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2,021,771

RELEASE INSURING DEVICE

Filed May 23, 1934

Fig. 1

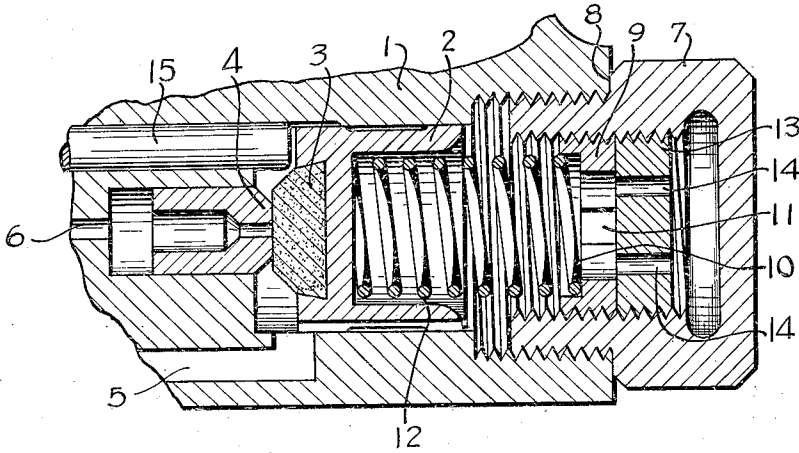


Fig. 2

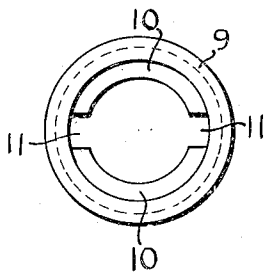


Fig. 3

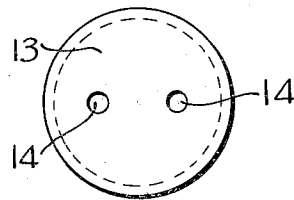


Fig. 4

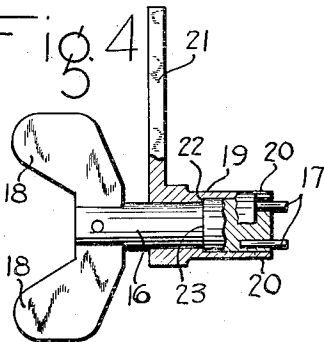
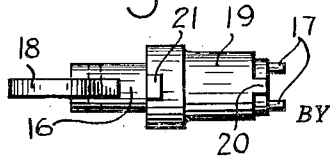


Fig. 5



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2,021,771

RELEASE INSURING DEVICE

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Application May 23, 1934, Serial No. 727,075

8 Claims. (Cl. 303—1)

This invention relates to valve devices and more particularly to a valve device for use in fluid pressure brake apparatus. More specifically the invention relates to a release insuring valve device of the type disclosed and broadly claimed in my pending application, Serial No. 612,465, filed May 20, 1932.

The release insuring valve device included in the fluid pressure brake apparatus shown in my aforementioned pending application comprises a vent valve which is operative, in releasing the brakes, to control the release of fluid from the auxiliary reservoir to the atmosphere to effect a reduction in auxiliary reservoir pressure and thereby facilitate the release of the brakes as will be understood.

The vent valve just referred to is normally held closed by the action of a coil spring and its operation is controlled by a movable abutment which is subject to the opposing pressures of the brake pipe and auxiliary reservoir and which is operative according to certain variations in these opposing pressures.

In unseating the vent valve and while the valve is open, the pressure of fluid acting on the auxiliary reservoir side of the abutment in opposition to brake pipe pressure acting on the other side is augmented by the pressure of the valve spring, which spring pressure is transmitted to the abutment through the medium of the valve and valve operating member. It will thus be seen that the valve spring is adapted to influence the operation of the movable abutment to some extent.

It is desirable to have the movable abutment on each car respond to substantially the same pressure differentials but, due to unavoidable inaccuracies in the manufacture of the valve spring and associated parts of the device, this has been found very difficult to accomplish without employing some means for accurately adjusting the compression of the valve spring.

Heretofore it has been the usual practice in spring controlled valve devices to so arrange the spring adjusting means that it is easily accessible from the exterior of the valve casing but in fluid pressure brake apparatus this practice has been found to be dangerous and therefore very undesirable for the reason that an inexperienced or unauthorized person is liable to change the setting of the spring and thereby cause the faulty operation of the brake apparatus.

The principal object of the invention is to provide a spring adjusting means for valve devices which is not accessible from the exterior of the valve casing and which cannot be easily operated

without the use of a special tool, thus eliminating the hereinbefore mentioned objectionable features.

Other objects and advantages will appear in the following more detailed description of the invention.

In the accompanying drawing, Fig. 1 is a sectional view of a portion of a valve device embodying the invention; Fig. 2 is a face view of the valve spring adjusting member; Fig. 3 is a face view of the member for locking the adjusting member in its adjusted position; and Figs. 4 and 5 are detail views of a special tool for effecting the adjustment of the spring adjusting members and for effecting the operation of the locking member to lock or unlock the adjusting member.

In the drawing, the invention is shown embodied in a release insuring valve device of the type illustrated in my aforementioned pending application and may comprise a casing 1 having a bore in which a valve member 2 is slidably mounted, said member having a valve 3 secured thereto which is adapted to cooperate with a valve seat member 4 to control communication between a passage 5 leading from the auxiliary reservoir (not shown) and a passage 6 which is adapted to be connected to the atmosphere.

The open end of the bore in which the valve member 2 is mounted is closed by a hollow cap nut 7 having screw-threaded connection with the casing 1, the screw-threads on the casing being formed interiorly of the bore. The cap nut is provided with an annular shoulder 8 which engages the casing 1 as shown in Fig. 1 when it is in its proper position in the casing.

Contained in the cap nut 7 is a rotatable spring adjusting member 9 which has screw-threaded connection with the nut so as to be adjustable relative to the cap nut. This member 9 is provided with curved spring seats 10 which are spaced apart to form notches 11 for the reception of a tool for rotating the member. Interposed between and engaging the spring seats 10 and the valve member 2 is a spring 12, which at all times exerts pressure on the valve member 2 in the direction of the valve seat 4, the initial compression of the spring being adapted to be varied upon varying the position of the member 9.

Also contained in the cap nut 7 is a rotatable circular locking plate 13 which has screw-threaded connection with the nut so as to be adjustable relative to the cap nut and member 9. This plate when rotated in one direction will move into engagement with and lock the member 9 in any desired adjusted position and when rotated in

the opposite direction will move out of such locking engagement.

The plate is provided with spaced openings 14 for the reception of a tool for rotating the plate. These openings are so disposed that they are readily accessible through the opening defined by the curved spring seats 10 of the member 9.

Since, as hereinbefore described, the release insuring valve device is of the same type as the corresponding device disclosed in my aforementioned pending application, it will be understood that the valve 3 is adapted to be unseated by a plunger 15 which is controlled by the operation of a movable abutment not shown in the drawing but which may be the same as that shown in said pending application.

The tool for rotating the member 9 and locking plate 13 is especially constructed to provide for the rotation of the member or plate independently of the other or for rotating both when the locking plate is out of locking engagement with the member 9. This special tool may comprise a rotatable shank 16 from one end of which extend two spaced projections 17 which are adapted to be inserted in the openings 14 in the locking plate and which, when the shank is rotated by means of wings 18, impart rotary movement to the locking plate. The tool also comprises a sleeve member 19 which is rotatably mounted on the shank 16 and which is provided with spaced lugs 20 which are adapted to be inserted in the notches 11 formed by the spring seats 10. The sleeve member is also provided with an operating handle 21. These lugs when in engagement with the spring seats within the notches 11 and when the sleeve is rotated, impart rotary movement to the member 9. The shank 16 and sleeve member 19 are freely rotatable relative to each other and freely movable longitudinally relative to each other for a limited distance to accommodate the relative movements of the member 9 and locking plate in unlocking, positioning and locking the member 9, accidental separation of the sleeve member and shank in one direction being prevented by the wings 18 and in the opposite direction by the engagement of an annular shoulder 22 on the sleeve member with a stop shoulder 23 on the shank.

Assuming the valve device to be assembled as shown in Fig. 1 and it is desired to increase the initial compressive force of the valve spring 12, the cap nut 7 is removed from the casing and then the adjusting tool is inserted in the cap member through the open end thereof a sufficient distance that the projections 17 of the shank 16 enter the openings 14 in the locking plate and the lugs 20 on the sleeve member 19 enter the notches 11 in the spring adjusting member 9. With the tool thus positioned, the person making the adjustment holds the sleeve member 19 and thereby the spring adjusting member 9 stationary and through the medium of the wings 18 rotates the shank and thereby the locking plate 13 in a clockwise direction out of locking engagement with the member 9. The sleeve member 19 and thereby the member 9 is now rotated in a counter-clockwise direction causing the member 9 to move toward the open end of the cap nut. Now when the member 9 is properly positioned, the shank 16 and thereby the locking plate 13 is rotated in a counter-clockwise direction into locking engagement with the member 9 while the member 9 is maintained stationary through the medium of the sleeve member 19. With the adjustment made and the member 9

locked against accidental rotation, the cap nut is again screwed into the casing 1 as shown in Fig. 1.

If it is desired to decrease the initial compressive force of the valve spring 12 the member 9 is first unlocked as hereinbefore described and then rotated in a clockwise direction causing the member 9 to move in a direction away from the open end of the cap nut. After the member is properly positioned, the locking plate is moved into locking engagement therewith.

It will be understood from the foregoing description that since the valve spring adjusting mechanism is entirely enclosed and requires the removal of a cap nut and a special tool to make an adjustment, danger of an unauthorized person making an adjustment is practically eliminated.

While one illustrative embodiment of the invention has been described in detail, it is not my intention to limit its scope to that embodiment or otherwise than by the terms of the appended claims.

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

1. A valve device comprising a casing having a bore open at one end to the exterior of the casing, and also having a fluid inlet passage leading to the bore and an outlet passage leading from the bore, valve means contained in said bore operative to control communication between said passages, a cap member secured to said casing and closing the open end of said bore, said cap member having formed therein a recess open to said bore, a spring seat member adjustably mounted on said cap member within said recess, and a valve biasing spring interposed between and engaging said valve means and spring seat member, said spring seat member being accessible for adjustment only through the open end of said recess only when the cap member is separated from said casing.

2. A valve device comprising a casing having a bore open at one end to the exterior of the casing, and also having a fluid inlet passage leading to the bore and an outlet passage leading from the bore, valve means contained in said bore operative to control communication between said passages, a cap member secured to said casing and closing the open end of said bore, said cap member having formed therein a recess open to said bore, a spring seat member adjustably mounted on said cap member within said recess, said spring seat member being provided with means adapted to be engaged by a special tool whereby adjusting movement is adapted to be imparted to the member, and a valve biasing spring interposed between and engaging said valve means and spring seat member, said spring seat member being accessible for engagement by the adjusting tool only through the open end of said recess when the cap member is separate from the casing.

3. A valve device comprising a casing having an open ended bore, a fluid inlet passage leading to the bore and a fluid outlet passage leading from the bore, valve means contained in said bore operative to control communication between said passages, a cap member secured to said casing closing the open end of said bore, said cap member having formed therein a recess which is open to said bore, a spring seat member adjustably mounted on said cap member within said recess, a locking element adjustably mounted on said cap member within said recess and

movable into locking engagement with said spring seat member to lock the spring seat member in position, and a valve biasing spring interposed between and engaging said valve means and spring seat member.

4. A valve device comprising a casing having an open ended bore, a fluid inlet passage leading to the bore and a fluid outlet passage leading from the bore, valve means contained in said bore operative to control communication between said passages, a cap member secured to said casing closing the open end of said bore, said cap member having formed therein a recess which is open to said bore, a spring seat member adjustably mounted on said cap member within said recess, a locking element interposed between the closed end of said cap member and said valve seat member and adjustably mounted on the cap member for movement into or out of locking engagement with the spring seat member, and a valve biasing spring interposed between and engaging said spring seat and valve means.

5. A valve device comprising a casing having an open ended bore, a fluid inlet passage leading to the bore and a fluid outlet passage leading from the bore, valve means contained in said bore operative to control communication between said passages, a cap member secured to said casing closing the open end of said bore, said cap member having formed therein a recess which is open to said bore, a spring seat member adjustably mounted on said cap member within said recess, a locking element adjustably mounted on said cap member within said recess and movable into locking engagement with said spring seat member to lock the spring seat member in position, and a valve biasing spring interposed between and engaging said valve means and spring seat member, said spring seat member being accessible for adjustment only through the open end of said recess and said locking element being accessible for adjustment only through the open end of the recess and an opening in the spring seat member.

6. A valve device comprising a casing having an open ended bore, a fluid inlet passage leading to the bore and a fluid outlet passage leading from the bore, valve means contained in said bore operative to control communication between said passages, a cap member secured to said casing closing the open end of said bore, said cap member having formed therein a recess which is open to said bore, a spring seat member adjustably mounted on said cap member within said recess, a locking element interposed between the closed end of said cap member and said valve seat member and adjustably mounted on the cap member for movement into or out of locking engagement with the spring seat member, and a valve biasing spring interposed between and engaging said spring seat and valve means, said locking element being accessible for adjustment only through the open end of said recess and an opening in

and valve seat member and then only when the cap member is separated from said casing.

7. A valve device comprising a casing having an open ended bore, a fluid inlet passage leading to the bore and a fluid outlet passage leading from the bore, valve means contained in said bore operative to control communication between said passages, a cap member secured to said casing closing the open end of said bore, said cap member having formed therein a recess which is open to said bore, a spring seat member rotatably mounted in the cap member and having screw-threaded connection therewith within said recess to effect the adjustment of the seat member when the seat member is rotated, means on said spring seat member through the medium of which rotary movement is adapted to be imparted to the seat member, a locking element rotatably mounted in the cap member and having screw-threaded connection therewith to effect the adjustment of the element into or out of locking engagement with the spring seat member, means included in the locking element through the medium of which rotary movement is adapted to be imparted to the locking element, and a valve controlling spring interposed between and engaging said valve means and spring seat member, said means on the spring seat member and said means included in the locking element being accessible to an operating tool only when the cap member is separated from said casing.

8. A valve device comprising a casing having an open ended bore, a fluid inlet passage leading to the bore and a fluid outlet passage leading from the bore, valve means contained in said bore operative to control communication between said passages, a cap member secured to said casing closing the open end of said bore, said cap member having formed therein a recess which is open to said bore, a spring seat member rotatably mounted in the cap member and having screw-threaded connection therewith within said recess to effect the adjustment of the seat member when the seat member is rotated, means on said spring seat member through the medium of which rotary movement is adapted to be imparted to the seat member, a locking element rotatably mounted in the cap member and having screw threaded connection therewith to effect the adjustment of the element into or out of locking engagement with the spring seat member, means included in the locking element through the medium of which rotary movement is adapted to be imparted to the locking element, and a valve controlling spring interposed between and engaging said valve means and spring seat member, said means on the spring seat member and said means included in the locking element being accessible to an operating tool only when the cap member is separated from said casing and only through the open end of said recess.

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