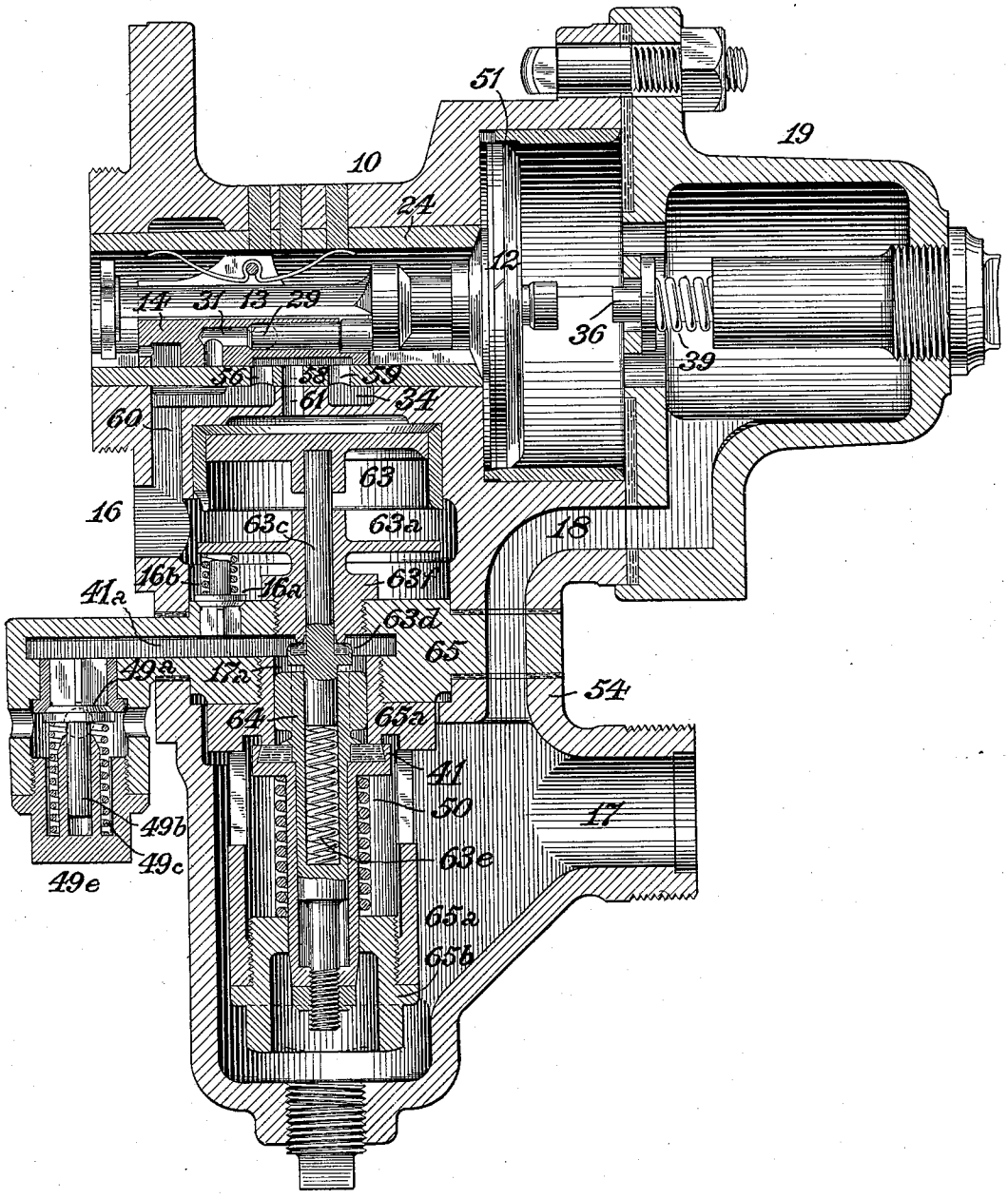
(No Model.)

G. WESTINGHOUSE.

QUICK ACTION TRIPLE VALVE.

No. 593,711. Patented Nov. 16, 1897.



WITNESSES:

Chas. F. Miller.

S. R. Bell.

INVENTOR.

Geo. Westinghouse

by J. Stevenson Bell,

Att'y.

UNITED STATES PATENT OFFICE.

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

QUICK-ACTION TRIPLE VALVE.

SPECIFICATION forming part of Letters Patent No. 593,711, dated November 16, 1897.

Application filed March 12, 1897. Serial No. 627,167. (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 triple valves for automatic-air-brake apparatus of the class which effect the local venting of the train-pipe to the brake-cylinder for the purpose of quickening the serial action of the brakes and increasing the force with which they are applied in emergency applications; and its object is to provide an appliance of such character in which while the train-pipe is, as heretofore, vented as fully as may be necessary to insure the rapid serial application of the brakes which is required in emergency applications the quantity of air which is admitted to the brake-cylinder may be limited to any desired and determined degree, so as to correspondingly reduce the force with which the brakes are applied, as may in certain cases be rendered necessary or desirable by conditions of service.

The improvement claimed is hereinafter fully set forth.

It has been found in practice, more particularly abroad, that where trains composed of a considerable number of short cars are used the couplings of which are provided with very flexible springs it is not advantageous for the brakes to be applied with maximum force and rapidity, such as result from the employment of quick-action triple valves of the standard Westinghouse type. It is, however, highly important and desirable that as much of the train-pipe air as possible may be utilized in the brake-cylinder without effecting so full and quick an application as may not, under certain conditions, be advantageous, and my improvement therefore is designed to enable such portion of the air vented from the train-pipe as may be necessary to effect this result to be admitted to the brake-cylinders and the remainder to be discharged to the atmosphere.

Referring to the accompanying drawing, which is a vertical central section through a quick-action triple valve, illustrating an application of my invention, the same 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, as well as 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.

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 from the passage 17^a to the atmosphere, its discharge opening or openings being controlled by an outwardly-opening atmospheric check-valve 49^a. Said check-valve is fixed upon a stem 49^b and is fitted to work in a chamber formed on the division-plate 65, to which access is had, for the insertion and removal of the check-valve, by a removable cap 49^c. The check-valve 49^a is normally held to its seat by a closing-spring 49^c. The discharge-passage 41^a also communicates, through a passage controlled by a brake-cylinder check-valve 16^a, with the chamber 63^a of the emergency-piston 63, below said piston, and, through said chamber, with the brake-cylinder passage 16. The brake-cylinder check-valve 16^a is herein shown as normally held to its seat by a light closing-spring 16^b. The spring may, if desired, be dispensed with and the valve 16^a be seated by gravity, but as greater certainty of action is attained by the employment of a spring it is therefore preferred.

The proportion of the air locally vented from the train-pipe which is admitted to the brake-cylinder through the passage controlled by the check-valve 16^a will depend upon the strength of the closing-spring of the atmospheric check-valve 49^a, which is regulated in accordance with the conditions and requirements of the service in which the mechanism is operated. The air which is delivered from the train-pipe to the discharge-passage 41^a, through the passage 17^a, when the emergency-valve 41 is unseated, will unseat the check-valve 16^a and pass directly to the brake-cylinder, such traverse of train-pipe air continuing until the pressure in the brake-cylinder becomes slightly greater than the tension of the closing-spring 49^c of the atmospheric check-valve 49^a. The valve 49^a will then be unseated, and the air which is thereafter vented from the train-pipe will be discharged to the atmosphere. The valve 16^a will be coincidently closed by the preponderance of brake-cylinder pressure, acting in conjunction with the gravity of the valve or the tension of its closing-spring, as the case may be, and backflow of air from the brake-cylinder to the train-pipe or to the atmosphere will be prevented. It has been found in practice that an increase of brake-cylinder pressure of about ten pounds may for certain service be effected desirably by the admission of air from the train-pipe, and the check-valve 49^a may be so regulated as to open when such or any other desired increase of pressure has been effected.

The quick-action or emergency valve 41 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 a 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.

The means above set forth by which pressure is released from the emergency-valve chamber to the brake-cylinder and leakage of air around the stem of the emergency-valve prevented are not claimed as of my present invention, the same being set forth and claimed in a separate application (Case A) filed by me of even date herewith.

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, first to the brake-cylinder and thereafter to the atmosphere, by the check-valves 16^a and 49^a for the purpose of quickening the serial application of the brakes and increasing, as desired, the pressure in the brake-cylinder, as hereinbefore

described. 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 56 and 81 by the movement of the piston 63, 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 coincidently returns the emergency-piston 63 to normal position through the spring 63^c and stem 63^c.

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, a supplemental emergency-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, a check-valve controlling communication between said emergency-valve and a brake-cylinder passage, and a check-valve subject continuously to closing pressure and controlling communication between said emergency-valve and an atmospheric discharge-passage.

2. In a quick-action triple valve, the combination, substantially as set forth, of a triple valve proper, an emergency-valve controlling communication between a train-pipe connection and a discharge-passage, an emergency-piston imparting opening movement to the emergency-valve, a spring acting in direction to close said valve, a check-valve controlling communication between the discharge-passage and a brake-cylinder passage, a check-valve controlling communication between the discharge-passage and the atmosphere, and a closing-spring bearing continuously on said last-named check-valve.

3. In a quick-action triple valve, the combination, substantially as set forth, of a triple valve proper, a supplemental emergency-piston, an emergency or train-pipe release-valve actuated, as to opening movement, by said piston, a valve-controlled communication between said emergency-valve and a brake-cylinder passage, a valve-controlled communication between said emergency-valve and the atmosphere, and means for imposing an independent regulated resistance to the opening of said last-named communication.

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, 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 a 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, a spring acting on the emergency-valve in direction to impart closing movement thereto, a check-valve controlling communication between the discharge-passage and a brake-cylinder passage, a check-valve controlling communication between the discharge-passage and the atmosphere, and a spring continuously imparting closing pressure to said last-named check-valve.

5. In a quick-action triple valve, the combination, substantially as set forth, of a triple valve proper, a supplemental emergency-piston, an emergency or train-pipe release-valve actuated, as to opening movement, by said piston, a valve-controlled communication between said emergency-valve and a brake-cylinder passage, a valve-controlled communication between said emergency-valve and the atmosphere, and independently-movable valve devices controlling the said communications.

GEO. WESTINGHOUSE.

Witnesses:
E. W. NEWELL,
J. SNOWDEN BELL.