No. 731,249. PATENTED JUNE 16, 1903.

W. H. WASHINGTON.

PRESSURE RETAINING VALVE.

APPLICATION FILED OCT. 20, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

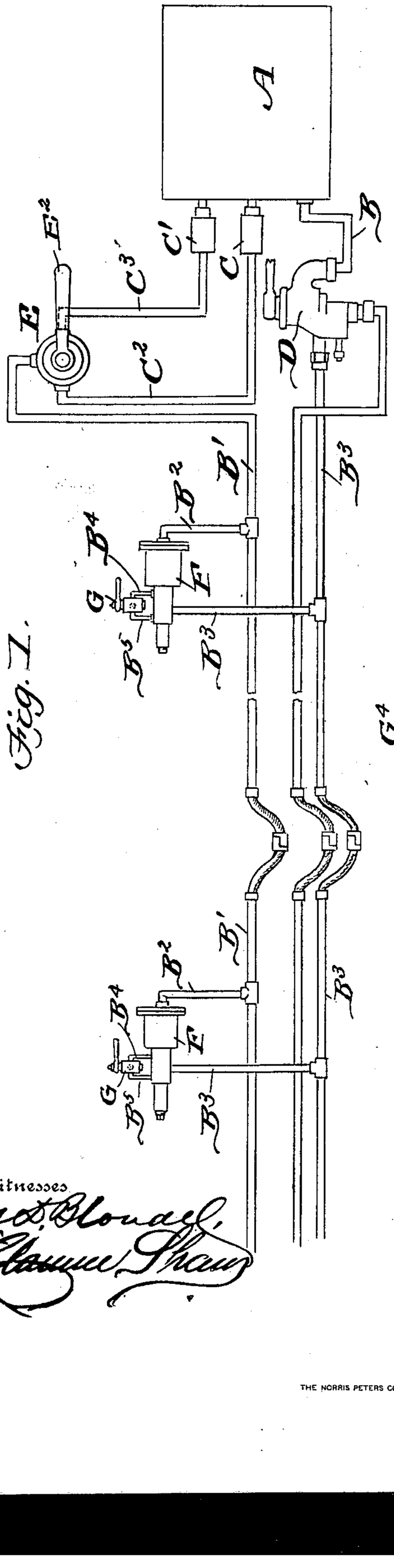


Fig. 1.

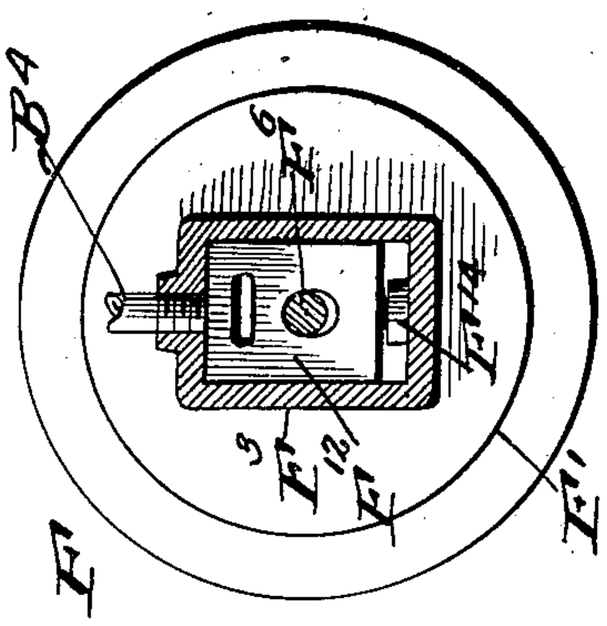


Fig. 3.

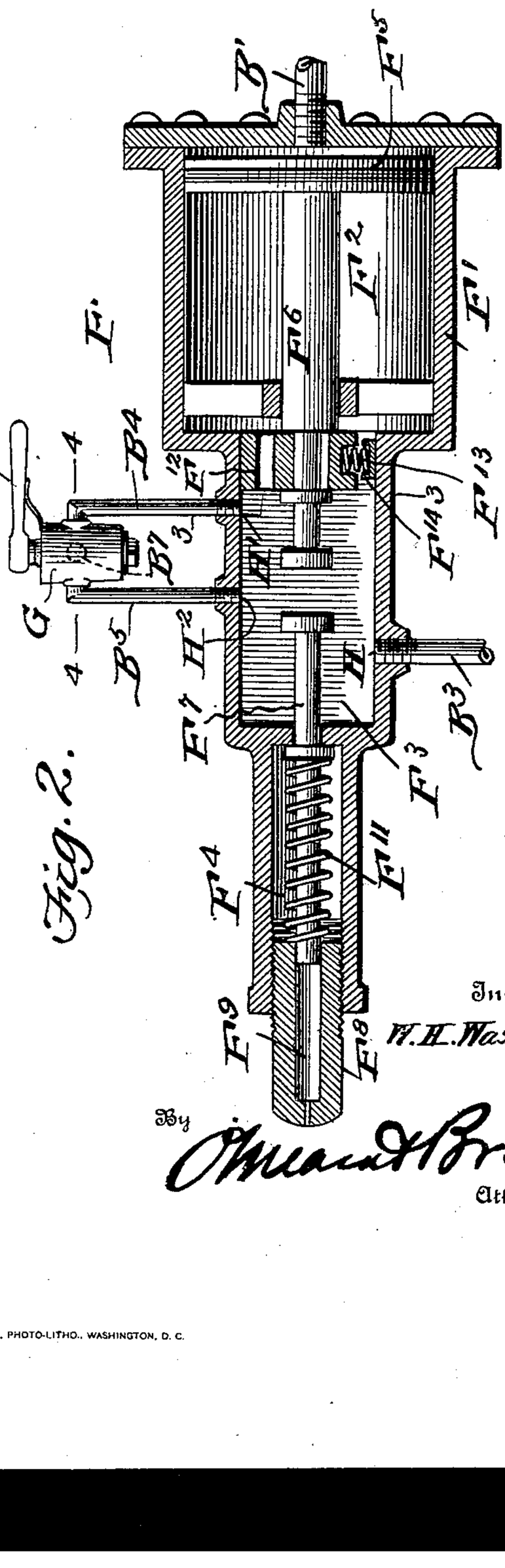


Fig. 2.

Witnesses
M. D. Blondel.
Chauncey Shaw

Inventor
W. H. Washington
By Wheeler & Brock
Attorneys

No. 731,249. PATENTED JUNE 16, 1903.

W. H. WASHINGTON.

PRESSURE RETAINING VALVE.

APPLICATION FILED OCT. 20, 1902.

NO MODEL. 2 SHEETS—SHEET 2

Fig. 4.

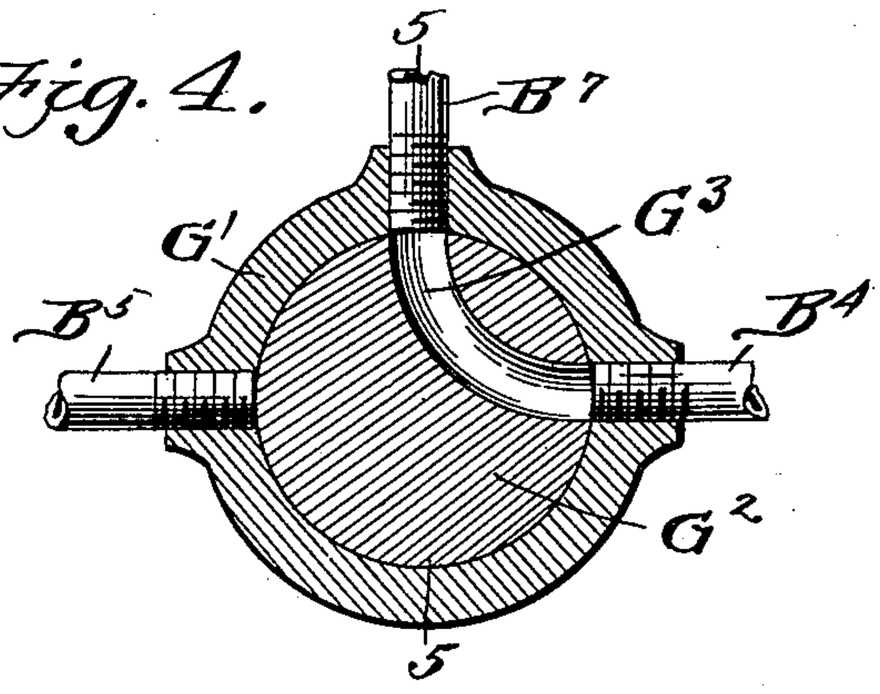


Fig. 5

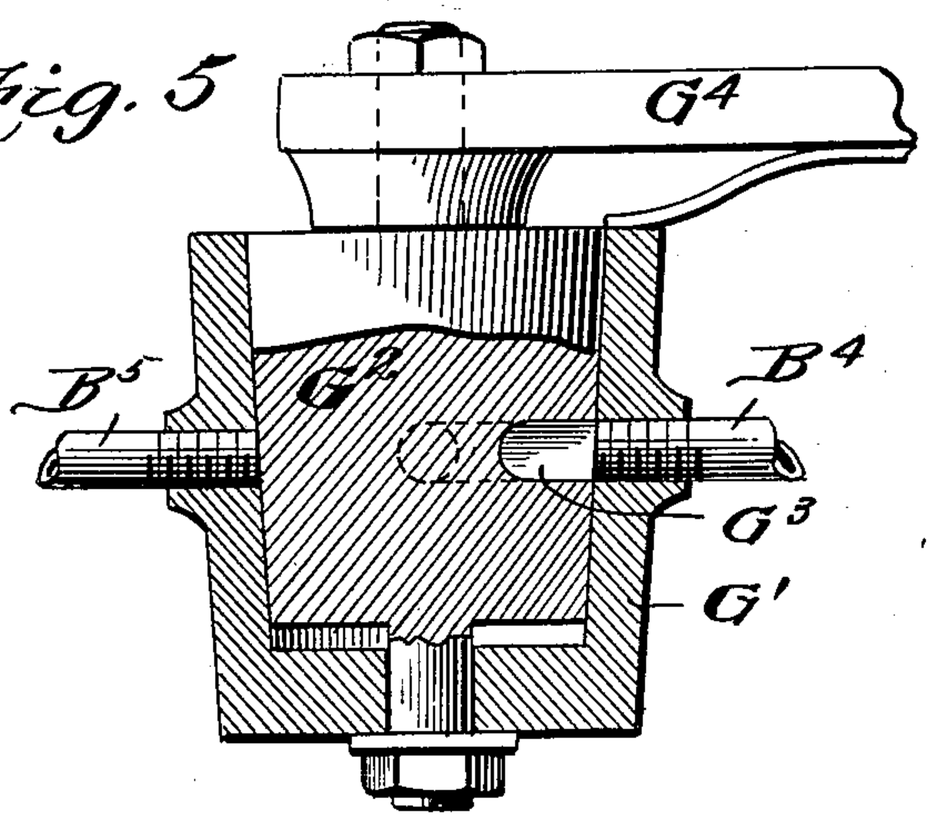


Fig. 8.

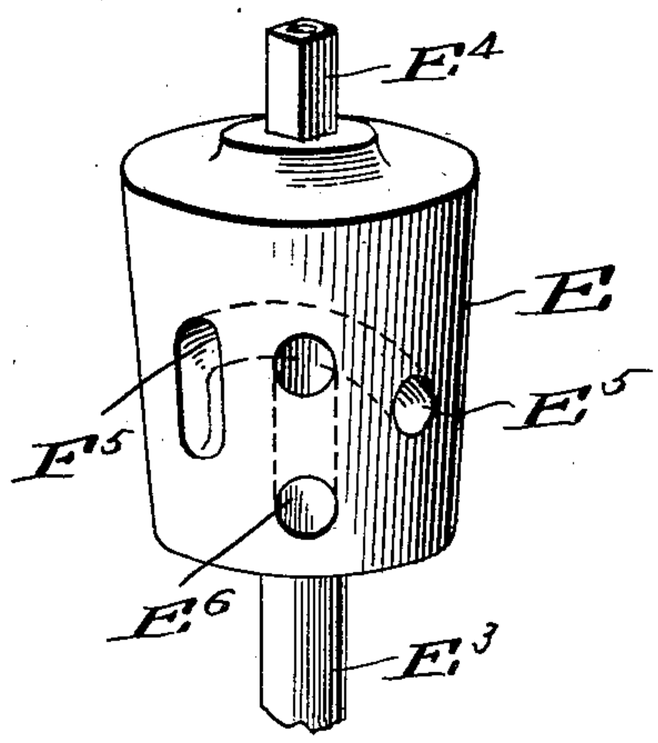
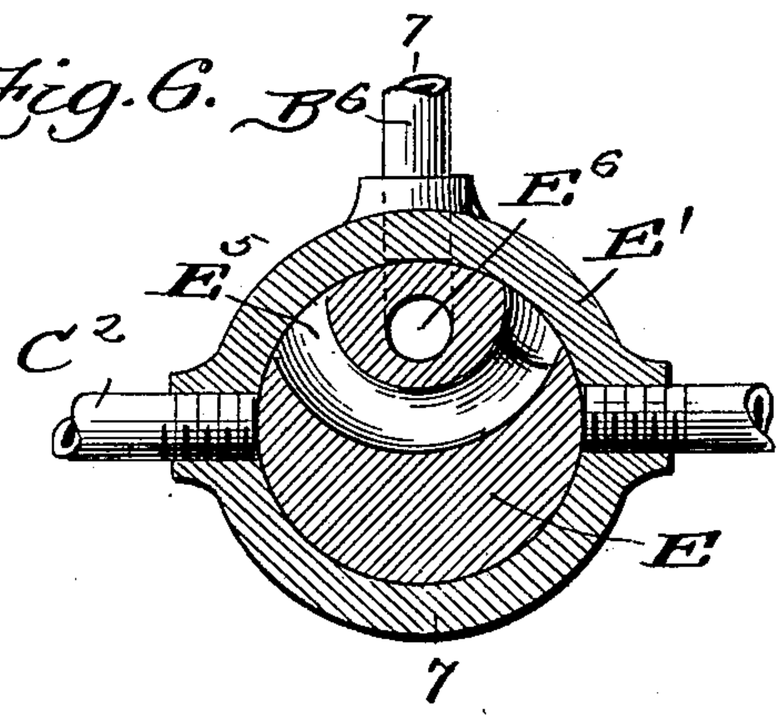
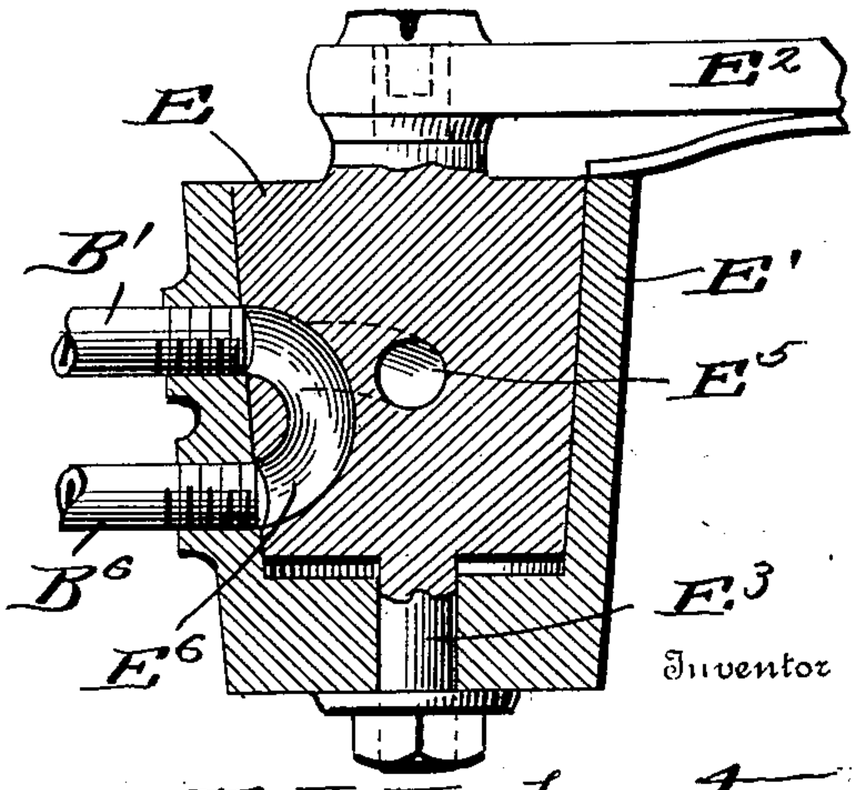


Fig. 7.

Fig. 6.





Witnesses
M. L. Blomquist.
Clarence Shaw

Inventor
W. H. Washington.
By O'Meara & Brock
Attorneys

No. 731,249. Patented June 16, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM H. WASHINGTON, OF JACKSON, MISSISSIPPI.

PRESSURE-RETAINING VALVE.

SPECIFICATION forming part of Letters Patent No. 731,249, dated June 16, 1903.

Application filed October 20, 1902. Serial No. 127,992. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. WASHINGTON, a citizen of the United States, residing at Jackson, county of Hinds, and State of Mississippi, have invented a new and useful Pressure-Retaining Valve, of which the following is a specification.

My invention is an improvement in pressure-retaining valves for use in connection with air-brakes.

The object of my improvement is to produce a device of this character which will enable the engineer to set the brakes on as many of the cars as may be necessary and to at any time release the brakes on those cars and set the brakes on other cars.

Other objects and advantages of my improvement will appear in the following specification.

Briefly, my device comprises, in addition to the usual reservoir, train-pipe, &c., an engineer's retaining-valve, located in the cab, the pressure-reducing valves, and my improved pressure-retaining valve, a pipe delivering air at a pressure of thirty-five pounds to the first-named valve and one delivering fifteen pounds pressure. An alternating-cock is connected to the pressure-retaining valve.

On very long grades much difficulty is experienced in braking, owing to the overheating of the wheels and brake-shoes by continuous application of the brake. On long freight-trains the difficulty is overcome at present by the brakemen on top the cars setting a portion of the brakes during a part of the grade and then releasing them when heated and setting others. With my device the pressure-retaining valve is set on alternate cars at fifteen and thirty-five pounds, respectively, and the brakes controlled by the engineer, my device enabling him to set the brakes on as many of the cars as may be desired and at any time release the brakes on those cars and set them on the remaining cars, and my device is especially adaptable for use with long freight-trains on roads having long grades, though it can of course be used with any air-brake system.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating the arrangement of the various parts connected with my improvement. Fig. 2 is an enlarged longitudinal sectional view taken through my improved pressure-retaining valve. Fig. 3 is a transverse section on about the line 3 3, Fig. 2. Fig. 4 is an enlarged sectional view taken through the alternating cock, said view being drawn on about the line 4 4, Fig. 2. Fig. 5 is a sectional elevation drawn vertically through the alternating cock or about on the line 5 5, Fig. 4. Fig. 6 is a horizontal sectional view taken through the engineer's retaining-valve. Fig. 7 is a vertical sectional view of the same on about the line 7 7 of Fig. 6, and Fig. 8 is a detail perspective view of the engineer's retaining-valve.

In the above-described drawings, A represents the compressed-air reservoir, B the train-pipe, and B′ the small train-pipe.

B^2 B^3 are crossover-pipes to the pressure-retaining valve.

B^4 B^5 are pipes leading to the alternating cock.

C C′ are reducing-valves, delivering air from the main reservoir at a pressure of fifteen and thirty-five pounds, respectively, to the engineer's retaining-valve.

D, Fig. 1, is the engineer's brake-valve, connected to the main train-line and not shown in detail, as it is no part of my invention.

The main portion of my invention will be found in the engineer's retaining-valve E, the pressure-retaining valve F, and the alternating cock G, which will be described in detail.

The engineer's retaining-valve E is illustrated in Figs. 6, 7, and 8 and comprises the valve E, shaped similar to the frustum of a cone, the casing E′ forming the valve-seat and the valve-handle E^2. The valve has downwardly and upwardly projecting stems E^3 E^4, threaded at the ends. Suitable nuts hold the valve in position and furnish means for tightening it in its seat. The valve-seat has lateral threaded apertures in which fit ends of the pipes B′, C^2, and C^3. The pipe C^2 leads from a reducing-valve with a pressure of fifteen pounds, while the pipe C^3 leads from a valve with a pressure of thirty-five pounds. The pipe B′ leads by way of the crossover-pipes B^2 to the pressure-retainer valve F. The valve E has two curved passage-ways E^5 and E^6, said passage-ways being arranged at

an angle to each other, but communicating. The passage-way E^5 is adapted to put either of the pipes C^2 C^3 into communication with the pipe B′, while the passage E^6 gives communication between the pipe B′ and the exhaust-pipe B^6.

The pressure-retaining valve (designated as a whole by F) comprises in detail the casing F′, divided into compartments F^2 F^3 F^4, decreasing in diameter in the order named. In the compartment F^2 is a piston F^5, having a stem F^6, which carries a valve loosely, but not revolubly, mounted thereon. The stem terminates in a head in the compartment F^3, and a rod F^7, having a head in alinement with the head of the stem F^6, extends from within the compartment F^3 through the greater portion of the compartment F^4, which compartment has an open end and is interiorly threaded adjacent the open end. A sleeve F^8 is threaded into this end of the compartment and contains a guideway F^9 for the rod F^7. The outer end of the sleeve is perforated to permit escape of air when the rod is forced into the sleeve. Around the rod is a spiral spring F^{11}, bearing at one end against a collar on the rod and at its opposite end on the sleeve, the said spring being adjusted to exert a pressure of approximately eighteen pounds. The inner headed ends of the piston-stem F^6 and the rod F^7 are normally spaced a slight distance apart, Fig. 2 showing the parts in their normal position. The valve F^{12} will be described later. The compartment F^3 has a port H, to which is connected the pipe B^3 and the ports H′ and H^2, from which lead the pipes B^4 and B^5, which at their opposite ends are connected to the alternating cock G. The alternating cock G is similar in general shape to the retaining-valve E and is illustrated in Figs. 4 and 5. It comprises the seat G′, valve G^2, the passage-way G^3, and the valve-handle G^4. The passage-way G^3 is adapted to effect communication between the pipe B^7, leading to the atmosphere, and the pipes B^4 B^5, but one of which can be placed in communication with the pipe B^7 at a time.

The valve F^{12} is a slide-valve carried by the stem F^6 and sliding along the wall of the compartment in which the ports H′ H^2 are located, and which are sufficient distance apart to prevent the valve from closing both of them simultaneously. To hold the valve firmly to the wall of the compartment in which the ports are located, a spring F^{13} is arranged on the valve and bears against the valve at one end and a guide-block F^{14} at the opposite end, the guide-block sliding along the wall opposite to that in which the ports are located.

The operation of my device is as follows: The position of the alternating cock under ordinary circumstances is with port H^2 closed, H′ being open. To use the retaining-valve after an application has been made of the brakes and the engineer's retaining-valve turned so as to admit air to the retaining-valve at B′ at a pressure of fifteen pounds, the engineer places his brake-valve in full-release position, which allows the air from the brake-cylinder to escape through the exhaust-port of the triple valve, through the pipe B^3 to the pressure-retaining valve. Port H^2 being closed by the alternating cock and H′ by the valve F^{12}, held in position by fifteen pounds pressure from the cab, the air from the brake-cylinder forces the piston to its original position, opening port H′ and escaping through the pipe B^4 and the port B^7 to the atmosphere until there remains only fifteen pounds, when the fifteen pounds applied by the engineer forces the piston back and closing port H′ retains fifteen pounds in the brake-cylinder. On a run with long heavy grades, however, the alternating cocks on each alternate car would be set so as to afford communication between pipes B^5 and B^7 and on the other cars, as shown in Fig. 4. The brakes would then be set, as described above, on, say, the first, third, and fifth cars or on the odd numbers. When the wheels of these cars began to heat, the engineer's retaining-valve would be set to afford communication between pipes C^2 and B′, thus putting a pressure of thirty-five pounds back of the piston F^5, twenty pounds of which would be utilized to force back the spring F^{11}, leaving fifteen pounds pressure to balance the corresponding pressure from the main train-pipe. This movement of the piston would cause the valve F^{12} to cover the port H^2, at the same time uncovering port H′ by the valve traveling past it, thus releasing the brakes on the odd-numbered cars and retaining only on the even numbers. This change can be made as often as desired, and the auxiliary reservoirs are always ready for an emergency. Wishing to release all the brakes, the engineer turns his retaining-valve so as to connect the pipe B′ with B^6, which leads to the atmosphere. There being no other outlet for the air from the small train-line except through B^6, the drain on the air-pumps will not be noticeable.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pressure-retaining valve, a suitable casing having inlet and outlet ports, a piston in one end of the casing, a piston-stem within the casing, a valve carried by the stem and adapted to close the outlet-ports, means for resisting the movement of the piston beyond a certain limit, and means for admitting an increase of pressure back of the piston sufficient to overcome said resistance.

2. In a pressure-retaining valve, the combination with a suitable casing having inlet and outlet ports, of a piston, within the casing, a stem connected to the piston and adapted to travel within the casing, a valve carried by the stem adapted to close either of the outlet-ports, pipes leading from said ports, means for regulating the pressure back of the

piston, and means forward of the piston for yieldingly resisting advance of said piston beyond a predetermined point when the maximum pressure is applied.

3. A pressure-retaining valve, comprising a suitable casing having inlet and outlet ports, a piston therein, a piston-stem, a valve carried by the piston-stem and controlling the longitudinally-movable rod, a spring adapted to hold the rod in its normal position said rod adapted to resist forward movement of the piston up to a predetermined limit and to yield to such movement above that limit, and means controlled by the engineer for regulating the pressure applied to said piston.

4. The combination with an alternating cock, of a casing having inlet and outlet ports, air-supply pipes leading to the inlet-ports, pipes leading from the outlet-ports to the alternating cock, a pressure-retaining valve in the casing adapted to close either of the outlet-ports, and means for regulating the movement of said valve from an engine-cab.

5. In an air-brake system, the combination with a suitable reservoir, of a retaining-valve in an engine-cab, a pressure-retaining valve on a car, an alternating cock on a car, pipes supplying air under different degrees of pressure to the retaining-valve on the cab, a pipe leading from the said retaining-valve to the pressure-retaining valve on the car, a pipe from the reservoir to the pressure-retaining valve, and pipes leading from the retaining-valve to the alternating cock.

WILLIAM H. WASHINGTON.

Witnesses:
D. E. ANAKISON,
J. H. MYERS.