

(No Model.)

G. WESTINGHOUSE.
QUICK ACTION TRIPLE VALVE.

No. 593,710.

Patented Nov. 16, 1897.

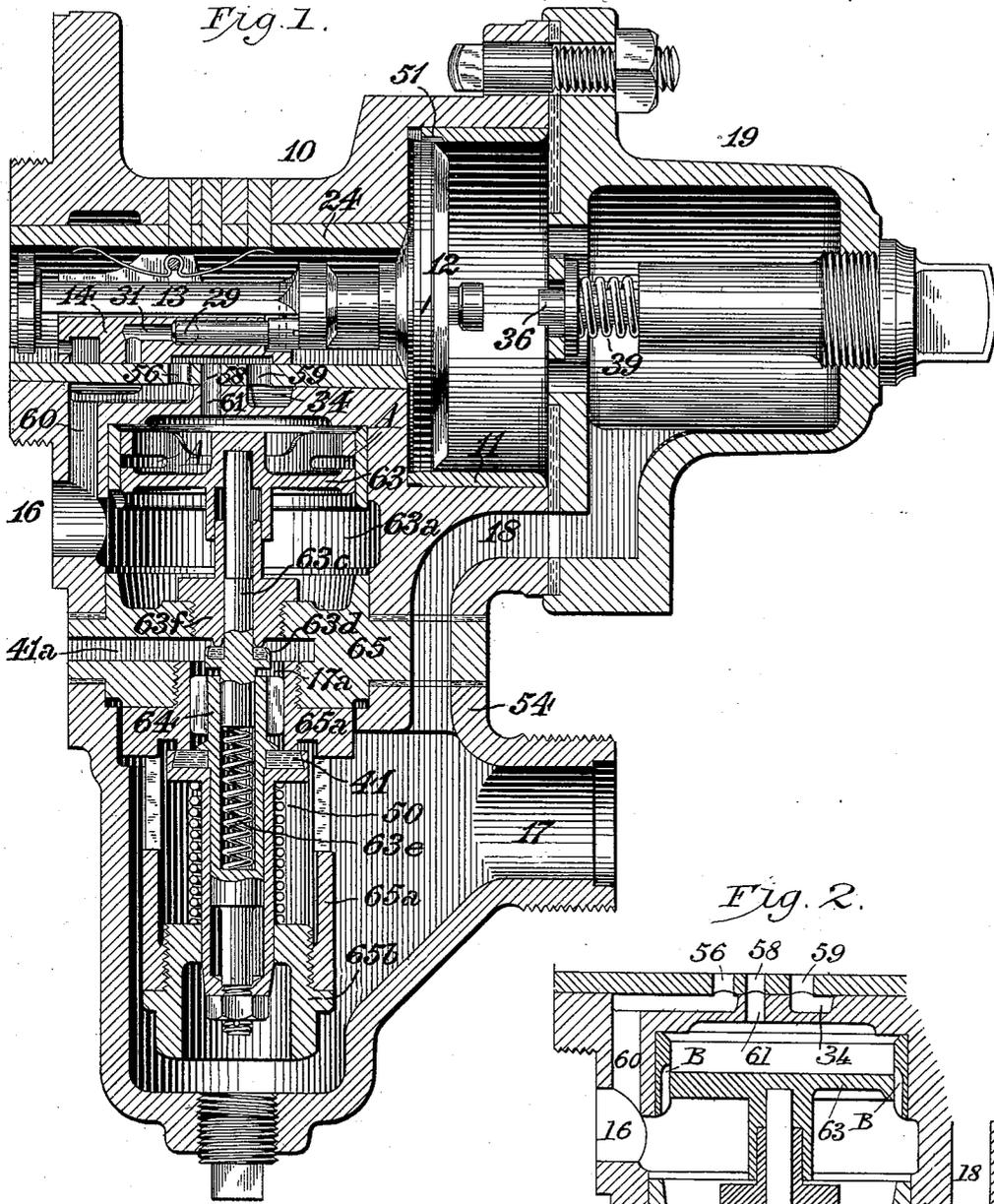


Fig. 1.

Fig. 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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QUICK-ACTION TRIPLE VALVE.

SPECIFICATION forming part of Letters Patent No. 593,710, dated November 16, 1897.

Application filed March 12, 1897. Serial No. 627,166. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Quick-Action Triple Valves, of which improvement the following is a specification.

My invention relates to quick-action triple valves for automatic-air-brake apparatus of the class which effect the local venting of the train-pipe to the atmosphere for the purpose of quickening the serial action of the brakes in emergency applications; and its object is to provide an appliance of such character by the use of which a quick and full emergency application of the brakes may be effected by the operation of a single vent opening and closing valve with a rapid equalization of auxiliary-reservoir and brake-cylinder pressures and a prompt closure of the emergency-valve after the desired amount of air has been discharged to the atmosphere.

It is a further object of my invention to provide an atmospheric vent-valve device which shall be of simplified construction and possess the capacity of application to and removal from quick-action triple valves of the standard Westinghouse type, if desired, without any modification of or interference with the construction and operation of the triple-valve mechanism proper or the relation of the emergency-piston of said standard valves.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical central section through a quick-action triple valve, illustrating an application of my invention; and Fig. 2, a detached sectional view showing a modification.

My invention is exemplified in a valvular mechanism the construction and operation of which, so far as the members of the triple valve proper and the relation of the emergency or quick-action piston thereto are concerned, accord with those of the Westinghouse standard quick-action triple valve, as set forth in Letters Patent of the United States No. 376,837, granted and issued to me under date of January 24, 1888. The triple-valve case 10 is, as in said Letters Patent, provided with

a bushing 11, which forms the chamber of the main piston 12, the usual charging groove or passage 51 being formed in said piston, and a bushing 24 communicating at one end with said chamber and at the other with the auxiliary reservoir. The bushing 24 forms the chamber of the main valve 14, which is reciprocated therein by the stem 13 of the piston 12. A graduating-valve 29, controlling a port 31, is fitted in the ordinary manner in the main valve 14, and said main valve controls ports 56, 59, and 58 in the bushing 24, said ports communicating, respectively, with a passage 60, leading to the brake-cylinder passage 16, an exhaust-passage 34, leading to the atmosphere, and a port 61, leading into the chamber 63^a of the supplemental emergency or quick-action piston 63, which actuates the emergency or quick-action valve 41 when the main piston 12 is by a sudden or considerable reduction of train-pipe pressure moved sufficiently far to the right to compress the spring 39 of the stem 36, which is fitted in the cap 19, and to open the ports 58 61 and admit pressure from any suitable auxiliary reservoir to the upper side of the emergency-piston 63.

The operation of the members above described in effecting the application, graduation, and release of the brakes is in all particulars (except that, as presently to be described, train-pipe air is in quick-action applications vented to the atmosphere instead of to the brake-cylinder) the same as that of the mechanism of Patent No. 376,837, and being fully set forth therein, as well as familiar to those skilled in and practicing the art, need not be herein at length described.

Under my present invention I provide a supplemental chamber or casing 54, having a train-pipe nozzle or connection 17, which is connected removably to the lower end of the main casing 10, a partition or division plate 65 being interposed between the casings 10 and 54. The supply-passage 18, through which train-pipe air passes to the auxiliary reservoir in charging the brake system and releasing the brakes, leads from the chamber 54 through the division-plate 65 and casing 10 into the cap 19. The chamber 54 and plate 65 are secured to the casing 10 by bolts

in the same manner as the corresponding members in the structure of Patent No. 376,837, for which members they may be readily substituted whenever desired.

5 The quick-action or emergency valve 41 controls a passage 17^a, leading from the supplemental chamber or casing 54 to a discharge port or passage 41^a, formed in the division-plate 65 and leading directly from the passage 17^a to the atmosphere. It is preferably seated in a cage or open frame 65^a, secured removably to the division-plate 65 and having a removable end piece 65^b, which serves as a guide for the stem 64 of the emergency-valve 41 and an abutment for the spring 50, by which, in connection with the action of train-pipe pressure, said valve is normally held to its seat, and is closed, after an emergency application of the brakes, as soon as the auxiliary-reservoir pressure and brake-cylinder pressure have become equalized. The movement of the piston 63 is transmitted to the emergency-valve 41 by a stem 63^c, passing through the division-plate 65, or preferably, as shown, through a removable guide-piece 63^f, secured therein, and leakage of auxiliary-reservoir air to the atmosphere around said stem in service applications of the brakes is prevented by a valve 63^d, fixed on said stem and seated in the release-passage 41^a on the upper side of said passage. The valve 63^d is held normally to its seat by a spring 63^e bearing against the lower end of the stem 63^c and against a shoulder in the tubular stem 64 of the valve 41, within which stem the stem 63^c is fitted freely. The tension of the spring 63^e is sufficient to hold the valve 63^d to its seat and make a tight joint against the maximum pressure exerted in the brake-cylinder and is less than that of the closing-spring 50 of the emergency-valve in order to prevent the unseating of said valve by the spring 63^e when the brake system is not charged with air.

45 The emergency-piston 63 is so fitted in its chamber 63^a that in its traverse in direction to impart opening movement to the emergency-valve 41 it establishes communication between the ports 58 61, leading into its chamber, and the brake-cylinder passage 60, thereby opening an additional and large avenue for the passage of air from an auxiliary reservoir to the brake-cylinder, and correspondingly expediting the equalization of brake-cylinder and auxiliary-reservoir pressures and the closure of the emergency-valve. To this end the annular rim of the piston 63 may be recessed, as shown in Fig. 1, or equivalently a groove or recess of proper transverse area may be formed in the bushing in which said piston works, as shown in Fig. 2, so as to permit auxiliary-reservoir air to pass from the space above said piston through the recess or recesses A (shown in Fig. 1) or through the groove or grooves B (shown in Fig. 2) to the brake-cylinder after said piston has been moved downwardly sufficiently far to open

the emergency-valve, a result of which is to effect the equalization of pressures on opposite sides of the emergency-piston upon the equalization of brake-cylinder and auxiliary-reservoir pressure, and to thereby enable the emergency-valve to be closed and the emergency-piston to be returned to normal position without reference to the return traverse of the triple-valve piston.

In the operation of the appliance a sudden or material reduction of train-pipe pressure made either by the engineer for the purpose of effecting an emergency application of the brakes or by the accidental escape of air from the train-pipe effects the full traverse of the main piston 12, thereby admitting auxiliary-reservoir air through the ports 58 61 to the top of the emergency-piston 63 and causing the downward movement thereof, by which the emergency-valve 41 is unseated and train-pipe air is locally vented to the atmosphere for the purpose of quickening the serial application of the brakes. Upon the equalization of brake-cylinder and auxiliary-reservoir pressures, which, as before indicated, is expedited by the volume of auxiliary-reservoir air admitted to the brake-cylinder through the ports 58 61 by the movement of the piston 63, such admission also insuring full application, the spring 50 returns the emergency-valve 41 to its seat and prevents needless and wasteful discharge of air. The closing movement of the valve 41 coincidentally returns the emergency-piston 63 to normal position through the spring 63^e and stem 63^c. It will be seen that but a single valve is required or employed for opening and closing the passage through which the train-pipe is locally vented to the atmosphere and that the traverse of the emergency-piston 63 in both directions—that is to say, both from and to normal position—is resultant upon the traverse of the main piston in one direction, the returning movement of the emergency-piston not being subsequent to or in any wise dependent upon the return of the main piston to release position.

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

1. In a quick-action triple valve, the combination, substantially as set forth, of a triple valve proper, an emergency or train-pipe release-valve, actuated, as to opening movement, by a supplemental emergency-piston, a spring acting in direction to close said valve, and an emergency-piston actuated in direction to impart opening movement to the emergency-valve by pressure from an auxiliary reservoir admitted to its chamber by the traverse of the triple-valve piston, and actuated in the opposite direction by the closing-spring of the emergency-valve, independently of the return traverse of said piston.

2. In a quick-action triple valve, the combination, substantially as set forth, of a triple valve proper, an emergency-piston working in the casing thereof and actuated by pres-

sure from an auxiliary reservoir, a valve device for admitting air from the auxiliary reservoir to the piston, an emergency or train-pipe release-valve, actuated, as to opening movement, by said piston, a spring acting in direction to close said valve, and means for quickly releasing auxiliary-reservoir air from the chamber of the emergency-piston directly to the brake-cylinder, by the final movement of the emergency-piston.

3. In a quick-action triple valve, the combination, substantially as set forth, of a triple valve proper, an emergency-piston working in a chamber in the casing thereof, and actuated by pressure from an auxiliary reservoir, a supplemental casing-section provided with a train-pipe connection and connected to the main casing of the triple valve, a partition or division plate interposed between the main and supplemental casings and provided with an atmospheric discharge-passage, an emergency-valve seated in the supplemental casing and controlling communication between said casing and the discharge-passage, a stem through which opening movement is imparted to the emergency-valve from the emergency-piston, and a spring acting on the emergency-valve in direction to impart closing movement thereto.

4. In a quick-action triple valve, the combination, substantially as set forth, of a triple valve proper, an emergency-piston working in a chamber in the casing thereof and actuated by pressure from an auxiliary reservoir, a supplemental casing-section provided with a train-pipe connection and connected to the main casing of the triple valve, a partition or division plate interposed between the main and supplemental casings and closing the chamber of the emergency-piston, an atmospheric discharge-passage in said division-plate, an emergency-valve seated in the supplemental casing and controlling communication between said casing and the discharge-passage, a stem passing through the division-plate and adapted to impart opening movement to the emergency-valve from the emergency-piston, a valve on said stem which is normally seated in the discharge-passage and closes the joint between the stem and the division-plate, a spring acting to impart closing movement to said valve, and a spring acting

on the emergency-valve in direction to impart closing movement thereto.

5. The combination, with a triple valve proper, of an emergency-piston which is actuated by pressure from an auxiliary reservoir, an emergency or train-pipe release-valve operated in one direction by movement of the piston and in the other direction by a spring, and means whereby the emergency-piston acts as a valve in its final movement, to open a communication between the auxiliary reservoir and the brake-cylinder, substantially as set forth.

6. The combination, with a triple-valve device of a supplemental piston which is actuated by auxiliary-reservoir pressure admitted thereto in applying the brakes, a train-pipe release-valve actuated by the movement of the supplemental piston and controlling a passage to the atmosphere, and means whereby movement of the supplemental piston connects the auxiliary reservoir with the brake-cylinder, substantially as set forth.

7. The combination, with a triple valve proper, of a supplemental chamber formed in a casing and normally disconnected from the auxiliary reservoir and from the train-pipe, but communicating with the brake-cylinder, a piston in the chamber, a release-passage from the train-pipe to the atmosphere, and a valve actuated by the piston, and controlling the release-passage, substantially as set forth.

8. The combination, with a triple valve proper, of a supplemental chamber, a piston in the chamber, normally exposed to atmospheric pressure on its opposite sides, means for admitting fluid under pressure to the piston in emergency applications, a release-passage outside of and separated from the supplemental chamber and connecting the train-pipe with the atmosphere, a valve controlling the release-passage, and means whereby the movement of the piston releases fluid under pressure from the auxiliary reservoir to the brake-cylinder, and from the train-pipe to the atmosphere, substantially as set forth.

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Witnesses:

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