No. 890,823.

PATENTED JUNE 16, 1908.

W. V. TURNER.

TRIPLE VALVE FOR GRADUATING RELEASE.

APPLICATION FILED OCT. 13, 1905.

Fig. 1.

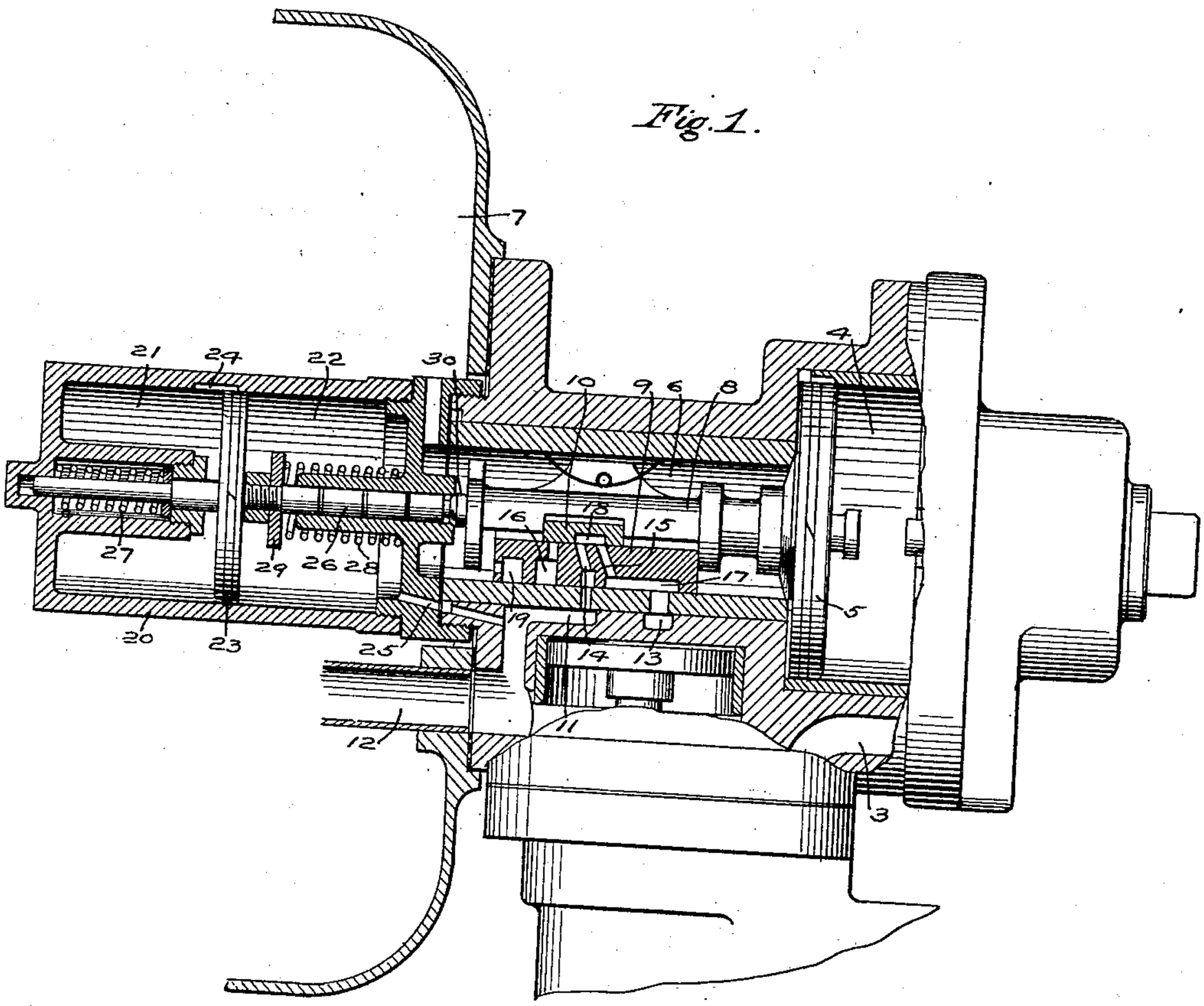
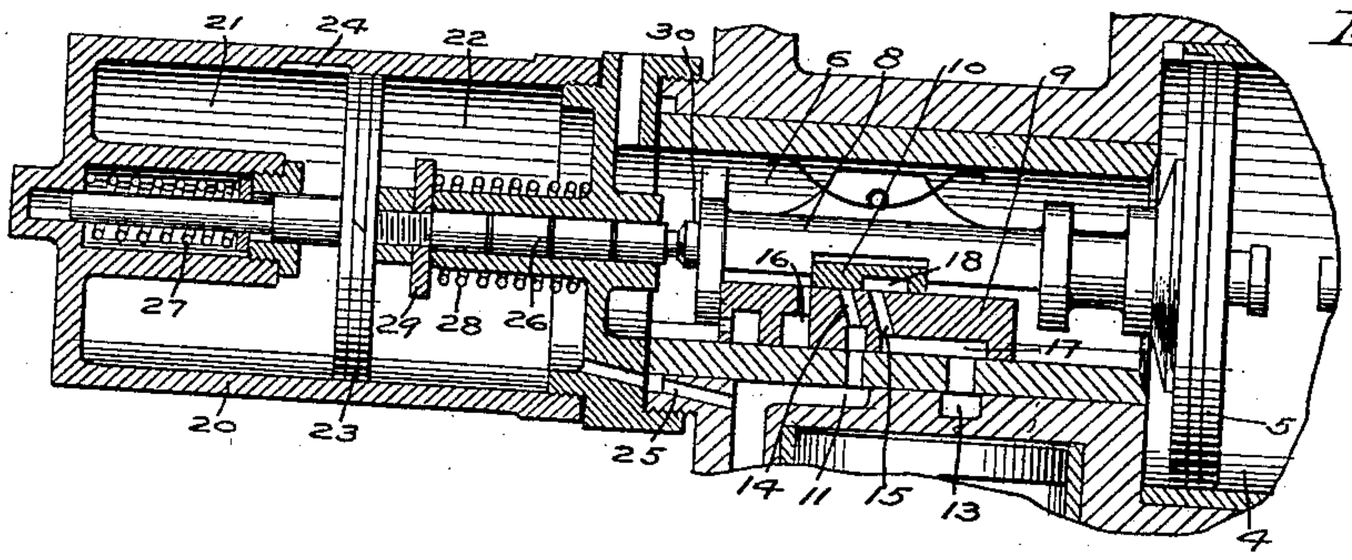


Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

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TRIPLE VALVE FOR GRADUATING RELEASE.

No. 890,823. Specification of Letters Patent. Patented June 16, 1908.

Application filed October 13, 1905. Serial No. 282,573.

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 Triple Valves for Graduating Release, of which the following is a specification.

This invention relates to automatic fluid pressure brakes, and more particularly to the triple valve device for such systems, the object being to provide an improved form of valve device by means of which the brake cylinder pressure may be graded down in successive stages, as desired, or be entirely released at any time.

This invention is in the nature of a modification or improvement on that feature of the device covered by my prior pending application, Ser. No. 198762, filed March 18, 1904, relating to the graduated release. In that case, a triple valve device is shown as provided with a piston subject on one side to the brake cylinder pressure and having a stem operated by the piston upon a reduction in brake cylinder pressure to bear against the main slide valve of the triple valve device and move the same to close the brake cylinder exhaust.

On account of the large area of the main slide valve a considerable pressure on the piston is required to overcome the frictional resistance and move the valve back a sufficient distance to close the exhaust, and my present invention comprises the provision of a small graduating valve having a lost motion, or independent movement relative to the main valve, and operated by the piston for controlling the brake cylinder exhaust.

In the accompanying drawing, Figure 1 is a view in vertical section of a triple valve device embodying my improvement; and Fig. 2 a similar view showing the parts in position for graduating the release.

According to the construction shown, the triple valve device is of the usual form, comprising a casing having train pipe passage 3, piston chamber 4 containing triple piston 5, valve chamber 6, with piston stem 8, main slide valve 9 and graduating slide valve 10. The triple valve casing is secured to the auxiliary reservoir 7 in the usual manner, the valve chamber 6 being in open communication therewith, and having the exhaust port 13 and brake cylinder port 11 connecting by passage 12 with the brake cylinder, while the valve 9 is provided with the usual service port 16 and emergency port 19. According to the present improvement the main valve is also provided with ports 14 and 15 adapted to be connected by cavity 18 in the small graduating valve 10 for establishing communication from the brake cylinder port 11 to the cavity 17 and exhaust port 13 in the release position of the valve.

At the inner end of the triple valve casing is mounted a casing 20 which may extend within the auxiliary reservoir and is divided by the piston 23 into the two chambers 21 and 22. The chamber 22 is closed from the triple valve chamber 6 by a partition through which extends the stem 26 provided with a head 30 adapted to be held to its seat on the partition by the spring 28 which bears against the collar 29 carried on the other end of the stem, thus preventing leakage around the stem from the auxiliary reservoir to the chamber 22. This chamber 22 on one side of the piston 23 communicates with the brake cylinder through port 25 and a spring 27 is located on the other side of the piston to keep the same normally in position against the opposite spring actuated stem 26 when the piston is balanced as to fluid pressure, as indicated in Fig. 1.

When an application of the brake is made by a reduction in train pipe pressure in the usual way, the triple piston 5 with the small graduating valve 10 moves out a short distance independent of the main valve 9, opening port 16 and closing port 14, then as the triple piston continues to move out it carries the main valve along with it to service position, in which the port 16 registers with brake cylinder port 11 and the brake cylinder is charged from the auxiliary reservoir, the piston with its graduating valve returning to lap and closing service port 16 upon equalization of the auxiliary reservoir and train pipe pressures in the ordinary manner. As the air pressure accumulates in the brake cylinder it flows through port 25 into chamber 22 and, moving the piston 23 slightly to the left against spring 27, feeds through small groove 24 into the chamber 21 on the opposite side of the piston, so that both chambers are charged with air at the same degree of pressure as the brake cylinder.

When it is desired to graduate down the brake cylinder pressure a certain amount

without entirely releasing the same, the train pipe pressure is increased a small amount sufficient to cause the triple valve piston to move to release position. Air from the brake cylinder then begins to discharge to the atmosphere through ports 11, 14, 18, 15, 17 and 13, and the pressure in chamber 22 diminishes at substantially the same rate as that of the brake cylinder. As the pressure in the chamber 21 on the opposite side of the piston cannot diminish as rapidly by leakage around the piston the excess of pressure in chamber 21 over that of chamber 22 acts to move the piston 23, with stem 26, to the right, compressing the spring 28 and moving the triple piston stem and small graduating valve 10 sufficiently to close the port 14, as indicated in Fig. 2, and cut off further exhaust from the brake cylinder.

The stem 26 engages the triple piston stem and easily moves the graduating valve, while the main slide valve 9, on account of its greater frictional resistance, remains in normal release position, as shown in Fig. 2. The pressure then equalizes around the piston 23 and the spring 28 returns the stem 26 and piston to normal position leaving the triple piston stem and graduating valve 10 in the position shown in Fig. 2. A further reduction in brake cylinder pressure may be made in a similar manner by slightly increasing the train pipe pressure sufficiently to move the triple piston and graduating valve from graduated release position to full release position, Fig. 1, whereupon the pressure in the brake cylinder and chamber 22 again diminishes by discharging to the atmosphere and the piston 23 acting on stem 26 moves the triple piston and graduating slide valve out to the position shown in Fig. 2 and again cuts off the brake cylinder exhaust. In thus grading down the brake cylinder pressure, it will be noticed that the main slide valve 9 does not move but remains in its normal release position, while the triple piston with the small graduating slide valve 10 moves alternately back and forth for controlling the brake cylinder exhaust. As the small valve has but little frictional resistance it moves very readily through this short independent movement relative to the main valve and the latter constitutes a block or yielding stop device for defining the independent travel of the graduating valve. In this manner very fine graduations may be made and the brake cylinder pressure graded down to any desired degree.

A full release of the brake may be made at any time by making a continued increase in the train pipe pressure by placing the brake valve in release or running position in the usual way. This produces a steady rise in pressure on the train pipe side of the triple valve piston, which overcomes any tendency of the excess pressure in the chamber 21 to move out the triple piston, and holds the valves in release position until the air is completely discharged from the brake cylinder.

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 main valve, of a graduating valve and piston having an independent movement relative to the main valve for controlling the brake cylinder exhaust, and a movable abutment or piston subject to brake cylinder pressure for operating said graduating valve.

2. In a fluid pressure brake, the combination with a main valve, and a graduating valve having an independent relative movement for controlling the brake cylinder exhaust, of a piston subject to train pipe pressure for operating said valves, and a movable abutment subject to brake cylinder pressure for operating said graduating valve to close the brake cylinder exhaust.

3. In a fluid pressure brake, the combination with a main valve having brake cylinder exhaust ports, of a graduating valve having an independent movement relative to the main valve for controlling said ports, and a piston subject to brake cylinder pressure for operating said graduating valve.

4. A triple valve device comprising a main valve and a graduating valve for controlling the supply and release ports to and from the brake cylinder, a piston for operating said valves in response to variations in train pipe pressure, and means operated by a reduction in brake cylinder pressure for moving said graduating valve to close the brake cylinder exhaust.

5. A triple valve device comprising a main valve and a graduating valve for controlling the supply and release ports to and from the brake cylinder, a piston for operating said valves in response to variations in train pipe pressure, and a piston subject to the opposing pressures of the brake cylinder and a chamber for moving said graduating valve to close the brake cylinder exhaust.

6. A triple valve device comprising a main valve having a service port and exhaust ports, a graduating valve having a movement relative to the main valve for controlling said ports, a piston subject to train pipe pressure for operating said valves, and another piston subject to brake cylinder pressure for also actuating said graduating valve.

7. A valve device for fluid pressure brakes comprising a main valve, an auxiliary valve having a movement relative to the main valve, a piston subject to train pipe pressure for operating said valve, and a movable abutment subject to the brake cylinder pressure for also operating said auxiliary valve.

8. A valve device for fluid pressure brakes comprising a main valve, an auxiliary valve having an independent movement relative to

the main valve for controlling the brake cylinder exhaust, a piston subject to the train pipe pressure for operating said valves, and a movable abutment subject to the brake cylinder pressure for operating on said auxiliary valve to close the brake cylinder exhaust.

9. A valve device for fluid pressure brakes comprising main and auxiliary valves for controlling the brake cylinder pressure, a piston subject to train pipe pressure for operating said valves, and means subject to brake cylinder pressure for also operating said auxiliary valve.

10. In a fluid pressure brake, the combination with a main valve, of a graduating valve and piston, having an independent movement relative to the main valve for controlling the brake cylinder exhaust, and a movable abutment for operating said graduating valve

In testimony whereof I have hereunto set my hand.

WALTER V. TURNER.

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