No. 697,694. Patented Apr. 15, 1902.

J. A. TOAL.

PRESSURE RETAINING VALVE FOR AIR BRAKES.

(Application filed Nov. 29, 1901.)

(No Model.)

Fig. 1.

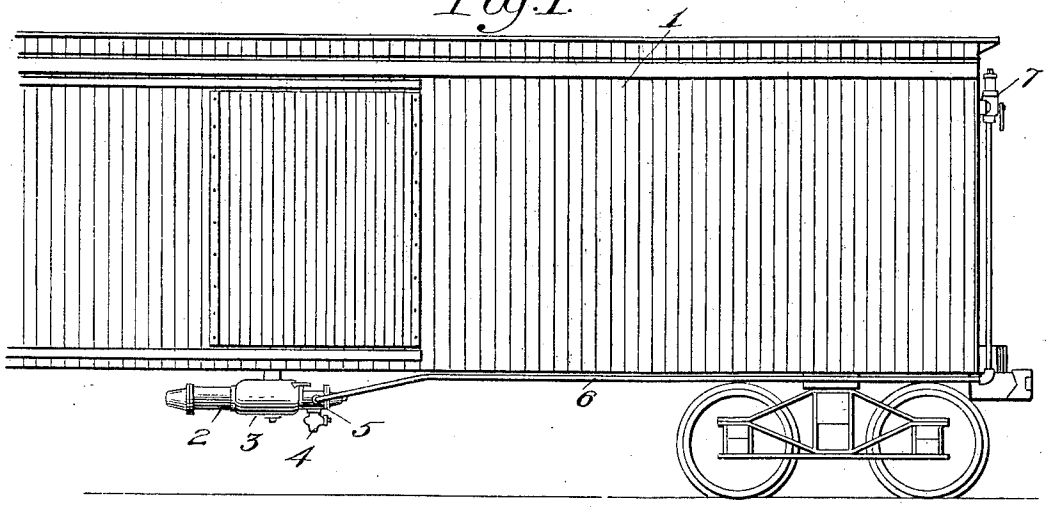


Fig. 2.

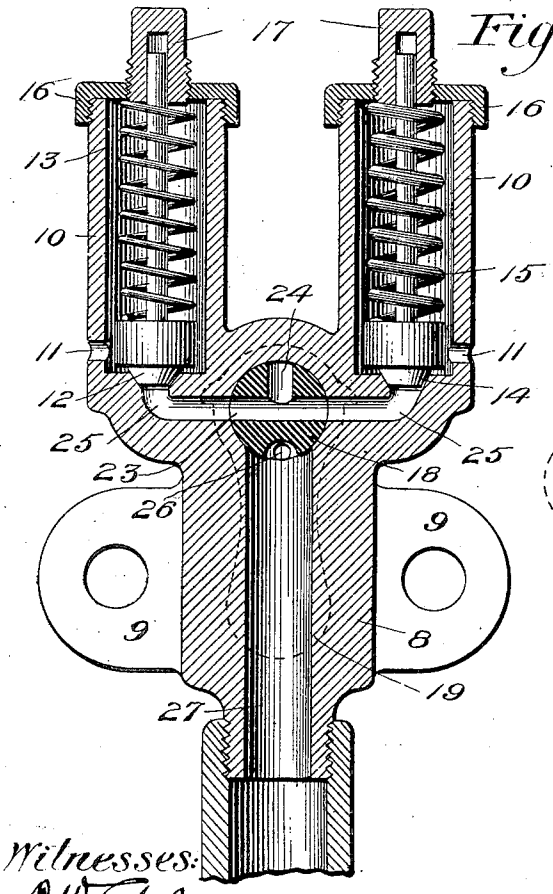


Fig. 3.

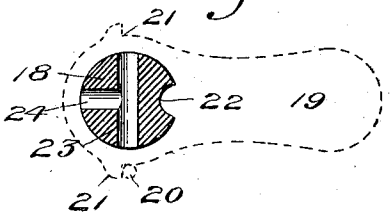
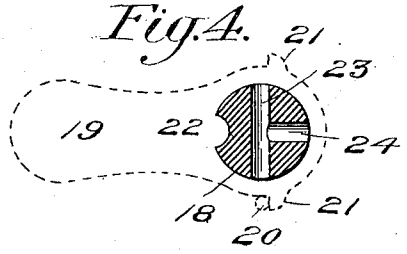


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN A. TOAL, OF CLANCY, MONTANA, ASSIGNOR OF ONE-HALF TO PETER LEARY, OF CLANCY, MONTANA.

PRESSURE-RETAINING VALVE FOR AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 697,694, dated April 15, 1902.

Application filed November 29, 1901. Serial No. 83,995. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. TOAL, a citizen of the United States, residing at Clancy, in the county of Jefferson and State of Montana, have invented new and useful Improvements in Pressure-Retaining Valves for Air-Brakes, of which the following is a specification.

My invention relates to pressure-retaining valves for air-brakes; and the object in view is the provision of means for retaining limited pressure within the brake-cylinders when the engineer recharges the auxiliary reservoirs, said pressure corresponding to the weights of the individual cars comprising the train.

The accompanying drawings illustrate one example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principle.

Figure 1 shows a car with my improvements applied to the fluid-pressure brake system which is attached thereto. Fig. 2 is a sectional view of a duplex retaining-valve with the handle in position of full release. Fig. 3 shows the handle in the position it occupies when a relatively low pressure is retained in the brake-cylinder. Fig. 4 shows the position of the handle when a relatively high pressure is retained in the brake-cylinder.

Referring to the several figures, the numeral 1 designates a car-body of any type; 2, the air-brake cylinder; 3, the auxiliary reservoir; 4, the triple valve; 5, the exhaust-port of the triple valve, and 6 the pipe leading from the triple-valve exhaust-port to a position near the top and end of the car, where it is readily accessible to the brakeman.

The numeral 7 designates the duplex valve as a whole; 8, the casing of the valve; 9, the perforated lugs by which the casing is secured to the car; 10, two small cylindrical castings in connection with the main casting; 11, exhaust-ports in the castings; 12, the low-pressure retaining-valve; 13, the low-pressure-retaining-valve spring; 14, the high-pressure retaining-valve; 15, the high-pressure retaining-valve spring; 16, removable caps at the ends of the valve-castings; 17, the spring-adjusting plugs; 18, a rotary plug located in the main casing; 19, a handle for turning the plug; 20, stops on the casing; 21, lugs upon the handle to engage the stops on the casing; 22, a longitudinal groove in the plug extending a portion of the length of said plug only; 23, a diametrical passage through the plug; 24, a passage at right angles to the diametrical passage; 25, passages from the plug to the low and high pressure retaining-valves; 26, the full-release port in the casing which is in communication with the groove in the plug when the handle is in a vertical position, and 27 is a passage from the pipe 6 to the plug.

As is well known to persons familiar with the art, the brakes are applied by the engineer exhausting air from the train-pipe to the atmosphere, and when applied the passage from the train-pipe to the auxiliary reservoir is closed, the passage from the auxiliary reservoir to the brake opened, and the exhaust-passage from the cylinder to the atmosphere closed. In recharging the reservoir the passage from the brake-cylinder to the atmosphere is opened and the passage from the train-pipe to the reservoir opened.

When a train is descending a grade, it is desirable to recharge the reservoir and retain the brakes set with a pressure in each brake-cylinder corresponding to the weight of the car or car-load. My valve enables that result to be secured. At the top of a grade the brakesman turns the handles upon the empty or lightly-laden cars to the position shown in Fig. 3, so that the air to escape must lift the valve 12 and overcome the pressure of the light spring. Upon the heavily-laden cars the handle is turned to the position shown in Fig. 4, which opens the passage to the valve 14 with the relatively stiff spring. When the engineer recharges the auxiliary reservoir, pressure is retained within the several brake-cylinders of the light and heavy cars corresponding to the force exerted by the springs 13 15 to seat the valves. The springs determine the pressure retained, which may vary from ten, fifteen, or twenty pounds for the lighter cars up to approximately full or completely full pressure for the heavier cars. Upon reaching the level track or the bottom of the grade the handles are turned to the po-

sition shown in dotted lines, Fig. 2, so that the passage from the exhaust-port 5 of the triple valve is entirely open to the atmosphere by way of the groove 22 in the plug and the port 26 in the casing. (Clearly shown in said figure.)

The difficulties and dangers attending the operation and control of trains upon steep and mountainous grades, whatever be the relative arrangement of the cars, are well-known to practical railroad men and need not be herein recited. The use of my invention will wholly eliminate such difficulties and dangers, as it provides means for retaining such pressure within the brake-cylinders as will control the individual car according to its weight or weight and load.

It is obvious that in practice modifications in construction may be introduced and equivalents used for parts of the valve. For instance, I may substitute weighted valves for the valves and springs shown, and the parts may be differently disposed. Changes which will not affect the mode of operation to secure the desired results I shall regard as unsubstantial departures.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with an air-brake system, of a pipe connected to the exhaust-port of the triple valve; a duplex valve embracing valves which can retain different pressures within the air-brake cylinder; and means for controlling the passage from the pipe to said valves.

2. The combination with an air-brake system, of a pipe connected to the exhaust-port of the triple valve; a duplex valve embracing two valves requiring different pressures to operate the same; and a plug adapted to place the pipe in communication with the said valves alternately.

3. The combination with an air-brake system, of a pipe connected to the exhaust-port of the triple valve; a duplex valve embracing a plurality of valves of unequal power; a plug adapted to place the pipe successively in communication with the valves; and means for opening a passage from the pipe to the atmosphere.

4. The combination with an air-brake system, of a pipe connected to the exhaust-port of the triple valve; a duplex valve embracing a plurality of valves held to their seats with unequal pressure; a plug with passages adapted to open communication between the pipe and the valves; and means in connection with the plug for opening a passage to the atmosphere.

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

JOHN A. TOAL.

Witnesses:
PETER LEARY,
CASIMIR KAMBER.