No. 827,291. PATENTED JULY 31, 1906.

A. J. BRISLIN.

TRIPLE VALVE.

APPLICATION FILED APR. 26, 1904.

3 SHEETS—SHEET 1.

Fig. 1.

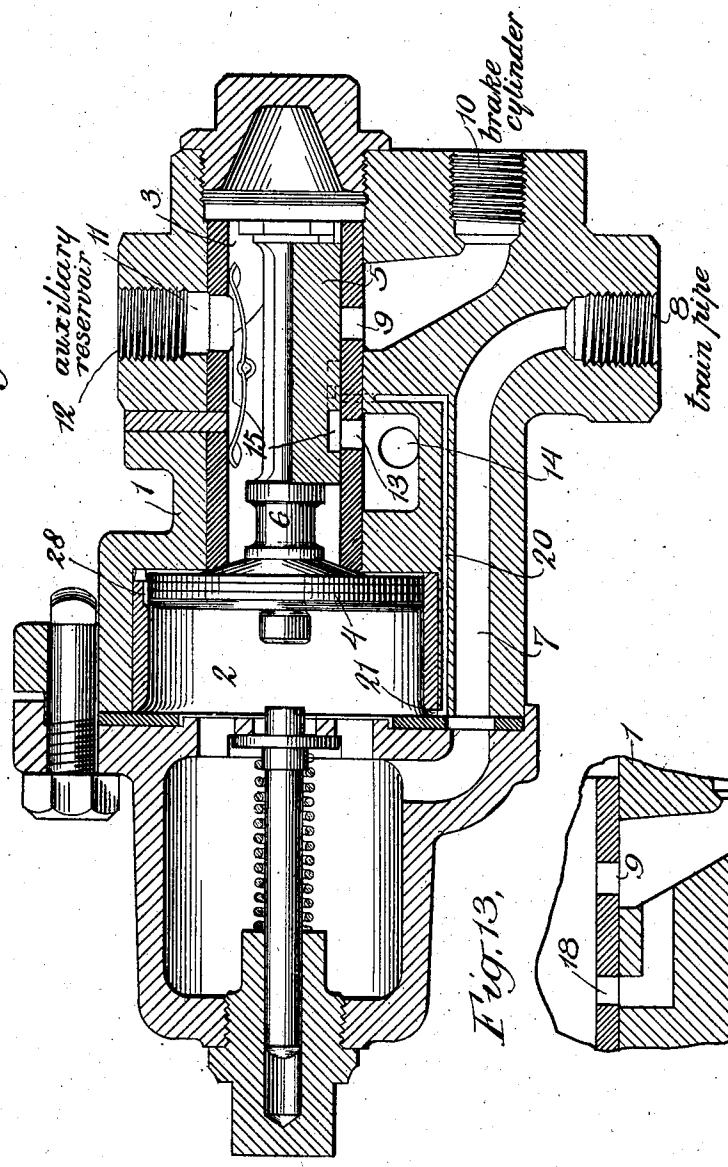

Fig. 13.

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3 SHEETS—SHEET 2.

Fig. 5.

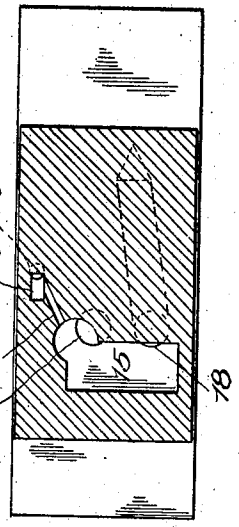


Fig. 6.

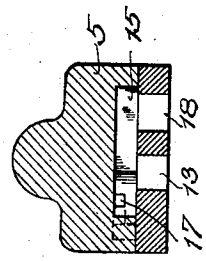


Fig. 7.

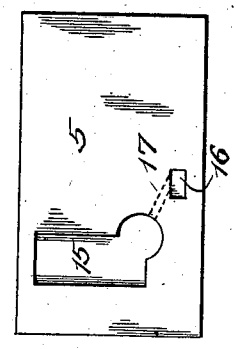


Fig. 2.

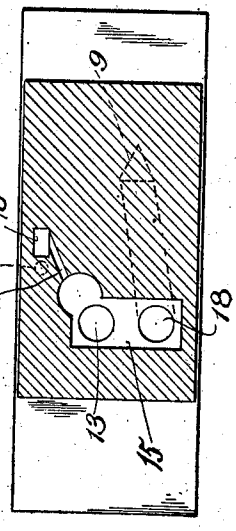


Fig. 3.

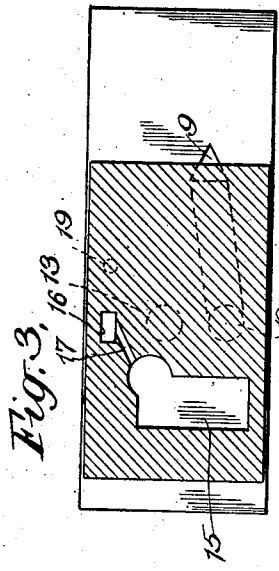
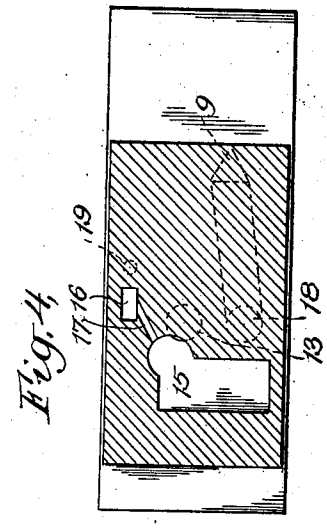


Fig. 4.



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No. 827,291. PATENTED JULY 31, 1906.

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TRIPLE VALVE.

APPLICATION FILED APR. 26, 1904.

3 SHEETS—SHEET 3.

Fig. 11.

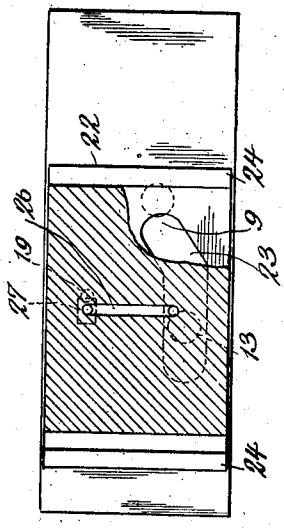


Fig. 12.

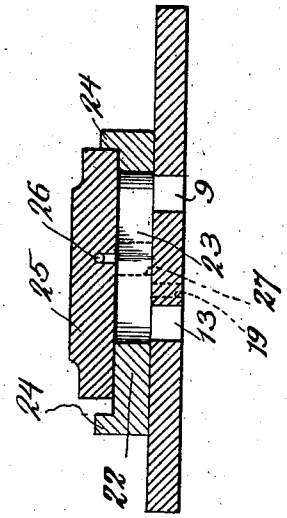


Fig. 8.

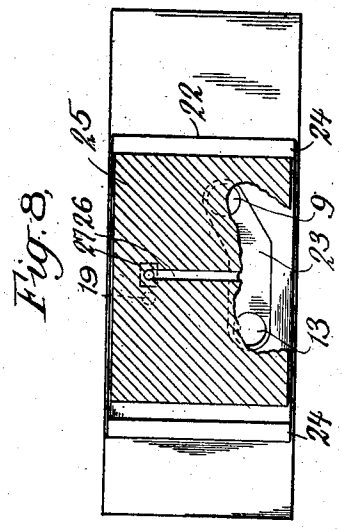


Fig. 9.

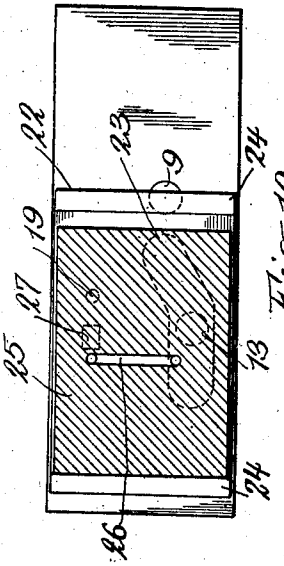
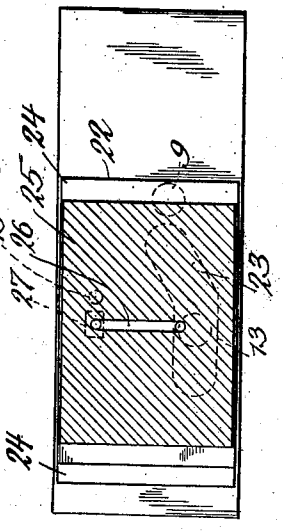


Fig. 10.



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UNITED STATES PATENT OFFICE.

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TRIPLE VALVE.

No. 827,291. Specification of Letters Patent. Patented July 31, 1906.

Application filed April 26, 1904. Serial No. 204,946.

To all whom it may concern:

Be it known that I, ANDREW J. BRISLIN, a citizen of the United States of America, residing at Jamaica, county of Queens, State of New York, have invented certain new and useful Improvements in Triple Valves, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to triple valves employed in air-brake systems.

The main object of my invention is to provide a graduated release operative in the ordinary Westinghouse brake system and without the employment of additional air-reservoirs other than the ordinary auxiliary and main reservoirs usually employed.

To this end my invention consists in a relief-passage leading from the train-pipe side of the graduating-piston to a point of discharge, as to the valve-chamber, and thence to exhaust, the port leading to said valve-chamber suitably controlled by movements of the graduating-valve; and my invention further consists in certain novel details of construction and combination of parts, as will be hereinafter set forth.

I will now proceed to describe the mechanism embodying my invention and will then point out the novel features in claims.

In the drawings, Figure 1 is a view in central vertical longitudinal section of a triple valve embodying my invention. Figs. 2, 3, 4, and 5 are diagrammatic views showing various positions of the graduating-valve with respect to its seat. Fig. 6 is a view in transverse section through the valve and its seat. Fig. 7 is an under side view of the valve. Figs. 8, 9, 10, and 11 are diagrammatic figures showing various positions of another form of graduating-valve with respect to its seat. Fig. 12 is a longitudinal section of the valve and its seat. Fig. 13 is a detail sectional view showing discharge-passage from brake-cylinder for the form of valve shown in Figs. 1 to 7, inclusive.

In Fig. 1 an ordinary form of triple valve is shown, comprising a casing 1, inclosing a piston-cylinder 2 and a valve-chamber 3. A graduating-piston 4, commonly known as the "triple" piston, is mounted in the cylinder 2, and a graduating-valve 5 is secured to the stem 6 of the said piston and is mounted in the said valve-chamber 3. A passage 7 leads to the front of the triple piston 4 from a train-pipe connection 8. A port or passage 9 leads from the valve-chamber 3 to the cylinder connection 10, and a passage 11 leads to the interior of the valve-chamber 3 from auxiliary-reservoir connection 12.

13 is a port or passage leading to exhaust 14. The usual charging-port 28 is provided, the same being a crossover-port in the wall of the cylinder 2, covered by the graduating-piston 4 in its first outward movement.

The valve 5, as will be seen more clearly by reference to Figs. 6 and 7, is provided with a chambered portion 15 and a recess 16, opening into said chambered portion through a channel 17. The valve-seat, which is provided with ports 9 and 13, as above stated, is also provided with a port or passage 18, leading from the brake-cylinder, the port or passage 18 being arranged in a line with the port or passage 13 and both arranged to be in register at certain times with the chambered portion 15 of the valve, so at such times to open the brake-cylinder to exhaust. The valve-seat has also a small port or passage 19 communicating with a relief-passage 20, opening at 21 into the forward end of the cylinder 2. This relief-passage is for the purpose of balancing the pressure in the front at the rear of the piston 4 by venting air from the train-pipe side of the piston 4 in intermediate return positions in order to provide a graduated release.

A complete operation of the device is as follows: Air under pressure admitted from the train-pipe through the passage 7 to the cylinder 2 in the front of the graduating-piston 4 will force the piston to its rearmost position, (in which position it is shown in Fig. 1,) and air will then be charged through the charging-passage 13 to the rear of the piston 4, to the valve-chamber 3, and through the passage 11 to the auxiliary reservoir. Air-pressure will now be balanced at the front and rear of the graduating-piston 4, and the valve 5 will be in its rearmost position. The valve is shown in such position in the diagram, Fig. 2, and in such a position, as will be seen, the port 9, admitting air to the brake-cylinder, is closed, while the port 18 from the brake-cylinder is open through the chambered portion 15 of the valve to the

exhaust-port 13. When it is desired to make what is known as a "service" application of the brakes, pressure in the train-pipe will be slightly lowered by operation of the engineer's valve in a well-known manner, whereby lowering of pressure in front of the piston 4 will cause the predominating pressure at the rear of the valve 5 to move the piston 4 forward or to the left, as shown in the drawings. The valve 5 will be moved until the rear end thereof begins to uncover the port 9 and admit air from the valve-chamber 3 and auxiliary reservoir through the port 9 to the brake-cylinder. The valve is shown in this position in diagrammatic Fig. 3, and it will be seen that when in this position the chambered portion 15 of the valve 5 is out of register with the ports 18 and 13, so that the brake-cylinder will be closed to exhaust. The pressure of air in the valve-chamber 3 at the rear of the piston 4 will on account of its expansion into the brake-cylinder gradually reduce to a point ever so slightly lower than the pressure on the train-pipe side of the graduating-piston 4, when the graduating-piston will move backward to its lap position, as shown in diagrammatic Fig. 4. In this position further expansion of the air into the brake-cylinder is stopped, and pressures being substantially equal on both sides of the graduating-piston 4 the parts will remain in their lap position. Should it be be desired at this time to make a further brake application, air will be again vented from the train-pipe, reducing the pressure on the front side of the piston 4 to repeat the operation, the valve always moving back to lap position as the pressures on both sides of the piston substantially equalize. This is the method now commonly employed for service-brake application in this style of valve. In releasing the brakes the pressure is raised in the train-pipe by proper manipulation of the engineer's valve in a manner well known, whereby the predominance of pressure on the front or train-pipe side of the graduating-piston overcoming the pressure at the rear thereof will start the piston and valve back toward its initial release position to discharge air from the brake-cylinder. In this type of mechanism once the valve has started to move from its lap position toward its initial or full-release position it will ordinarily so move the entire distance, because no means have been provided for equalizing the pressure between the front and rear of the graduating-piston, except the crossover-port 13, and this port is not opened until the piston 4 reaches its most rearward position. In the present device, however, the valve in moving rearward will open the release-passage 20 through the port 19, recess 16, channel 17, and chambered portion 15 to exhaust at 13, as shown in diagrammatic view, Fig. 5, whereby sufficient air will be discharged therethrough from the front side of the piston 4 to exhaust, so as to reduce the pressure on the train-pipe side of the piston to a point ever so slightly lower than the pressure on the valve-chamber side thereof, when the valve will return to lap position with all the ports closed, as shown in diagrammatic view, Fig. 4. When the valve is in the position shown in Fig. 5, with air discharging from the train-pipe side of the piston 4 to exhaust, the port 18 from the brake-cylinder will also be slightly opened to exhaust, so that a small quantity of air will be exhausted from the brake-cylinder. The valve will, however, quickly move back to lap position, so that but a small quantity will be so discharged and a graduated release effected. This operation may be effected a number of times successively, if desired, each time discharging a small quantity of air, until finally all the air has been discharged and the brakes entirely released.

It will thus be seen that by my invention I obtain in an exceedingly simple manner both graduated application and release, and the valve is at all times under full control of the engineer. It will of course be apparent that a full release may be obtained in the usual manner by recharging a sufficient quantity of air into the train-pipe to drive the valve all the way over. The amount of air admitted to the train-pipe will determine the release, and the release may be as delicate and gradual as desired by the introduction of but small quantities of air or may be as quick as formerly by the introduction of large quantities, just in the same way as the service application may be as gradual as is desired by venting but a small quantity of air at a time from the train-pipe, or the application may be suddenly by a large reduction of air in a manner well known.

It may be noticed that in the initial movement of the valve from its full-release and charging position, as shown in Fig. 2 of the drawings, to a position for service application, as shown in Fig. 3, the recess 16 of the valve crosses the port 19. In passing a whiff of air will be discharged; but the movement of the valve is so rapid and the opening so small that the quantity discharged will be so small as to be practically negligible. This small quantity may be saved, however, if desired, by the use of a rider-valve, as shown in Fig. 12 of the drawings and the diagrammatic Figs. 9, 10, and 11. In the form of valve-seat shown in these figures the port 9, leading to the brake-cylinder, is also employed as a discharge-port, the rear end of the main valve 22 is arranged to uncover the said port when in a forward position, and the recessed portion 23 of the valve is arranged to form a communication between the port 9 and the exhaust-port 13 in the release position. The valve 22 is formed with two shouldered portions 24, between which a rider-valve 25 is permitted limited movement.

The rider-valve 25 has a crossover port or passage 26, one end of which is arranged to register with the chambered portion 23 of the valve 22 and the other end of which is arranged to move into and out of register with a passage 27, formed in the body of the valve 22. The passage 27 is arranged in certain positions of the valve to register with the relief-port 19. The parts are shown in Fig. 8 in the full-release and charging position. In such position the ports 9 and 13 are in communication through the chambered portion 23 of the valve 22. The valve 22 is in its rearmost position, as is also the rider-valve 25. The rider-valve 25 is connected to the stem of the graduating-piston and upon the first movement of the graduating-piston will move therewith before any movement is transmitted to the valve 22. In the foregoing position, which is the full-release and charging position, the passage 27 of the valve 22 is in communication with the crossover-passage 26, but is out of register with the relief-ports 19. The initial movement of the valve 25 will carry the crossover-port 26 out of register with the passage 27, so that when movement of the valve 22 commences, due to the front end of the rider-valve abutting against the front shoulder 24 of the main valve, the crossing of the passage 27 over the relief-port 19 will effect no communication between the relief-port 19 and the passage 26. This will be clear by an examination of diagrammatic view, Fig. 9, in which the valves have moved to a service-application position. In the first return or rearward movement the rider-valve will take up the lost motion between its rear end and the rear shoulder 24 of the valve 22, so as to again bring the passage 27 and crossover-port 26 in communication. Thus when in a return position and the passage 27 registers with the relief-port 19 the crossover-port will also be in register therewith, and relief will take place through the port 19, passage 27, and crossover-port 26 to exhaust. The parts are so shown in diagrammatic view, Fig. 11. In this construction it will be seen, then, that no air can escape through the relief-passage during the forward movement of the valve 22, as owing to the relative position of the rider-valve with respect to the main valve the ports and passages necessary for such relief will be out of register, while upon return movement of the parts the said ports and passages will be brought into register and relief permitted, as and for the purpose above explained.

What I claim is—

1. In a triple valve, the combination with a casing, of a triple piston and a graduating-valve controlled by movements thereof, said casing provided with a train-pipe connection and a passage leading therefrom to one side of said triple piston, and a relief-passage leading from the casing on the same side thereof, said relief-passage controlled by the said graduating-valve, and arranged to be opened only when communication is closed between the train-pipe side of said piston, and the opposite side thereof.

2. In a triple valve, the combination with a casing, of a triple piston therein open on one side to train-pipe pressure and on the other side to pressure from another source, and a graduating-valve controlled by movements of the said piston, said casing having a relief-passage leading from the said train-pipe side of said triple piston, said graduating-valve comprising means for opening the said relief-passage in certain positions during movements in one direction only thereof, and in which positions communication between the opposite sides of said piston is closed.

3. In a triple valve, the combination with a casing, of a triple piston therein open on one side to train-pipe pressure and on the other side to pressure from another source, and a graduating-valve controlled by movements of the said piston, said casing having an exhaust-port, and a relief-passage leading from the said train-pipe side of said triple piston, said graduating-valve comprising a main and a rider valve, and having a passage therein arranged in certain position of said valve to register with said relief-passage and said exhaust-port and place same in communication with each other in which position communication between the opposite sides of said piston is closed, said valve-passage closed by relative movements of the main and rider portions of the said graduating-valve during movements of same in one direction.

In witness whereof I have hereunto set my hand this 25th day of April, 1904.

ANDREW J. BRISLIN.

Witnesses:
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C. F. CARRINGTON.