W. V. TURNER.

GRADUATED RELEASE TRIPLE VALVE.

APPLICATION FILED FEB. 7, 1905.

971,421. Patented Sept. 27, 1910.

Fig. 1.

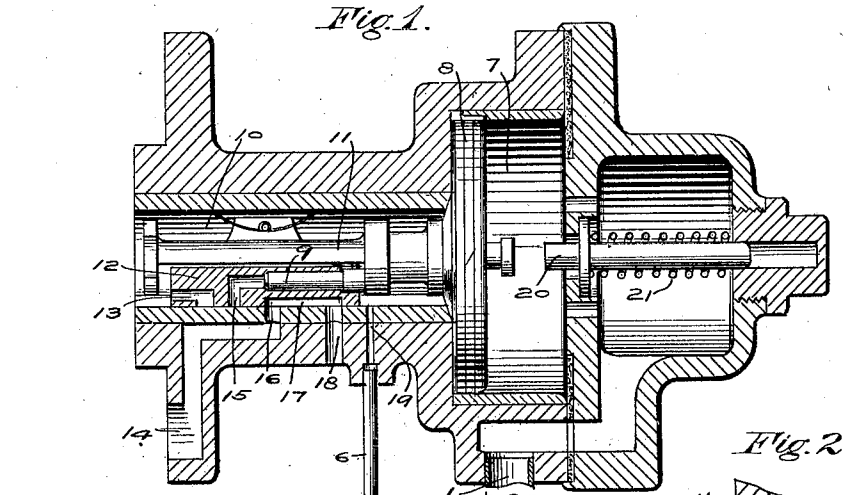


Fig. 2.

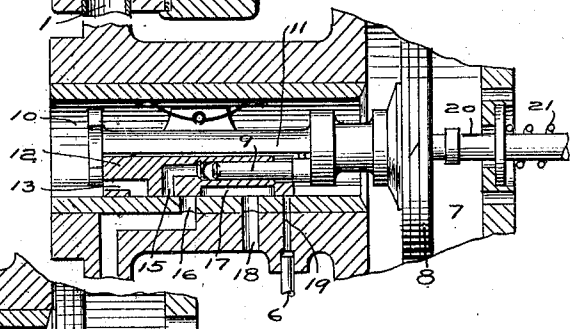


Fig. 3.

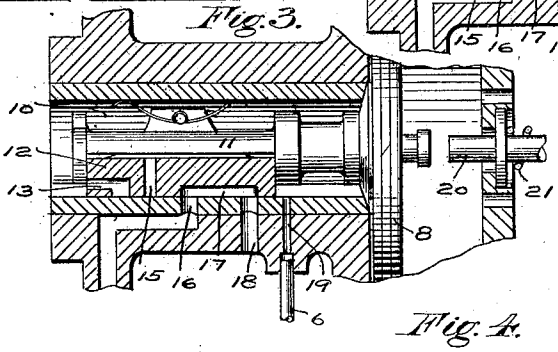
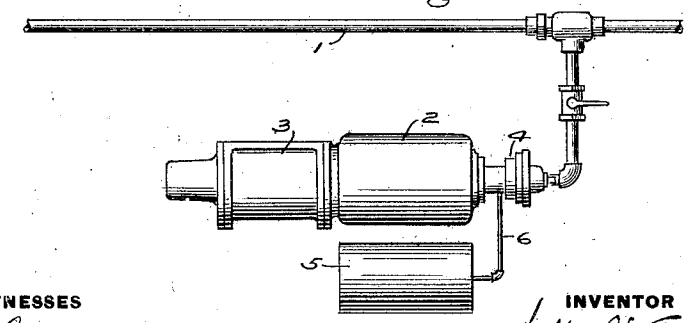


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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GRADUATED-RELEASE TRIPLE VALVE.

971,421. Specification of Letters Patent. **Patented Sept. 27, 1910.**

Application filed February 7, 1905. Serial No. 244,622.

To all whom it may concern:

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

This invention relates to fluid pressure brake apparatus, and has for its object to provide an improved valve device operating in response to variations in fluid pressure, and in connection with an additional reservoir or source of fluid pressure other than the usual auxiliary reservoir, for controlling the release from the brake cylinder, and communication from the additional source of pressure to the auxiliary reservoir, whereby a graduated release of the brakes and a quick recharge of the auxiliary reservoir may be secured.

Heretofore it has been proposed to combine a supplemental reservoir with an automatic brake apparatus and a valve device having a single valve moved positively by its operating piston for securing graduating effects both in the application and release of the brakes. Such a construction has been found to be defective, however, for the reason that no means are provided for arresting the movement of the valve at certain intermediate positions, except the resulting variations of pressure on the opposite sides of the operating piston due to the opening or closing of certain ports, and the valve is liable to move too far and thus destroy the delicacy of the graduating effect.

My invention therefore comprises means, preferably in the form of a yielding stop device, for defining an intermediate or lap position of the valve device in which the brake cylinder port, and the port communicating with the additional source of pressure are closed, thereby preventing an excessive travel of the valve beyond this position in graduating the brake cylinder pressure on or off. This yielding stop device is preferably made in the form of an extended spring-actuated graduating stem of the triple valve device and it is in connection with this form of improvement that I have illustrated the invention in the accompanying drawing, in which—

Figure 1 is a sectional view of a triple valve device embodying my improvement; Fig. 2 a similar sectional view showing the valve in its intermediate or lap position; Fig. 3 a similar sectional view showing a modified form of triple valve device having a single slide valve; and Fig. 4 a small diagram illustrating the equipment as applied on a car.

Referring to Fig. 4, the reference numeral 1 represents the usual train pipe, 2 the auxiliary reservoir, 3 the brake cylinder, and 4 the triple valve device. According to this invention an additional source of air pressure is used to supply air to the auxiliary reservoir or the auxiliary reservoir side of the triple valve piston, when the brakes are being released. This source of pressure is here represented by the additional or supplemental reservoir 5, but it is understood that any other supply may be used, if desired.

As shown in Figs. 1 and 2, I have applied my improvement to a standard triple valve device having the usual piston chamber 7, valve chamber 10, piston 8, stem 11, slide valve 12 and graduating valve 9, the valve seat having exhaust port 18 and brake cylinder port 16 leading to passage 14, while the valve is provided with service port 15, emergency port 13 and exhaust cavity 17, all of which may be of the ordinary well known construction. An additional port 19 in the valve seat communicates with pipe 6 and the additional reservoir 5.

According to my improvement a yielding resistance means is provided for defining an intermediate or lap position of the valve, in which the additional reservoir port 19 and the service port are closed, and as here shown this comprises the long graduating stem 20 having spring 21, and adapted to engage the piston in such position that these ports are closed as shown in Fig. 2.

When the triple valve is in release position, as indicated in Fig. 1, and air under pressure is supplied to the train pipe, it flows through the usual feed groove around the piston 8 and charges the valve chamber and the auxiliary reservoir in the usual way, and as the port 19 is open the supplemental reservoir 5 is also charged through pipe 6 to the normal standard degree of pressure. When a train pipe reduction is made for a service application of the brakes

the piston with g duating valve moves out and draws the slid valve to service position, in which the service port 15 registers with the brake cylinder port 16 and the yielding stop 20 is pushed out, compressing the spring 21 to a certain extent. As soon as the auxiliary reservoir pressure has fallen to a degree equal to that of the train pipe, the graduating spring returns the piston and graduating valve to close the service port 15 and prevent further flow of air from the auxiliary reservoir to the brake cylinder. If desired, the graduating stem 20 may be made of sufficient length to also move the main slide valve a short distance sufficient to carry the service port 15 and the brake cylinder port 16 out of register, and this is necessary in the modified form of valve shown in Fig. 3, in which there is no graduating valve and the service port opens directly into the valve chamber and auxiliary reservoir. In either case, it will be noted that the supplemental reservoir port 19 is closed at the first outward movement of the slide valve, so that the higher degree of pressure is retained in this reservoir.

If it be desired to reduce the brake cylinder pressure a certain amount, a corresponding increase is made in the train pipe pressure and the brake valve then lapped, whereupon the triple valve moves up to release position, opening the port 19 and the brake cylinder exhaust port. The brake cylinder pressure then begins to reduce by exhausting to the atmosphere, but as air from the higher pressure of the supplemental reservoir or other source of supply then flows into the valve chamber and raises the pressure on the auxiliary reservoir side of the triple valve piston the same is moved out again to its intermediate position, in which it touches the yielding stop and closes the brake cylinder exhaust and the admission port from the additional reservoir or other source of supply. Further reductions in the brake cylinder pressure may be made in a similar manner, and it will be noticed that in each case the auxiliary reservoir is recharged from the additional source to a corresponding extent.

If a full release of the brakes is desired at any time, a continuous increase is made in train pipe pressure which holds the triple valve in full release position a sufficient length of time to allow a complete exhaust from the brake cylinder. It is therefore evident that perfect control of the brakes is thus secured, and that the brake cylinder pressure may be graded up or down at will.

In graduating off the brake cylinder pressure by admitting air from an additional source to the auxiliary reservoir side of the triple valve piston it is important that means should be provided for preventing the valve from making such an excessive outward movement as to again open the service port to the brake cylinder, and this is the great advantage derived from the use of a resistance device, such as the yielding graduating spring or stop which engages the piston or valve at the intermediate or lap position and defines this position in which the brake cylinder port and the additional supply port are closed. This yielding stem also defines the lap position of the valve in a graduated application of the brakes when the auxiliary reservoir pressure falls to that of the train pipe as previously explained.

An emergency application may be made in the usual manner by a sudden and greater reduction in train pipe pressure which causes the piston and valve to travel out to the extreme position, compressing the graduating spring to a greater extent and bringing the emergency port 13 into register with the brake cylinder port 15. It will be understood that the additional supply port 19 is at one side of the valve so as not to register with the exhaust cavity 17.

By the use of my improvement for defining the intermediate or lap position of the valve in graduating down the brake cylinder pressure, all excessive outward movement of the valve and consequent undesirable opening of the brake cylinder service port is effectually prevented and a much more definite and positive action of the valve is secured.

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 train pipe, auxiliary reservoir, and brake cylinder, of an additional reservoir or source of pressure, and a valve device having yielding resistance means for defining an intermediate or lap position, and operated by variations in fluid pressure for controlling the release from the brake cylinder and communication from the additional source to the auxiliary reservoir.

2. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir, brake cylinder, and an additional reservoir or supply, of a valve device having a movable abutment operated by variations in fluid pressure, a valve actuated by said abutment for controlling communication from the additional reservoir to the auxiliary reservoir, and yielding resistance means for defining an intermediate or lap position of said valve.

3. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir, brake cylinder, and an additional reservoir or supply, of a valve device having a movable abutment subject to the opposing pressures of the train pipe and auxiliary reservoir, a valve operated by said abutment for controlling communication from the

additional reservoir to the auxiliary reservoir side of said abutment and the release from the brake cylinder, and yielding resistance means for defining an intermediate or lap position of said valve.

4. A triple valve device having a brake cylinder port and a port for supplying air from an additional reservoir or source to the auxiliary reservoir, and a yielding resistance means for defining an intermediate or lap position of the valve in which these ports are closed.

5. A triple valve device having ports adapted in one position to open the exhaust from the brake cylinder and communication from an additional reservoir or source to the auxiliary reservoir, and in another position to open communication from the auxiliary reservoir to the brake cylinder, and a yielding stop for defining an intermediate lap position with the ports closed.

6. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir, brake cylinder, and additional reservoir or source, a triple valve device having ports for opening the brake cylinder exhaust, and communication from the additional reservoir to the auxiliary reservoir in release position, and for opening communication from the auxiliary reservoir to the brake cylinder in service position, and a graduating spring for defining an intermediate lap position.

In testimony whereof I have hereunto set my hand.

WALTER V. TURNER.

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