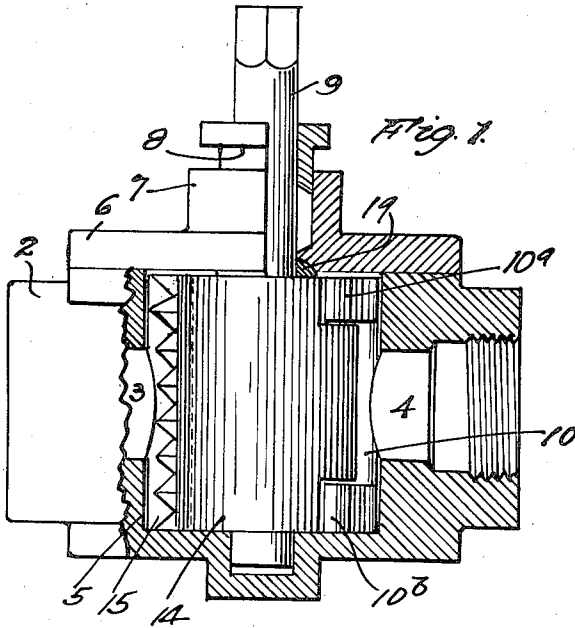
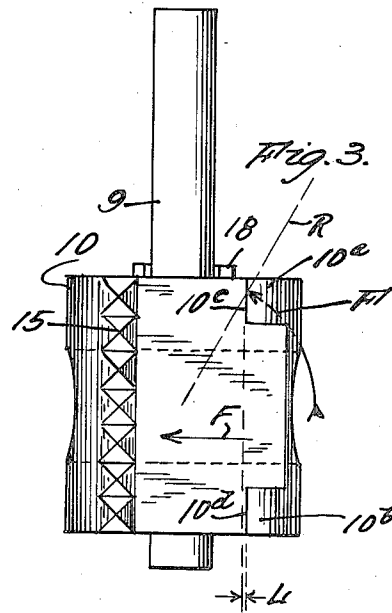
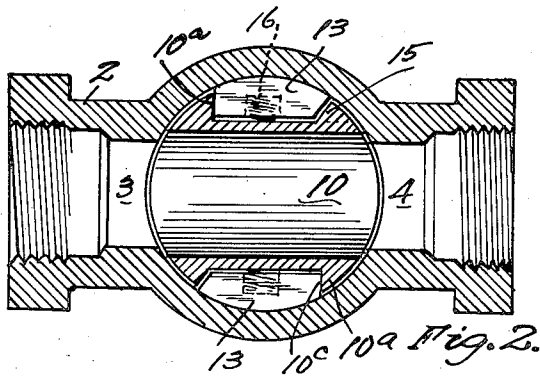
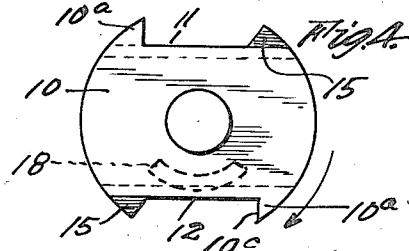
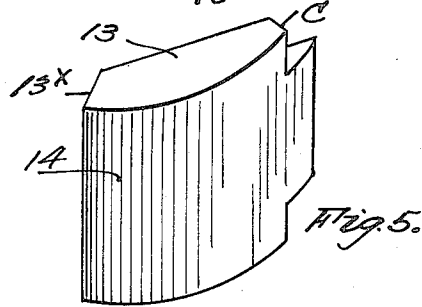
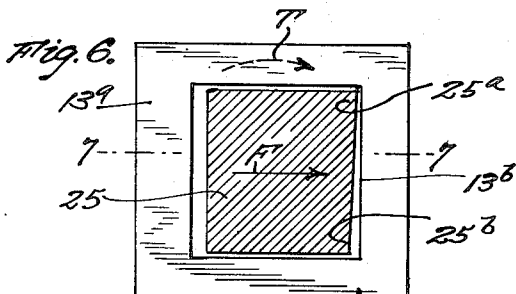
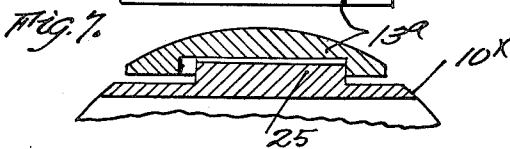


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W. D. SHAFFER ET AL
HIGH PRESSURE VALVE OR COCK

2,007,664

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2,007,664

HIGH PRESSURE VALVE OR COCK

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4 Claims. (Cl. 251-102)

This invention is a valve or cock of the high pressure type, somewhat of the kind shown in Swanson Patent No. 1,927,855.

This patent shows rotary core 7 in which is a radially slidable closure 9 which turns with and by action of the core to open or close the shell ports; the core and the closure having a through hole for flow. The patent shows a means for initially cracking or slightly opening the sliding closure 9 to ease valve opening effort under high pressure. This structure is rather expensive and has other characteristics which we aim to avoid by the invention of our instant disclosure.

We have found that it is possible to eliminate the eccentric stem device of Swanson and to effect a cracking of the closure by merely applying, on one corner of the closure, an effort which is angular to or is in an arc about the axis of the closure which is coaxial with the valve port axis.

Since the closure has a sealing face which is concentric with and sits on a mutual concave shell bore (transverse to the port axis) it will be clear that any effort which tends to twist the closure about its (port) axis then the closure will, in making the slightest movement, break conformity with its shell seat and a leak will result in the port. The action can be physically demonstrated by merely lapping one hand over the back of the other in concentric position and then relatively twisting one hand on the other about an axis through the lapped hands.

To illustrate in Swanson, if one of the side walls of the core 7 next to the closure 9 be cut back to relieve the core, and if any side wall is so cut that it will come into contact with a corner diagonal to the axis of the flow port then the effort of contact of such corner will be to twist the closure from its concave seat, as will be fully set out hereinafter.

Briefly it is an object of the invention to provide, in a valve with a closure having a convex face to close on a like concave seat, means to twist the closure off of its seat to crack the port slightly to relieve high pressure on the closure.

The invention consists in certain advancements in this art as set forth in the ensuing disclosure and having, with the above, additional objects and advantages as hereinafter developed, and whose construction, combination and details of means, and the manner of operation will be made manifest in the description of the herewith illustrative embodiment; it being understood that modifications, variations and adaptations may be resorted to within the scope, principle and

spirit of the invention as it is more directly claimed hereinafter.

Figure 1 is a stem-axial section of the valve; some parts being in elevation, and

Figure 2 is a section on the port-axis of the valve.

Figure 3 is a side elevation of the removed valve stem and core, and

Figure 4 is a plan thereof.

Figure 5 is a perspective of a removed port closure.

Figure 6 is a rear elevation of a modified form of the closure and its twisting agent, (the latter in section), and

Figure 7 is a section on line 7-7, Fig. 6.

The valve includes a shell 2 with opposite fitting ports 3-4 and a bored chamber 5 closed at the top by a cap 6 having a gland box 7 and a follower 8.

Passing through the gland is the stem 9 of a ported core 10 which is concentric to, but clear of, the shell bore wall so as to turn without contact therewith. Opposite sides of the core are recessed back to provide chordal faces 11-12, Fig. 4.

In each recess is disposed a segmental block 13 of rectangular facial plan and whose curved face 14 is on an arc of the same radius as that of the valve shell bore so that, under outward pressure the blocks, hereafter called the closure, will seat true on the bore and when in position over the valve ports 3-4 will seal the same. But the depth of the closure is such that it may shift back toward the chordal face (11-12) and thus open the port a crack to break resistance of contact before the closure is turned by its core 10.

Since the closure face 14 is of the same radius as the seat or bore, if a force F, Fig. 3, is applied on a corner as C, Fig. 5, the moment of force on radius R of the port axis of the closure exerts a wrenching—that is, a twisting reaction in the closure, to turn it, so to say, on its seat. Since the seat is cylindrically concave and since the face 14 of the closure 13 is complementally convex the result of the effort is that the closure bucks back into the recess of the core body enough to allow a leakage of fluid past the closure. This leakage therefore breaks physical face-to-face contact of the closure on the seat and provides for a relatively easy rotation of the valve stem and core, carrying with it the now freed closures.

The action is clearly shown in Figs. 6 and 7 which shows an embodiment wherein the core 10* has a lug 25 lying in a back cavity of a closure 13*, one corner 25* of the lug being advanced as

to its relative side corner 25^b (as to the near side wall 13^b of the closure) so that the two corners 25^a—25^b do not simultaneously about the side 13^b of the closure, but one corner as 25^a, engages in advance of the other and tends to twist the closure off of its seat as indicated by dotted arrow T.

As soon as the twist is effected then both corners 25^a—25^b act conjointly to turn the closure bodily with rotation of the core 10^x.

(Swanson, supra, shows means to forcibly pull the closure straight back against the fluid pressure. In the present invention no such pull-back effort to lift the closure clear is intended—it is important to note that the effort to twist the closure is made and done while the closure is under load and is in contact with its concave seat. The action is likened to rolling a log up a hill instead of actually lifting it from the ground and transporting it.)

In Figs. 1, 3 and 4, the core 10 has upper and lower shoulders 10^a—10^b at one side of each chordal face 11—12; one of the lugs having its closure abutting face 10^c slightly in advance (in direction of force arrow F) of the face 10^d of the other lug; the advance or lead being indicated schematically at L, Fig. 3.

It will be noted that the faces 10^c—10^d lie perpendicular to the chordal faces 11—12, as in the Swanson device, and exert a straight push against the closures, during valve opening rotation.

The core has, opposite to the lugs 10^a—10^b, a straight row of pyramidal spurs 15 forming an abutment for the near side 13^x of the closure 13 and by which this is pushed to closing position over its valve port. The spaces between the spurs of the row are to provide for wash-out of particles between the core faces 11—12 and the relative closures to keep the valve clear.

If desired light springs 16 may be used to thrust the closures outward toward the shell wall.

A suitable stop-lug 18 is provided on the core to limit action of the core in the shell.

A ground, quarter-round section washer 19 is placed between the top of the core and the shell cap to reduce leakage tendency under very high pressures.

What is claimed is:

1. In a high pressure valve or cock; a shell hav-

ing a cylindrical bore chamber and flow ports leading thereto; and a valve core turnable in the chamber without wall contact, and provided with closures having outer faces concentric with and to close tight on the cylindrical wall bore at the ports and close the same; said closures and the core having opposed abutment faces which are so disposed that in opening rotation of the valve core an angular or twisting effort in a line transverse to the concentric faces is applied to the closures, to relatively turn them as to the axis of the seats while in place thereon.

2. In a high pressure valve or cock; a shell having a bore chamber forming cylindrical concaved seats and flow ports leading thereto; and a valve core turnable in the chamber without wall contact, and provided with closures having convex outer faces concentric with and to close tight on the wall bore seats at the ports and close the same; said closures and the core having opposed abutment faces which are so disposed that in opening rotation of the valve core an angular or twisting effort is applied to the closures, to relatively turn them as to the axis of the seats while in place thereon.

3. In a valve or cock, a shell having a bore chamber with a flow port leading thereto, and a valve core turnable in said chamber; said core carrying a radially movable port closure seating at the port and having abutment means to engage the seated closure and exert an effort to twist the closure on and relative to its seat at the port, whereby to break fluid pressure on the closure; said closure and its seat in the bore having concentric facial contour about the axis of the core.

4. In a valve of the class described, a core part having a radially movable port closure part, said parts having mutually engaging abutments so disposed as to initially exert a twisting effort during opening turn of the core, on the seated valve and turn it as to the port axis of the closure; the seating face of the closure being convex and concentric to the axis of the core part and adapted to seat on a complementary port seat in the valve shell.

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