E. FISHER.

VALVE.

APPLICATION FILED NOV. 18, 1915.

1,202,044. Patented Oct. 24, 1916.

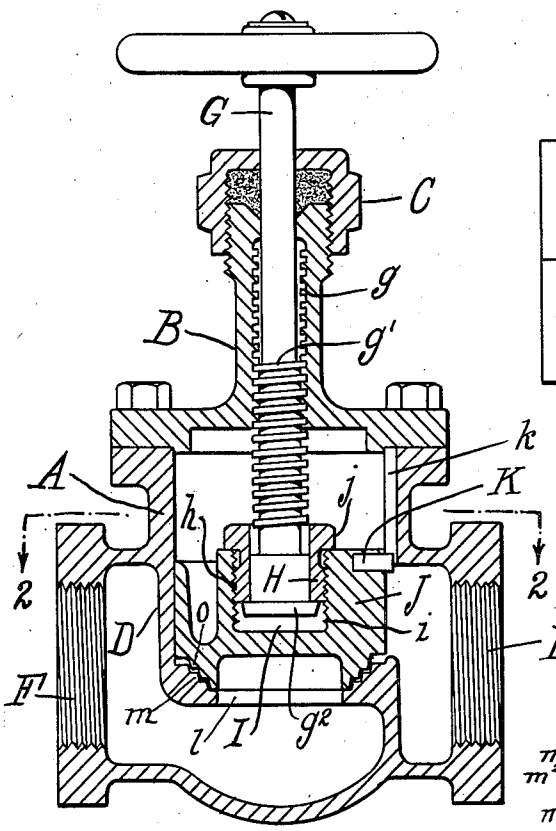


Fig. 1.

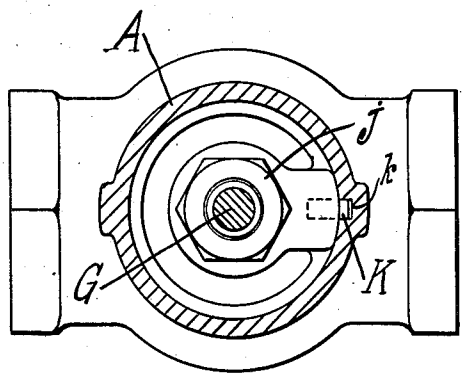


Fig. 2.

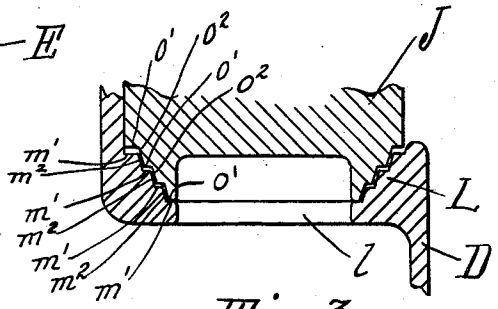


Fig. 3.

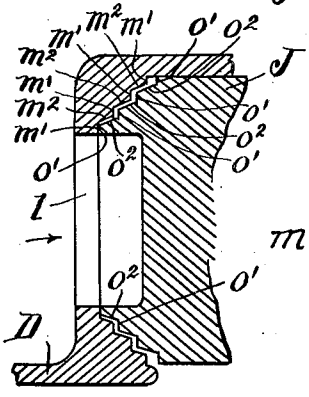


Fig. 5.

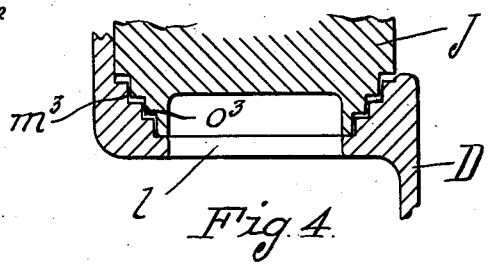


Fig. 4.

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VALVE.

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To all whom it may concern:

Be it known that I, EMANUEL FISHER, 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 Valves, of which the following is a specification.

My invention relates to steam and water valves, but is more particularly adapted for use as a globe valve.

The essential objects of my invention are to provide a compound seated valve; to minimize wear and prevent leakage; to insure the repeated contact of the valve member or disk upon the seat in substantially the same place to facilitate regrinding and repair; and to attain these ends in a structure which is substantial, easy to operate, and inexpensive to construct.

To the above ends essentially my invention consists in such parts and combinations of parts as fall within the scope of the appended claims.

In the accompanying drawings which show an embodiment of my invention in an approved form, Figure 1 is a vertical central section of a valve casing and valve member or disk, Fig. 2, a section on line 2—2 of Fig. 1, Fig. 3, an enlarged section of a portion of the disk and valve seat corresponding with the section thereof shown in Fig. 2, Fig. 4, a similar section of a modified form and valve seat, Fig. 5, a section showing the parts arranged horizontally.

Like reference characters indicate like parts throughout the views.

The valve casing comprises in this instance a cylindrical shell A, head B, cap nut C, partition D, and inlet and outlet E and F all of the usual globe valve construction. The head of the valve is provided with threads g engaging threads g' on the valve stem G. The lower end of the valve stem is provided with an annular shoulder g^2 whose upper face abuts against the bottom of a sleeve H which slidably engages the lower end of the stem and is provided with external threads h engaging the thread i within a vertical recess I formed in a cylindrical valve body J. A square laterally extending shoulder j upon the upper portion of the sleeve H rests upon the top of the body J.

It will be observed that the lower portion of the valve stem, namely the shoulder g^2, is revoluble in the body J, but that the sleeve H coöperates with the said shoulder to prevent the escape of the valve stem from the valve. When it is desired, however, to remove the valve it is obvious that by applying a wrench to the nut or shoulder j the sleeve H may be removed from the recess and the parts be disassembled. Fixed in the side of the body J is a horizontal pin K which projects loosely into a vertical guideway k formed in the casing wall A, and this vertical groove insures a vertical reciprocation of the body J, so that each part of the valve in its successive reciprocations engages the identical portions of the valve seat with which the valve coöperates, thus preventing wear of the contacting faces.

The partition D has a port l having a valve seat L, comprising a plurality, in the present instance four, parallel horizontally disposed annular channels of gradually lessening radii downwardly, forming a corresponding series of solid stepped abutments m, having flat horizontal upper faces m', and preferably inclined side faces m^2. The depths of the latter faces are preferably uniform.

The valve member or disk J has at its bottom a plurality of radially graduated steps o, in the present instance four in number, having flat parallel bottom faces o' forming continuous and broad areas for contact with the faces m', and having preferably inclined side operating faces o^2 adapted to continuously engage the areas m^2. The faces o' are of successively gradually increasing depth upwardly so that the lowest faces m', o', only are initially in contact, and the pairs of horizontal faces above the lowest faces are successively and gradually spaced apart increasing distances, such as 1/32, 1/16, 3/32 inches, etc. The graduation of depths of the steps is convenient in case that by any remote contingency or possibility any leak occurs. In such an event the member J is removed from the valve casing and 1/32 of an inch is ground from the lowermost bottom face o' of the valve shoulders, so that the next higher successive face o' will contact with its corresponding face m' of the valve shoulders, and thus the treatment may be continued in like manner from time to time until the last seat is reached. The side

faces o^2 and m^2 are preferably uniformly spaced from each other slightly say one hundredth of an inch.

It will be observed that a vertical adjustment of the valve member J is permitted relatively to the valve stem G by virtue of the space I and the sleeve H the latter being operable by the nut flange j. Thus compensation is permitted either for the wear or the grinding of any of the valve or valve seat faces.

The compound character of this valve and the extended area of the contacting and adjacent disk and seat surfaces makes the closure exceptionally effective.

The successively increasing graduated spaces between the faces m', o' and the spaces between the faces m^2, o^2 greatly assist in preventing any cutting of the faces by steam when a leak occurs in the lower contacting steps. For example, if the steam be entering the port l from below, and a leak occur between the lowest engaged faces m', o', the series of spaces referred to will permit an expansion of the upwardly forced steam thus preventing any cutting of the steps above.

The bevel form of the surfaces o' and m' is preferable because it assists in guiding the valve faces to their original places; and when the valve is mounted horizontally, as suggested in Fig. 5, and water is entering the port l in the direction of the arrow, the inclination of the faces will assist the liquid to induce any dirt downwardly and away from the seats when the valve is being closed.

In Fig. 4 is shown a modified form of my invention wherein the valve seat and the valve are provided with vertical side faces m^3 and o^3 respectively. This form of my invention is not, however, as already suggested the preferred form.

I claim:—

1. In a valve, the combination of a valve seat comprising a series of steps of successively increasing diameter, and a valve member comprising a series of steps integral therewith and adapted to contact successively with the first steps in the order of increasing diameter of the latter and comprising acting faces of successively gradually increasing heights.

2. In a valve, the combination of a valve seat comprising a series of concentric steps of successively increasing diameter, and a valve member comprising a series of concentric steps integral therewith and adapted to contact successively with the first steps in the order of increasing diameter of the latter and comprising acting faces of successively gradually increasing heights.

3. In a valve, the combination of a valve seat comprising a series of steps of successively increasing diameter, and a valve member comprising a series of steps integral therewith and adapted to contact successively with the first steps in the order of increasing diameter of the latter, the pairs of horizontal faces of the steps beyond the first steps being successively and gradually spaced apart increasing distances.

In testimony whereof I have affixed my signature.

EMANUEL FISHER.