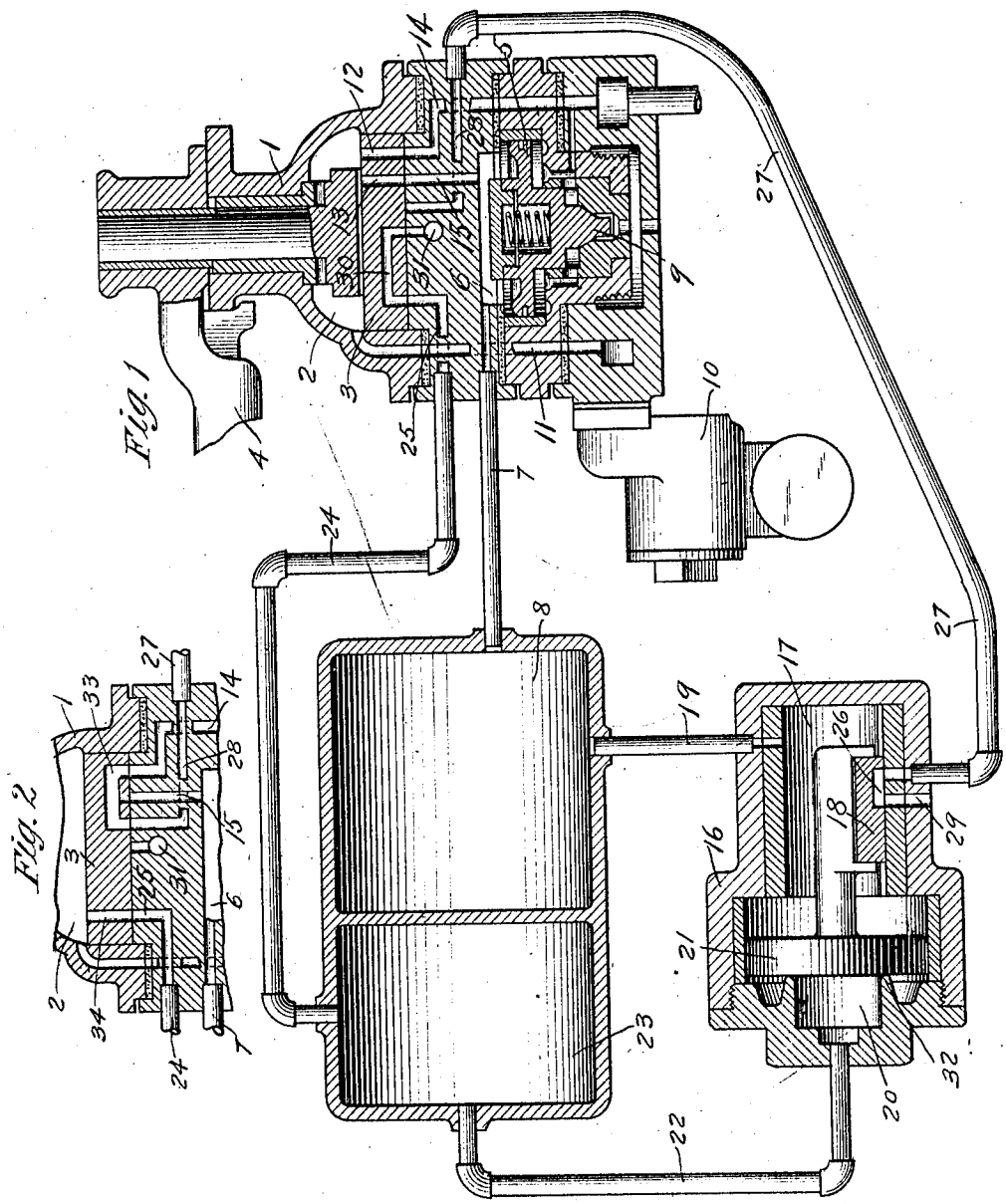
W. V. TURNER.

BRAKE VALVE DEVICE.

APPLICATION FILED MAY 24, 1911.

1,039,222. Patented Sept. 24, 1912.



WITNESSES

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INVENTOR

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UNITED STATES PATENT OFFICE.

WALTER V. TURNER, OF EDGEWOOD, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

BRAKE-VALVE DEVICE.

1,039,222. Specification of Letters Patent. Patented Sept. 24, 1912.

Application filed May 24, 1911. Serial No. 629,189.

To all whom it may concern:

Be it known that I, WALTER V. TURNER, a citizen of the United States, residing at Edgewood, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Brake-Valve Devices, of which the following is a specification.

This invention relates to fluid pressure brakes, and more particularly to an engineer's brake valve device for controlling the admission and release of fluid under pressure to and from the train pipe.

According to a prior application of mine, Serial No. 525,871, filed November 2, 1909, in order to limit the amount of reduction in train pipe pressure which may be made in a service application of the brakes, a limiting or reducing reservoir is provided into which fluid is vented from the equalizing reservoir, and in order to shorten the time required to effect a given reduction in train pipe pressure, a direct exhaust port is provided through which air is vented from the train pipe at the same time that the equalizing reservoir pressure is being reduced into the limiting reservoir. Means are also provided for automatically closing the direct exhaust upon equalization of the equalizing reservoir pressure into the limiting or reducing reservoir. While the above mentioned construction operates very satisfactorily, I have discovered that the time required to effect a given reduction in train pipe pressure may be still further reduced. With this prior apparatus, the action is regulated by the time required for the equalizing reservoir to equalize into the reducing reservoir, and according to well known principles, the rate of flow gradually becomes slower as the pressure in the reducing reservoir approaches the equalization point, so that the last few pounds are equalized quite slowly.

The principal object of my present invention is therefore to provide an improved device of the above character in which the time required to effect a given reduction in train pipe pressure is reduced to a minimum.

In the accompanying drawing, Figure 1 is a sectional view of an engineer's brake valve device embodying my invention showing the rotary valve of the brake valve in running position and Fig. 2 a sectional view of a portion of the brake valve, showing the rotary valve in service application position.

The engineer's brake valve may be of the usual type comprising a casing 1 having a valve chamber 2 containing a rotary valve 3 adapted to be operated by a handle 4, and having a piston chamber containing an equalizing piston 5, subject on one side to the pressure of chamber 6 communicating through pipe 7 with an equalizing reservoir 8 and subject on the opposite side to train pipe pressure. The piston 5 operates an equalizing discharge valve 9 for venting air from the train pipe. A feed valve device 10 may supply fluid through passage 11 to the chamber 2 above the rotary valve 3 and said rotary valve may be provided with the usual ports 12 and 13 for supplying fluid in running position respectively to train pipe passage 14 and to passage 15 leading to chamber 6.

According to my improvement, a valve device is provided comprising a casing 16 having a valve chamber 17 containing a slide valve 18 and connected by pipe 19 to the equalizing reservoir 8 and having a piston chamber 20 containing a piston 21 for operating said valve. The inner face of the piston 21 is subject to the pressure of the equalizing reservoir in valve chamber 17 and the chamber at the outer face of said piston is connected by a pipe 22 to a chamber 23 which in turn is connected to the seat of the rotary valve 3 through pipe 24 and passage 25. The slide valve 18 is provided with a cavity 26 adapted in one position of the valve to connect pipe 27 and a passage 28 leading to the rotary valve seat with an exhaust port 29.

In the running position of the rotary valve 3, a cavity 30 connects passage 25 with exhaust port 31, so that the chamber 23 is normally at atmospheric pressure.

The equalizing reservoir 8 is charged with fluid under pressure through the port 13 and passage 15 and consequently the valve chamber 17 is supplied with fluid from the equalizing reservoir through the pipe 19. As the outer face of the piston 21 is subject to the atmospheric pressure in chamber 23, the fluid pressure in the valve chamber 17 maintains said piston in its outer position and the

slide valve 18 in position connecting the pipe 27 with exhaust port 29. The piston 21 preferably engages a seat ring 32 in its outer position, so as to prevent leakage past the piston 21 from escaping to the atmosphere. If a service application of the brakes is desired, the brake valve is turned to service application position, as shown in Fig. 2 of the drawing, and in this position, a cavity 33 in the rotary valve 3 connects both the equalizing reservoir passage 15 and the train pipe passage 14 with passage 28. Fluid is thus vented at the exhaust port 29 controlled by valve 18, both from the equalizing reservoir and directly from the train pipe. In service position, air also flows through a port 34 in the rotary valve 3 to passage 25 and thence into the chamber 23. This port 34 is of such size that the pressure in the chamber 23 will be charged to the degree of pressure at which the train pipe pressure is limited to reduce to, at substantially the same time that the equalizing reservoir pressure is reduced to said limiting point, for example, if the normal train pipe pressure carried is 70 pounds and the limit for reducing the train pipe pressure is determined 50 pounds, then the port 34 should be of such size that the chamber 23 will be charged from 0 to 50 pounds at the same time that the equalizing reservoir pressure is reduced from 70 to 50 pounds. It will now be evident that in service position, the pressure in valve chamber 17 is reducing while the pressure on the outer face of piston 21 is increasing, so that finally the pressure on said outer face overbalances the valve chamber pressure and the piston 21 thereupon operates the valve 18 to cut off the exhaust port 29 from pipe 27. This closes the direct exhaust from the train pipe and prevents any further reduction in the equalizing reservoir pressure. The equalizing discharge valve will, however, remain open until the train pipe pressure has reduced to a point slightly lower than the equalizing reservoir pressure, when the equalizing discharge valve will seat and prevent further exhaust of air from the train pipe.

Upon moving the brake valve handle to running position, the chamber 23 is connected to the exhaust and the aqualizing reservoir is charged up to the normal train pipe pressure and the increased pressure in valve chamber 17 thereupon shifts the piston 21 to its outer position in which the slide valve connects the pipe 27 with exhaust port 29 in readiness for making another application of the brakes.

It will now be apparent that with the present construction, the time required to effect a given reduction in train pipe pressure is reduced to a minimum, as the equalizing reservoir is vented directly to the atmosphere instead of to a closed chamber.

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

1. In a fluid pressure brake, the combination with a train pipe and a brake valve provided with an equalizing reservoir, an equalizing discharge valve mechanism, and a direct exhaust port for venting fluid from the train pipe, of means for controlling the exhaust of air from the equalizing reservoir to the atmosphere and operating upon a predetermined reduction in the equalizing reservoir pressure to close said atmospheric exhaust.

2. In a fluid pressure brake, the combination with a train pipe and a brake valve provided with an equalizing reservoir, an equalizing discharge valve mechanism, and a direct exhaust port for venting fluid from the train pipe, of means for controlling the exhaust of air from the equalizing reservoir and from the train pipe through said direct exhaust port to the atmosphere and adapted upon a predetermined reduction in equalizing reservoir pressure to close said atmospheric exhaust.

3. In a fluid pressure brake, the combination with a train pipe and a brake valve provided with an equalizing reservoir and an equalizing discharge valve mechanism governed by the pressure in the equalizing reservoir for controlling the discharge of air from the train pipe, of means for controlling the exhaust of air from the equalizing reservoir to the atmosphere, said means being adapted upon a predetermined reduction in equalizing reservoir pressure to close said atmospheric exhaust.

4. In a fluid pressure brake, the combination with a train pipe and a brake valve provided with an equalizing reservoir and an equalizing discharge valve mechanism governed by the pressure in the equalizing reservoir for controlling the discharge of air from the train pipe, of a valve device subject to the opposing pressures of the equalizing reservoir and a chamber for controlling the exhaust of air from the equalizing reservoir and the train pipe.

5. In a fluid pressure brake, the combination with a train pipe and a brake valve provided with an equalizing reservoir and an equalizing discharge valve mechanism governed by the pressure in the equalizing reservoir for controlling the discharge of air from the train pipe, of a valve device subject to the opposing pressures of the equalizing reservoir and a chamber for controlling the exhaust of air from the equalizing reservoir and directly from the train pipe.

6. In a fluid pressure brake, the combination with a train pipe and a brake valve provided with an equalizing reservoir and an equalizing discharge valve mechanism

governed by the pressure in the equalizing reservoir for controlling the discharge of air from the train pipe, of a valve device subject to the opposing pressures of the equalizing reservoir and a chamber normally at atmospheric pressure for controlling the exhaust of air from the equalizing reservoir and directly from the train pipe, and means for supplying fluid to said chamber upon reducing the pressure in the equalizing reservoir to thereby operate said valve device at a predetermined reduction in equalizing reservoir pressure to close said exhaust.

7. In a fluid pressure brake, the combination with a train pipe and a brake valve provided with an equalizing reservoir and an equalizing discharge valve mechanism governed by the pressure in the equalizing reservoir for controlling the discharge of air from the train pipe, of a valve device subject to the opposing pressures of the equalizing reservoir and a chamber normally at atmospheric pressure for controlling the exhaust of air from the equalizing reservoir and directly from the train pipe to the atmosphere and means for supplying fluid to said chamber as the pressure is reduced in the equalizing reservoir to thereby operate said valve device to close the atmospheric exhaust upon a predetermined reduction in equalizing reservoir pressure.

8. In a fluid pressure brake, the combination with a train pipe and a brake valve provided with an equalizing reservoir and an equalizing discharge valve mechanism governed by the pressure in the equalizing reservoir for controlling the discharge of air from the train pipe, of a valve device subject to the opposing pressures of the equalizing reservoir and a chamber normally at atmospheric pressure for controlling the exhaust of air from the equalizing reservoir and directly from the train pipe to the atmosphere and means for charging said chamber to a predetermined degree of pressure at substantially the same time that the equalizing reservoir pressure is reduced to said predetermined pressure.

In testimony whereof, I have hereunto set my hand.

WALTER V. TURNER.

Witnesses:
A. M. CLEMENTS,
B. A. OLIVER.