(No Model.)

H. H. WESTINGHOUSE.

QUICK ACTING TRIPLE VALVE.

No. 506,612. Patented Oct. 10, 1893.

FIG. 1.

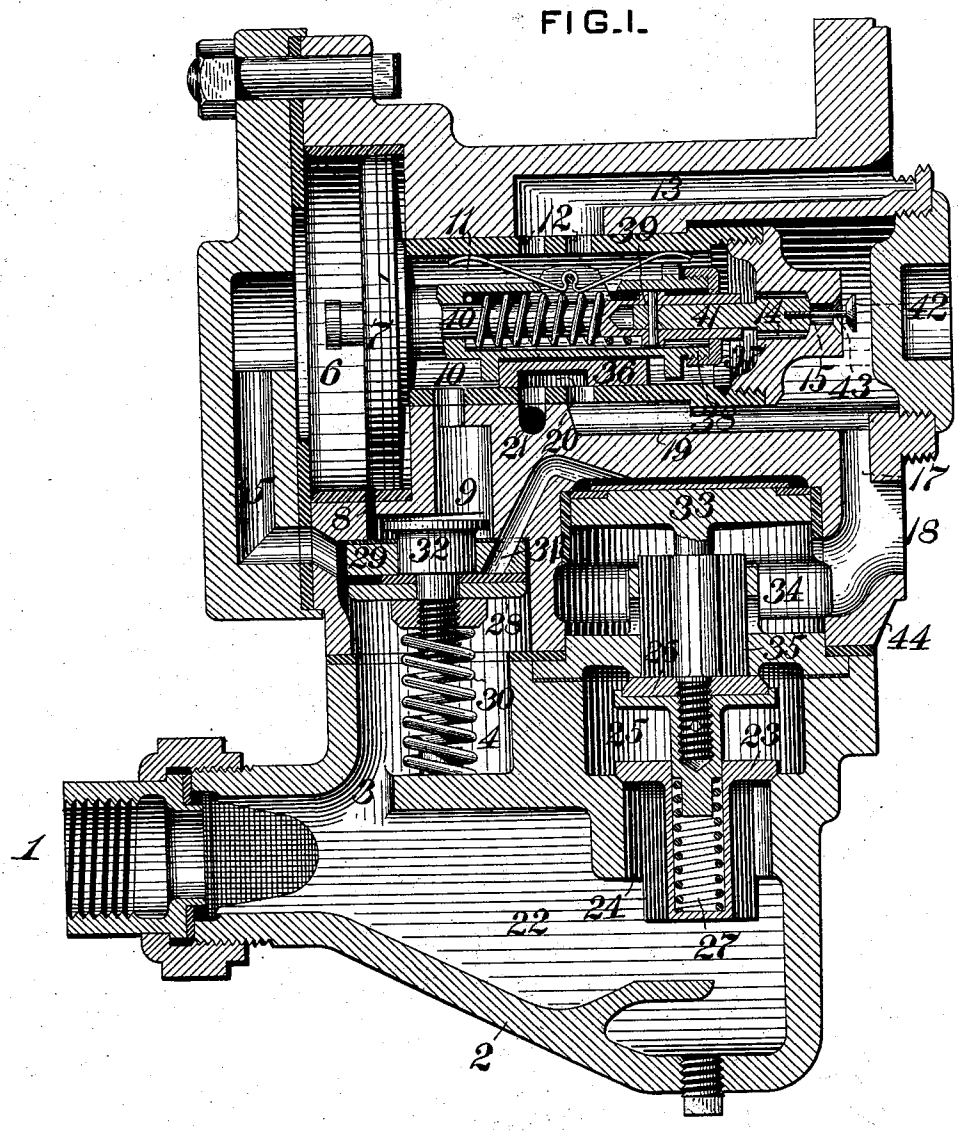


FIG. 2.

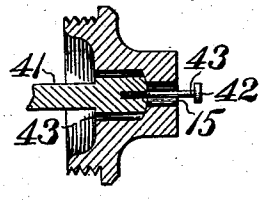
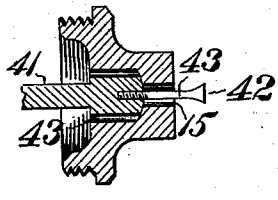


FIG. 3.



WITNESSES:

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F. E. Gaither.

INVENTOR,

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Att'y.

UNITED STATES PATENT OFFICE.

HENRY HERMAN WESTINGHOUSE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF SAME PLACE.

QUICK-ACTING TRIPLE VALVE.

SPECIFICATION forming part of Letters Patent No. 506,612, dated October 10, 1893.

Application filed October 6, 1892. Serial No. 448,041. (No model.)

To all whom it may concern:

Be it known that I, HENRY HERMAN WESTINGHOUSE, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Quick-Acting Triple Valves, of which improvement the following is a specification.

The object of my invention is to provide means whereby, in a quick acting automatic fluid pressure brake system, the emergency application of the brakes on successive cars in a train is made more nearly simultaneous than has heretofore been possible; and, to this end, it consists in means whereby the release of air from the train pipe on each car is quickened, with the effect of reducing the interval of time between the operation of the automatic devices on successive cars in the train, and reducing the time required for the application of the brakes on each car after the initial movement of the quick acting devices.

My invention is an improvement on quick acting triple valve devices of the class in which a port or passage between the auxiliary reservoir and the brake cylinder, and a port or passage between the train pipe and the brake cylinder, are opened simultaneously, or nearly so, when a sufficiently great and rapid reduction of train pipe pressure is effected. Such a reduction of train pipe pressure occurs in making emergency applications of the brakes, either by the opening of a large exhaust port in the engineer's valve or by the parting or rupture of the train pipe. In either case the reduction of pressure causes the operation of the nearest quick action valve, and the release of air from the train pipe by that valve, in turn, causes the next quick action valve to operate, and so on throughout the train; the effect of opening each quick acting valve being to so diminish the interval of time between its operation and that of the next succeeding valve that the brakes on all of the cars of the train are applied in a much shorter time than would be required if the reduction of train pipe pressure were effected through a single exhaust port or opening, such as that in the engineer's valve or the opening caused by the parting or rupture of the train pipe. When the fluid under pressure which is released from the train pipe by the quick acting valves is utilized in the brake cylinder, the resultant pressure in the brake cylinder is greater than when pressure from the auxiliary reservoir only is employed to move the brake pistons, and the consequence is that the brake shoes are not only applied to the wheels with greater force, in making emergency stops, but that the application of the brakes on each car is effected in a shorter time on account of the speed and force with which the brake pistons are moved outward. By my improvement the interval of time between the operation of the quick acting devices on successive cars on a train is so diminished as to make the application of all the brakes on a train nearly simultaneous; and by the same means I am enabled to utilize a large quantity of air from the train pipe in the brake cylinder, and thereby obtain a quicker and more powerful application of the brakes on each car.

In quick acting devices as heretofore employed, the tripple valve has been so constructed as to open a port of comparatively large capacity between the auxiliary reservoir and the brake cylinder, at the same time that the quick acting valve opens communication between the train pipe and the brake cylinder, the effect of which has been to hinder or prevent a sufficiently quick exhaust of the train pipe air into the brake cylinder, and also to cause the cessation of such exhaust before all the train pipe air which could be utilized in the brake cylinder has been discharged into it. By my improvement, the opening between the auxiliary reservoir and the brake cylinder, through which air flows from the auxiliary reservoir to the brake cylinder in making emergency applications of the brakes, is so regulated as to prevent any hindrance, by the flow of air from the auxiliary reservoir to the brake cylinder, to a quick and sufficient exhaust of air from the train pipe to the brake cylinder.

In the accompanying drawings: Figure 1 is a central section through a quick acting triple

valve illustrating an application of my invention, and Figs. 2 and 3, views showing modifications of detail.

In the triple valve herein shown the branch pipe from the train pipe is connected by the union 1 to the cap 2 which is bolted to the main casing 44 of the triple valve. Air from the train pipe flows through the passage 3, chamber 4, and passage 5, to the triple valve piston chamber 6; moves the piston 7 to the right, uncovering the feed passage 8, and passes through the feed passage 8, chamber 9, and port 10 into the slide valve chamber 11, and through the ports 12, and passage 13, to the auxiliary reservoir. The valve 14 is then in position to close the port 15 through which auxiliary reservoir air is admitted to the passages 17 and 18, leading to the brake cylinder, and the brake cylinder is then in communication with the atmosphere through the passages 18, 17, and 19, the exhaust cavity 20, in the slide valve 36, and the passage 21, which opens to the atmosphere. The air from the train pipe also fills the space 22 and lifting the check valve 23, flows through the passage 24 into the chamber 25, where it is confined by the seating of the valve 23; the valve 26 being normally seated by the pressure of the air in the chamber 25 and the spring 27 which also seats the valve 23, after a certain pressure is reached in the chamber 25. A valve 28, in the chamber 4, is normally held against its seat 29 by the spring 30, so as to cover the port 31 leading to the top of a supplementary piston 33.

In making a service application of the brakes a moderate reduction of train pipe pressure causes the triple valve piston, 7, to move to the left, thereby closing the feed groove 8 and moving the slide valve 36 to the left, so as to close communication between the brake cylinder exhaust passage 19 and the exhaust cavity 20 in the slide valve. By the time that the slide valve has been moved to close the exhaust port from the brake cylinder, the head of the cap 37 on the hollow piston rod 38 comes in contact with a shoulder 39, on a stem 40, to which the stem 41 of the valve 14 is connected, and as the piston 7 moves farther to the left, the valve 14 is unseated and air passes from the auxiliary reservoir to the brake cylinder. A piston 32 is connected to the valve 28, said piston being at all times exposed to auxiliary reservoir pressure, and when a sufficiently great reduction of train pipe pressure is made, the auxiliary reservoir pressure, acting on the piston 32, overcomes the pressure of the spring 30 and moves the valve 28 so as to uncover the port 31 and thereby admit train pipe air to the top of the piston 33. The piston 33 is then forced down, and unseats the valve 26, and the air in the chamber 25 exhausts into the brake cylinder, thus relieving the pressure above the valve 23 and permitting the train pipe pressure to open the valve 23 and flow through the passage 24, chamber 25, passage 35, chamber 34, and passage 18 to the brake cylinder. When the valve 26, between the train pipe and brake cylinder, is opened, the air from the train pipe rushes into the brake cylinder so long as there is a sufficient difference in the pressures in the train pipe and brake cylinder, and it will be clear that if the passage through which air is admitted from the auxiliary reservoir to the brake cylinder is made large, and fully opened during the time of making an emergency application, the pressure in the brake cylinder soon becomes so great that the difference in pressure between the train pipe and brake cylinder is not sufficiently great to permit a further exhaust from the train pipe.

In order to permit a sufficient exhaust of train pipe pressure, I employ, as shown in the drawings, a reducer 42, connected, by a stem 43, to the valve 14, in such a manner that it does not interfere with or in any wise affect the normal transverse area of the passage 15 in making service applications of the brakes, but permits the regulation of that passage by the valve 14. This is accomplished by making the stem 43 of the reducer 42 of greater length than the length of the passage 15 so that the distance between the reducer 42 and the end of the valve 14 shall be greater than the length of the passage 15, plus the lift of the valve 14 in making service stops.

In making emergency applications of the brakes, the piston 7 is suddenly moved to the left, to the end of its stroke, and the valve 14 is moved to its maximum distance from its seat, and, but for the reducer 42, the maximum flow of air would take place from the auxiliary reservoir to the brake cylinder through the passage 15. But the reducer 42 is so arranged that when the valve 14 has its greatest lift the reducer 42 is moved far enough to the left to contract or reduce the passage through which air passes from the auxiliary reservoir to the brake cylinder, thereby limiting the flow of air from the reservoir to the brake cylinder so as to permit a sufficient exhaust of air from the train pipe to the brake cylinder.

Fig. 2 shows a modification of the form of the reducer, which, in this case, is simply a flat plate or disk formed on or fixed to the end of the stem 43, and Fig. 3 shows the reducer as formed by a conical or tapering prolongation of the stem 43.

I claim as my invention and desire to secure by Letters Patent—

1. In a quick acting automatic brake system, the combination of a quick acting valve controlling the release of air from the train pipe to the brake cylinder, a triple valve controlling the passage of air from the auxiliary reservoir to the brake cylinder, and means for reducing the area for the passage of air from the auxiliary reservoir to the brake cyl-

inder in making emergency applications of the brake, relatively to that afforded in service applications substantially as set forth.

2. In a quick acting automatic fluid pressure brake system, the combination with a quick acting valve, controlling communication between the train pipe and the brake cylinder, of a valve controlling communication between the auxiliary reservoir and the brake cylinder and a reducer which is connected to said last specified valve, and is moved into position to reduce or contract the passage of air from the auxiliary reservoir to the brake cylinder in making emergency applications of the brakes, substantially as set forth.

In testimony whereof I have hereunto set my hand.

HENRY HERMAN WESTINGHOUSE.

Witnesses:
J. SNOWDEN BELL,
T. J. HOGAN.