G. T. HUXFORD.

ADJUSTABLE FLUID TIGHT PACKINGLESS VALVE.

APPLICATION FILED MAR. 12, 1912.

1,069,067. Patented July 29, 1913.

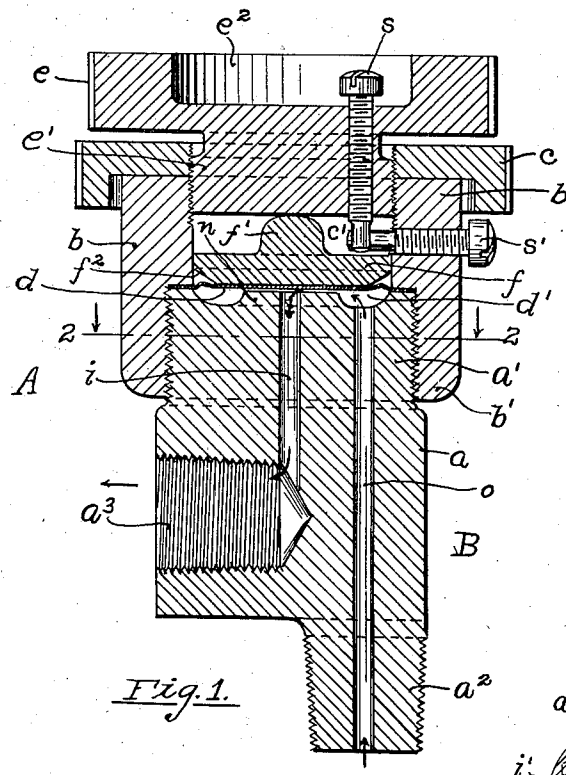


Fig. 1.

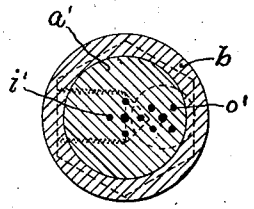


Fig. 3.

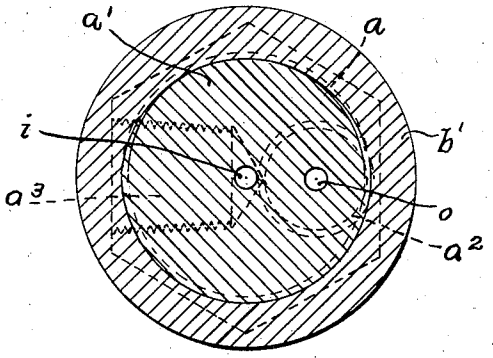


Fig. 2.

WITNESSES.

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ADJUSTABLE FLUID-TIGHT PACKINGLESS VALVE.

1,069,067. Specification of Letters Patent. Patented July 29, 1913.

Application filed March 12, 1912. Serial No. 683,359.

To all whom it may concern:

Be it known that I, GEORGE T. HUXFORD, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Adjustable Fluid-Tight Packingless Valves, of which the following is a specification.

This invention relates to improvements in adjustable packingless and leakless valves, and it consists in the novel construction and arrangement of its parts, all as more fully hereinafter set forth and claimed.

In certain classes of machines, as for example, various types of testing-machines; weighing machines; transmission dynamometers and other analogous hydraulic or pneumatic machines, the force or weight, or the sudden impact of a blow is instantly transmitted to fluid confined in the pressure chamber of the machine, said fluid pressure being transmitted therefrom by tubular connections to a suitable pressure-indicating gage. As thus usually connected, the hand or pointer of the gage is liable to vibrate to a considerable extent before it becomes steady enough to permit an accurate reading. Another objection is that the joints are not oil-tight or leakless. This defect, *i. e.* fluid-leaking, is more apparent, however, in cases where manually controlled reducing or throttling valves, or analogous devices, are employed in connection with the pressure-chamber of the machine and the pressure-indicating gage, because the escape or loss of even a very small amount of the volume of the fluid, as oil, used and normally filling all the connected chambers and piping renders the gage-reading more difficult and materially less accurate.

The object I have in view is to overcome, in a simple and inexpensive manner, the disadvantages and objections above referred to. To this end I have devised and produced an adjustable and self-contained oil-tight or leakless valve device, adapted to be interposed between said fluid-charged chamber and a fluid pressure-gage, the said valve member being in continuous direct open communication with both the said pressure-chamber and pressure-indicating gage.

By means of my invention, the same, when in use, operates to automatically interrupt or arrest the usual wave-like or pulsatory movements transmitted through the fluid to the pressure-indicating gage.

In the accompanying sheet of drawings, Figure 1 represents, in enlarged scale, a longitudinal central sectional view of a packingless and fluid-tight pressure-equalizing valve, embodying my improvements; Fig. 2 is a horizontal sectional view of the same, taken on line 2—2 of Fig. 1; and Fig. 3 is a similar sectional view, in reduced scale, showing a slight modification.

The following is a more detailed description of my invention and the manner of its operation:

A, in the drawings, indicates the improved pressure-regulating valve device or attachment, complete. The main member B of the device has a body portion *a* (which may be polygonal) provided with a screw-threaded head part a^1 having a shallow, concentric recess d^1 and raised central face or seat *n* formed in its upper end, and having a relatively small, downwardly extending central hole *i*, the latter terminating in a lateral opening or nozzle a^3, whereby the device is adapted to be detachably secured to a pipe or connection in open communication with a suitable pressure-indicating gage; said pipe and gage members being omitted from the drawing. The body member B has also a small inlet hole *o* extending upward into said recess d^1 from the nozzle a^2, the latter adapted to be detachably secured to the fluid-pressure chamber of a testing or other analogous machine—the latter not shown. An imperforate, disk-like, slightly elastic diaphragm *d*, preferably of metal, rests flatwise upon and is or may be soldered to the upper outer annular face of the head a^1, thereby, in connection with said recess d^1, forming an absolutely fluid-tight auxiliary chamber when the device is properly connected to a pressure-transmitting machine and gage. The nut *b* screwed to head a^1 is bored to form a chamber c^1 to receive a follower *f*, the latter being in continuous engagement with the diaphragm positioned below it and forming a resistance or thrust-plate therefor. The under side of the follower, peripherally, is beveled or cut away, at f^2, to permit a slight freedom of diaphragm movement at that point.

A suitably headed screw *e*, or thumb-screw, as it may be termed, has its lower or screw-threaded shank e^1 fitted to the finely

threaded upper portion of the correspondingly threaded inner face of the wall of the chambered part c^1 of the nut b. The bottom end of said shank is in continuous engagement with a central raised lug f^1 of the follower below. The head portion of screw e may be milled or knurled peripherally and also provided with a recess e^2 in which an adjusting or stop-screw s is mounted, its lower end portion extending into the dry chamber c^1. Between the head of screw e and the upper face of nut b is positioned a check-nut c fitting the finely threaded screw of the shank e^1, for obvious purposes. A stop-screw s^1 passes laterally through the wall of jam-nut b at a point above the follower f; this screw, in coöperation with the said vertical stop-screw s, constitutes adjusting means for limiting the backward movement of screw e a small fraction of a turn in case the latter tends to accidentally unscrew.

In the valve device A herein described a valve-stem and packing elements are dispensed with, the result being that a much greater degree of efficiency is obtained, because loss of fluid by leakage is wholly overcome, and the cost of manufacture lessened.

I do not desire to limit my invention to the scope and application hereinbefore described, nor to the exact form and construction represented in the drawings, as changes or modifications may be made therein without departing from the spirit of the invention. For example, in lieu of single apertures o and i for the flow of fluid, two groups of them may be employed, as indicated at o^1 and i^1, Fig. 3, thereby providing for a larger volume of fluid. If desired, the follower and diaphragm may be adjusted so as to throttle the fluid, thereby adapting the device to discharge or deliver fluid at correspondingly reduced pressure and volume. This valve may be successfully substituted in lieu of the usual radiator-valve, so-called, (in which a packed stem and valve proper are used) thereby preventing leakage, etc. Obviously, the substitute valve in such case is adapted to be opened and closed by manipulating the screw e. Of course, the action of the valve device is substantially the same in case the inlet and outlet nozzles a^2 and a^3 are transposed.

I claim as my invention:—

1. As an improved article of manufacture, a fluid-tight packingless valve device, the same consisting of a main body member having an interiorly screw-threaded chamber formed in its upper portion and independent intake and outlet passages extending longitudinally of the body and terminating in the base of said chamber, an endwise movable follower member supported in the chamber, a slightly elastic diaphragm interposed flatwise between the ends of said passages and the adjacent face of the follower and forming a fluid-tight seal therebetween, a cap-screw fitting the screw-threaded portion of said chamber for limiting the movements of said diaphragm, and an annular check-nut fitting the screw-threaded part of said cap-screw and at the same time bearing on the upper face of the said chamber's walls.

2. In a valve device of the general character described, having a main or body member provided with independent intake and outlet passages, both passages normally opening into a shallow annular recess formed in the upper end of said body member, and a diaphragm secured to the said recessed end and forming therewith a fluid-tight chamber, the combination therewith of a nut screwed to said body and seated upon the peripheral portion of the diaphragm, a manually controlled screw fitting a fine screw-thread formed in the said nut, a follower element interposed between and normally engageable with the inner end of the screw and diaphragm, and means for accurately adjusting the position of the follower.

3. In a valve device of the general character described, having a main member provided with independent intake and outlet passages extending through its end, and a diaphragm fixedly superimposed on the latter and over said passages to form a fluid-tight peripheral joint, the combination therewith of a bored collar member fixed to said main member, having a portion extending thereabove, a manually controlled follower movably mounted in said collar, normally bearing against the diaphragm, and means for limiting the movements of the latter.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGE T. HUXFORD.

Witnesses:

GEO. H. REMINGTON,

CALVIN H. BROWN.