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E. L. CLARK

PRESSURE RETAINING VALVE

Filed July 14, 1922

Fig. 1.

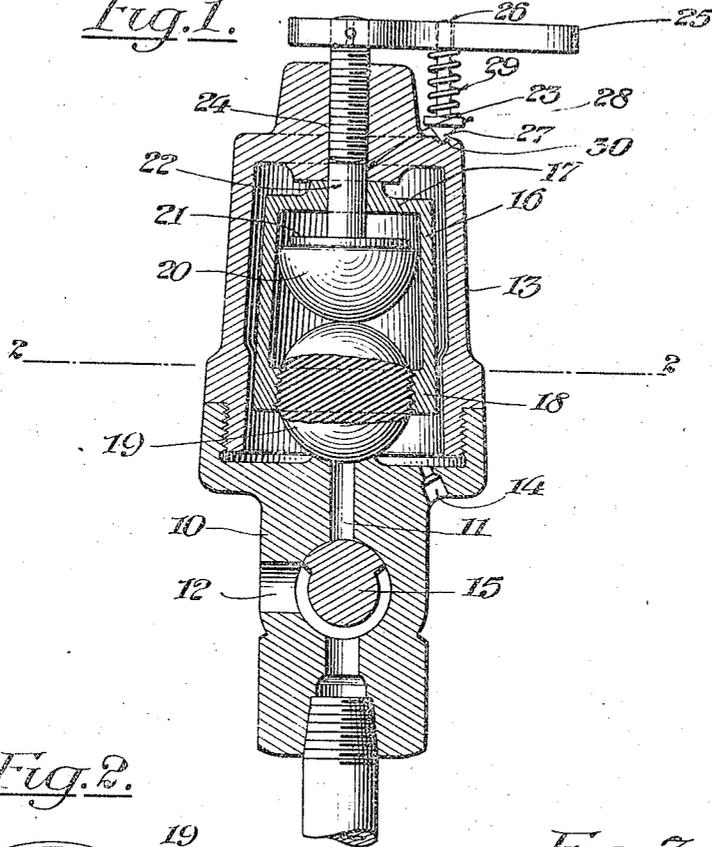


Fig. 2.

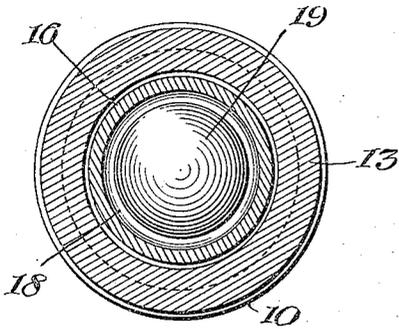


Fig. 3.

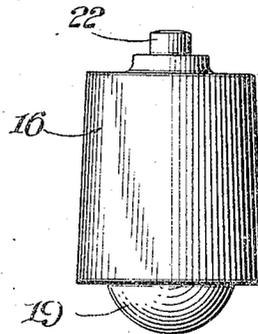
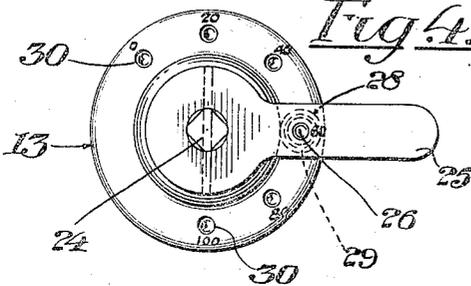


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PRESSURE-RETAINING VALVE.

Application filed July 14, 1922. Serial No. 574,882.

To all whom it may concern:

Be it known that I, EDDY L. CLARK, a citizen of the United States, and resident of West Pittston, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Pressure-Retaining Valves, of which the following is a specification.

This invention relates to pressure retaining valves, and particularly valves of the kind used in connection with the air-brake systems of railroad cars.

The object of the invention is to provide a pressure retaining valve of simple, durable and efficient construction having a valve element that can be readily mounted within the valve case and adjusted to resist any required pressure from the brake cylinder; such a valve that will effectually maintain its seat under the varying conditions of service, and such a valve wherein the elements are readily removable and replaceable as occasion may require.

With these and other objects in view my invention comprises various novel features of construction and combinations of parts which will be hereinafter described and claimed.

In the drawings—

Figure 1 is a vertical section of a valve device embodying the preferred form of my invention.

Fig. 2 is a horizontal section of the device on the line 2—2 of Fig. 1.

Fig. 3 is a side elevation of the valve proper removed from the casing.

Fig. 4 is a plan of the device.

Referring to the drawings, 10 designates a body having a central port 11 provided intermediate its ends with a lateral exhaust port 12. The lower end of this body is adapted to be coupled, as usual, to the train pipe extending from the brake cylinder. Detachably fitted to the upper end of the body is a valve case 13 such end constituting the bottom of the valve chamber and having a suitably-disposed vent port 14. Rotatably mounted within the body is a transverse cock key 15 manually operable to establish communication between the train-pipe and the vented chamber of the valve case, as desired. Within this chamber is mounted a valve element which normally closes communication between the said chamber and the port 11, but is adapted to be automatically raised

to open position by a predetermined pressure in the brake cylinder.

According to the preferred form of my invention, the valve element comprises an inverted cup-shaped shell 16 having at its upper end a centrally perforated head 17 and having at its mouth an internal threaded flange 18. Screwed firmly into this flange is a ball 19 of elastic substance, such, for example, as rubber, the lower portion of the ball projecting outwardly of the shell. Loosely confined within the shell is a hemispherical body 20 of rubber or other resilient material, the convex surface of which rests on the ball 19. Bearing on the upper flat surface of the body 20 is the foot 21 of a vertical stem 22 which is slidably fitted and guided in the central perforation of the head 17.

The valve element just described is positioned within the valve case so that the ball 19 rests on the valve seat at the bottom of the chamber, the stem 22 being entered in a central perforation 23 in the top of the case. This perforation is internally threaded to receive a set-screw 24, which, bearing upon the top of the stem, can be vertically adjusted from the exterior of the device to exert more or less pressure, as desired, on the stem, and thus, through the elastic action of the body 20 on the ball 19, effect a predetermined pressure of the latter on its seat.

As a simple and efficient means to adjust the set-screw and secure it in any predetermined position of adjustment, I provide the outer projecting end of the screw with a radially extending handle arm 25 having suitable locking means adapted to engage the valve case at various points in accordance with the position of the arm. In the present instance, a depending pin 26 is slidably fitted in an orifice in the arm so as to overhang the top of the valve case. The lower end of the pin is pointed, as at 27, and is also provided with a shoulder, as at 28, a spring 29 being interposed between the shoulder and the arm so as to press the pin yieldingly down against the top of the case, and such top being provided with a circular series of spaced sockets 30 with any predetermined one of which the pin point may be temporarily engaged by the act of properly turning the arm 25. The top of the case is preferably indexed or graduated in prox-

imity to the sockets, as shown, so that the amount of pressure effected by the rotation of the screw will be indicated. Any other suitable means for turning and locking the set-screw may be employed.

When the valve element is positioned within the case the ball 19 is firmly held upon the seat or mouth of the port 11 under varying conditions of service; that is, the ball is effectually seated not only when the flow of air to the valve chamber is turned off but when the valve is subjected to severe vibrations, or is set at various angles. When the active surface of the ball 19 becomes worn, the ball can be unscrewed from the shell and then reinserted in a reverse position therein so as to present a new bearing surface to the seat. The parts of the valve element can be readily removed or reassembled for repairs or replacement.

It is to be understood that I do not limit my invention to the details of construction herein disclosed, as the parts may be modified within the principle of the invention and the scope of the appended claims.

I claim—

1. The combination with a valve case having a port, of a valve element comprising a shell movable within and longitudinally of the case, an elastic body fixed to and projecting from one end of said shell so as to be movable therewith, the projecting portion of the body being adapted to be seated on the port, and means freely movable through the opposite end of the shell for applying predetermined pressure upon the inner portion of said body, said means including a member operable from the exterior of the valve case.

2. The combination with a valve case having a port, of a valve element comprising a shell movable within and longitudinally of the case, a spherical elastic body fixed to and projecting from one end of said shell so as to be movable therewith, the projecting portion of the body being adapted to be seated on the port, and means freely movable through the opposite end of the shell for applying predetermined pressure upon the inner portion of the body, said means including a member operable from the exterior of the valve case.

3. The combination with a valve case having a port, of a valve element comprising a shell, an elastic body supported by and projecting from one end of said shell, the projecting portion of the body being adapted to be seated on the port, and means for applying predetermined pressure upon the inner portion of said body, said means including a stem axially movable within the shell, and a set-screw fitted to the case and bearing upon the stem.

4. The combination with a valve case having a port, of a valve element comprising

a shell, an elastic body supported by and projecting from one end of said shell, the projecting portion of the body being adapted to be seated on the port, and means for applying predetermined pressure upon the inner portion of said body, said means including a stem axially movable within the shell, a set-screw fitted to the case and bearing upon the stem, a handle on said screw, and devices to retain said handle in various positions of rotary adjustment.

5. The combination with a valve case having a port, of a valve element comprising a shell movable within and longitudinally of the case, an elastic body fixed to and projecting from one end of said shell and adapted to be seated on the port, a yielding pressure member contained within said shell and bearing upon the said body, and means freely movable through the opposite end of the shell and operable from the exterior of the casing to adjust the force of the pressure member on said body.

6. The combination with a valve case having a port, of a valve element comprising a shell movable within and longitudinally of the case, a ball fixed to and projecting from one end of said shell and adapted to be seated on the port, a body of resilient material contained within said shell and bearing upon the ball, and means freely movable through the opposite end of the shell and operable from the exterior of the casing to adjust the force of the said body on the ball.

7. The combination with a valve case having a port at one end thereof and a threaded perforation at the opposite end of a valve element comprising a shell having a guide perforation at one end, an elastic body projecting from the opposite end of said shell and adapted to be seated on said port, a yielding pressure member contained within said shell and bearing upon said ball, a stem slidably fitted in the perforation of the shell, and a set-screw fitted in the perforation of the valve case and bearing upon the said stem.

8. The combination with a valve case having a port at one end thereof and a threaded perforation at the opposite end, of a valve element comprising a shell having a guide perforation at one end, and an internally threaded mouth portion at the opposite end, an elastic ball screwed into said mouth portion and adapted to be seated on said port, a yielding pressure member contained within said shell and bearing upon said ball, a stem slidably fitted in the perforation of the shell, and a set-screw fitted in the perforation of the valve case and bearing upon the said stem.

9. The combination with a valve case having a port, of a valve element comprising a shell, an elastic body projecting from said shell and adapted to be seated on the port, a yielding pressure member contained

within said shell and bearing upon the said body, means operable from the exterior of the casing to adjust the force of the pressure member on said body, said means including a set-screw fitted to the case, and a handle on said screw.

10. The combination with a valve case having a port, of a valve element comprising a shell, an elastic body projecting from said shell and adapted to be seated on the port, a yielding pressure member contained within said shell and bearing upon the said body, means operable from the exterior of the casing to adjust the force of the pressure member on said body, said means including a set-screw fitted to the case, a handle on said screw, and devices to retain said handle in various positions of rotary adjustment.

11. A pressure retaining valve element comprising a shell having an internally threaded mouth portion at one end, and a ball detachably screwed into said mouth portion.

12. A pressure retaining valve element comprising a shell having a guide perforation at one end and an open mouth portion at the opposite end, a ball secured within said mouth portion, a pressure member confined within the shell and bearing upon the said ball, and a stem fitted to the perforation of the shell and bearing on the pressure member.

13. A pressure retaining valve member comprising a shell having a guide perforation at one end and an internally threaded mouth portion at the opposite end, a ball de-

tachably screwed into said mouth portion, a yielding pressure member confined within the shell and bearing upon the said ball, and a stem fitted to the perforation of the shell and bearing on the pressure member.

14. The combination with a valve case having a port at one end thereof and a threaded perforation at the opposite end, of a valve element comprising a shell having a guide perforation at one end, and a mouth portion at the opposite end, an elastic ball supported in said mouth portion and adapted to be seated on said port, a yielding pressure member contained within said shell and bearing upon said ball, a stem slidably fitted in the perforation of the shell, a set-screw fitted in the perforation of the valve case and bearing upon said stem, a handle on said screw, and means to retain said handle in various positions of rotary adjustment.

15. The combination with a valve case having a port at one end thereof, of a valve element including an elastic member having a convex sealing surface adapted to be seated directly over the port, means remote from the port and extending through the opposite end of the case for exerting pressure upon the valve element against the inherent elasticity of said member, a rotary member for actuating said pressure member, and spring-controlled locking means for temporarily retaining said rotary member in various positions of rotary adjustment.

Signed at Pittston, in the county of Luzerne and State of Pennsylvania, this 12th day of July, A. D. 1922.

EDDY L. CLARK.