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A. C. RICHARDS.

AIR BRAKE SYSTEM.

APPLICATION FILED FEB. 29, 1904.

Fig. 1.

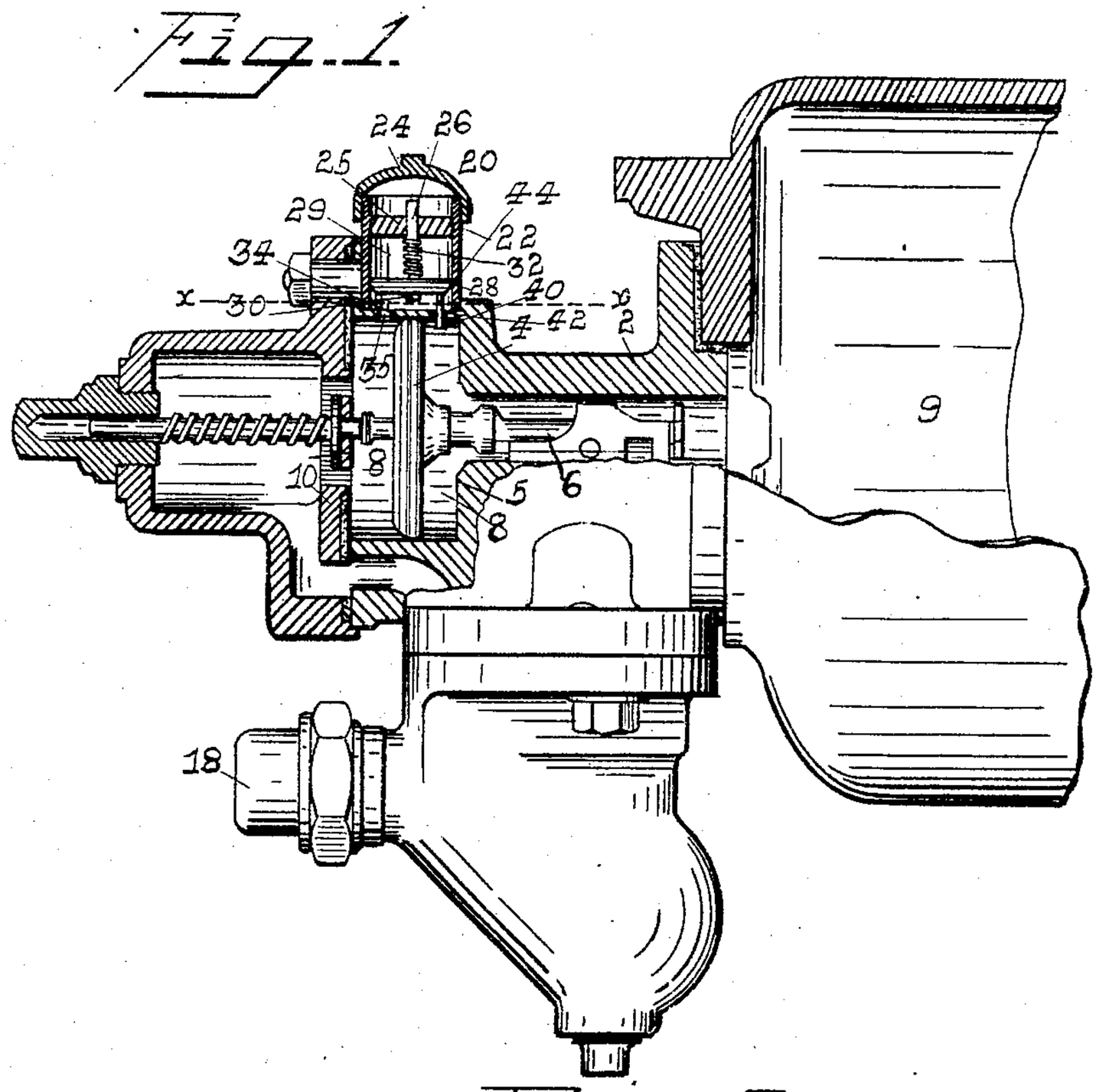
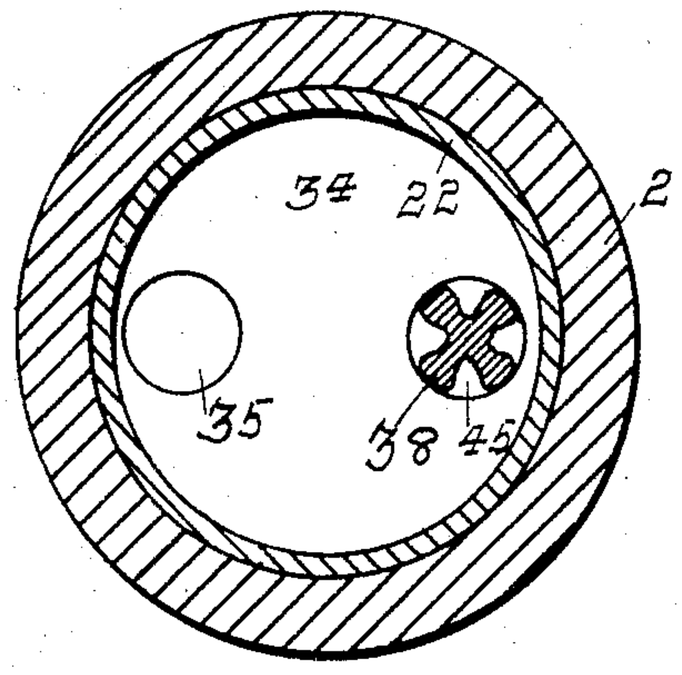



Fig. 2.




WITNESSES:

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No. 786,383. Patented April 4, 1905.

# UNITED STATES PATENT OFFICE.

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## AIR-BRAKE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 786,383, dated April 4, 1905.

Application filed February 29, 1904. Serial No. 195,712.

*To all whom it may concern:*

Be it known that I, ALVA C. RICHARDS, a citizen of the United States, residing at Tomah, in the county of Monroe and State of Wisconsin, have invented new and useful Improvements in Air-Brake Systems, of which the following is a specification.

The object of my invention is to provide means whereby the auxiliary reservoir and the train-line may be charged after the reduction in the pressure on the train-line and auxiliary reservoir has been made by setting the brakes and even while they are still set; and it consists in a valve set in communication with any triple valve provided with a piston used in the ordinary braking system, and it also consists in means for controlling the action of the piston of the triple valve.

For a better understanding of my invention and the manner in which it is constructed, together with the mode of operation, attention is called to the following specification when taken in connection with the drawings accompanying the same and forming a part hereof.

Figure 1 shows a vertical section of my valve in position over a triple valve provided with a piston. Fig. 2 is a cross-section through line $x\,x$ of Fig. 1.

In the following description I have shown one form of my valve in connection with one form of a triple valve provided with a piston used in the ordinary braking system; but it will manifestly be seen in the following specification that other forms of valves may be used with other forms of triple valves and the valves may be set in different relation to each other.

Like figures of reference denote corresponding parts in each of the drawings.

Referring to the drawings, 2 represents a triple-valve casing; 4, the piston of the triple valve; 5, the seat; 6, the stem; 8, the piston-chamber; 10, the cap or covering of the piston-chamber, and 9 the auxiliary reservoir. The piston-chamber is connected with the train-line 18 in the ordinary way.

Thus far my description relates wholly to the well-known triple valve and its connection with the train-line and auxiliary reservoir and forms no part of my invention, but I use my invention in connection therewith.

Over the piston-chamber 8 the casing is cut away sufficiently to insert my invention 20, which is simply screw-threaded into the casing or attached in any convenient manner. It might be cast with the other part of the casing, but I prefer to screw it into the casing of the triple valve over the piston-chamber. The device consists in a tubular casing 22, provided with a cap 24, screwed onto the top of the casing 22 for the purposes presently to appear. Within the casing 22 is an adjusting-nut 25, through which passes a piston-stem 26, extending down and is fastened to the piston 28. The piston 28 is adapted to travel in the piston-chamber 29. At the lower end of the piston 28 is a projection 30. Around the stem between the piston 28 and the adjusting-nut 25 is a coil-spring 32, which spring is set to such tension as desired by the adjusting-nut 25, and in order to conveniently get at the adjusting-nut 25 the cap 24 is removably attached to the upper end of the casing 22.

At the bottom of the casing 22 is a plate 34, formed of part of the casing of the triple-valve piston-chamber not cut away, through one side of which is an opening 35, whereby air is admitted from the piston-chamber 8 into the piston-chamber 29. At the opposite side of the piston-head 28 is positioned a valve 38, widened out at 40 and adapted to fit into a seat 42 in the plate 34. The stem 44 of the valve 38 projects up through the plate 34 and is securely fastened to the base of the piston-head 28. The stem 44 of the valve 38 is fluted at 45 to admit the air from the chamber 29 into the chamber 8 when the valve 38 is moved off from its seat 42.

From the description thus far given it will be seen that the casing 22 and the plate 34, with its openings 35 and 42, which are arranged opposite each other near the periphery of said plate, so as to be separated by the piston 4 of the triple valve when that element is released from its seat, provide a con-

duit over and around the piston 4, and thereby establishes direct communication between the train-pipe and the auxiliary reservoir independently of the triple-valve piston.

The mode of operating my device is substantially as follows: Starting with the train-line and the auxiliary reservoir 9 fully charged, the engineer draws off from the train-line sufficient air to set the brakes on the train. This moves the triple valve 4 over to a central position in the piston-chamber 8 by the air from the auxiliary reservoir 9. When the reduction of the pressure of the air in the chamber 8 is sufficient to permit the spring 32 to come into action, it will force down the piston 28, and with it the valve 38, into the chamber 8 upon the auxiliary-reservoir side of the piston 4 and prevent the piston 4 from moving back to its seat or to its released position. To charge the auxiliary reservoir 9 while the brakes are still set, the engineer now forces air into the train-line 18, which passes up into the chamber 8 upon one side of the piston 4 and through the port 35 into the chamber 29 beneath the piston 28, and this air passes around and down through the flutes 45 of the valve 38 in the valve-stem 44, down into the chamber 8, and out into the auxiliary reservoir. In this manner the engineer can charge the train-line and the auxiliary reservoir to nearly the original pressure or to nearly the amount of the pressure to which the spring 32 is set by the adjusting-nut 25. When it is charged to a little more than this amount, the spring is set to resist. Then the pressure of air will raise the piston 28 against the pressure of the spring 32 and at the same time raise the valve 38 out of the chamber 8 into its seat 42. A further charging of the train-line will force the piston 4 back on its seat to its released position. In emergencies when the engineer has made a sudden reduction in the train-line the spring 32 will come into action and force down the valve 38 into the chamber 8 in the same manner as in service application of the brakes, and then the engineer can charge the train-line and the auxiliary reservoir, as before described, even while the brakes are set.

By setting the automatic emergency-valve mechanism in the wall of the piston-chamber of the triple valve the piston-chamber or the space in which the piston 4 moves is free and unobstructed, permitting the triple-valve mechanism to always remain intact and preventing the latter from being rendered inoperative by breakage or disarrangement of any of the parts comprised in the automatic emergency-valve mechanism. Furthermore, if such emergency-valve mechanism becomes inoperative or broken access may be had thereto by simply removing the cap 24 and without disturbing the parts of the triple valve. This arrangement is important, in that it provides an unobstructed piston-chamber and insures of the proper operation of the triple valve at all times.

Having now described my invention, what I claim is—

1. In a fluid-pressure brake mechanism, the combination with a triple valve, of a conduit terminating at each end in the side wall of the piston-chamber of the triple valve, a spring-actuated piston, and a valve to control said conduit constructed and arranged to automatically establish direct communication between the train-line and the auxiliary reservoir when the supply of braking pressure in the latter is reduced to a predetermined point.

2. In a fluid-pressure brake mechanism, the combination with a triple valve having a piston-chamber and a piston in said chamber, of a conduit terminating at each end in the side wall of the piston-chamber of the triple valve, a spring-actuated piston adjustable over the conduit, and a valve secured to the piston and actuated thereby and arranged to admit fluid-pressure from the train-pipe to the auxiliary reservoir when the triple piston has been unseated by a reduction of the supply of braking pressure in the auxiliary reservoir.

3. In a device of the character described, a triple valve provided with a piston, a valve provided with a piston opening into the chamber of the piston of the triple valve, air communication between the train-line and the said valve, air communication between the said valve and the auxiliary reservoir through the triple valve, and a stop attached to the piston of said valve and adapted to project into the chamber of the triple-valve piston and prevent said piston from returning to its released position while the train-line and auxiliary reservoir are being charged.

4. In a fluid-pressure brake mechanism, the combination with a triple valve, of a conduit terminating at each end in the side wall of the piston-chamber of the triple valve, a spring-actuated piston constituting the upper wall of the conduit and provided with a downwardly-extending projection to limit the descent thereof, a valve actuated by the piston and adapted to normally close said conduit on the auxiliary-reservoir side of the triple-valve piston, and means for opening said valve to establish direct communication, independently of the triple-valve piston, between the train-pipe and the auxiliary reservoir upon the reduction of the supply of braking pressure in the latter.

5. In a fluid-pressure brake mechanism, the combination with a triple valve having a piston-chamber and a piston therein, of a conduit in the side wall of the piston-chamber and opening at each end into the piston-chamber of the triple valve and a yielding piston forming one side of the conduit, and a

valve actuated by the piston and constructed and arranged to establish direct communication between the train-pipe and the auxiliary reservoir upon the reduction of the supply of braking pressure in the latter.

6. In a device of the character described, a triple valve provided with a piston, an automatic valve set in communication with said triple valve said automatic valve consisting of a casing in which is set a spring-actuated piston, a valve-stem attached to the piston, a valve opening into the triple valve and controlled by said piston, a stop attached to said valve and projecting into the triple valve in the chamber of its piston and adapted to hold the said piston off its seat.

7. In a device of the character described, in combination with a triple valve provided with a piston, an automatic valve in communication with the triple valve, a spring-actuated piston in said automatic valve, means for setting said spring at a given tension, communication between the train-line and said automatic valve, communication between said automatic valve and the triple valve, and a stop attached to the piston of the automatic valve and projecting into the piston-chamber of the triple valve to hold the triple-valve piston off its seat while the train-line and auxiliary reservoir are being charged.

8. In a device of the character described, a triple valve provided with a piston, an auxiliary reservoir, an automatic valve set in communication with the piston-chamber of the triple valve, a spring-actuated piston in said automatic valve, means for setting said spring at a given tension, a valve-stem secured to said piston and adapted to project its valve into the piston-chamber of the triple valve on the side of the piston next its seat to hold said piston off its seat while the air is discharged from the train-line into the automatic valve beneath its piston and out into the piston-chamber of the triple valve to the auxiliary reservoir.

9. In a fluid-pressure brake mechanism, the combination with a triple valve having a piston-chamber and a piston, of means for delivering fluid-pressure from the train-pipe to the auxiliary reservoir when the supply of braking pressure in the latter has been reduced, comprising a conduit in the piston-chamber of the triple valve with its termini opening in the side of the piston-chamber near each end thereof, and a valve arranged to control said conduit and also hold the piston from its seat while the conduit is open.

10. In an air-brake mechanism, a triple valve having a piston-chamber, a piston in said chamber, and an automatic emergency-valve mechanism set in the casing of the piston-chamber and having direct communication with the auxiliary reservoir when the valve is opened by the piston and means operated by said mechanism to hold the piston from its seat when the supply of braking pressure in the auxiliary reservoir is reduced to a predetermined point.

11. In a fluid-pressure brake mechanism, the combination with a triple valve having a piston-chamber 8, and a piston in said chamber, of a chamber 29 in the side wall of the piston-chamber, and having ports in communication with the latter near each end thereof, a valve to normally close one of said ports, and an automatically-acting piston in the chamber 29 to operate the valve and open its port when the supply of braking pressure has been reduced to a predetermined point.

12. In a fluid-pressure brake mechanism, the combination with a triple valve having a piston-chamber 8, and a piston in said chamber, of a chamber 29 in the side wall of the piston-chamber and having ports arranged at each end of the piston-chamber on opposite sides of the piston, a valve normally closing the port on the auxiliary-reservoir side of the piston, and an automatically-acting piston in the chamber 29 to open said valve and project it in the path of the triple piston when the supply of braking pressure has been reduced to a predetermined point.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALVA C. RICHARDS.

Witnesses:
M. M. CADY,
K. M. CADY.