No. 795,385. PATENTED JULY 25, 1905.

N. V. H. BERGENHEIM.

RECHARGING DEVICE FOR AIR BRAKES.

APPLICATION FILED SEPT. 21, 1904.

Fig. 1.

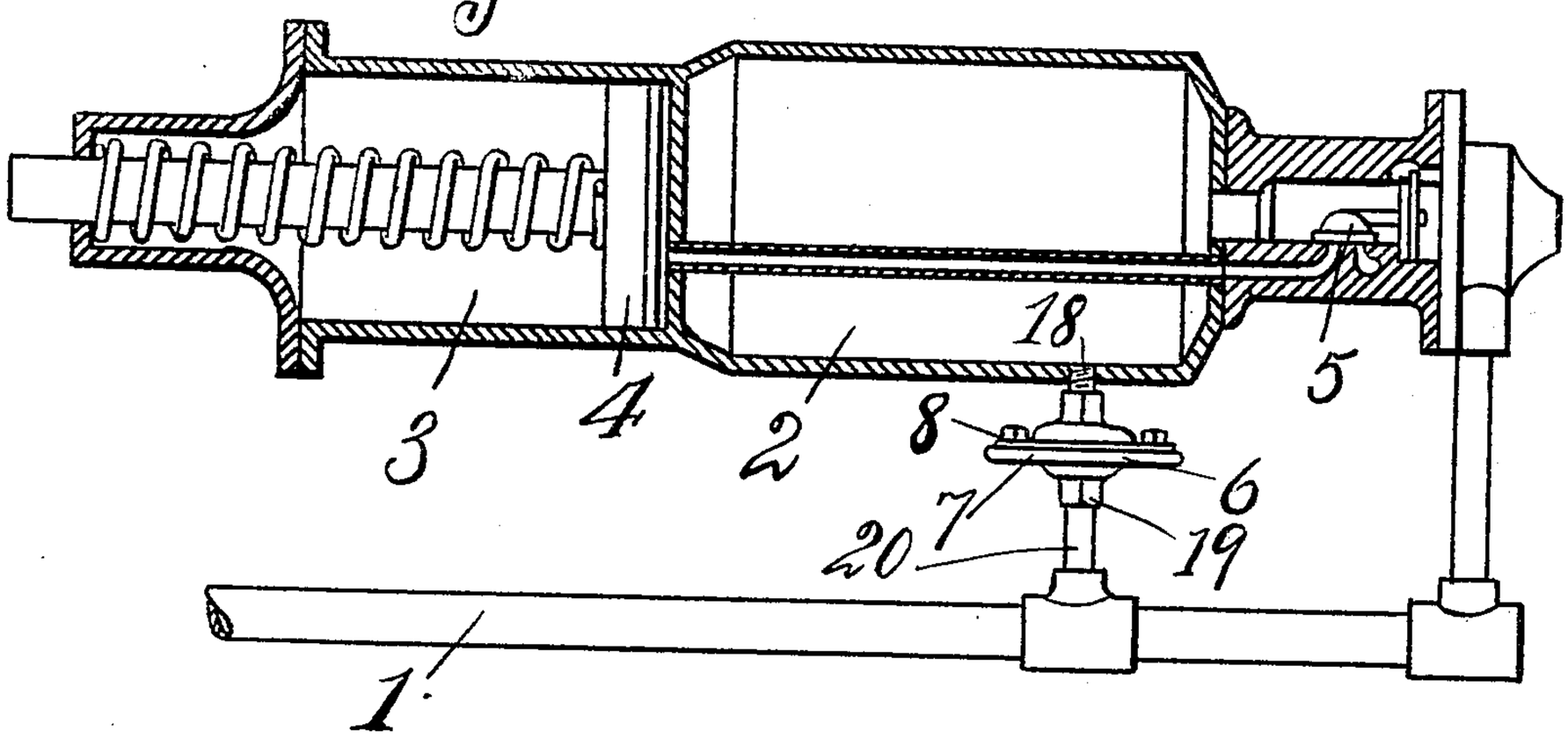


Fig. 2.

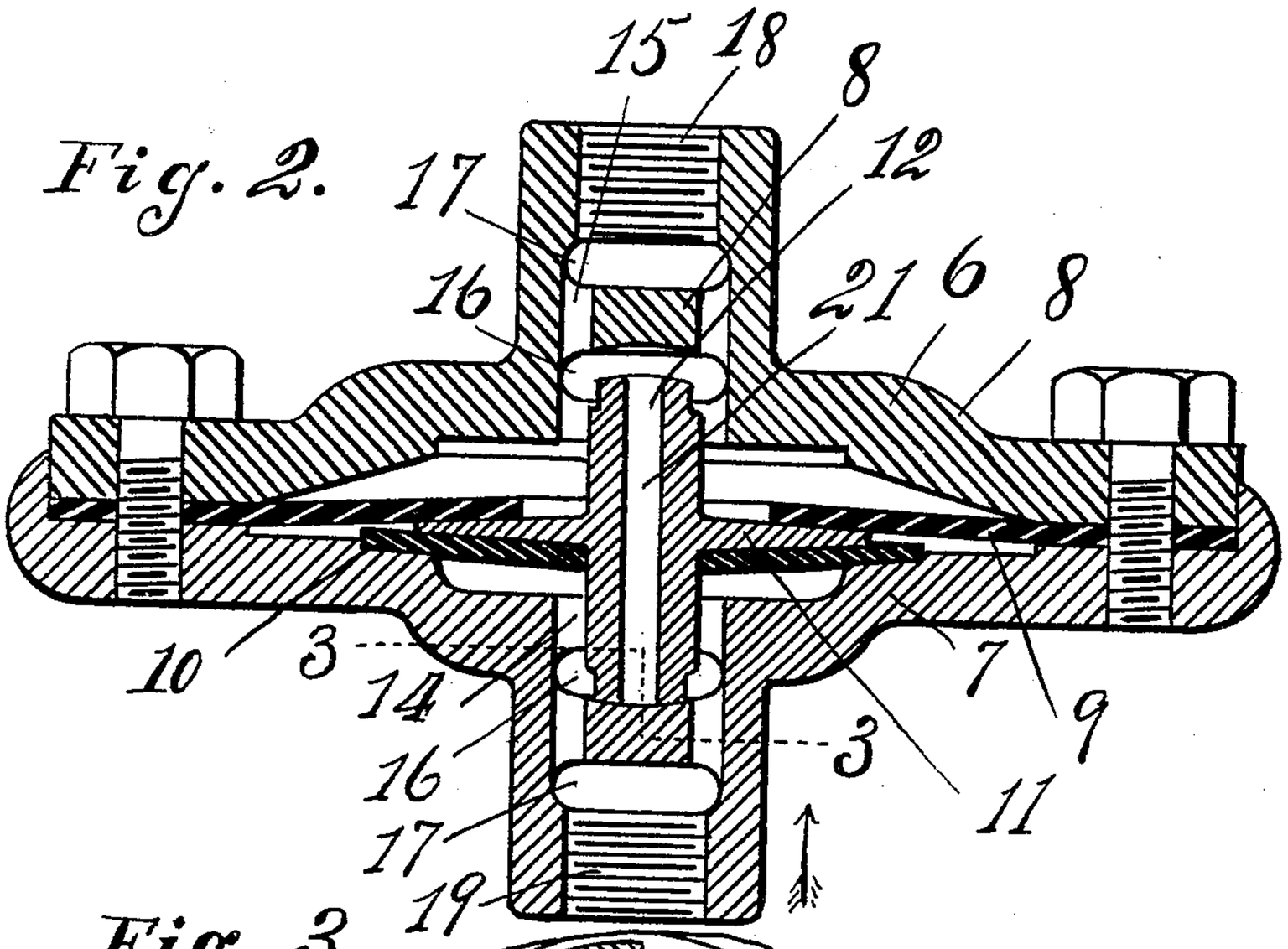
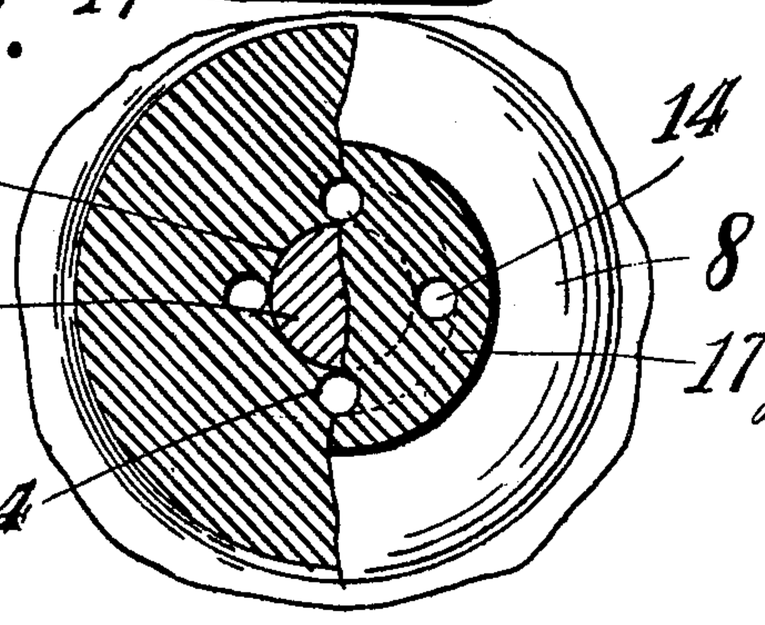


Fig. 3.



Witnesses

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RECHARGING DEVICE FOR AIR-BRAKES.

No. 795,385. Specification of Letters Patent. Patented July 25, 1905.

Application filed September 21, 1904. Serial No. 225,321.

To all whom it may concern:

Be it known that I, NILS VICTOR HUGO BERGENHEIM, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Recharging Devices for Air-Brakes, of which the following is a specification.

This invention relates to a recharging apparatus for air-brakes, and is of especial use in mountainous regions. In such districts the frequency of the application of the brakes eventually reduces the pressure in the compressed-air reservoir so low as to be insufficient to set the brakes without recharging. With the ordinary apparatus this recharging takes place in the intervals when the brakes are released, and on fairly level roads there is sufficient time to recharge the auxiliary reservoir; but on hilly roads this is not the case. Even on a continuous downgrade the present system is defective, for then, on account of leakage, the pressure on the brakes gradually diminishes, rendering it necessary to reset the brakes, which lowers the auxiliary-reservoir pressure, making it necessary to recharge the same. In order to maintain the pressure on the brakes while recharging the reservoir, it is at present the custom to provide retaining-valves which maintain a pressure upon the brakes of about fifteen pounds to the square inch, and these are used while recharging; but these retaining-valves have to be cut in and out by hand at a signal from the engineer, so that the system is not automatic, and it is quite possible for accidents to occur from a misunderstanding of the signals or from other cause. Moreover, the weights do not exert a sufficient pressure. Fifteen pounds to the square inch is as much as is practicable; but this is not sufficient in many cases, so that the engineer may lose control of his train on account of insufficient brakage.

The object of this invention, then, is to enable the auxiliary reservoir to be recharged without the necessity of releasing the brakes, so that a sufficient degree of pressure may at all times be maintained in the auxiliary reservoir even when the brakes are being constantly or frequently in use.

In the accompanying drawings, Figure 1 is a vertical section of my improved apparatus. Fig. 2 is an enlarged section of the valve. Fig. 3 is a horizontal section on the line 3 3 of Fig. 2 looking in the direction of the arrow.

Referring to the drawings, 1 represents the train line or pipe for the compressed air, and 2 represents the auxiliary reservoir under each car for supplying the compressed air to the brake-cylinder. Upon the end of the auxiliary reservoir is formed, preferably integral therewith, the brake-cylinder 3, having a spring-resisted piston 4 for setting the brake.

5 represents the triple valve, which admits air to the auxiliary reservoir from the train-line pipe and also supplies air from the auxiliary reservoir to the brake-cylinder when the pressure in the train-line pipe is reduced. All this is of common construction and forms no part of my present invention.

Since under the present system it is necessary to reduce the pressure in the train-line pipe in order to set the brakes and since during the time that the pressure is so reduced no compressed air can be supplied to the auxiliary reservoir, it follows that after repeated and long-continued setting of the brakes, as in descending long declivities, the compressed-air pressure in the auxiliary reservoir may be so greatly reduced that the engineer may lose control of his train. He must take off the brakes to recharge the auxiliary reservoir, and this he can not afford to do.

Now by my invention I provide means for recharging the cylinder while the brakes are on and this without interfering with the action of the ordinary means for charging the reservoir. For this purpose there is attached to the bottom of the auxiliary reservoir 2 a valve-casing 6, composed of two halves 7 and 8, screwed together, as shown, and inclosing between them an annular rubber diaphragm 9, between which and another diaphragm 10 is placed the circular flange or web 11 of a hollow lift-valve 12, the ends of which slide in bearings 13, formed in the two halves of the valve-casing. Said sections 7 8 are provided with ports 14, leading from the interior of the valve to annular chambers 16 around the ends of the lift-valve 12, and with ports 15 from said chambers 16 to chambers 17, connecting with the outlets 18 19 of the valve, by which they are connected, respectively, with the auxiliary reservoir 2 and with a pipe 20, leading to the train-line pipe 1.

The operation of this device is therefore as follows: So long as the pressure in the auxiliary reservoir is equal to or greater than

that in the train-line pipe the lift-valve 12 is in its lowest position, assuming the same by gravity, also assisted slightly by the pressure of the annular rubber diaphragm 9; but when it is desired to recharge the auxiliary reservoir without releasing the brakes then if the compressed air be thrown on slowly the compressed air coming from the train-line pipe and passing upward by the ports 15 14 on the under side of the lift-valve raises said valve, so that the compressed air passes through the lower ports 15 and into the lower end of the conduit 21 through the lift-valve, out through the upper end of said conduit, out through the upper ports 15, and into the auxiliary reservoir, thus raising the pressure in said reservoir. As soon as the pressure in the reservoir equals the pessure in the train-line pipe, so that the pressures on the two sides of the circular web 11 of the lift-valve are equal, said valve again closes by gravity. This valve will not be brought into operation by the ordinary manner of handling the brakes, for ordinarily the engineer supplies compressed air from the main drum in the engine to the train-line suddenly, and it will be seen that a sudden application of compressed air moves the lift-valve so that the upper end of the conduit 21 is brought up against the upper valve-section 8 and is closed, so that no air can pass therethrough into the auxiliary reservoir. Therefore in order to use this valve the engineer must perform the operation of recharging slowly, so that there will be no sudden force thrown upon the lift-valve, but only sufficient to leave it in the position in which the conduit 21 is open both at the top and bottom, thus allowing compressed air to enter the auxiliary reservoir until the same is fully charged.

I claim—

1. In an apparatus of the character described, in combination with the train-line pipe, auxiliary reservoir, triple valve between said train-line pipe and reservoir, and a brake-cylinder, of an independent connection between the train-line pipe and the auxiliary reservoir, and a valve therein controlling the passage of the air from the pipe to the reservoir, said valve comprising ports connecting with the auxiliary reservoir and the train-line pipe, and a lift-valve, said lift-valve having a circular flange or web, annular flexible diaphragms between which said web is inclosed, said lift-valve having a central conduit connecting with the ports when the valve is in a mediate position, but the conduit being closed when the valve is in either terminal position, substantially as described.

2. The combination, with the auxiliary reservoir and train-line pipe of an air-brake, of a conduit between the two and a valve controlling said conduit, comprising a lift-valve having a circular flange and a central conduit, the casing of the valve having parts arranged to close one or the other of the ends of the conduit, in the terminal positions of the lift-valve, and having ports communicating with said conduit in a mediate position of said lift-valve, and an annular flexible diaphragm closing the passage of the air around the flange, substantially as described.

3. The combination, with the auxiliary reservoir and train-line pipe of an air-brake, of a conduit between the two and a valve controlling said conduit, said valve comprising a movable member arranged to open the conduit when in its mediate position and to close the same when in either terminal position, the movable member having a circular flange, and an annular flexible diaphragm closing the passage of the air around said flange, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

NILS VICTOR HUGO BERGENHEIM.

Witnesses:

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