No. 890,824. PATENTED JUNE 16, 1908.

W. V. TURNER.

GRADUATING TRIPLE VALVE.

APPLICATION FILED OCT. 20, 1905.

Fig. 1.

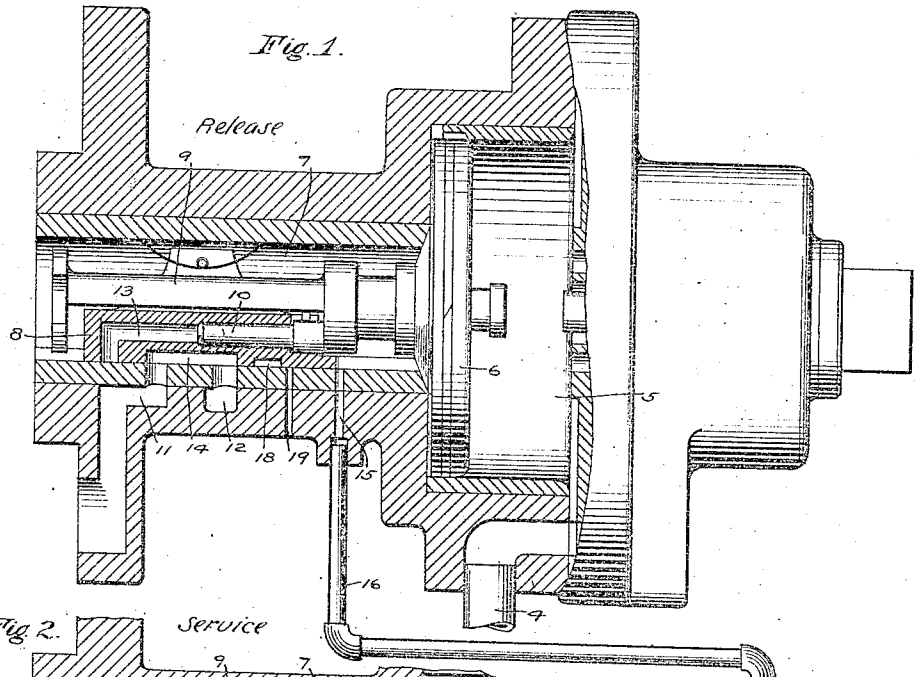


Fig. 2.

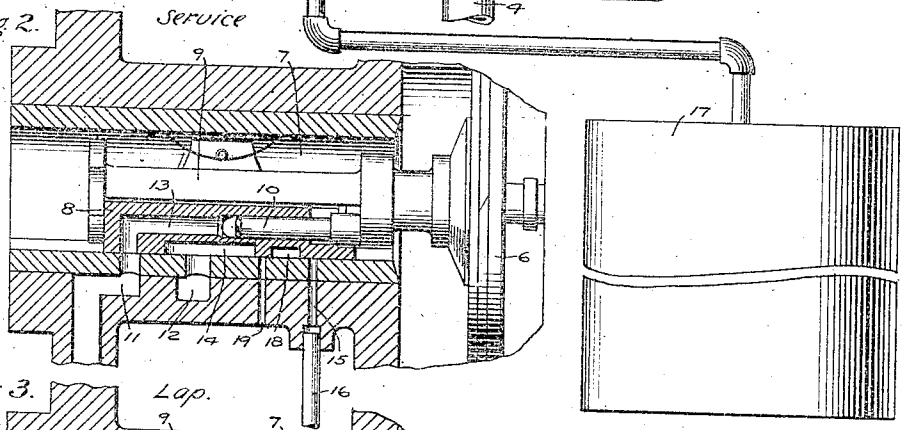
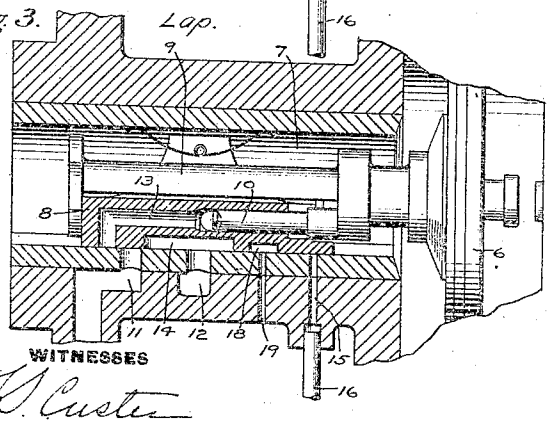


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

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GRADUATING TRIPLE VALVE.

No. 890,224. Specification of Letters Patent. Patented June 16, 1908.

Application filed October 20, 1906. Serial No. 339,592.

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

This invention relates to fluid pressure brakes, and has for its object to provide an improved triple valve device adapted to graduate the release of the brake, whereby the brake cylinder pressure may be graded down to any desired degree without entirely releasing the same or may be completely released at any time.

It has heretofore been proposed to graduate the release of the brake by the use of an additional or supplemental reservoir connected to the triple valve chamber or usual auxiliary reservoir by a port in the triple valve seat in such position as to be opened by the movement of the main slide valve of the triple valve to full release position. With this construction, after the system is charged with compressed air and an application of the brake made in the usual way, the brake cylinder pressure may be graded down by making a small increase in train pipe pressure and then turning the engineer's brake valve to lap position. This rise in train pipe pressure causes the slide valve of the triple valve to move to release position and open the brake cylinder exhaust port as well as the port leading to the supplemental reservoir in which the air has been maintained at the higher degree of pressure during the time that the train pipe has been reduced for the application. Air at this higher degree of pressure then flows from the supplemental reservoir into the valve chamber on the auxiliary reservoir side of the triple valve piston and raising the pressure therein above that of the train pipe moves the piston and slide valve out to again close the exhaust port and hold the remaining pressure in the brake cylinder and also close the supplemental reservoir port. When the slide valve makes this outward movement to cut off the release, it is very liable to travel too far and not only close the exhaust but also again open the service port for supplying air to the brake cylinder unless some resistance means is employed to limit or retard its movement at the desired position.

For this purpose, my present invention comprises means for increasing the frictional resistance of the valve at certain points whereby this graduated action may be secured without moving the valve too far. It is an established fact that the frictional resistance between a slide valve and its seat depends upon the pressure in the valve chamber and the area of the cavities in the face of the valve that communicate with the atmosphere or a space of lower pressure than the valve chamber. This principle may be employed for increasing the frictional resistance of the valve at any particular position by forming an additional cavity in the face of the valve and providing a port which is adapted to open communication from said cavity to the atmosphere in the desired position of the valve, but to be closed in other positions.

In the accompanying drawing, Figure 1 is a longitudinal section of a triple valve device embodying my improvement and showing the supplemental reservoir attached, the parts of the device being indicated in full release position; Fig. 2 a similar sectional view of the triple valve device showing the parts in service application position; and Fig. 3 a similar view showing the parts in a lap position for graduating the release.

The triple valve device may be of the usual construction, comprising a connection 4 for the train pipe, piston chamber 5, piston 6, valve chamber 7 in open communication with the auxiliary reservoir and containing main slide valve 8, piston stem 9 and graduating valve 10. The main valve seat is provided with the usual brake cylinder port 11 and exhaust port 12, while the main valve has a service port 14 controlled by the graduating valve 10, and a main exhaust cavity 14 for connecting the brake cylinder with the exhaust port 12 and the atmosphere in release position, all of which may be of the ordinary well-known construction.

In addition to the usual ports above enumerated I provide a port 15 in the valve seat communicating by pipe 16 with supplemental reservoir 17, said port 15 being open to the valve chamber and auxiliary reservoir in the release position of the valve whereby the supplemental reservoir is normally charged to the same maximum degree of pressure as the auxiliary reservoir and train pipe. An additional cavity 18 is also formed in the face

of the main slide valve 8 and is adapted to communicate with the atmospheric port 19 when the valve moves to a lap position for cutting off the exhaust in graduating the release from the brake cylinder.

The application of the brakes is made in the usual way by reducing the train pipe pressure.

After the brakes are applied, if it be desired to grade down the brake cylinder pressure a certain amount without entirely releasing the same, a slight increase is made in the train pipe pressure sufficient to move the triple valves to release position, Fig. 1, thereby opening the brake cylinder exhaust and also uncovering the supplemental reservoir port 15.

By the closing of port 15 by the slide valve during the application of the brakes, the normal maximum degree of pressure has been retained in the supplemental reservoir 17, so that when the slide valve is returned to release position this air, at a higher pressure than that of the reduced auxiliary reservoir and train pipe, flows into the valve chamber on the auxiliary reservoir side of the triple valve piston and raises the pressure thereon above that of the train pipe on the opposite side, in which only a small and momentary increase has been made. This causes the piston and slide valve to move out far enough to close the supplemental reservoir port and the brake cylinder exhaust. When the valve reaches this lap or graduated release position, as indicated in Fig. 3, the additional cavity 18 communicates by port 19 with the atmosphere, thereby increasing the frictional resistance of the valve at this position so as to retard and arrest the movement of the valve and prevent the same from traveling to its service position, Fig. 2, in which the service port would be opened to the brake cylinder. In all positions of the valve, other than that shown in Fig. 3, the atmospheric port 19 is closed, so that this additional frictional resistance is exerted only at this point in the travel of the valve.

Further reductions in the brake cylinder pressure may be made in a similar manner by again increasing the train pipe pressure a small amount, whereupon the piston moves the valve to release position and opens the brake cylinder exhaust port and the supplemental reservoir port, so that a portion of the air is released from the brake cylinder while the admission of compressed air from the supplemental reservoir again acts on the piston to move the valve out to lap or graduated release position, as shown in Fig. 3. In this manner the brake cylinder pressure may be graded down to any desired degree.

Whenever a complete release of the brake is desired, a continuous increase is made in the train pipe pressure in the usual way, thereby holding the triple valve piston and slide valve in full release position, since the pressure then continues to rise more rapidly on the train pipe side of the piston than on the other side by the air flowing in from the supplemental reservoir.

It will be apparent that any desired source of air pressure may be used in lieu of the supplemental reservoir, or that other means may be employed for moving the slide valve outward to close the brake cylinder exhaust.

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

1. A triple valve device having a slide valve for controlling the exhaust from the brake cylinder, and means for increasing the frictional resistance of the slide valve upon its seat at a certain point of its travel.

2. A triple valve device having a slide valve for controlling the exhaust from the brake cylinder, and means for exposing a portion of the slide valve to lower or atmospheric pressure at a certain point of its travel to increase the frictional resistance.

3. A triple valve device having a slide valve for controlling the exhaust from the brake cylinder, and an additional cavity with an atmospheric port for increasing the frictional resistance of the valve at a certain point of its travel.

4. A triple valve device having a slide valve for controlling the exhaust from the brake cylinder, means for supplying compressed air from an additional source to the auxiliary reservoir side of the triple valve piston in the release position of the valve, and means for increasing the frictional resistance of the valve at a point of its travel in which the brake cylinder exhaust is closed.

5. A triple valve device comprising a piston subject to the opposing pressures of the train pipe and auxiliary reservoir, a slide valve operated by the piston for controlling the brake cylinder exhaust, a port for admitting compressed air from an additional source to the auxiliary reservoir side of the piston in the release position of the valve, and means for exposing an additional area of the valve to atmospheric pressure in a position in which the brake cylinder exhaust port and the additional supply port are closed.

6. A triple valve device comprising a piston subject to the opposing pressures of the train pipe and auxiliary reservoir, a slide valve operated by the piston for controlling the brake cylinder exhaust, a port for admitting compressed air from an additional source to the auxiliary reservoir side of the piston in release position of the valve, an additional cavity in said valve, and an atmospheric port adapted to communicate with said cavity in a position of the valve in which the brake cylinder exhaust is closed.

7. A triple valve device having a slide valve for controlling the exhaust from the brake cylinder, and means for increasing the effective pressure with which the slide valve is held against its seat at a certain point in its travel.

8. A triple valve device having a slide valve for controlling the exhaust from the brake cylinder, and means for increasing the effective pressure with which the slide valve is held against its seat by the fluid pressure at a certain position of the valve in which the brake cylinder exhaust is closed.

9. A triple valve device having a slide valve for controlling the exhaust from the brake cylinder, and means for increasing the frictional resistance of said slide valve at a point at which the brake cylinder exhaust is closed.

In testimony whereof I have hereunto set my hand.

WALTER V. TURNER.

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