Oct. 10, 1933. H. W. LANDENBERGER ET AL 1,929,643

VALVE

Filed April 22, 1930

Fig. 1.

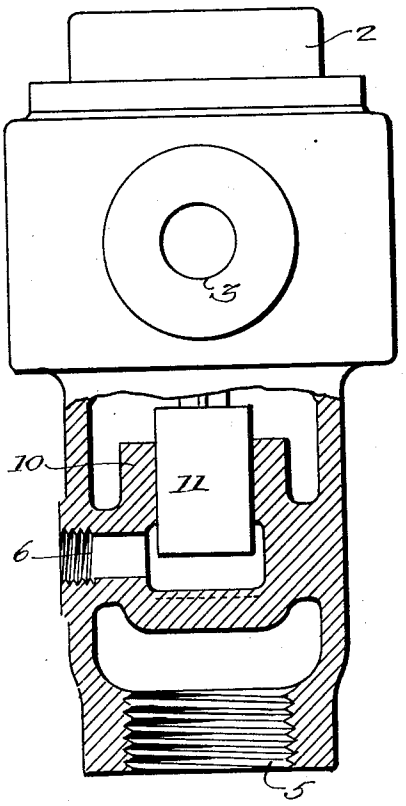


Fig. 2.

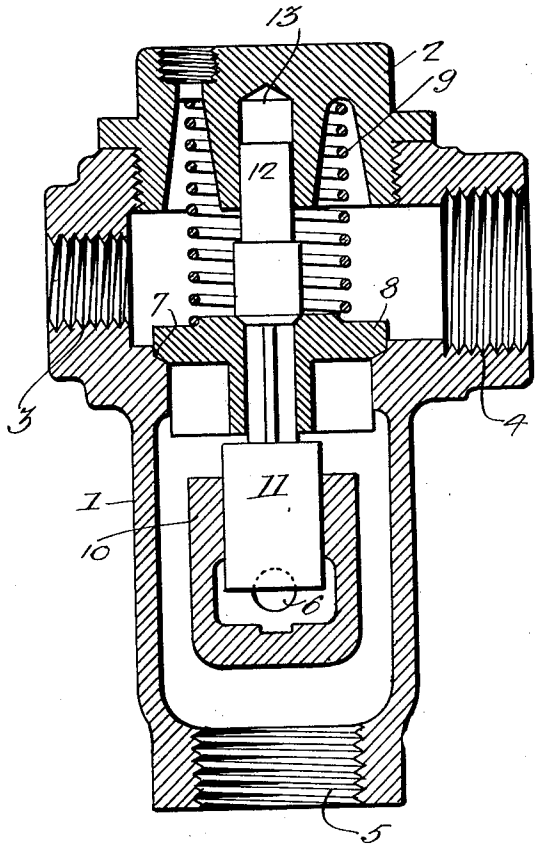
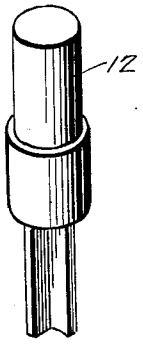


Fig. 3.



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VALVE

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Application April 22, 1930. Serial No. 446,365

1 Claim. (Cl. 137—139)

This invention relates to improvements in valves, and one of the objects of the invention is to provide a pressure-actuated check valve having improved structural and operating characteristics, as hereinafter set forth.

A more specific object of the invention is to provide a valve of the stated type in which the said valve actuating means shall be contained entirely within the valve casing, thereby avoiding a necessity for stuffing boxes and packing with their attendant disadvantages.

Another object of the invention is to provide means for rendering the valve actuating means effective to unseat the valve element with a minimum of delay or lag.

The invention further resides in novel and improving structural features and details hereinafter set forth and illustrated in the attached drawing, in which:

Figure 1 is an elevational view of a valve made in accordance with our invention;

Fig. 2 is a section on the line 2—2, Fig. 1, and

Fig. 3 is a view in perspective of one of the elements of the valve.

With reference to the drawing, the valve in one embodiment comprises a casing 1 having a removable top closure member 2 and ports 3, 4, 5 and 6, the functions of which will be hereinafter set forth. Within the casing 1 is a seat 7 for a main valve element 8, which element as shown in Fig. 2 controls the connection between the ports 4 and 5. A spring 9 confined between the closure member 2 and the valve 8 tends to retain the latter on its seat.

In the interior of the casing 1 below the valve 8 is a chamber 10, the open upper end of which provides a cylinder in which operates a plunger 11. Preferably the walls of the chamber 10 are integral with the casing 1 as shown. As illustrated in Fig. 1, the port 6 extends into the chamber 10 and affords means for admitting to that chamber fluid pressure for forcing the plunger 11 upwardly against the valve 8 to unseat the latter. Carried by the valve 8 is an auxiliary pressure relief valve 12, the upper end of which is guided in a cylindrical recess 13 in the cover member 2, while the lower extension, when the valve is seated as shown in Fig. 2 projects below the bottom of the valve 8 and in the path of the plunger 11 whereby the latter when actuated by pressure admitted through the port 6 first engages and unseats the auxiliary valve 12 before becoming effective to unseat the main valve 8.

One application of a valve of this character is shown in our copending application S. N. 367,001, filed May 29, 1929, of which the present application is a continuation in part. In that instance fluid pressure is applied from a suitable source to a pressure actuated platen press through the said valve, the port 3 being connected to the said source and the port 4 to the press. During operation of the press, the valves 8 and 12 are held to their seats by the fluid pressure in the upper end of the valve chamber, the spring 9 functioning primarily to prevent hanging-up of the valve and insuring return thereof to its seat after being elevated and released as hereinafter set forth.

When it is desired to release the fluid pressure from the ram cylinder of the press, the pressure is removed from the port 3 and applied to the port 6, this pressure forcing the plunger 11 upwardly and into engagement with the bottom of the auxiliary valve 12 as shown. The differential in the pressure areas of the plunger 11 and the valve 12 being in favor of the plunger, the auxiliary valve is readily forced from its seat, thereby equalizing the pressures at opposite sides of the main valve 8 and permitting the plunger 11 to become immediately effective to elevate the main valve in spite of the unfavorable differential in the pressure areas of the plunger 11 and main valve 8. Elevation of the valve 8 affords a rapid discharge of pressure from the press ram cylinder through the port 4 and the exhaust 5. By reversing the fluid pressure from the port 6 to the port 3 the valve elements are again returned to their seats and pressure again applied to the ram cylinder.

It will be noted that the valve is characterized by a complete absence of packings or stuffing boxes of the usual type. This is accomplished by establishing the valve actuating means 10—11 entirely within the valve casing. Any leakage past the plunger 11 passes immediately to the discharge port 6, and since the actuating means lies within the casing there is no requirement for a stuffing box in the casing itself as would be necessary for passage through the casing of an operating rod from an external actuator.

The arrangement affords a desirable simplicity and compactness in the valve structure and avoids the disadvantages in operation and maintenance resulting from the use of the stuffing boxes forming a necessary adjunct of external valve actuating means. The valve is particularly desirable for use in high pressure systems.

It will be understood that the invention in principle is applicable to valves of many different forms and adapted for various purposes.

We claim:

In a valve, the combination with a casing having upper and lower chambers, intake and discharge ports communicating with said upper chamber, and an exhaust port communicating with the said lower chamber, a main valve in said upper chamber adapted to seat within the casing and when seated to separate said chambers, a supplemental valve guided in the first-named valve and having a seat in the latter, said supplemental valve when open providing a passage between said chambers, a stem extending from said supplemental valve, guide means for said stem in the casing, a spring seated against the main valve and casing in said upper chamber and tending to retain the main valve on its seat, a cylinder located in the lower chamber, a plunger in said cylinder, and a port extending from said cylinder to the exterior of said casing, said piston being so constructed and arranged that when actuated by fluid pressure in the cylinder it successively engages and unseats the supplemental and main valves.

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