Feb. 2, 1926. 1,571,396

H. E. DARROW

PRESSURE EQUALIZER VALVE

Filed March 24, 1924 2 Sheets-Sheet 1

Fig. 1.

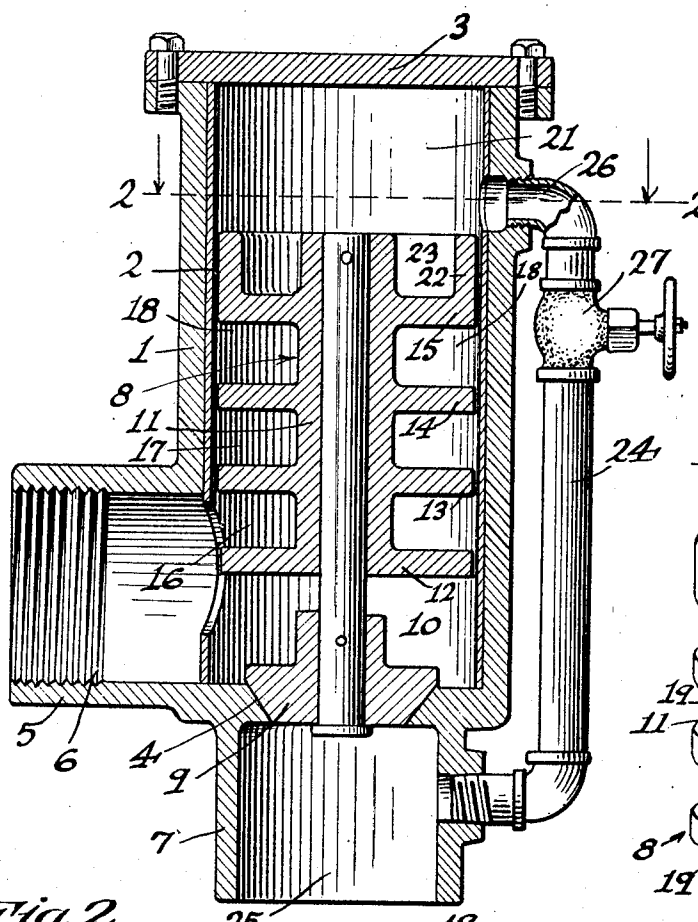


Fig. 3.

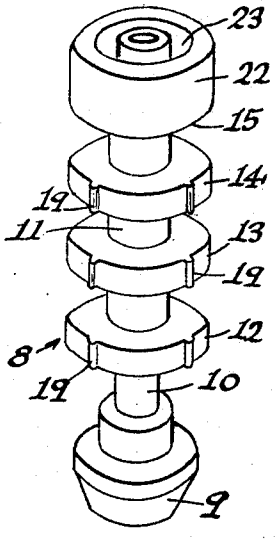
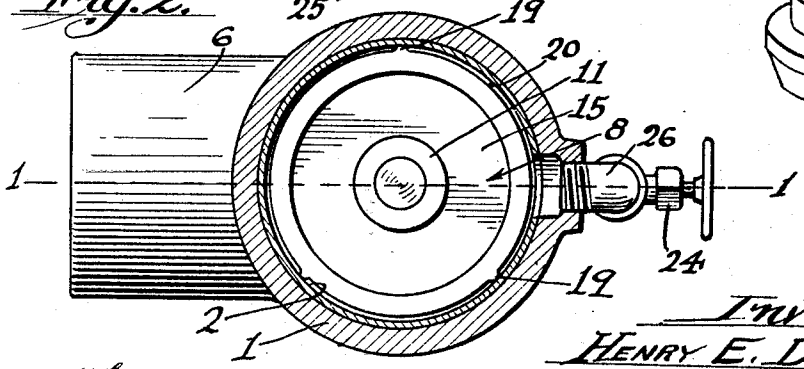


Fig. 2.



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Fig. 4.

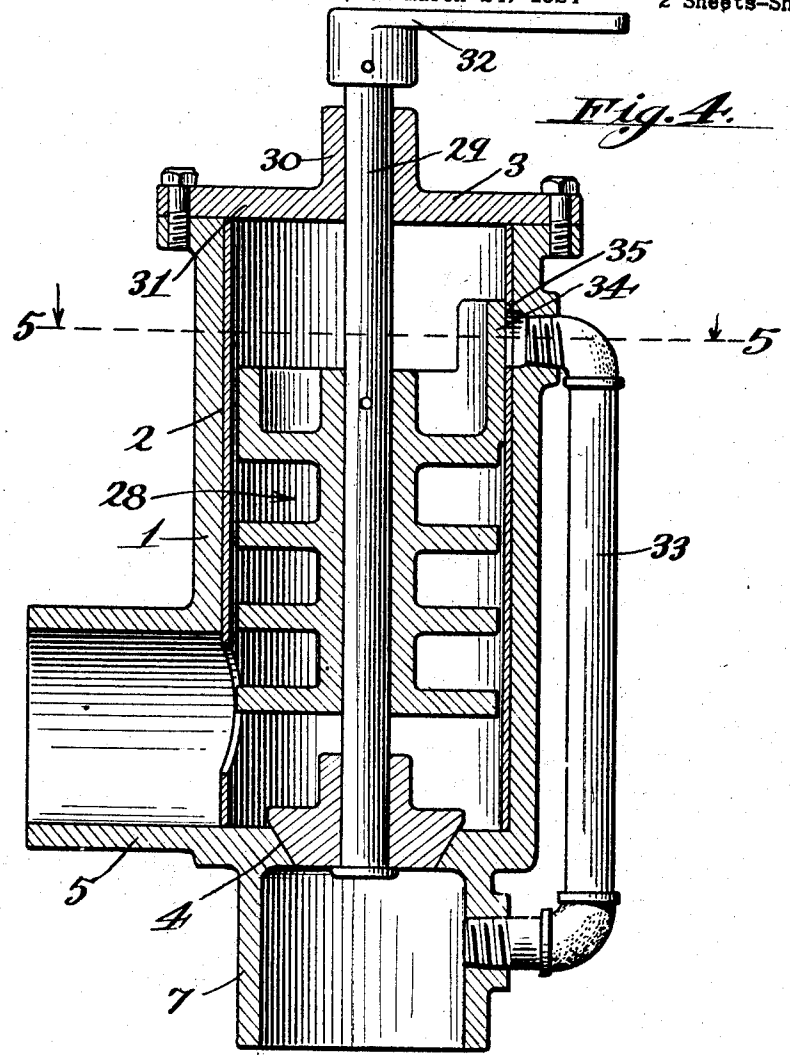
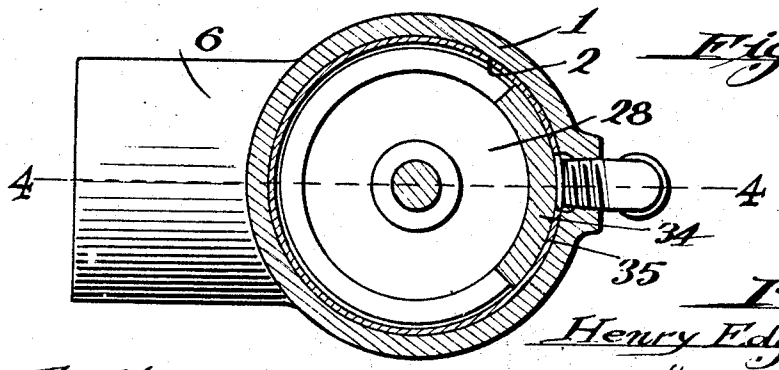


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY EDGAR DARROW, OF SANTA BARBARA, CALIFORNIA.

PRESSURE-EQUALIZER VALVE.

Application filed March 24, 1924. Serial No. 701,513.

To all whom it may concern:

Be it known that I, HENRY EDGAR DARROW, a citizen of the United States, residing at Santa Barbara, in the county of Santa Barbara and State of California, have invented new and useful Improvements in Pressure-Equalizer Valves, of which the following is a specification.

My invention relates to pressure equalizer valves and consists of the novel features herein shown, described and claimed.

An object is to make a valve having a floating valve member, operated by liquid pressure, the pressure being normally balanced and the valve closed and having a by-pass leading from the opposite end of the valve member to the outlet and adapted to be manually opened and closed, so that when the by-pass is open the liquid pressure will be unbalanced to open the main valve.

Another object is to make a valve having a floating valve member normally closed when the liquid pressure is balanced, and having means for unbalancing the liquid pressure to open the valve, all for the purpose of making an easy opening and easy closing valve, and thereby avoiding noise and shock.

Other objects and advantages will appear from the drawings and specification.

The drawings illustrate two forms of pressure equalizer valves.

Figure 1 is a sectional elevation of a pressure equalizer valve embodying the principles of my invention, the view being taken on the line 1—1 of Fig. 2.

Fig. 2 is a horizontal cross section on the line 2—2 of Fig. 1, and looking downwardly as indicated by the arrows.

Fig. 3 is a perspective of the floating valve member shown in Fig. 1.

Fig. 4 is a view analogous to Fig. 1, and showing a modified construction.

Fig. 5 is a horizontal cross section on the line 5—5 of Fig. 4, and looking downwardly as indicated by the arrows.

The details of the pressure equalizer valve shown in the drawings are as follows:

The valve casing 1 is a straight cylinder having a straight bore forming a valve chamber 2. A cap 3 closes the upper end of the chamber 2. The valve seat 4 is formed at the lower end of the chamber 2. The inlet nipple 5 extends laterally from the lower end of the casing 1 and has a screw threaded bore 6 communicating with the lower end of the chamber 2 above the valve seat 4. The outlet nipple 7 extends downwardly from the valve seat 4. The floating valve member 8 fits closely in the chamber 2 and is adapted to reciprocate freely. The valve plug 9 fits the valve seat 4 and is secured to a stem 10.

The head 11 is mounted upon the upper end of the stem 10 and has vanes 12, 13, 14 and 15 spaced apart to form annular chambers 16, 17 and 18 concentric to the stem 10. The vanes 12, 13, 14 and 15 are slightly smaller than the chamber 2, and are provided with radial ribs 19 to engage the inner face of the casing 1 and form a substantially equal annular space 20 providing for a limited flow of liquid upwardly or downwardly around the floating valve member 8. When the plug 9 is seated, a considerable chamber 21 is formed above the valve member and an annular wall 22 extends upwardly from the vane 15 and forms a pocket 23 communicating with the chamber 21. A pipe 24 is connected through the casing 1 to the chamber 21 and extends downwardly outside of the casing and is connected to the passage 25 in the nipple 7 below the valve seat 4, thus forming a by-pass 26 from the chamber 21 to the outlet. A valve 27 is incorporated into the pipe 24 to open and close the by-pass.

In the practical operation, when the valve 27 is closed the liquid pressure in the inlet and in the chamber 2 will press the plug 9 upon the seat 4 and shut off the flow of liquid. At this time the liquid pressure is balanced. When the valve 27 is opened, liquid will flow from the chamber 21 to the outlet, thus unbalancing the pressure and the flow of liquid upwardly will raise the floating valve member and open the passage through the valve seat 4. When the valve 27 is again closed, the liquid pressure will become equalized, and the floating valve member will gradually settle and close the outlet.

A particular object of this type of valve is to make an easy and noiseless opening and closing operation.

Referring to the modification shown in Figs. 4 and 5, the floating valve member 28 has a stem 29 extending through a hub 30 in the cap 31 and a handle 32 upon the upper outer end of the stem 29. The by-pass 33 is controlled by a lug 34 extending upwardly from the head of the floating

valve member 28 and bearing against a seat 35 at the upper end of the by-pass so that when the handle 32 is moved to normal position the by-pass 33 is closed and the floating valve member 28 seats to close the outlet, and so that when the handle 32 is moved laterally from its normal position, the by-pass 33 is opened to unbalance the liquid pressure, and the flow towards the upper end of the by-pass will unseat the floating valve 28.

The object and operation of this type of pressure equalizer valve is substantially the same as shown and described with reference to Figs. 1, 2 and 3, the only difference being the substitution of the handle 32 and the closure 34 for the valve 27.

The floating valve member fits so closely in the liquid chamber as to form a resistance to the flow of the liquid, so that the liquid pressure when unbalanced operates the member, and in this respect the construction resembles the action of a dash pot.

The vanes, annular chambers and pockets serve to produce culs de sac and conflicting currents and pressures to resist quick action of the floating valve member.

Various changes may be made without departing from the spirit of my invention as claimed.

I claim:

1. In a valve, a valve casing having a chamber, an inlet port, an outlet port and a valve seat between the chamber and the outlet port, a valve floatingly mounted in the chamber and adapted to fit the seat and close the outlet when the pressure is equalized said valve having a plurality of veins spaced apart, means forming a by-pass leading from the chamber above the floating valve member to the outlet below the seat, and means for opening and closing the by-pass.

2. In a valve, a valve casing having a straight cylindrical chamber, an inlet port at one side of the lower end of the chamber, an outlet port in line with the chamber and a valve seat between the chamber and the outlet port, a valve floatingly mounted in the chamber and adapted to fit the seat and close the outlet, said valve having a plurality of vanes spaced apart, the vanes being slightly smaller than the chamber and provided with radial ribs to loosely engage the inner face of the chamber, means forming a by-pass leading from the chamber above the vanes to the outlet below the seat, and means for opening and closing the by-pass.

In testimony whereof I have signed my name to this specification.

H. E. DARROW.