No. 723,386. PATENTED MAR. 24, 1903.

M. W. HIBBARD.

FLUID PRESSURE BRAKE.

APPLICATION FILED FEB. 24, 1902

NO MODEL.

Fig. 1.

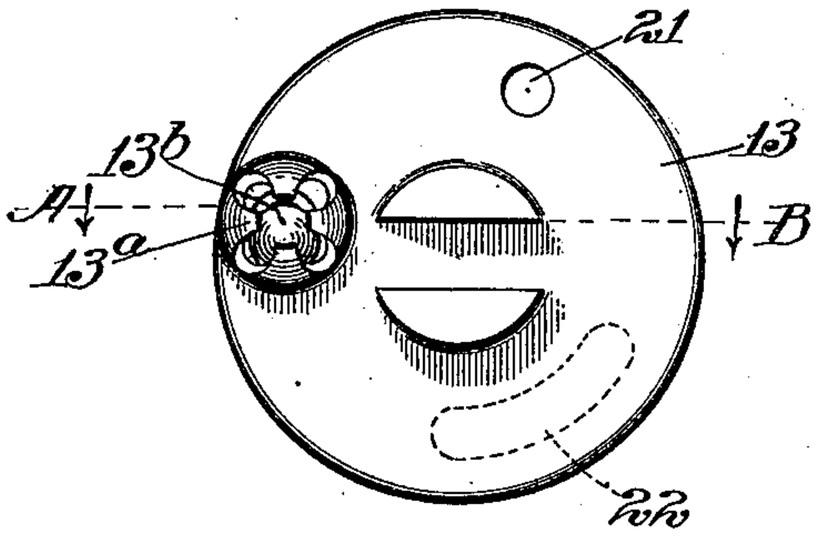


Fig. 2.

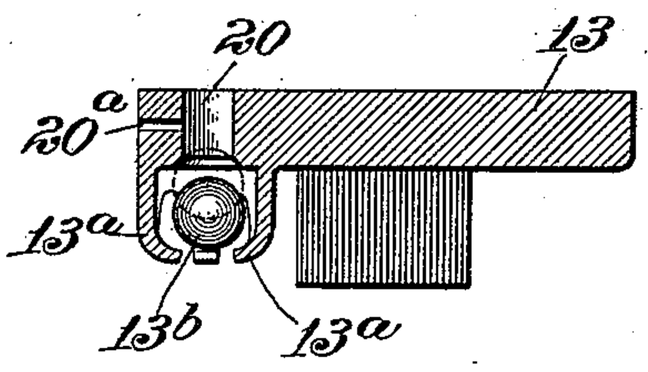


Fig. 3.

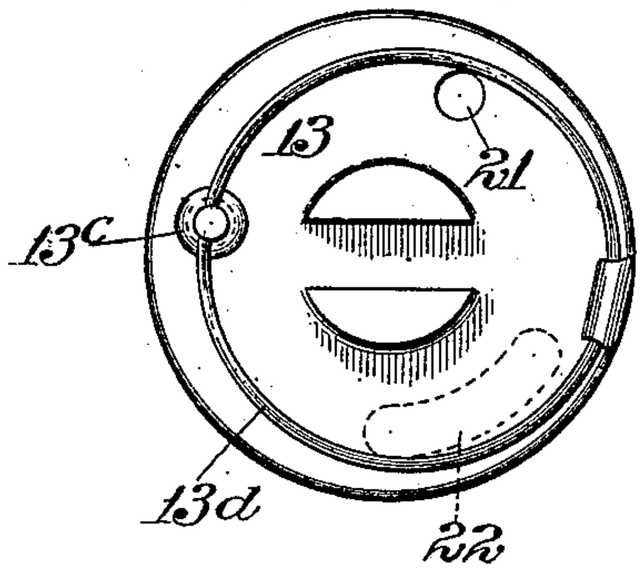


Fig. 4.

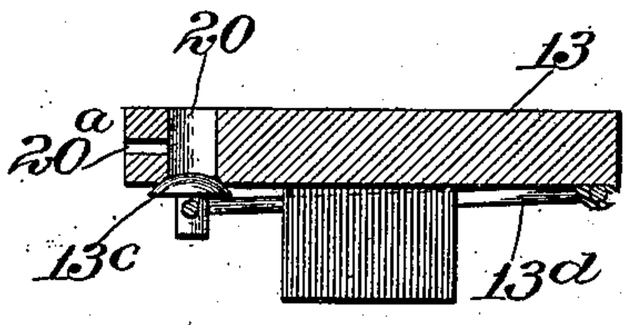
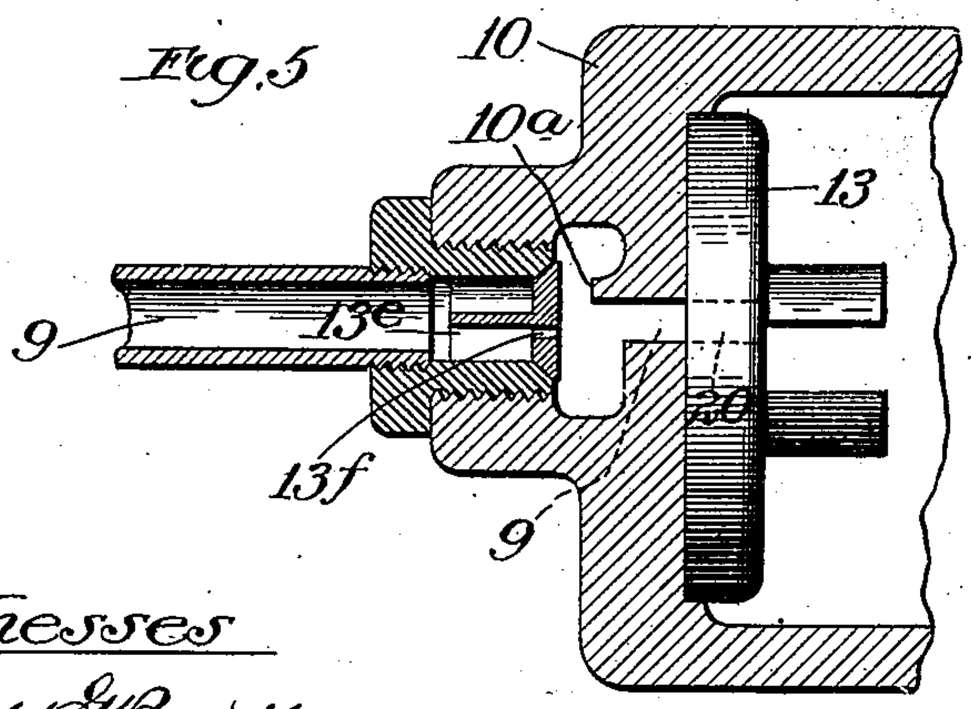


Fig. 5.



Witnesses

Harold G. Barrett

Louis B. Erwin

Inventor:

Maury W. Hibbard,

By Rector & Hibben

His Attys.

UNITED STATES PATENT OFFICE.

MAURY W. HIBBARD, OF CHICAGO, ILLINOIS, ASSIGNOR TO RICHARD FITZGERALD, OF CHICAGO, ILLINOIS.

FLUID-PRESSURE BRAKE.

SPECIFICATION forming part of Letters Patent No. 723,386, dated March 24, 1903.

Application filed February 24, 1902. Serial No. 95,340. (No model.)

To all whom it may concern:

Be it known that I, MAURY W. HIBBARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fluid-Pressure Brakes, of which the following is a specification.

My present invention has relation to devices or valve mechanisms operating in connection with an air-brake system of railway-cars for the purpose of producing a partial braking pressure for a car empty and a full or increased braking pressure for a car loaded, and such an invention is applicable to and constitutes an improvement upon the device shown and described in Patent No. 683,205, issued September 24, 1901, on my invention for improvements in fluid-pressure brakes and also applicable to the device of the same general character shown and described in Patent No. 699,386, issued May 6, 1902.

The object of the present invention is to provide simple and efficient means for preventing a too rapid charging of the supplemental reservoir and a consequent depletion or reduction in pressure of the auxiliary reservoir. In the present instance this provision comprises, in general terms, a by-pass check-valve arranged at any suitable point in the passage or communication between the reservoirs.

Referring for convenience to the device of the pending application aforesaid, in case the supplemental reservoir should happen to be empty, or substantially so, the connecting therewith of the auxiliary reservoir by the trainman by means of the rotary disk valve would obviously cause a quick drop or decrease of the auxiliary-reservoir pressure, which would continue until equalization obtained between these two reservoirs. This condition of things might be objectionable if it should be desired that the train proceed at once, inasmuch as the brake system would not then be under the customary pressure of seventy pounds, whereupon it would be necessary or proper to hold the train until the reservoirs, both supplemental and auxiliary, were pumped up. Furthermore, if several of these empty and loaded car devices should be operated simultaneously or in quick succession by the trainman as he passed along the train the sudden reduction of auxiliary-reservoir pressure and consequent sudden call or drain upon the train-line pressure to supply such auxiliary reservoirs to their proper pressure, but at a rate faster than the supply from the air-brake pump, might cause a sufficient lowering of the train-pipe pressure to apply some of the brakes in the same manner as brought about by the reductions of pressure at the engineer's brake-valve. My invention is capable of avoiding these possible objections by providing for a feed to the supplemental reservoir which is slow as compared with that of the devices of my said patents, but providing for a full flow in the opposite direction—that is, by providing a by-pass check-valve device in the communication between the reservoirs whereby the proper braking pressure will be maintained in the air-brake system and the supplemental reservoir will be permitted to feed gradually and preferably at a rate slower than the pump supply and slower than the usual feed through the ordinary triple valve.

In the accompanying drawings, Figure 1 is an elevation of a rotary disk valve corresponding to the valve 13 of the device of my said Patent No. 699,386 and embodying my invention; Fig. 2, a section on the line A B of Fig. 1; Figs. 3 and 4, views similar to Figs. 1 and 2 and illustrating a modified form of check-valve; and Fig. 5, a sectional elevation of the valve-casing and valve, illustrating a modified form of the by-pass.

The valve-casing and the valve and its ports are similar to those shown in my said Patent No. 699,386, and will, for convenience, be marked with corresponding reference-figures. As before, the valve 13 has the recess 22 and the two transverse ports 20 and 21, the latter of which is concerned with reservoir-bleeding and the former of which is adapted to connect or form communication between the auxiliary reservoir and the supplemental reservoir.

Referring to Figs. 1 and 2, the valve has on one side, immediately adjacent the port 20, a cage which is formed by a series of prongs 13^a, within which is inclosed a ball 13^b, adapted under certain circumstances, as hereinafter explained, to seat upon and close the port 20,

and having the functions of a check-valve. In practice the prongs 13^a are straight lugs, cast with the valve and then clenched down by a die or tool after the ball has been inserted.

As shown in Fig. 2, the edge of the valve has a small port or by-pass 20^a, entering the port 20 and forming a communication of restricted size around the ball or check valve and preferably of less carrying capacity than the usual by-pass of a standard triple valve.

Normally the ball 13^b drops by gravity away from its seat, thereby leaving the port 20 open for the free passage of air from the supplemental reservoir, as well as to the supplemental reservoir, whenever the two reservoirs are almost equalized as to pressure. Assuming that the supplemental reservoir of a car is empty and that the brake system is pumped up to full pressure, the turning of the valve 13 in the proper direction will form communication between the two reservoirs, as explained in said Patent No. 699,386; but the air-pressure endeavoring to pass directly through the port 20 will move the ball and force and hold it to its seat, as shown by dotted lines in Fig. 2. The air will then be required to pass through the restricted port or by-pass 20^a, whereby the charging of the supplemental reservoir will be gradual and according to the carrying capacity of such by-pass, which may be varied as desired. In practice this by-pass is now made of a size to charge the supplemental reservoir in from five to ten minutes, while under the requirements of the standard brake systems as specified by the code of the Master Car Builders' Association the triple valve by-pass permits a charging of the auxiliary reservoir in from forty-five to sixty seconds. Practically as soon as equalization occurs between the two reservoirs the ball will roll down in its cage and away from its seat, and upon the application of the brakes the supplemental-reservoir air will have free flow to the auxiliary reservoir.

By the above-described provision the auxiliary-reservoir pressure is maintained, and the train may proceed without danger, and the supplemental reservoirs may be charged gradually while the train is running. Furthermore, the rate of charging of the brake system including my devices is thus entirely within the capacity of the air-pump, and all liability of improper application of the brakes is avoided.

The check-valve may take other forms, as shown in Figs. 3 and 4, wherein the valve 13^c is secured to a spring-wire 13^d, which is soldered or otherwise secured to the valve, so as to normally hold the valve preferably slightly off its seat. This valve acts, like the ball, to close against air-pressure flowing to the supplemental reservoir but to open to the air-pressure flowing in the opposite direction.

In the forms of valve shown in Figs. 1 to 4 the by-pass is shown outside of or separate from the valve itself, although it is apparent that it might be through the valve. However, a hole through the ball would not be a practical construction, but a hole through the valve 13^c would operate properly. To show such arrangement of the by-pass and at the same time show the check-valve itself in another location away from the operating-valve, I have designed the arrangement illustrated in Fig. 5. Here in the passage 9 leading to the supplemental reservoir is interposed a winged check-valve 13^c, seating in the direction of such reservoir and having a by-pass or port 13^f. This check-valve is limited by a stop 10^a, which in the present instance is a lug cast in the main-valve casing 10. This check-valve operates in a manner now obvious from the description hereinbefore given of the other check-valve.

I claim—

1. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve controlling communication between such reservoirs and adapted to open or close such communication to permit flow in either direction, and means for restricting the speed of charging of the supplemental reservoir.

2. In combination of an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve controlling communication between such reservoirs and adapted when operated to open or close such communication to permit flow in either direction, and means for restricting the speed of charging of the supplemental reservoir but permitting free opposite flow.

3. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve controlling communication between said reservoirs, and a by-pass check-valve device cooperating with said communication to restrict the charging of the supplemental reservoir but permitting free opposite flow.

4. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve controlling communication between such reservoirs and adapted to open or close such communication to permit flow in either direction, and means for restricting the speed of charging of the supplemental reservoir so that such reservoir will be charged slower than the auxiliary reservoir.

5. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir and fed by pressure therefrom and having a less speed of charging and a valve adapted to connect and disconnect such reservoirs.

6. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve having a port 20 to connect said reservoirs, a check-valve adapted to seat on said port when the auxiliary-reservoir pressure is in excess

and a by-pass for charging the supplemental reservoir.

7. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve having a port 20 to connect said reservoirs, and a cage adjacent such port, a ball check-valve in such cage seating on the port against direct flow to the supplemental reservoir.

8. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve having a port 20 to connect said reservoirs, and a cage adjacent such port formed by a series of lugs 13^a clenched down to form inclosing prongs, a ball check-valve in such cage seating on the port against direct flow to the supplemental reservoir and a by-pass charging the supplemental reservoir.

9. The combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir, a valve 13 having a port 20 to connect said reservoirs and having a cage adjacent said port and also having a by-pass communicating between the auxiliary reservoir and such port 20 and a ball confined within the cage and acting as a check-valve against direct flow of air-pressure to the supplemental reservoir.

10. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir, a valve having a port adapted to communicate between said reservoirs and a check-valve adapted to seat on said port but normally off such seat.

11. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir, a valve operated independently of the triple valve and having a port adapted to communicate between said reservoirs and a check-valve arranged on and movable with said valve and adapted to govern said port.

12. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir, a valve having a port adapted to communicate between said reservoirs and a ball adapted to seat upon and govern said port, said valve having means for holding the ball in coöperative relation to the port it governs.

13. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir, a valve having a port adapted to communicate between said reservoirs and a ball acting as a check-valve adapted to seat upon and govern said port but normally held away therefrom by force of its gravity and arranged to seat upon and close such port upon a too rapid flow of pressure from the auxiliary reservoir to the supplemental reservoir.

14. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir, a valve having a port adapted to communicate between said reservoirs and also having a restricted opening or by-pass connecting with said port beyond the valve which governs it and a check-valve device arranged on and movable with said valve and adapted to govern said port.

15. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir, a casing having a chamber communicating with the reservoirs respectively, a rotary valve operating in said chamber and having a port or passage adapted to communicate between the reservoirs and a by-pass check-valve device arranged on said valve.

16. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir, a rotary disk valve operated independently of the usual triple valve and controlling communication between the said reservoirs, and a by-pass check-valve device arranged on said valve and coöperating with said communication to restrict the charging of the supplemental reservoir but permitting free opposite flow.

17. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve controlling communication between such reservoirs and adapted to be set by hand so as to either open or close such communication and means for restricting the speed of charging of the supplemental reservoir but permitting free opposite flow.

18. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve controlling communication between such reservoirs and adapted to open or close such communication, and means also coöperating with such communication and governed by the speed of flow through such communication for the purpose of preventing a too rapid flow toward the supplemental reservoir.

19. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve controlling communication between such reservoirs, and means coöperating with such communication and normally adapted to permit free flow in both directions but governed by the pressure of a too rapid charging of the supplemental reservoir so as to close such free communication.

20. In combination with an air-brake system, a reservoir supplemental to the usual auxiliary reservoir of the brake system, a valve controlling communication between such reservoirs, and a normally unseated check-valve coöperating with such communication and adapted to always permit free flow toward the auxiliary reservoir and normally in both directions but to be seated by the force of a too rapid flow in the charging of the supplemental reservoir.

MAURY W. HIBBARD.

Witnesses:
S. E. HIBBEN,
LOUIS B. ERWIN.