Nov. 18, 1924. 1,516,000

E. L. CLARK

PRESSURE RETAINING VALVE

Filed June 20, 1923

Fig. 1.

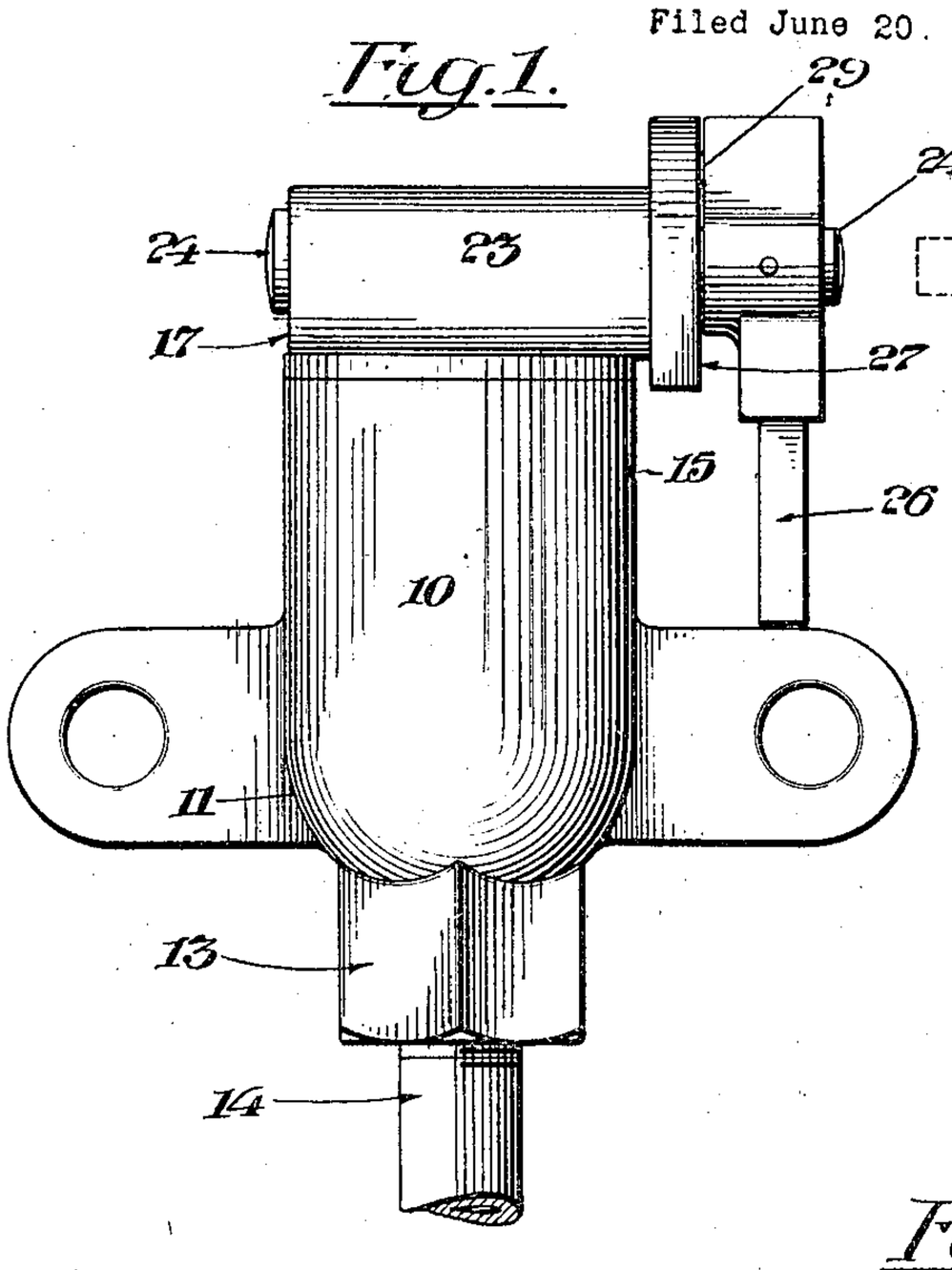


Fig. 2.

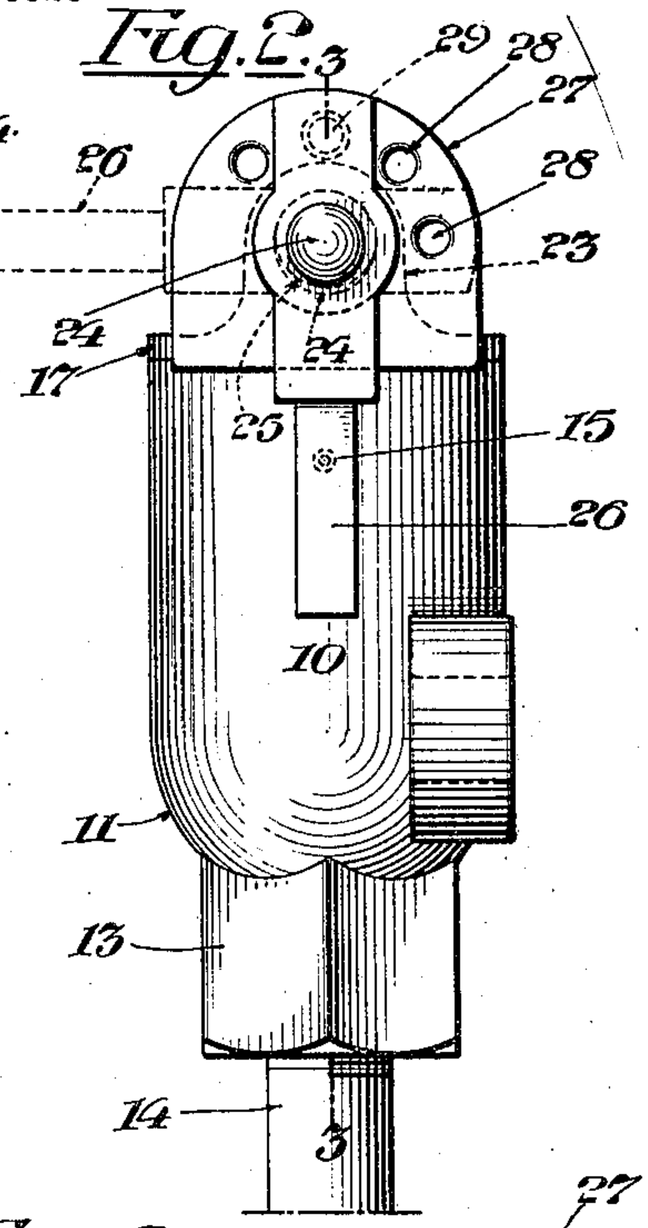


Fig. 3.

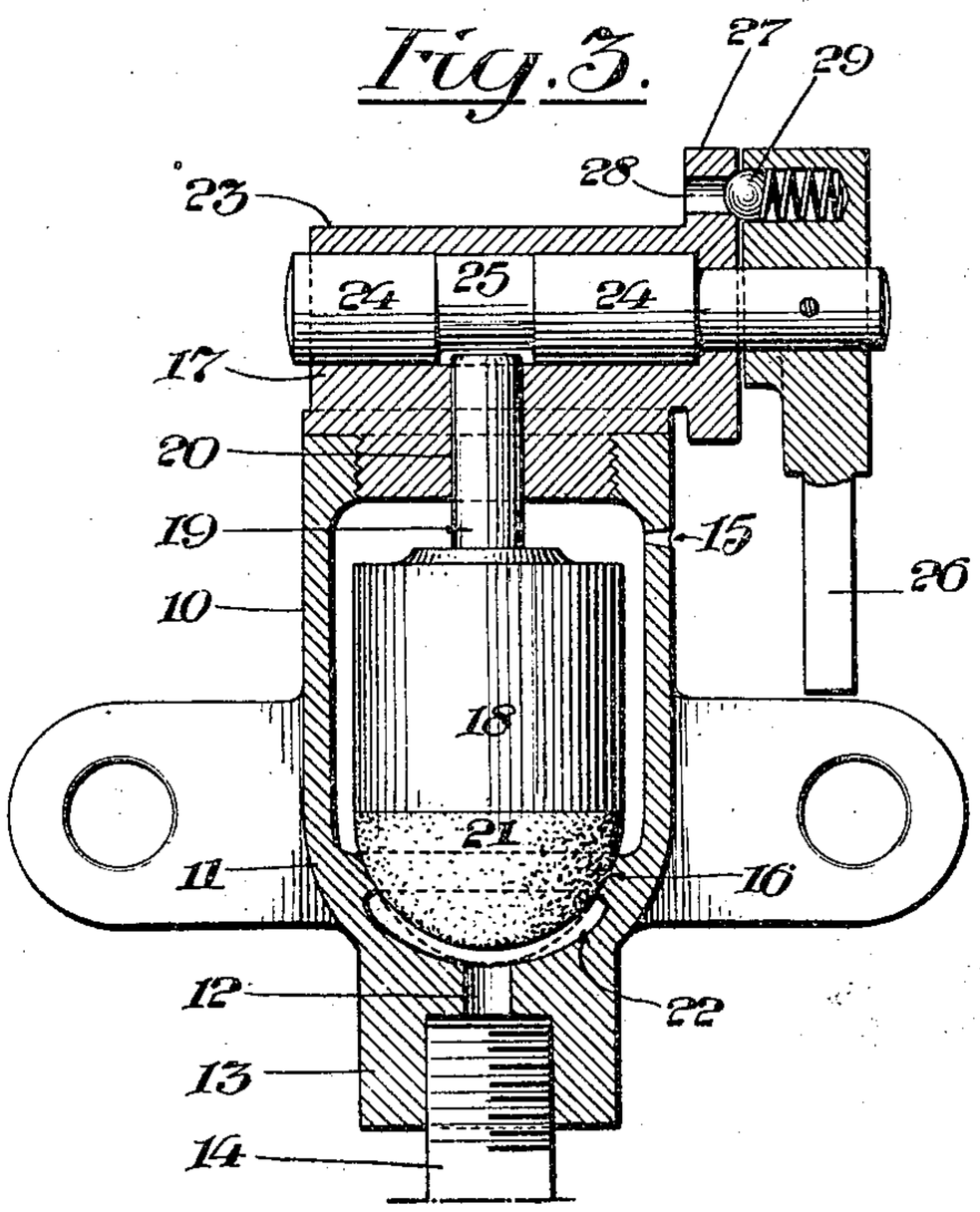
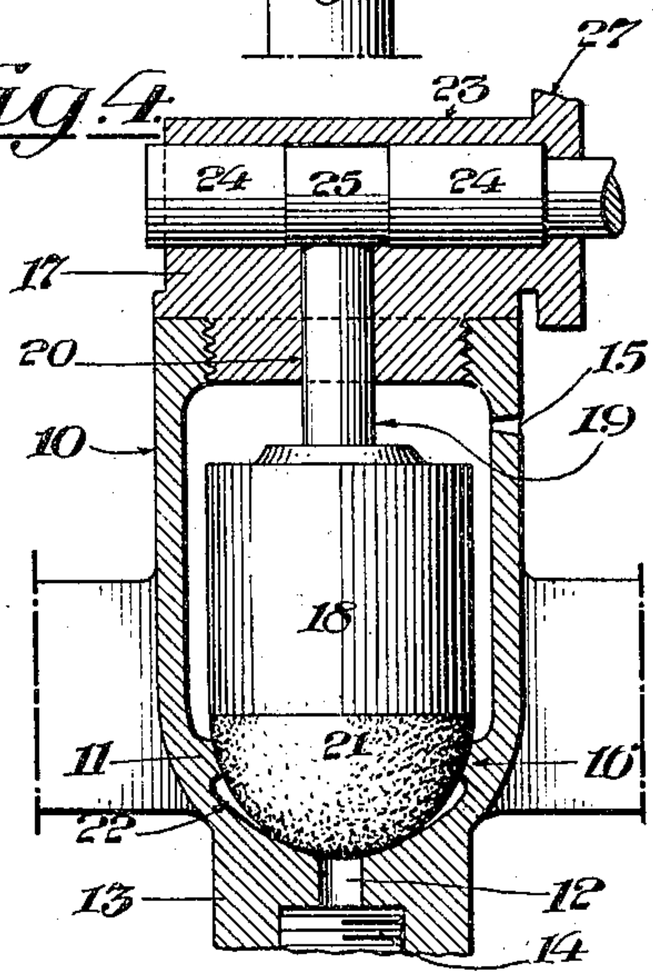


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDDY L. CLARK, OF WEST PITTSTON, PENNSYLVANIA.

PRESSURE-RETAINING VALVE.

Application filed June 20, 1923. Serial No. 646,507.

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 valves, having reference more particularly to pressure retaining valves for use in connection with the air brake systems of railroad cars.

The objects of my invention are to provide a device of simple, durable and efficient construction having a valve element which is so constructed and mounted in relation to the inlet and vent ports as to perform, in addition to the function of an adjustable pressure retaining valve, the office of an exhaust valve for the train pipe; to provide a structure whereof the valve element will effectually maintain its seat under varying conditions of service, and to provide a structure whereof the members are readily removable and replaceable as occasion may require.

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

In the drawings—

Figure 1 is a front elevation of a valve embodying a preferred form of my invention.

Fig. 2 is a side elevation of the valve.

Fig. 3 is a vertical section thereof, on the line 3—3 of Fig. 2.

Fig. 4 is a similar view showing the valve in sealing relation to the inlet port.

Referring to the drawings, 10 designates a hollow body open at its upper end and formed with an integral bottom portion 11 having a central inlet port 12 in communication with a depending neck 13 to which is connected the train pipe 14 extending from the brake cylinder. The lower wall of the body is provided above the inlet port with an annular flange 16 having a concave bearing surface constituting a valve seat. The body wall is also provided above the valve seat with a vent port 15, and the upper end of the body is internally threaded to receive a centrally perforated screw head 17.

The interior of the body 10 constitutes a valve chamber within which is contained a movable valve element comprising, in the present instance, an inverted cup-shaped shell 18 from the upper end of which a guide stem 19 extends into the central perforation 20 of the head. Secured within the shell is a ball 21, preferably of elastic substance, such as rubber, the lower portion of which ball is normally seated upon the concave bearing surface of the annular flange. This flange is so disposed that the bottom of the ball depends below it and near to the inlet port 12 so as to afford an air-space 22 in open communication with the inlet port. (See Fig. 3.)

On the head 17 is a transversely extending projection 23 which is bored to provide a bearing for a rotatable shaft 24 having intermediate its ends an eccentric portion 25 which, when the shaft is partially rotated, bears with a gradually varying or adjusted force upon the up-projecting end of the guide stem 19. One end of the shaft is provided with a suitable handle 26 whereby the shaft can be readily turned in a manner to cause the eccentric to bear against and exert more or less pressure, as desired, upon the stem, and thus force and maintain the ball with corresponding pressure against its annular seat. The end of the projection 23 adjacent the handle is enlarged, as at 27, and the enlargement is provided on its outer face with a series of spaced-apart sockets 28, and the handle is provided with a spring-backed locking member, such as the metal ball, 29, positioned to register with one or another of the sockets when the handle is partially turned, and thereby temporarily to lock the handle, together with its shaft, in a predetermined position of adjustment.

The co-operative arrangement of the parts just described is such that when the handle is in its depending, or zero, position, the eccentric is slightly spaced from the top of the stem 19 and the valve ball 21 rests upon the annular flange, thus permitting the air under pressure from the train pipe to flow through the inlet port into the space 22 below such ball in a manner to raise the valve from its seat and thus permit the air to enter the upper part of the valve chamber and to escape thence by way of the vent port 15. If the handle be turned to the left until the member 29 engages one or

the other of the succeeding sockets 28 in its path, the valve ball 21 will be forcibly depressed to seat its under portion firmly upon and in sealing relation to the annular seat, the sealing pressure, being, according to the angle of the handle, adjusted to resist a predetermined pressure in the brake cylinder, and thus to maintain the closure of the vented portion of the valve chamber until the pressure of the valve is exceeded by that of the air, at which juncture the valve ball will be forced upward, against its inherent elasticity, to establish communication between the inlet port and the vented portion of the chamber. When the pressure of the eccentric is fully exerted upon the stem the valve ball is depressed with the maximum resistance upon the inlet port, as seen in Fig. 4.

It will be seen that the valve construction hereinbefore described obviates the use of a separate valve device for primarily releasing the air from the brake cylinder and yet efficiently performs the function of an adjustable pressure retaining valve. Further that when the valve is held on its seat by the action of the eccentric the ball 21 maintains its effective sealing position not only when the pressure to the valve chamber is cut off but also when the valve is subjected to severe vibrations, or is set at various angles. Moreover, the annular valve seat affords for the lower portion of the ball 21 a continuous lateral support that prevents undue distortion of the ball when it is under the maximum sealing pressure.

The various parts of my improved valve can be readily assembled and can be as readily separated and reassembled for repairs or replacement.

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

I claim—

1. The combination with a valve case having an inlet port, a valve seat spaced above said port, and a vent port above said seat, of a valve element having a resilient sealing portion supported on said seat to afford an open air space between the inlet port and such sealing portion and yet permit said portion to be forced against its elasticity into sealing relation with said port, and means for applying adjusted pressure upon said valve element.

2. The combination with a valve case having an inlet port, a valve seat spaced above said port, and a vent port above said seat, of a valve element having a sealing portion supported on said seat to afford an open air space between the inlet port and such sealing portion, and means to permit free independent upward movement of said valve element when it is seated, and yet operative to exert an adjusted pressure upon said element.

3. The combination with a valve case having an inlet port, an annular seat spaced above said port, and a vent port above said seat, of a valve element having a convex sealing portion of elastic substance supported on said seat and above the inlet port to afford an open air space between the inlet port and the sealing portion, and means for applying adjusted pressure upon said valve element.

4. The combination with a valve case having an inlet port, an annular seat spaced above said port, and a vent port above said seat, of a valve element having a convex sealing portion of elastic substance supported on said seat and above the inlet port to afford an open air space between the inlet port and the sealing portion, and means for applying adjusted pressure upon said valve element to force the sealing portion thereof into closing relation to the inlet port.

5. The combination with a valve case having an inlet port, an annular seat spaced above said port, and a vent port above said seat, of a valve element comprising a movable supporting member and a sealing body carried by said member and having a convex portion supported on said seat and above the inlet port to afford an open air space between the inlet port and the sealing portion, and means for applying adjusted pressure upon the said supporting member.

6. The combination with a valve case having an inlet port, an annular seat spaced above said port, and a vent port above said seat, of a valve element comprising a supporting member, a guide stem thereon extending into a perforation in the top of the valve case, and a sealing body carried by said member and having a convex portion supported on said seat and above the inlet port to afford an open air space between the inlet port and the sealing portion, and means for applying adjusted pressure upon the said supporting member.

7. The combination with a valve case having an inlet port, a valve seat spaced above said port, and a vent port above said seat, of a valve element comprising a supporting member, a guide stem thereon extending into a perforation in the top of the valve case, and a sealing body carried by said member and having a convex portion supported on said seat and above the inlet port to afford an open air space between the inlet port and the sealing portion, and a manually operative valve adjusting member rotatably mounted on said case in position to bear upon said stem.

8. The combination with a valve case having an inlet port, an annular seat spaced above said port, and a vent port above said

seat, of a valve element comprising a supporting member, a guide stem thereon extending into a perforation in the top of the valve case, and a sealing body carried by said member and having a convex portion supported on said seat and above the inlet port to afford an open air space between the inlet port and the sealing portion, a manually operative eccentric member rotatably mounted on said case in position to bear upon said stem, and means for temporarily locking said member in different positions of rotary adjustment.

Signed at Pittston, in the county of Luzerne and State of Pennsylvania, this 18th day of June, A. D. 1923.

EDDY L. CLARK.