W. V. TURNER.

RETARDED RELEASE TRIPLE VALVE DEVICE.

APPLICATION FILED AUG. 12, 1908.

1,134,424. Patented Apr. 6, 1915.

Fig. 1.

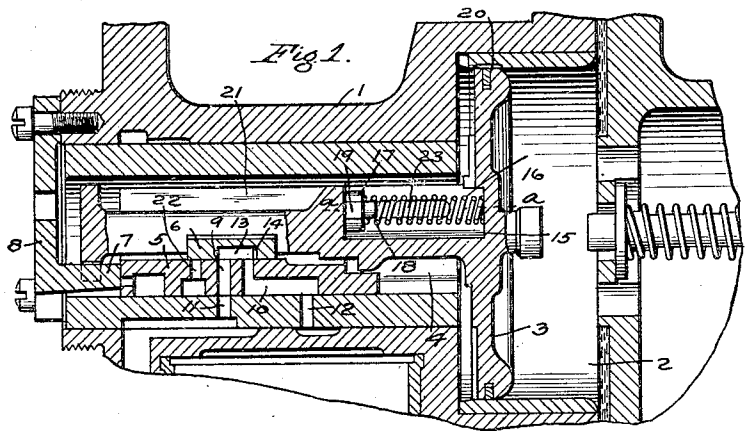


Fig. 2.

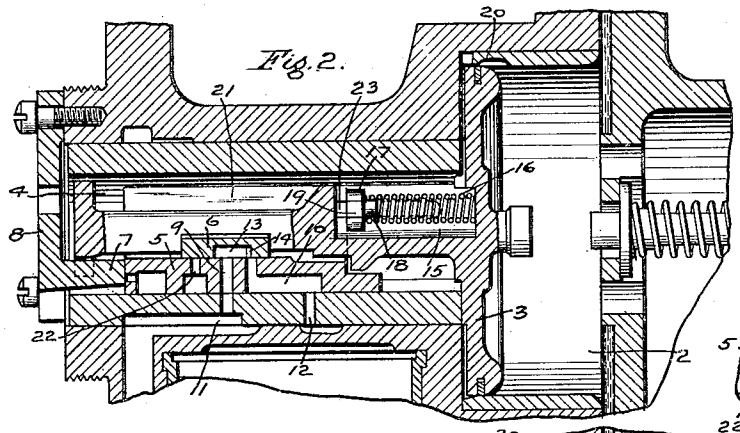


Fig. 5.

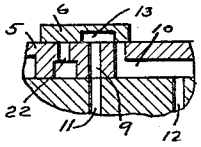


Fig. 3.

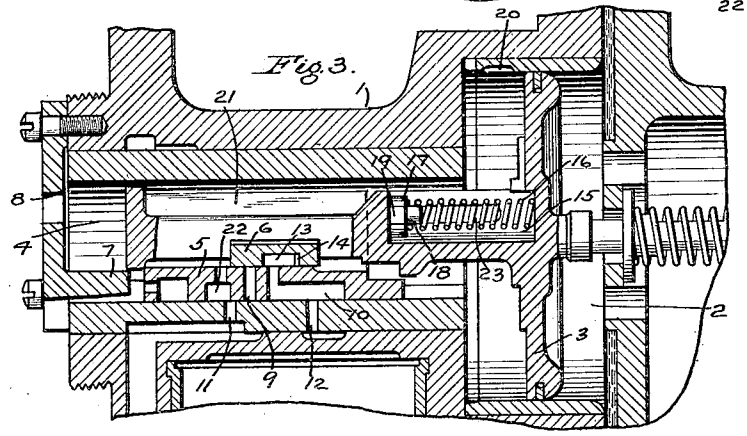
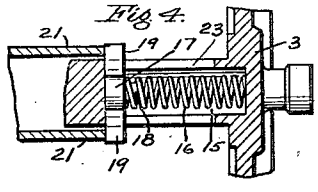


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

WALTER V. TURNER, OF EDGEWOOD, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

RETARDED-RELEASE TRIPLE-VALVE DEVICE.

1,134,424. Specification of Letters Patent. Patented Apr. 6, 1915.

Application filed August 12, 1908. Serial No. 448,190.

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 Retarded-Release Triple-Valve Devices, of which the following is a specification.

This invention relates to fluid pressure brakes, and more particularly to a triple valve device having means for retarding the release of the brakes at the head end of a train, in order to secure a more uniform release of the brakes throughout the train.

It has heretofore been proposed to provide a valve for controlling the exhaust of air from the brake cylinder, having a full release position and a retarded release position in which the opening from the brake cylinder to the atmosphere through the exhaust port is nearly or quite closed. A yielding resistance means such as a spring has been used which is adapted to oppose the movement of the exhaust valve and operating piston from the full to the retarded release position, so that at the head end of the train where the increase in train pipe pressure to release the brakes is more pronounced, the triple valve pistons are forced over to their extreme inner positions against the opposing spring pressure, thereby restricting the exhaust opening from the brake cylinder and retarding the release of the brakes. At the rear end of the train, however, the increase in train pipe pressure is not sufficient to overcome the resistance of the spring device, and so the triple valve pistons are moved only to their full release positions, in which the brake cylinder freely exhausts to the atmosphere. In these prior constructions the yielding resistance spring is attached to and projects out from the rear end of the triple valve casing where there is more or less liability to damage from rough handling and shipping.

The principal object of my present invention is to provide an improved retarded release triple valve device of the above character, wherein the yielding resistance means or spring may be carried by the moving parts of the valve mechanism within the casing so as to produce a simple compact and durable structure which may be readily packed, shipped and handled without liability of injury.

Another object is to so locate the resistance spring that the increased train pipe pressure acting on the triple valve piston to release brakes is transmitted through the spring to the main valve whereby an auxiliary valve actuated by the piston may be employed for controlling and retarding the release from the brake cylinder.

In the accompanying drawing, Figure 1 is a central sectional view of a triple valve device embodying a preferred form of my invention and showing the parts in normal full release position; Fig. 2 a similar view, showing the triple valve parts in the retarded release position; Fig. 3 a similar view showing the parts in service application position; Fig. 4 a sectional view of a portion of the triple valve on the line *a*—*a* of Fig. 1; and Fig. 5 a fragmentary sectional view of the main slide valve and the auxiliary or graduating valve, illustrating a construction wherein the exhaust from the brake cylinder may be entirely closed in the retarded release position.

The triple valve device illustrated in the drawings comprises a casing 1, having piston chamber 2 containing triple valve piston 3, and valve chamber 4 containing main slide valve 5 and auxiliary or graduating valve 6, mounted on and having a movement relative to the main slide valve, said valve being operated by the piston 3. The valve chamber 4 is adapted to be in open communication with the auxiliary reservoir, and the piston chamber 2 communicates with the train brake pipe in the usual manner.

I preferably employ the auxiliary or graduating valve 6 for controlling the exhaust from the brake cylinder in the retarded release position and accordingly a stop lug 7, attached to a supporting spider 8, may be provided for engaging the main slide valve 6 so as to prevent inward movement thereof beyond the full release position.

The main slide valve is provided with ports 9 and 10, which are adapted to register respectively with brake cylinder port 11 and exhaust port 12 in full release position, and the graduating valve 6 has a cavity 13, for connecting the ports 9 and 10 in full release position, and a restricted portion 14 for re-

stricting the exhaust opening in the retarded release position. If desired the restricted portion may be dispensed with and the exhaust entirely closed in retarded release position as shown in Fig. 5.

The auxiliary slide valve is mounted to be moved positively by the piston and both have a movement relative to the main slide valve for controlling the release from the brake cylinder, there being a normal full release position, as shown in Fig. 1, and a further inward movement of the piston and the auxiliary slide valve to a position for retarding the release, as shown in Fig. 2.

For the purpose of opposing the movement of the piston and auxiliary exhaust valve from normal full release position to a position for retarding the release a yielding resistance means such as spring 16 is provided and this spring is preferably carried by the moving parts of the valve mechanism within the casing and is so mounted as to act between the main valve and the piston as the train pipe pressure is increased upon the latter to move the valve mechanism to release brakes.

As shown in the drawing the spring 16 is mounted in a recess 15 in the triple valve piston, one end of the spring bearing against the forward wall of the recess and the other end against a head 17 having a central guide 18 and lateral projections or wings 19 which extend through side slots 23 and engage the wings 21 of the main slide valve 5 when in normal full release position or whenever the piston is operated by the action of train pipe pressure to move the valve mechanism to release brakes.

When the piston is operated in the opposite direction by a reduction in train pipe pressure for applying brakes the projections 19 move away from the wings 21 as the piston and auxiliary slide valve move forward relative to the main slide valve and the head 17 then engages with the rear end wall of the recess 15 in the piston or stem.

The head 17 with projections 19 engaging the wings 21 of the main slide valve forms a fixed stop for the rear end of the retarding spring in the full release position of the valve mechanism.

The system being charged with air under pressure in the usual manner, when a service reduction is made in train pipe pressure the piston with auxiliary slide valve move forward under the preponderating auxiliary reservoir pressure, closing feed groove 20, uncovering port 22 and closing port 9, then as the lost motion between the piston and main slide valve is taken up the head of the piston stem engages the main slide valve and both move together to the service position in which the service port 22 registers with port 11 leading to the brake cylinder and air flows from the auxiliary reservoir to the brake cylinder to apply the brakes in the usual manner, as shown in Fig. 3. As the auxiliary reservoir pressure falls slightly below that in the train pipe the piston with the auxiliary slide valve and spring 16 move back to lap position in which the projections 19 engage the wings 21 of the main slide valve and the service port 22 is closed.

When the train pipe pressure is increased in the usual manner for releasing brakes this pressure acting on the piston is transmitted through the spring 16 and head 17 to the main slide valve 5 thereby moving the valve mechanism toward full release position in which the main valve engages the stop 7 and prevents further inward movement of the main valve. This also forms a fixed stop for the head 17 as it engages the main valve. At the forward end of the train the wave of increased pressure in the train pipe acting on the triple pistons is much greater comparatively than toward the rear of the train and is sufficient to cause the pistons and auxiliary slide valves on the forward cars to continue to move inward after the main valve is against the stop, thereby compressing the spring 16 and moving the auxiliary slide valve to a retarded release position in which the release from the brake cylinder is more or less restricted as shown in Fig. 2, or in which the exhaust from the brake cylinder may be entirely closed if desired, as shown in Fig. 5. On cars toward the rear of the train however the increase in train pipe pressure is not sufficient to compress the retarding spring 16, consequently the triple valve mechanism on the rear cars move only to the normal full release position in which the exhaust from the brake cylinder is fully open as illustrated in Fig. 1.

As the triple valves on the forward cars move much more promptly than upon the rear cars it will be seen that by thus retarding the release on the forward cars a much more uniform release of the brakes throughout the train is secured, then as the pressure equalizes upon the triple pistons at the forward end the springs 16 operate to return the pistons and auxiliary valves to the normal full release position.

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 casing containing a piston subject to variations in train pipe pressure, and a graduating valve actuated by said piston for controlling the supply of fluid to the brake cylinder and the release from the brake cylinder, the graduating valve having a normal full release position and an inner retarded release position, and a yielding resistance means carried by the moving parts of the triple valve device and acting to oppose the movement of said graduating valve from its

full release position to its retarded release position.

2. A triple valve device comprising a casing containing a piston subject to variations in train pipe pressure, a valve actuated by said piston for controlling the supply of fluid to the brake cylinder and the release from the brake cylinder, said valve having a normal full release position and an inner retarded release position, and a spring carried by the moving parts of the triple valve device and tending to move the same from the retarded release position to the normal full release position.

3. A triple valve device comprising a casing containing a valve mechanism composed of a piston and slide valve for controlling a brake cylinder service port and a brake cylinder exhaust port, said valve having a normal full release position and an inner retarded release position, and yielding resistance means carried by said valve mechanism for opposing the movement of the same from its full release position to its retarded release position.

4. A triple valve device comprising a casing containing a valve mechanism composed of a piston and slide valve for controlling the supply to and the release from the brake cylinder, said valve having a normal full release position and an inner retarded release position, and a spring carried by said valve mechanism and tending to move the same from its retarded release position to its full release position.

5. In a triple valve device, a valve mechanism comprising a piston subject to variations in train pipe pressure, a main valve, and a graduating valve mounted on the main valve operated by said piston for controlling the supply of fluid to and the release from the brake cylinder, said graduating valve having a normal full release position and a retarded release position, a spring carried by said valve mechanism and tending to move the graduating valve from its retarded release position to full release position, and a fixed stop for engaging one end of the spring in full release position.

6. In a triple valve device, a main valve, an auxiliary valve and piston having a movement relative to the main valve for controlling the release from the brake cylinder and a spring acting between the main valve and the piston to oppose the movement of the latter and the auxiliary valve from a normal full release position to an inner retarded release position.

7. In a fluid pressure brake, the combination with a piston subject to variations in train pipe pressure and valve means operated by said piston and having a full release position and a retarded release position, of means for opposing the movement of said valve means to the retarded release position comprising a spring carried by the piston, a relatively movable member engaging one end of the spring and having lateral projections adapted to engage stops in full release position to thereby prevent movement thereof from full to retarded release position.

8. In a fluid pressure brake, the combination with a piston subject to variations in train pipe pressure and valve means operated by said piston and having a full release position and a retarded release position, of means for opposing the movement of said valve means to the retarded release position comprising a spring carried by the piston, a relatively movable member engaging one end of the spring, sad lateral projections on said member adapted to engage stops in the full release position to thereby effect the compression of the spring in the movement of the parts from full to retarded release position.

9. In a fluid pressure brake, the combination with a piston subject to variations in train pipe pressure, a main valve having a full release position, and an auxiliary valve having a full release and a retarded release position, both valves being operated by said piston, of a fixed stop for limiting the movement of the main valve at the full release position, a spring carried by said piston, a movable member for engaging said spring, and stops carried by the main valve for engaging said movable member to thereby compress the spring in the movement of the piston and auxiliary valve from full to retarded release position.

10. In a fluid pressure brake, the combination with a train pipe and brake cylinder, of a triple valve device comprising a piston, a main slide valve, and an auxiliary valve having a movement relative to said main valve, for controlling the release from the brake cylinder, said auxiliary valve having a full release position and a retarded release position, and a yielding resistance spring carried by the triple valve piston for opposing the movement of said auxiliary valve from the full release to the retarded release position.

In testimony whereof I have hereunto set my hand.

WALTER V. TURNER.

Witnesses:
R. F. EMERY,
A. M. CLEMENTS.