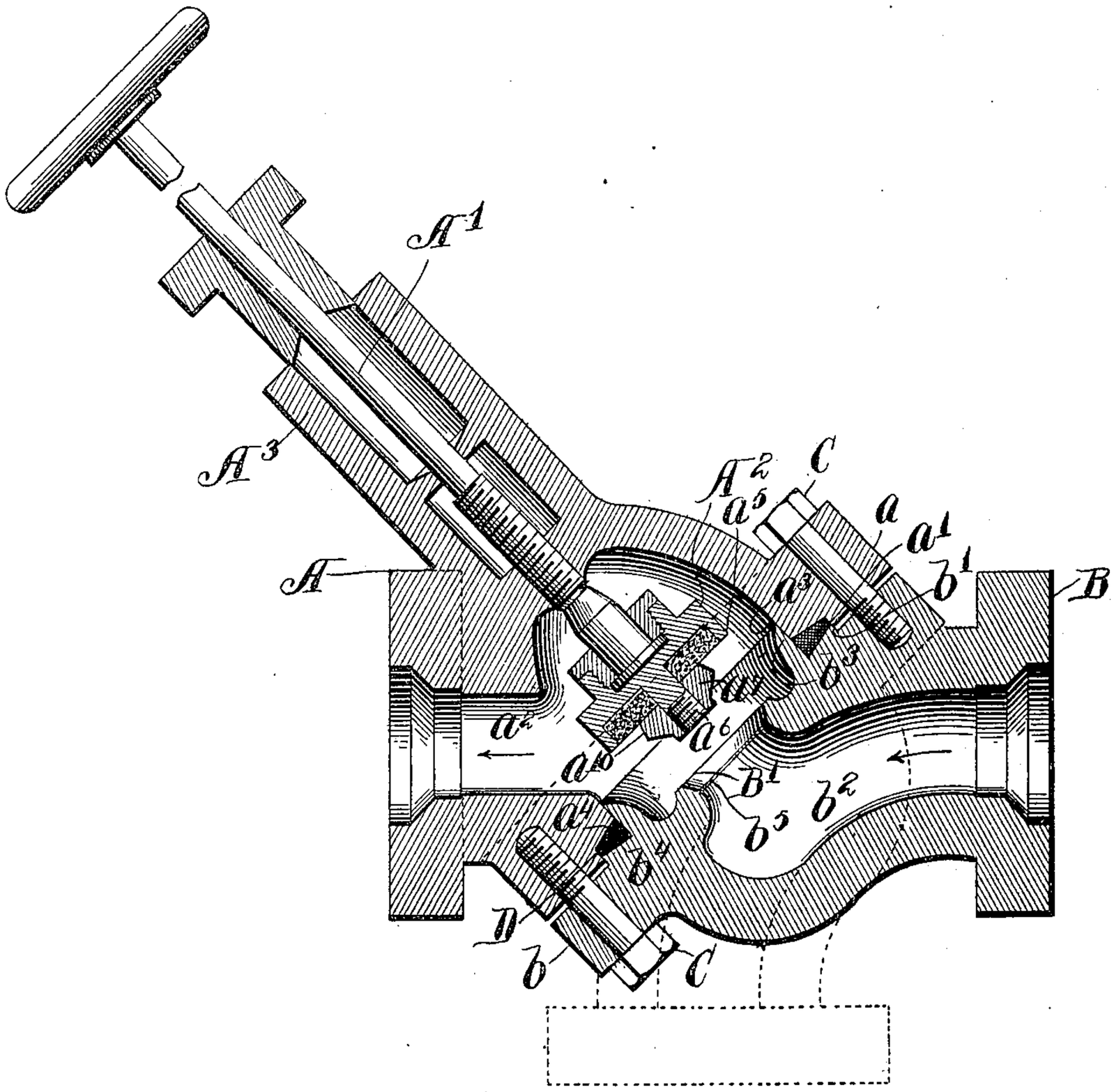
No. 670,083. Patented Mar. 19, 1901.

E. F. OSBORNE.

VALVE.

(Application filed July 26, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

EUGENE F. OSBORNE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE OSBORNE STEAM ENGINEERING COMPANY, OF SAME PLACE.

VALVE.

SPECIFICATION forming part of Letters Patent No. 670,083, dated March 19, 1901.

Application filed July 26, 1900. Serial No. 24,890. (No model.)

To all whom it may concern:

Be it known that I, EUGENE F. OSBORNE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which forms a part of this specification.

This invention relates to improvements in valves constructed to be used either in a straight line of piping or at an angle of a deflected line.

The invention relates, further, to other features of improvement in valves, as will more fully hereinafter appear.

From the accompanying drawing, which illustrates my invention by a central longitudinal section of the casing when its parts are joined for connection of the valve in a straight line of piping, it will be seen that the valve-casing is composed of two principal parts A and B and that the inner and meeting ends of these parts are severally inclined at an angle of forty-five degrees to the outer ends thereof. The meeting ends of the parts A and B are also shown as provided with flanges a b, by which said parts may be bolted together. Said meeting end faces are also further provided with mutually interfitting concentric annular offsets, which may be of any suitable form adapted to hold the parts laterally in place with respect to each other. As here shown, said offsets consist of an annular shoulder b' on the part B of the casing and the corresponding shoulder a' on the part A of the casing. The part B, as here shown, is additionally provided with an annular flange b^3 at some distance inside and concentric with the shoulder b', said flange b^3 extending into the cylindric opening a^3 of the chamber a^2 in the part A of the casing. This additional provision of the flange b^3 has especial utility in a valve which is to be subjected to high pressure, and in such a valve the meeting faces of the parts A and B are provided with the inclined annular surfaces a^4 b^4, situated between said flange and the exterior shoulders a' b', and between which surfaces is inserted the soft-metal or other annular packing-ring D. This packing-ring is wholly confined by the surfaces of the offset a', flange b^3, and the inclined surfaces a^4 b^4, so that when the bolts C C are properly set up the packing-ring is made to completely fill the space provided for it, and leakage is rendered impossible.

Concentric with the annular shoulder b' on the part B said part is provided with an annular valve-seat B', surrounding the passage for the fluid. The part A is correspondingly provided with a concentric valve-stem A', supported at right angles with the inner end of said part A and in line with the center of the opening through the annular valve-seat in the part B. This valve-stem is screw-threaded into the casing and externally to the screw-thread passes through a stuffing-box formed in a suitable chambered projection A^3 of the valve-case. To the inner end of the valve-stem A' is rotatively attached a valve-disk A^2.

From the construction above described it is obvious that the meeting faces of parts A and B of the valve-casing may be rotated one upon the other to bring the outer ends of the valve-casing either parallel with each other, as shown in the drawing, at right angles with each other, as will be required to connect the valve in a right angle of a deflected line of piping, or at any angle greater than ninety degrees, at which the number and position of the bolt-holes in the flanges a b adapt the parts A B to be set.

It is an obvious advantage of this construction that when the parts of the valve-casing are connected for juncture with a straight line of piping, as shown in the drawing, the opening or passage through the valve is more direct than in the construction heretofore employed in globe and angle valves.

In valves for ammoniacal liquor or gas under high pressure (for which the valve here shown is more especially intended) cast-iron and steel are the only materials available and the valve-seat must have considerable breadth of face, because the material is relatively coarse-grained and porous. To enable the valve-disk to closely fit a seat of this description, the face of the valve-disk must be of relatively soft material, which will therefore be espe-

cially subject to wear. The protection of the valve-seat is therefore a matter of material consequence.

For the purpose of protecting the face a^5 of the valve-disk A^2 against the wearing effect of the fluid passing in the direction of the arrows, and especially when the valve is only slightly open and the flow is more rapid, the disk A^2 is provided with a central stud a^6, projecting toward the opening through the valve-seat, and to this stud is applied a nut a^7, which when the disk is seated projects into the said opening. When the valve-disk is removed only a short distance from the valve-seat, there is therefore a still narrower passage between the periphery of the nut a^7 and the wall of the passage surrounding the nut than there is between the face a^5 of the valve-disk and the valve-seat itself. As a consequence, the flow of liquid will be relatively slower through the larger space between the surface a^5 and that of the valve-seat than between the edge of the nut and the wall of the passage in the part B, and the wear due to the high velocity of the fluid will be principally upon the nut and the surrounding wall of the passage instead of upon the face a^5 and the surface of the valve-seat. In the preferred form of this construction the passage within the valve-seat is made slightly conical or flaring at its upper end, as shown at b^6, to a depth a little less than the thickness of the wider part of the nut a^7, and the nut at its widest part is made of suitable size to fit closely the narrowest or restricted part b^5 of said passage. The part of the nut closest adjacent to the valve-face is beveled or conical, as shown at a^{10}, in a direction opposite the bevel of the seat-flange. When the valve-disk is seated, the widest part of the nut a^7 is forced a slight distance into the restricted part b^5 of the passage, said restricted part of the passage being less distant from the plane of the seat than the thickness of the upper or wider part of the nut. When the valve-disk is thus seated, the beveled parts b^6 and a^{10} are opposite to each other, and as the inclinations are in opposite directions an annular chamber is formed between said parts which surround the upper end of the passage b^2. In retracting the valve-disk from its seat the first effect will be to separate the face a^5 of the valve-disk from the face of the valve-seat without admitting any considerable flow of liquid to the space so opened, because the nut fills the passage leading to this space. Upon further slight opening of the valve, however, a little space is opened around the nut a^7, while the space between the valve-disk and its seat is still further widened. The annular space or chamber formed between the inclined parts b^6 and a^{10} first receives the fluid as it is discharged around the widest part of the nut as the latter is retracted from the restricted part of the passage b^2, so that said fluid is permitted to expand somewhat before it reaches the face a^5 of the valve, with the result that its wearing force is somewhat lessened before it reaches the face of the valve-disk. Upon the still further retraction of the valve-disk the narrowest part of the passage for the liquid will be between the nut and the wall of the orifice embraced by the valve-seat, so that the margin of the nut and the wall of the orifice within the valve-seat instead of the disk-face and the face of the seat will at all times take the severest wear until the valve is fully opened. The conical form of the face of the nut a^7 closest adjacent to the valve-seat is also favorable in connection with its elevation to the deflection of the fluid-current away from the face a^5 of the valve-disk and to a corresponding relief of said face of the disk from wear.

I claim as my invention—

1. The valve described comprising the parts A and B provided with meeting faces inclined at an angle of forty-five degrees to their respective ends and rotative one upon the other, one of said parts being provided with an annular concentric flange which has overlapping engagement with the other part and bears against an interior bearing-surface thereof, overlapping annular shoulders on said parts radially outside of and concentric with said annular flange, packing interposed between said parts and confined between said annular flange and one of said shoulders, one of said parts being provided with a concentric annular valve-seat, and the other with a screw-threaded valve-stem having a valve-disk, said stem being rotative in an axis concentric with said seat, and means for securing the parts of the valve together when occupying different angular relations.

2. The valve described comprising the parts A and B provided with meeting faces inclined at an angle of forty-five degrees to their respective ends and rotative one upon the other, one of said parts being provided with an annular concentric flange which has overlapping engagement with the other part and bears against an interior surface thereof, said parts being provided outside of said annular flange with annular overlapping shoulders concentric with said flange, packing interposed between said parts and confined between said annular flange and one of said shoulders, an annular valve-seat radially inside of and concentric with said annular flange and below the plane of the upper edge of said annular flange, a screw-threaded valve-stem carrying a valve-disk and rotative on an axis concentric with the valve-seat, and means for securing the parts of the valve together when occupying different angular relations.

3. The valve described comprising the parts A and B having their meeting faces arranged at an angle of forty-five degrees to their respective ends, said faces being provided with closely-overlapping offsets a' b' a^3 b^3 and with the inclined meeting surfaces a^4 b^4 in combination with the packing-ring D confined be-

tween the offset a' and b^3 and said inclined surfaces a^4 b^4.

4. The valve described having an annular valve-seat, a movable valve-disk, a projection on the disk which enters a passage embraced by the seat, said passage being contracted at a point less distant from the plane of the seat than the thickness of the projection, and the diameter of said projection being substantially that of the contracted part of the passage.

5. The valve described, having an annular valve-seat, a movable valve-disk, a projection on the disk which enters a passage embraced by the seat, said passage being made flaring or conical at its outer end, and contracted at a point less distant from the plane of the seat than the thickness of the projection, said projection being beveled in its part adjacent to the seat, the inclination of which is opposite to that of the conical outer end of the seat-passage, and the widest diameter of said projection being substantially that of the restricted part of said passage.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 11th day of July, A. D. 1900.

EUGENE F. OSBORNE.

Witnesses:

WILLIAM C. HALL,

TAYLOR E. BROWN.