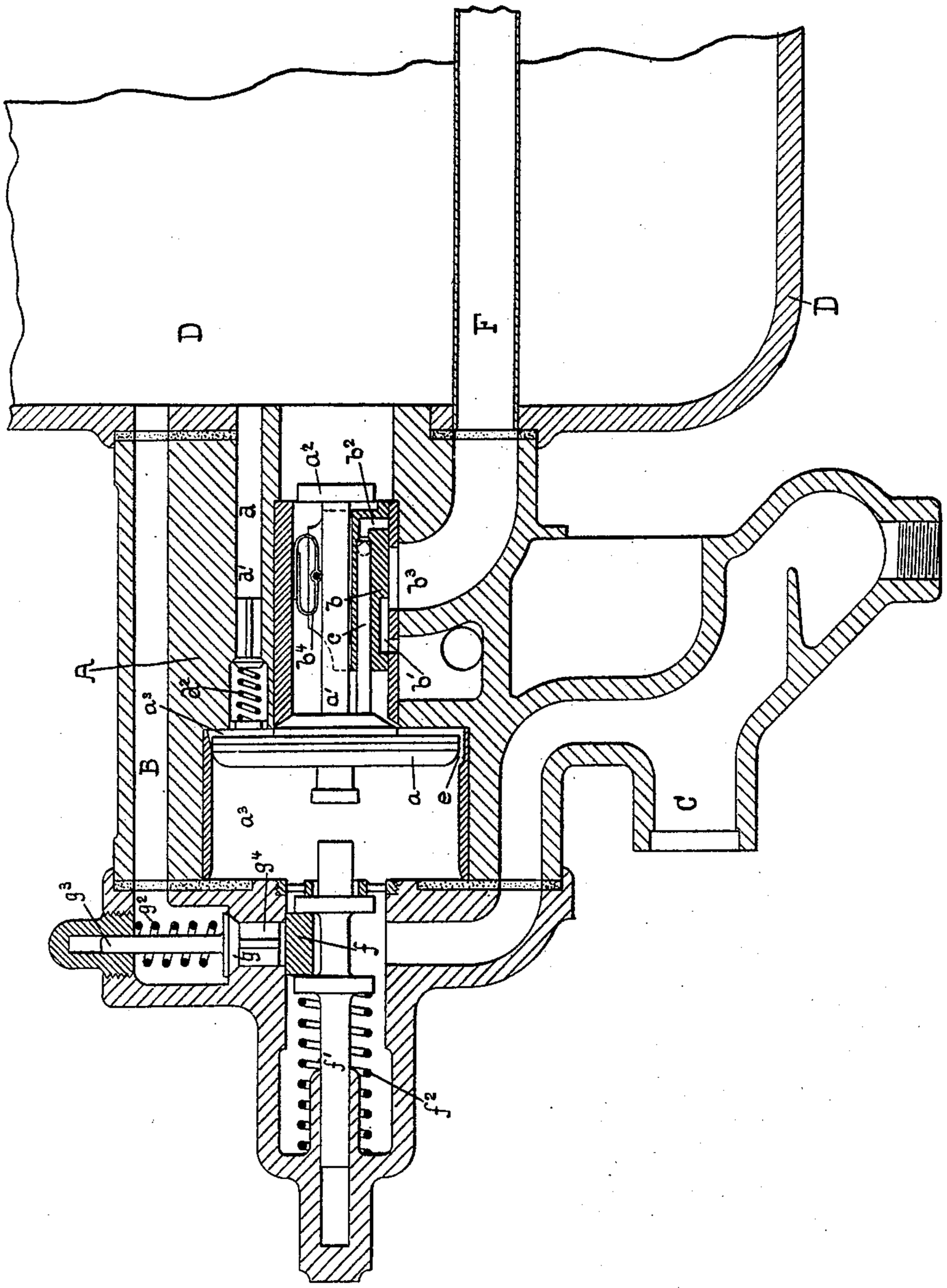
(No Model.)

G. A BOYDEN.

AUTOMATIC AIR BRAKE.

No. 583,278. Patented May 25, 1897.



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AUTOMATIC AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 583,278, dated May 25, 1897.

Application filed March 31, 1897. Serial No. 630,060. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. BOYDEN, a citizen of the United States, residing at Mount Washington, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Automatic Air-Brakes, of which the following is a specification.

This invention relates to quick-action automatic air-brakes in which air is vented directly from the train-pipe to the auxiliary reservoir in making an emergency application of the brakes; and it consists in combining with the triple valve and the passage leading from the train-pipe to the auxiliary reservoir an auxiliary valve to govern said passage.

This invention is a modification of that for which I made application for Letters Patent of the United States, dated March 20, 1897, Serial No. 628,413.

As the automatic brake, consisting of a train-pipe, a brake-cylinder, and a triple valve, is well understood, it is not necessary to describe and show the same in all its details.

The drawing shows a section of the triple valve A, provided with a passage B, leading from the train-pipe connection C directly to the auxiliary reservoir D, and an auxiliary valve *f*, arranged to govern said passage. The triple valve is attached to the auxiliary reservoir D in the usual manner and communicates through the pipe F with the brake-cylinder. (Not shown.)

The triple valve comprises a piston *a*, provided with a stem *a'*, and a head or partition a^2. The functions of the latter are to divide the valve-chamber and to engage with the main valve *b*, by which the motion of the piston *a* to the left is imparted to the valve.

The main valve *b* is of the slide form and governs the exhaust-passage by means of a cavity *b'*, the graduating-passage b^2, and the main port b^3. The valve is held to its seat by the spring b^4.

The graduating-valve *c* is of the puppet form and secondarily governs the passage b^2 through the main valve *b*. The said graduating-valve is secured to the piston *a* in such a manner that the same reciprocating motion in each direction of the piston is communicated to it, whereby the graduating-port b^2 is opened or closed without necessarily moving the main valve in graduating the application of the brakes, which is obtained by the piston *a*, stem *a'*, and the graduating-valve *c*, having a short range of motion independent of the movement of the main valve.

The passage *d* establishes communication between the auxiliary reservoir D and the piston-chamber a^3, it being provided with a check-valve *d'* and spring d^2, by which the air is temporarily confined in the piston-chamber and prevented from returning to the auxiliary reservoir through the said passage when making an emergency application of the brakes.

The feeding-in valve is formed by the piston *a* and the small groove *e*, through which the air passes to charge the auxiliary reservoir.

The direct passage B from the train-pipe connection C to the auxiliary reservoir D is governed by the valve *f*, which is auxiliary to the triple valve. The valve *f* is secured to the stem *f'* and moved to the closed position by the spring f^2, thereby preventing any train-pipe air from passing through the passage B to the auxiliary reservoir in the service application of the brakes.

The check-valve *g* is held to its seat by the spring g^2 and properly guided by the stem g^3 and the wings g^4, integral with the valve, the said valve preventing the return of air to the train-pipe.

In the operation air passes from the train-pipe to the piston-chamber a^3, moving the piston *a* to the right, which opens the feeding-in groove *e*, through which the air passes to the valve-chamber, thence to the auxiliary reservoir. To gradually or partially apply the brakes, a slight reduction in the train-pipe pressure is made, which causes the piston *a* to make a partial movement, moving the main valve *b*, closing the release-cavity *b'*, and opening the graduating-port b^2. The air from the auxiliary reservoir then passes through the said port to the brake-cylinder until its pressure is slightly below that in the train-pipe, which causes the piston to partially move to the right, causing the graduating-valve *c* to close the port b^2 and hold the pressure in the brake-cylinder. If a greater pressure is required, the above operation is re-

peated. To release the brakes, the maximum pressure is established in the train-pipe, which causes the piston to fully move to the right, thereby shifting the main valve, closing the graduating-port b^2, and opening the exhaust-cavity b', through which the air in the brake-cylinder is discharged to the atmosphere. In making an emergency application of the brakes a sudden and greater reduction of train-pipe pressure is made than for graduating, which causes the piston a to make its full stroke, thereby simultaneously fully opening the port b^3 by the main valve and the port governed by the auxiliary valve f. This operation causes the auxiliary-reservoir pressure to instantly and fully pass to the brake-cylinder, thereby lowering the auxiliary-reservoir pressure, and the train-pipe pressure quickly passes to the auxiliary reservoir through the passage B, resulting in quickly and fully applying each individual brake and quickening the service application of all the brakes throughout the train.

The piston a in an emergency application is held to its full stroke by the air being momentarily confined in the piston-chamber a^3 by the check-valve d' and the partition a^2.

Having thus described my invention, what I claim is—

1. In automatic brakes, the combination of a train-pipe; a brake-cylinder; an auxiliary reservoir; a triple valve; a passage leading directly from the train-pipe to the auxiliary reservoir for discharging air from the train-pipe to the auxiliary reservoir in an emergency application of the brakes; and an auxiliary valve to control the said passage.

2. In automatic brakes, the combination of a train-pipe; a brake-cylinder; an auxiliary reservoir; a triple valve; a passage directly from the train-pipe to the auxiliary reservoir; and a valve to control said passage which is opened by the piston of the triple valve when said piston makes its full stroke for applying the brakes.

3. In automatic brakes, the combination of a train-pipe; a brake-cylinder; an auxiliary reservoir; a triple valve; a passage directly from the train-pipe to the auxiliary reservoir; a valve to control the said passage; and a check-valve arranged in said passage to prevent the return of air to the train-pipe.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE A. BOYDEN.

Witnesses:

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