W. V. TURNER.

TRIPLE VALVE DEVICE.

APPLICATION FILED AUG. 20, 1912.

1,096,872. Patented May 19, 1914.

Fig. 1

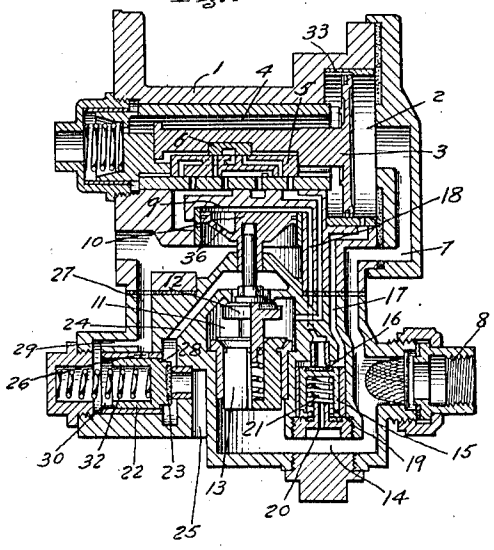


Fig. 2

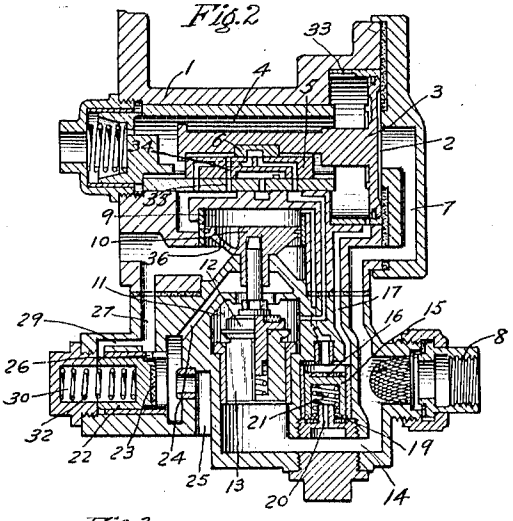
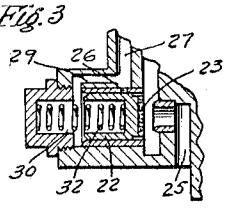


Fig. 3



WITNESSES

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UNITED STATES PATENT OFFICE.

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TRIPLE-VALVE DEVICE.

1,096,872. Specification of Letters Patent. Patented May 19, 1914.

Application filed August 20, 1912. Serial No. 715,968.

To all whom it may concern:

Be it known that I, WALTER V. TURNER, a citizen of the United States, residing at Edgewood, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Triple-Valve Devices, of which the following is a specification.

This invention relates to fluid pressure brakes, and more particularly to an automatic valve device having means for effecting quick action and an emergency application of the brakes. Heretofore, considerable trouble has been experienced in operating trains having cars equipped with quick action valve mechanisms due to what is known as undesired quick action.

It is difficult to construct triple valves so that the resistance of the main slide valve to movement will be uniform on all cars and the result is that often some triple having a slide valve requiring a high differential to start same will not move under the usual initial service reduction in train pipe pressure but when the differential in pressures between the auxiliary reservoir and the train pipe finally becomes sufficient to start the valve parts of the triple, the parts are at once shifted to emergency position, in which quick action is initiated on that particular car, and following the well known quick serial action principle, quick action is propagated through the train when not intended.

One object of my invention is to provide means for preventing undesired quick action.

It has also been the practice to provide a large port for quickly charging the brake cylinder in emergency application position, but especially on long trains, quick serial action is not transmitted rapidly enough to prevent the building up of substantially full equalized braking pressure on the head cars, or adjacent to the point where quick action is started, before much braking pressure exists on the rear cars, and as a consequence, the momentum of the unbraked cars is liable to effect a running in of the slack and bunching of the cars which causes damage by collision and sometimes buckling of the train and derailment.

Another object of my invention is to obviate the above difficulty.

In the accompanying drawing; Figure 1 is a central sectional view of a triple valve device embodying my invention, showing the parts in normal release position; Fig. 2 a similar view, showing the parts in emergency application position; and Fig. 3 a detail view, in section, of the train pipe vent valve mechanism, showing the same in position closing the brake cylinder vent and holding the atmospheric vent open.

As shown in the drawing, the triple valve device may comprise a casing 1 having a piston chamber 2 containing a piston 3 and a valve chamber 4 containing a main slide valve 5 and a graduating slide valve 6 both adapted to be operated by the piston 3.

The piston chamber 2 is connected to the passage 7 leading to the train pipe 8 and valve chamber 4 is in communication with the auxiliary reservoir. The casing 1 also has a piston chamber 9 containing an emergency piston 10 and a valve chamber 11 containing an emergency valve 12, the usual emergency check valve 13 being interposed between emergency train pipe passage 14 and valve chamber 11.

According to my improvement, a double seating valve piston 15 is provided having one seat 16 adapted to control communication from a passage 17 leading to the piston chamber 2 to a passage 18 leading to the piston chamber 9 above the emergency piston 10 and having its opposite seat 19 adapted to seat around a passage 20 leading to the emergency train pipe passage 14. A spring 21 tends to hold the valve piston 15 to its seat 16. A valve piston 22 is also provided having a seat 23 adapted to control communication from a passage 24 leading to the chamber above the emergency vent valve 12 to a large atmospheric exhaust port 25. In addition, the valve piston 22 controls a port 26 leading to a brake cylinder passage 27, the piston 22 being provided at its outer end with an annular portion 28 of reduced diameter, so that when the valve piston is shifted to a certain inner position, the annular portion 28 is adapted to register with the port 26. A passage 29 also leads from the chamber 30 at the inner face of the valve piston 22 to brake cylinder passage 27. A spring 32 tends to hold the valve seat 23 in its closed position.

The auxiliary reservoir is charged in the usual manner through feed groove 33 when the triple valve piston 3 is in release posi-

tion and upon a reduction in train pipe pressure, whether gradual for a sevice application or sudden for an emergency application of the brakes, the triple valve piston 3 moves over to seat on the gasket as shown in Fig. 2. In this position air flows through port 34 in the slide valve 5 to passage 35 and thence to the brake cylinder. The communication through which fluid is supplied from the auxiliary reservoir to the brake cylinder is restricted at some point, it is immaterial where, so that the maximum rate of flow does not exceed the maximum rate of reduction in train pipe pressure which it is desired shall be the limit for service reductions in train pipe pressure and the valve device 15, which in application position of piston 3 is subject on one face to auxiliary reservoir pressure, is so designed that when the rate of train pipe reduction exceeds the maximum service rate, the auxiliary reservoir pressure not being able to reduce through the restricted brake cylinder supply port as fast as the train pipe pressure is reducing, the valve device is actuated by the higher auxiliary reservoir pressure and communication is thereupon opened from the auxiliary reservoir to the chamber 9. The emergency piston 10 is then shifted to emergency position and fluid then flows from the auxiliary reservoir to the brake cylinder through a restricted port 36 in the emergency piston 10. The movement of the emergency piston opens the quick action vent valve 12 so that fluid from the train pipe flows from passage 14 to passage 24 and acting on the valve piston 22 shifts the same so as to open port 26 as well as port 25. Fluid from the train pipe thus flows to the brake cylinder and also the atmosphere and the fluid supplied to the brake cylinder serves to quickly move the brake cylinder piston to application position with a few pounds pressure.

When the train pipe pressure has reduced a predetermined amount, the valve piston is moved back to close the brake cylinder port 26, as shown in Fig. 3, but the port 25 remains open and the train pipe continues to reduce through said port until the train pipe pressure has been reduced to a still lower degree, when the valve piston moves to its seat and closes the port 25.

It will now be evident that quick action will not be initiated unless the rate of reduction in train pipe pressure exceeds the rate of reduction of auxiliary reservoir pressure into the brake cylinder and as the triple valve piston moves to the same position for both service and emergency application of the brakes the possibility of obtaining undesired quick action is obviated. The restricted port 36 is smaller than the restriction in the service communication to the brake cylinder, so that the rate of flow from the auxiliary reservoir in emergency is less than that in service.

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 an automatic valve device operating upon a reduction in train pipe pressure for supplying fluid from the auxiliary reservoir to the brake cylinder through a port restricted for a service rate of supply, of a valve mechanism for producing quick serial action and means operating only upon the reduction in train pipe pressure at a greater rate than the auxiliary reservoir reduces into the brake cylinder for effecting the operation of said quick action valve mechanism.

2. In a fluid pressure brake, the combination with an automatic valve device operating upon a reduction in train pipe pressure for supplying fluid from the auxiliary reservoir to the brake cylinder through a port restricted to permit flow only at a service rate, of a valve mechanism for effecting an emergency application of the brakes and means operating only upon a reduction in train pipe pressure at a greater rate than the auxiliary reservoir reduces into the brake cylinder for effecting the operation of said quick action valve mechanism.

3. In a fluid pressure brake, the combination with an automatic valve device operating upon a reduction in train pipe pressure for supplying fluid from the auxiliary reservoir to the brake cylinder, of a valve mechanism for effecting quick serial action and a valve device subject to the opposing pressures of the train pipe and auxiliary reservoir and operating only upon a rate of reduction in train pipe pressure exceeding the rate of reduction of auxiliary reservoir pressure into the brake cylinder for effecting the operation of said quick action valve mechanism.

4. In a fluid pressure brake, the combination with an automatic valve device operating upon a reduction in train pipe pressure for supplying fluid from the auxiliary reservoir to the brake cylinder, of a valve mechanism for effecting quick serial action and a valve piston subject on one side to auxiliary reservoir pressure upon a movement of the automatic valve device to brake application position and on the other side to train pipe pressure and the pressure of a spring for effecting the operation of said quick action valve mechanism.

5. In a fluid pressure brake, the combination with a triple valve device having valve means for controlling the admission of fluid from the auxiliary reservoir to the brake cylinder, and a piston operated upon a reduction in train pipe pressure for actuating said valve means, of a valve mechanism for effecting quick serial action and a valve pis-

ton subject on one side to auxiliary reservoir pressure supplied only in application position of said piston and on the other side to train pipe pressure for controlling the operation of said quick action valve mechanism.

6. In a fluid pressure brake, the combination with a triple valve device having valve means for controlling the admisison of fluid from the auxiliary reservoir to the brake cylinder, and a piston operated upon a reduction in train pipe pressure for actuating said valve means, of a valve mechanism for effecting quick serial action and a valve piston subject on one side to auxiliary reservoir pressure supplied in application position of said piston and on the other side to train pipe pressure for controlling a port for supplying fluid to said quick action valve mechanism to operate the same.

7. In a fluid pressure brake, the combination with a triple valve device having valve means for controlling the admission of fluid from the auxiliary reservoir to the brake cylinder, and a piston operated upon a reduction in train pipe pressure for actuating said valve means, of a valve mechanism for effecting quick serial action and a valve piston subject on one side to auxiliary reservoir pressure supplied in application position of said piston and on the other side to train pipe pressure for controlling a port for supplying fluid from the auxiliary reservoir to said quick action valve mechanism to operate the same.

8. In a fluid pressure brake, the combination with an automatic valve device operating upon a gradual reduction in train pipe pressure for supplying fluid from the auxiliary reservoir to the brake cylinder, of a valve mechanism comprising a valve for venting fluid from the train pipe and a piston for operating same having a restricted port and means operating upon a reduction in train pipe pressure at a greater rate than the auxiliary reservoir reduces into the brake cylinder for supplying fluid from the auxiliary reservoir through said restricted port to the brake cylinder.

9. In a fluid pressure brake, the combination with an automatic valve device operating upon a gradual reduction in train pipe pressure for supplying fluid from the auxiliary reservoir to the brake cylinder, of a valve mechanism comprising a valve for venting fluid from the train pipe and a piston for operating same having a restricted port and means operating upon a reduction in train pipe pressure at a greater rate than the auxiliary reservoir reduces into the brake cylinder for supplying fluid from the auxiliary reservoir to said piston to operate the same and open the train pipe vent valve, said fluid being also adapted to flow through said restricted port to the brake cylinder.

10. In a fluid pressure brake, the combination with a valve device operating upon a reduction in train pipe pressure for supplying fluid to the brake cylinder, of a valve mechanism operating upon a reduction in train pipe pressure at a greater rate than the rate of reduction in auxiliary reservoir pressure by flow to the brake cylinder for supplying fluid from the auxiliary reservoir to the brake cylinder.

11. In a fluid pressure brake, the combination with an automatic valve device controlling a passage through which air is supplied from the auxiliary reservoir to the brake cylinder upon a reduction in train pipe pressure, of a valve mechanism for controlling another passage through which air is supplied from the auxiliary reservoir to the brake cylinder upon a reduction in train pipe pressure at a greater rate than the auxiliary reservoir pressure is reduced by flow through the passage controlled by the automatic valve device.

12. In a fluid pressure brake, the combination with an automatic valve device having only one passageway through which fluid is supplied from the auxiliary reservoir to the brake cylinder upon a reduction in train pipe pressure, of means for controlling another passageway for supplying fluid from the auxiliary reservoir to the brake cylinder upon a reduction in train pipe pressure at a greater rate than fluid is supplied from the auxiliary reservoir to the brake cylinder through the passageway controlled by the automatic valve device.

13. In a fluid pressure brake, the combination with an automatic valve device operating upon a reduction in train pipe pressure for supplying fluid to the brake cylinder, of a valve piston operating in an emergency application of the brakes for first simultaneously venting fluid from the train pipe to the brake cylinder and to the atmosphere and then adapted upon a predetermined reduction in train pipe pressure to close the brake cylinder vent while the atmospheric vent remains open.

14. In a fluid pressure brake, the combination with an automatic valve device operating upon a reduction in train pipe pressure for supplying fluid to the brake cylinder, of a valve piston subject on one side to brake cylinder pressure and on the opposite side to flow of air from the train pipe in an emergency application of the brakes and having one position in which communication is open from the train pipe to the brake cylinder and to the atmosphere and another position in which the brake cylinder communication is closed.

15. In a fluid pressure brake, the combination with an automatic valve device operating upon a reduction in train pipe pressure for supplying fluid to the brake cylinder, of

a valve piston subject on one side to brake cylinder pressure and on the opposite side to flow of air from the train pipe in an emergency application of the brakes and having one position in which communication is open from the train pipe to the brake cylinder and to the atmosphere, another position in which the brake cylinder communication is closed, and a third position in which both the brake cylinder and atmospheric communications are closed.

In testimony whereof I have hereunto set my hand.

WALTER V. TURNER.

Witnesses:
A. M. CLEMENTS,
S. W. KEEFER.