No. 897,741.

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J. A. HICKS.

FEED AND QUICK RELEASE VALVE.

APPLICATION FILED FEB. 15, 1907.

Fig. 2.

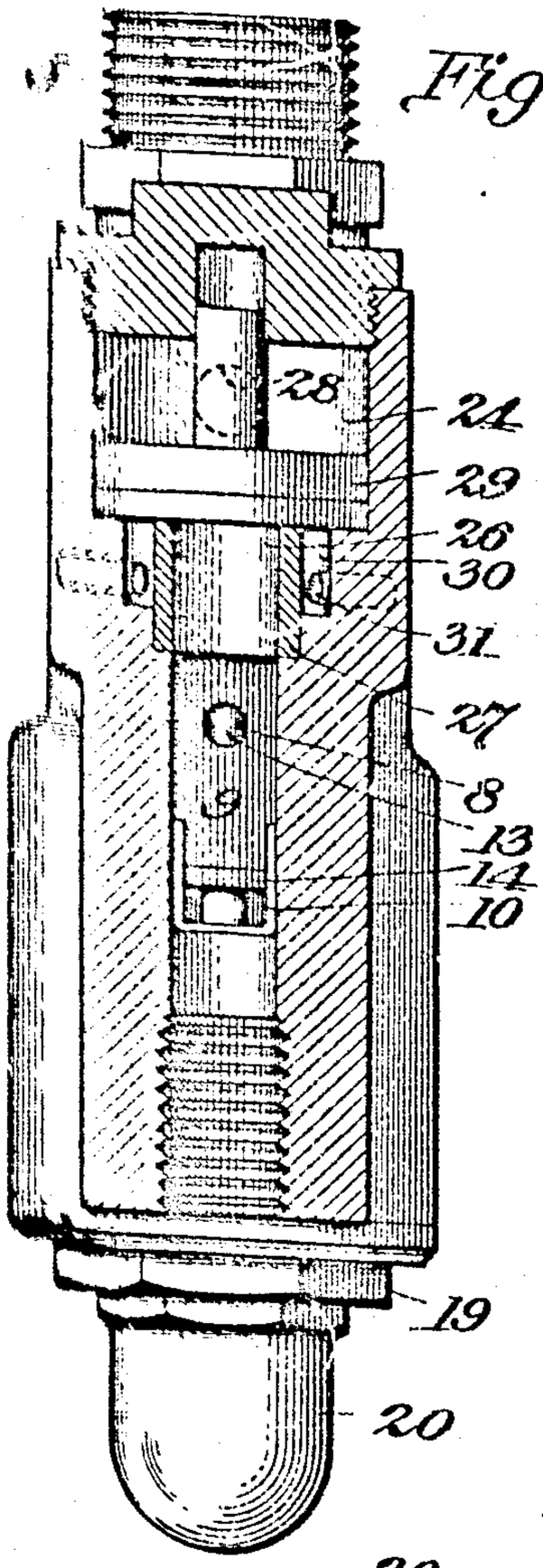


Fig. 1.

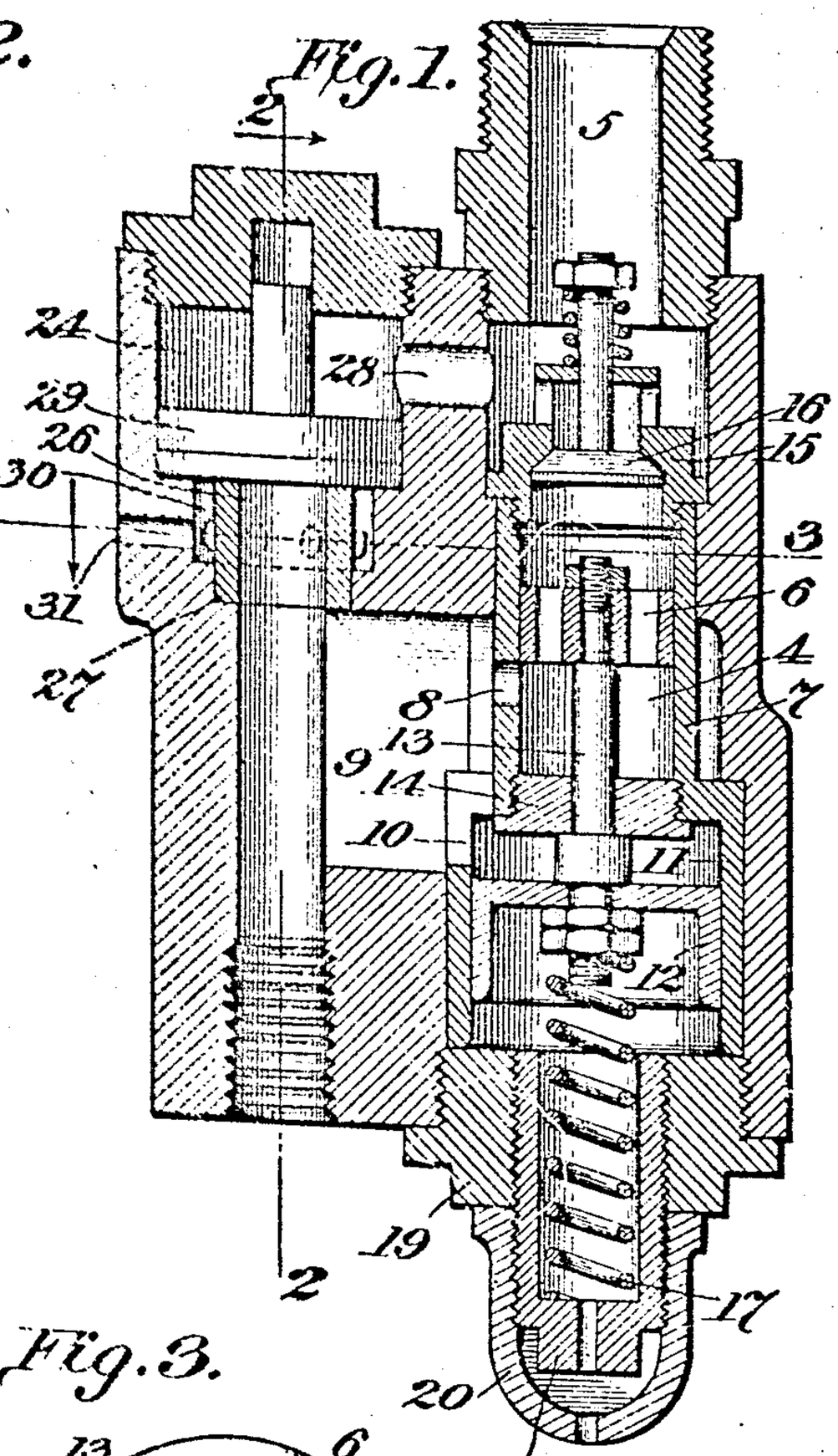
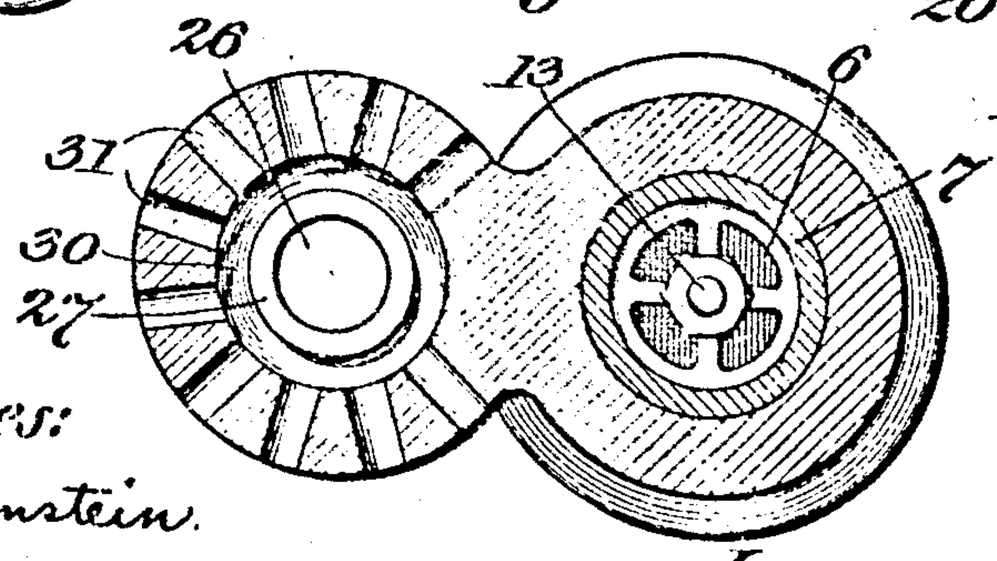


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES AMERS HICKS, OF ATLANTA, GEORGIA, ASSIGNOR TO HICKS IMPROVED ENGINE BRAKE COMPANY, OF ATLANTA, GEORGIA, A CORPORATION OF GEORGIA.

FEED AND QUICK-RELEASE VALVE.

No. 897,741. Specification of Letters Patent. Patented Sept. 1, 1908.

Application filed February 15, 1907. Serial No. 357,568.

To all whom it may concern:

Be it known that I, JAMES AMERS HICKS, citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Feed and Quick-Release Valves, of which the following is a specification.

The present invention relates to feed or reducing valves by means of which the pressure may be stepped down or reduced from a source of supply to the point of application, it being customary to provide reducing valves of this general type in fluid pressure brake systems, in order that initial pressure in the system may be brought to the pressure desired in the brake cylinders, and my present improvement has for its object the provision of a feed or reducing valve for this work which is highly efficient in its control of the air pressure, and which is simple in construction and readily assembled, either in the initial putting together of its component parts or in the disassemblage of such parts for the purpose of inspection or repairs.

A further object of my invention is to provide in connection with the feed valve, a quick release device to insure the escape of air from the brake cylinders and their leading pipes when the brakes are released, the present embodiment of my invention showing this quick release device in close association with the feed valve proper, as the close assemblage of the two simplifies and reduces the cost of equipment and furnishes a compact and highly efficient combination of these two elements.

In the drawings herewith, which exhibit one embodiment of my invention: Figure 1 is a longitudinal section through my combined feed and release valve. Fig. 2 is a section on line 2—2 of Fig. 1, taken at right angles to the section shown in Fig. 1. Fig. 3 is a transverse section on line 3—3 of Fig. 1.

Referring to the drawings by numerals, like numbers indicating like parts in the several views; 4 designates a casing or chamber for the feed valve, said chamber 4 being connected by a suitable coupling at 5 with the air supply. Within the chamber 4 is mounted the valve 6, which is preferably of the sliding type shown, having its body perforated to permit free passage of air and eliminate pressure in the valve itself. Said valve 6 slides in a suitable housing or barrel 7 mounted in the chamber 4, said housing 7 being provided with an outlet port 8 leading to the outlet chamber 9, which connects by means of a suitable coupling with the brake cylinders or with the delivery connections to the point where the reduced air pressure is to be utilized. The outlet chamber 9 communicates through a suitable port 10 with a piston housing 11 in the chamber 4, and within said piston housing 11 is mounted a piston head 12, which is secured to the spindle 13 of the valve 6, said spindle 13 projecting through a suitable stuffing head 14 interposed between the valve chamber and the piston chamber, so as to close communication between them. The other end of the valve housing 7 is closed by a suitable head 15 which carries a spring check valve 16 opening into the valve housing 7 to admit air coming from the inlet connection 5, but which closes against pressure in the opposite direction. The said piston 12, which, it will be apparent, is subjected to the outlet pressure in the chamber 9, controls the position of the valve 6 with respect to its port 8. In order to regulate the movements of the piston valve to proportion the pressure on the inlet and outlet side of the valve as may be desired, the piston 12 is under the tension of a spring 17 mounted within an adjustable head nut 18, threaded in the nut 19 which closes the chamber 4, a suitable cap nut 20 being provided to engage and cover the head nut 18, both the head nut 18 and the cap nut 20 being perforated so as to eliminate back pressure behind the piston 11. With this construction it will be seen that when the pressure falls in outlet chamber 9 below the desired point the spring 17 will force the piston 12 and the valve 6 forward and uncover the port 8, so as to admit inlet pressure on the opposite side of the valve to the outlet side, and immediately the pressure on the outlet side is brought to the desired point its action against the piston 12 through the port 10, will force the piston and valve back against the spring and close the port 8.

The construction which I have devised is, it will be apparent, a very compact and simple one, for the body of the chamber 4 may be readily cast and machined and the valve housing and the piston housing, which, as shown, are preferably formed in one piece, may be readily slipped into place in the casting, and the several parts making up the

piston valve, the packing nuts, and the head nuts, can be readily assembled.

The quick release valve which constitutes one feature of my present improvement comprises a valve chamber 24, which, as shown in the present embodiment of the invention, is formed in the same casting with the outlet chamber 9 hereinbefore referred to, the two chambers being in communication with each other through a port or passage 26, which is preferably formed, for a purpose presently to be described, by setting into the casting between the chambers a short housing or section 27 as clearly shown in Fig. 1. The said chamber 24 is in communication with the valve chamber 4 on the inlet side thereof, by means of a port 28 so as to give normally an inlet pressure in the valve chamber 24, thereby practically forming a by-pass around the feed valve. Mounted in said chamber 24 is a check valve 29, which is normally forced to its seat in the position shown in full lines in Fig. 1, by inlet pressure from passage 5, so that communication between the outlet chamber 9 and the check valve chamber 24 is cut off. The said check valve 29 in addition to cutting off communication between the outlet chamber and the valve chamber so that inlet pressure may not pass from the passage 5 into the outlet chamber 9 except through the reducing valve, is sufficiently large to close an exhaust pocket 30, which in the form shown, encircles the port between the chamber 9 and the check valve chamber 24, this exhaust pocket communicating with atmosphere through a series of exhaust openings 31 in the wall of the casing, and it will be seen that when braking pressure is let into the governor valve it will stand against the check valve 29 and hold it in closed position as shown in Fig. 1, the pressure against the under side of the check valve from the outlet chamber 19 being insufficient to unseat the check valve against the greater pressure on its opposite side. When, however, the pressure from the passage 5 is released to permit the brakes to throw off, the outlet pressure in chamber 9 will immediately unseat the check valve 29, and the air on the outlet side of the governor valve will exhaust rapidly and quickly through the port 26 into the circular pocket 30, and out through the exhaust openings 31 to the atmosphere, the check valve 16 in the governor valve chamber preventing any exhaust from the inlet side of the governor valve back into the passage 5.

It will be seen that with this construction a very compact arrangement of feed and release valves is secured, and quick release of pressure from the brake cylinder and brake cylinder connections is secured, as the exhaust takes place at a point relatively close to the cylinders or other receptacles to be exhausted, and the necessity of carrying the air back through return connections and fouling the ports and passages with the exhaust is entirely done away with. Furthermore, this release is entirely automatic in its operation when inlet pressure has once been relieved and the necessity of separate exhaust pipes to take care of the exhaust from the brake cylinders is obviated.

While I have shown the quick release device in close relation to the feed valve, since the arrangement is an extremely simple and efficient one, it will be obvious that the feed valve casing and the release valve casing might be made separate from each other and placed some distance apart, being coupled by suitable piping, and such adaptation of my invention as well as all other changes within the skill of the mechanician I deem to be within the purview of my invention, and I do not, therefore, limit myself to any of the details of construction shown and described, except in so far as I am limited by the prior art to which the invention belongs.

Having disclosed my invention, I claim:—

1. In a device of the class described and in combination, a pressure-controlled feed valve, and an independent brake exhaust valve operable automatically upon a predetermined variation in pressures on the inlet and outlet sides of said feed valve.

2. In a device of the class described and in combination, a pressure-controlled feed valve, and an independent brake exhaust valve opening automatically under outlet pressure upon a predetermined variation in pressures on the inlet and outlet sides of said feed valve.

3. In a device of the class described and in combination, a pressure-controlled feed valve, and an independent brake exhaust valve subject to outlet pressure on one side and inlet pressure on the other side, and automatically operable upon a predetermined variation in pressures on the inlet and outlet sides of said feed valve.

4. In a device of the class described and in combination, a pressure-controlled feed valve, an exhaust passage on the outlet side of said feed valve, and an independent valve controlling said exhaust passage and automatically operable upon a predetermined variation in pressures on the inlet and outlet sides of said feed valve.

5. In a device of the class described and in combination, a pressure-controlled feed valve, exhaust ports in the outlet chamber of said feed valve, and an independent valve controlling said exhaust ports and automatically operable upon a predetermined variation in pressures on the inlet and outlet sides of said feed valve.

6. In a device of the class described and in combination, a pressure-controlled feed valve, exhaust ports in the outlet chamber of said feed valve, and an independent valve

controlling said exhaust ports and automatically operable under outlet pressure.

7. In a device of the class described and in combination, a pressure-controlled feed valve, exhaust ports in the outlet chamber of said feed valve, and an independent valve controlling said exhaust ports and subject on one side to outlet pressure and on the other side to inlet pressure and automatically operable upon a predetermined variation in said pressures.

8. In a device of the class described and in combination, a pressure-controlled feed valve, an exhaust port on the outlet side of said feed valve, an independent valve controlling said exhaust port and subject to outlet pressure on one side and inlet pressure on the other side, and means for preventing the return of outlet pressure through the feed valve.

9. In a device of the class described and in combination, a pressure-controlled feed valve, an exhaust port on the outlet side of said feed valve, an independent valve controlling said exhaust port and subject on one side to outlet pressure and on the other side to inlet pressure, and means on the inlet side of said feed valve to prevent the return of outlet pressure through the feed valve.

10. In a device of the class described and in combination, a pressure-controlled feed valve, an exhaust port on the outlet side of said feed valve, an independent valve controlling said exhaust port and subject to outlet pressure on one side and inlet pressure on the other side, and a check valve to prevent the return of outlet pressure through the feed valve.

11. In a device of the class described and in combination, a pressure-controlled feed valve, an exhaust port in the outlet chamber of said feed valve, an independent automatic pressure-operated valve controlling said exhaust port, and a check valve on the inlet side of said feed valve to prevent the return of outlet pressure through said feed valve.

12. In a device of the class described and in combination, a feed valve, a by-pass around said feed valve, an exhaust port in said by-pass, and an automatic pressure-operated valve closing said by-pass against inlet pressure and controlling said exhaust port.

13. In a device of the class described and in combination, a feed valve, a by-pass around said feed valve, an exhaust port in said by-pass, and an automatic valve closing said by-pass and operable upon variation in pressures upon the opposite sides thereof to open or close said exhaust port.

14. In a device of the class described and in combination, a feed valve, a by-pass around said feed valve, an exhaust port in said by-pass, and an automatic valve in said by-pass normally closed by inlet pressure on one side and subject to outlet pressure on the other side to open or close said exhaust port.

15. In a device of the class described and in combination, an inlet chamber, an outlet chamber, a pressure-controlled feed-valve controlling communication between said chambers, an exhaust pocket connecting said outlet chamber with atmosphere, and an independent valve automatically operable upon variation in pressures on the inlet and outlet sides of said feed valve normally closing said exhaust pocket.

16. In a device of the class described and in combination, a casing having an inlet chamber and an outlet chamber communicating with each other, a pressure-controlled feed-valve controlling communication between said chambers, an exhaust port in the wall of said outlet chamber to connect the same with atmosphere, and an independent valve automatically operable upon variation in pressures on the inlet and outlet sides of the feed-valve normally closing said exhaust port.

17. In a device of the class described and in combination, a casing having an inlet chamber and an outlet chamber communicating therewith, a pressure-controlled feed-valve controlling communication between said chambers, an exhaust pocket in said outlet chamber having a series of ports leading to atmosphere, and an independent valve automatically operable under outlet pressure upon reduction of inlet pressure normally closing said exhaust pocket.

18. In a device of the class described and in combination, a casing having an inlet chamber and an outlet chamber communicating therewith, a pressure-controlled feed-valve in said inlet chamber controlling communication between said chambers, and pressure-controlled means for preventing return of outlet pressure through said inlet chamber.

19. In a device of the class described and in combination, a casing having an inlet chamber and an outlet chamber communicating therewith, an outlet-pressure controlled feed-valve controlling communication between said chambers, and an outlet pressure-controlled check valve to prevent return of outlet pressure through said inlet chamber.

20. In a device of the class described and in combination, a casing having an inlet chamber and an outlet chamber communicating therewith, an outlet-pressure controlled feed-valve controlling communication between said chambers, and an outlet pressure-controlled check valve in said inlet chamber to prevent the return of outlet pressure through said inlet chamber.

21. In a device of the class described and in combination, a casing having an inlet chamber and an outlet chamber communicating therewith, a bushing in said inlet

chamber having a chamber-connecting port therein, and a feed-valve mounted in said bushing and removable therewith controlling said port.

22. In a device of the class described and in combination, a casing having an inlet chamber and an outlet chamber, a bushing mounted in said inlet chamber and having a valve chamber and a piston chamber, a port in said valve chamber connecting the inlet and outlet sides of the valve, a port in said piston chamber connecting with the outlet side of the valve, and a piston valve mounted in said bushing and controlling communication between said inlet and outlet chambers.

23. In a device of the class described and in combination, a casing having an inlet chamber and an outlet chamber, a bushing longitudinally removable from said inlet chamber and having a valve chamber and a piston chamber, a port in said valve chamber connecting the inlet and outlet sides of the valve, a port in said piston chamber communicating with the outlet side of the valve, a spring piston valve controlling the port between the inlet and outlet sides of the valve, and a spring check valve in the end of said bushing to prevent return of outlet pressure through the inlet side of the valve.

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

JAMES AMERS HICKS.

Witnesses:
ARTHUR L. BRYANT,
A. V. CUSHMAN.