W. ORD.

BALANCED VALVE.

APPLICATION FILED JUNE 12, 1908.

919,753. Patented Apr. 27, 1909.

Fig. 1

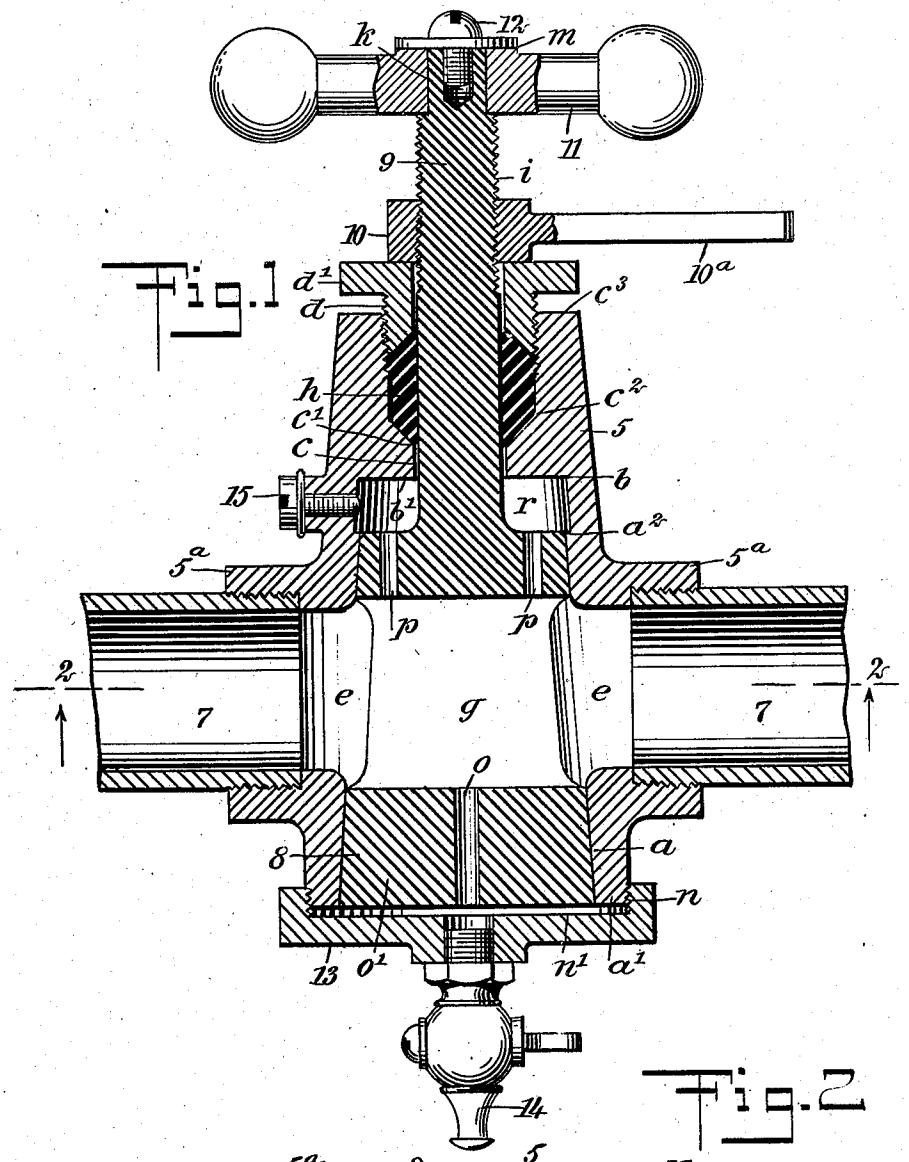
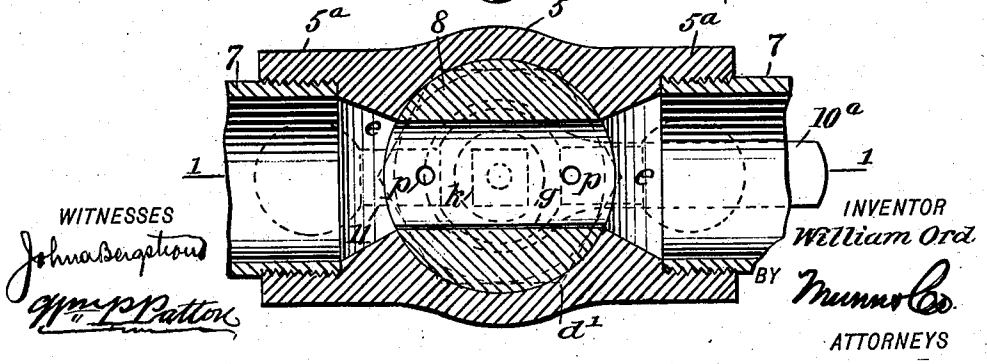


Fig. 2



WITNESSES

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BALANCED VALVE.

No. 919,753. Specification of Letters Patent. Patented April 27, 1909.

Application filed June 12, 1906. Serial No. 438,050.

To all whom it may concern:

Be it known that I, WILLIAM ORD, a citizen of the United States, and a resident of Brooklyn, in the county of Cuyahoga and State of Ohio, have invented a new and Improved Balanced Valve, of which the following is a full, clear, and exact description.

This invention relates to stop valves, employed for the control of high pressure fluids, and more particularly to valves of the shell and plug type, which afford a straightway passage therethrough.

The purpose of the invention is to provide novel details of construction for a valve of the character indicated, which are simple, practical and very efficient, and that enable the balancing of pressure on the body of the plug valve, so that leakage around the valve will be prevented, and said valve body be adapted for convenient adjustment to control the passage of fluid therethrough.

The invention consists in the novel construction and combination of parts, as is hereinafter described and defined in the appended claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views.

Figure 1 is a sectional side view of the improved valve, substantially on the line 1—1 of Fig. 2, and Fig. 2 is a horizontal sectional view, substantially on the line 2—2 of Fig. 1.

The body or shell 5 of the improved valve is given a coniform shape exteriorly, and in the shell a coniform bore a is formed. The bore a, that is concentric with the exterior of the shell, is of greatest diameter at the normally lower end a' of the latter, and extends toward the smaller upper end thereof, having a smooth surface, that terminates at a^2, where a shoulder is formed by a slight enlargement of the bore, which diametrically enlarged bore extends from the shoulder a^2 to a point b, where it terminates in a flat transverse wall b'.

Centrally in the wall b' a circular opening c is formed, that extends toward the smaller end of the shell, and terminates a short distance from said transverse wall in a shoulder c', formed by the diametrical enlargement c^2 of said circular opening, which forms a packing box that extends to the upper end wall c^3 of the shell 5. The cylindrical wall of the packing box c^2 is threaded from the outer edge inwardly, and receives the exteriorly-threaded annular gland d, whereon is formed a peripheral flange d', that is polygonal in contour and thus adapted for the reception of a wrench.

Near the center of the bore a, between its ends, two similar opposite openings e, e are formed in the shell 5, which are elongated lengthwise of the shell and flare outwardly. The openings e, e are encircled by similar branches 5^a, 5^a formed on the shell 5 and projecting oppositely therefrom. The branches 5^a are cylindrical, and are internally threaded for the reception of the threaded ends of similar tubes 7, 7, that are conduits for high pressure fluid, the flow of which is controlled by the valve in complete form.

In the coniform bore a is neatly fitted the coniform body 8 of a plug-valve, that should be ground therein and thus rendered steam and water tight. The length of the plug 8 is proportioned to the depth of the coniform bore a in the shell 5, between the lower end a' and the shoulder a^2, so that it will leave a shallow space between its flat lower end and the lower end a' of the shell, when the upper end of said plug-valve is flush with the shoulder a^2, as is shown in Fig. 1.

A longitudinally-elongated opening g is formed in the plug-valve body 8, and corresponds in dimensions with those of the openings e, e, and is so relatively positioned that the opening in the plug may be alined with said openings e, e, and thus produce a straightway passage through the valve-shell and the plug therein.

An elongated cylindrical stem 9 is extended from the longitudinal center of the plug valve body 8, at the smaller end thereof, and passes up through the opening c, packing box c^2 and gland d. In the box c^2 a suitable packing h is placed and closed around the stem 9 by a proper adjustment of the gland d. The stem 9 projects outside of the gland d, and is threaded on said portion, the thread i extending somewhat within the gland, as is shown in Fig. 1. Upon the threaded portion of the stem 9 a jam nut 10 is mounted, having a laterally-extended handle 10^a thereon, which enables the adjustment of said nut. The outer end portion k of the stem 9 is squared, as is shown by

dotted lines in Fig. 2, and upon said angularly-shaped end of the stem a cross handle 11 is fitted. In the end of the stem 9, at its center, a perforation is longitudinally formed, which is tapped to thread its wall, and in the perforation a clamping screw 12 is inserted, first passing through a washer *m*, that is clamped by means of said screw upon the stem and handle, thus securing the latter on said stem.

The exterior surface of the shell 5, at or near its lower end *a'*, is threaded, and upon said threaded end a cap piece 13 is screwed, the latter having a peripheral flange *n* thereon, which is interiorly threaded for an engagement with the end of the shell 5, that is thus hermetically sealed, as shown in Fig. 1. The cap-piece 13 is centrally perforated and threaded in the perforation, wherein the threaded upper end of a pet-cock 14 is screwed. In the portion of the plug valve body 8, which is below the transverse passage *g* therein, a vertical perforation *o* is formed, that affords a communication between the passage *g* and a shallow cavity *n'*, formed between the lower end *o'* of the plug valve body 8 and the cap piece 13. In the portion of the plug valve body 8 that extends above the transverse passage *g* therein, preferably two vertical perforations *p* are formed, these perforations connecting the passage *g* with a chamber *r*, that is formed between the upper end of the plug body 8 and the flat bottom wall *b'* of the bore *a* in the shell 5. In the shell 5, opposite the chamber *r*, a threaded perforation is formed, wherein a removable screw 15 is fitted, and normally the flat head of the said screw has fluid-tight contact with the side wall of the shell.

To adapt the valve for service, the motive fluid conduits 7, 7 are respectively extended and connected with a source of high pressure motive fluid, and to mechanism that is to be actuated by the motive fluid. Assuming that the conditions for service are completed, it will be evident that as the motive agent has contact with each end of the plug valve 8, when the valve is opened the pressure thereon will be nearly equal, and the valve may be readily turned in the shell 5 for closure of the same. When closed, the pressure of the motive fluid on one side of the plug valve 8, owing to the taper of the latter, will have a tendency to loosen said plug valve and cause a leakage of said motive agent around the latter. To prevent this, the nut 10 is tightened upon the gland *d*, while the cross handle 11 is held from turning, and it will be seen that this adjustment of the nut 10, by means of the lever-handle 10ª thereon, will secure the plug valve so that it will be held with proper pressure on the coniform wall of the bore *a* in the shell 5.

The chamber *r* serves as a receiver for the lubricant that may be introduced through the opening that is normally closed by the sealing plug 15, the liquid lubricant passing down through the passages *p* into the transverse duct *g*, and thence into the crevice between the plug-valve and the shell, for a lubrication of the surfaces thereof. It will be noted that the passage *o* affords a duct through which condensed liquid from the pipes 7 may be removed by opening the pet-cock 14 from time to time, as may be found necessary.

It will be obvious that the plug valve body 8 may be ground upon its seat successively by its rotation in the shell 5, through the medium of the cross-handle 11, and wear on said valve be compensated for, so that the valve will remain fluid tight after years of service, under the extremes of high and low pressure.

The simplicity and practical nature of the improved valve are advantageous features, and enable its manufacture without requiring the provision of a costly, special equipment of tools, in a rapid, perfect manner at a moderate cost. Furthermore, the improved valve may be produced in sizes to suit the different standard calibers of pipes, from large to small, and be equally serviceable as a controlling means in gas, water or steam service.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A valve of the character described, comprising a shell having its lower end externally screw threaded and provided with a coniform bore leading out through the lower end of the shell, the upper end of the bore being enlarged, a vertical opening leading from the enlargement of the bore out through the upper end of the shell, a lateral opening leading from said enlargement of the bore out through the side of the shell, and oppositely arranged branches having elongated openings leading into the said bore, a coniform plug valve having a plain lower end and provided with an elongated transverse opening, openings leading from the transverse opening through the ends of the valve, and a stem projecting from its upper face and provided with a handle, the valve fitting in the bore with its lower end flush with the lower end of the shell and its upper end flush with the shoulder formed by the enlargement of the bore and having its stem extending out through the upper end of the shell, a closure for the lateral opening of the enlarged end of the bore, and a cap having a peripheral internally threaded flange screwed on the lower end of the shell and forming with the lower end of the shell and the lower end of the plug valve, a chamber, said cap being centrally apertured and a valve for the aperture of the cap.

2. A valve of the character described, comprising a coniform shell, having a coniform bore therein that extends partly through the shell, terminating in a transverse wall, said wall being centrally perforated, the shell at its smaller end having a packing space that intersects the perforation and an internal thread, an annular threaded gland screwed into said thread, a coniform plug valve having a flat surface at its larger end, and fitted fluid tight into the coniform bore, the plug valve being spaced from the upper end wall of the coniform bore, forming a chamber, two cylindrical branches that are internally threaded and projected oppositely from the shell, said shell having opposite openings therein that register with the branches, the plug valve having a transverse passage therethrough that may register with the openings in the shell, a cap-piece screwing on the larger end of the shell, leaving a cavity below it, a pet-cock thereon, the plug valve having a perforation therethrough extended from the transverse passage toward the pet-cock, and also having a perforation in the upper end thereof between the chamber and the transverse passage, a jam nut on the stem, and a cross-handle thereon for turning the plug valve.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM ORD.

Witnesses:

JOHN SHANKLAND,

RAY W. LUNN.