for supplying air to the brake cylinder, of a free open restricted passage from the piston to the train pipe adapted to permit a gradual reduction in pressure upon said piston and a release passage for permitting the free admission of air from the train pipe to said piston in releasing the brakes and provided with a check valve for preventing flow of air from the piston to the train pipe.

9. In a triple valve of an automatic air brake apparatus, the combination with the triple valve piston and cylinder in which it operates having a communication with the train pipe of relatively small capacity, and a connecting passage of larger capacity between said cylinder and train pipe, and a valve controlling the said passage; and an actuating piston for said valve subjected to train pipe pressure at one side, and at the opposite side to pressure in an equalizing chamber having a communication of relatively small capacity with the train pipe, whereby said piston is actuated by the pressure in said equalizing chamber to open said valve when train pipe pressure is suddenly reduced.

10. In a triple valve of an automatic air brake apparatus, the triple valve piston and cylinder in which it operates, in free communication with the auxiliary reservoir at one end, and having a closure at the other end and a relatively small communication with the train pipe, and a relatively large valve controlled communication, whereby when said valve controlled communication is closed, movement of said piston by preponderance of auxiliary reservoir pressure increases the pressure in the cylinder at the other side of the piston and is checked thereby, and thereafter controlled by reduction of pressure by flow of air through said small communication.

In testimony whereof I have hereunto set my hand.

FRED B. FARMER.

Witnesses:
S. R. McMasters,
Jno. P. Larkin.