March 31, 1931. E. J. KILEY 1,798,473

VALVE AND METHOD OF MANUFACTURING SAME

Filed July 26, 1927

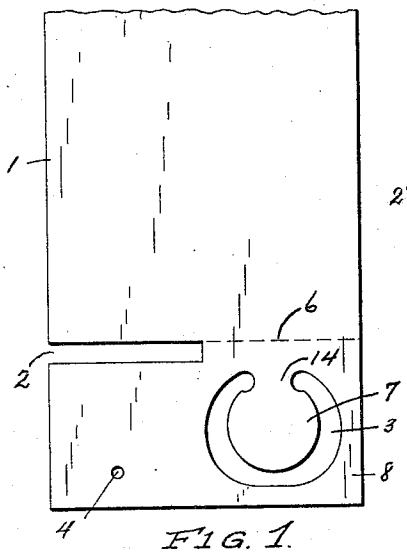


FIG. 1.

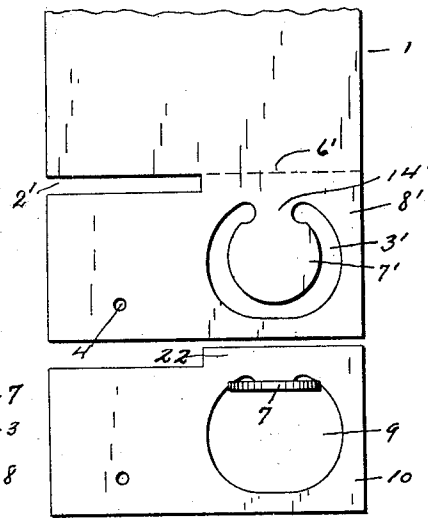


FIG. 2.

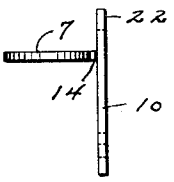


FIG. 3.

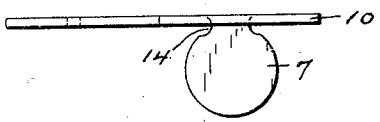


FIG. 4.

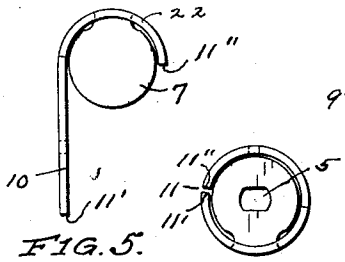


FIG. 5.

FIG. 9.

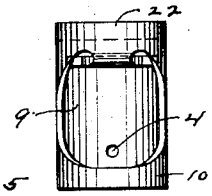


FIG. 7.

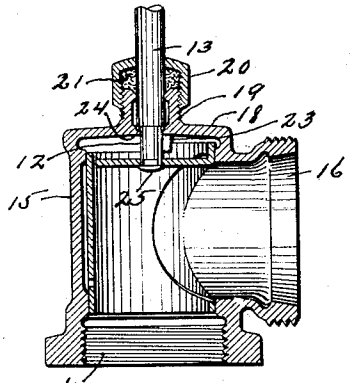


FIG. 10.

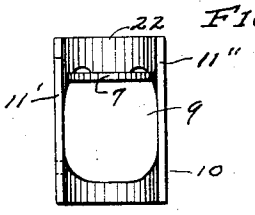


FIG. 6.

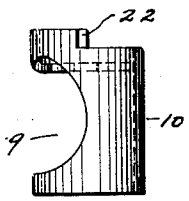


FIG. 8.

Inventor

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Witness:

H. J. Stromberger

By

Attorney

Patented Mar. 31, 1931

1,798,473

UNITED STATES PATENT OFFICE

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VALVE AND METHOD OF MANUFACTURING SAME

Application filed July 26, 1927. Serial No. 208,575.

My invention relates to valves and particularly to the closing portion and the method of manufacturing the same.

The object of my invention is to produce a valve which is simple, economical, of few parts and free from the defects which most valves now on the market are subject to.

My invention resides in the new and novel construction and relation of the various parts hereinafter described and shown in the drawing and steps necessary to produce the same.

In the drawing:—

Fig. 1 shows the first step in the manufacture of the closing portion which I will hereinafter term the valve member.

Fig. 2 shows the second step in the manufacture of my improved valve member.

Fig. 3 is an end or edge view of the part produced by the first two steps of my invention.

Fig. 4 gives a top view of the segregated portion of Fig. 2.

Fig. 5 shows the third step in the production of my improved valve member and represents a top view of the valve member.

Fig. 6 may be termed a side view of Fig. 5 representing the valve member after the third step.

Fig. 7 is a front side view of my improved valve member after the fourth operation.

Fig. 8 is a side view of Fig. 7.

Fig. 9 is a top view of my invention shown in Figs. 7 and 8 after the fifth step.

Fig. 10 is a longitudinal sectional view of my completed invention taken on a center line through the openings to and from the valve body.

In the construction and manufacture of my improved valve member the same is formed up out of sheet metal, preferably brass, as this metal is uniform in thickness, uniform in quality and can be secured at a very reasonable price to any thickness desired and to any width, and, therefore, lends itself very readily to the economical production of a valve member.

By properly designing the valve member very little waste material is necessary and this point I have particularly had in mind in designing my improved valve member.

I have also had in mind reducing the number of operations as far as possible, thereby assisting in another way to reduce the cost without sacrificing the essential points necessary in a valve member of this character.

In constructing the valve member I employ a strip of sheet brass indicated by 1 in Fig. 1 and probably of the exact width required without waste. The first operation is to cut the notch 2 in the valve member and simultaneously therewith the horse shoe shaped slot 3 and the hole 4 which acts as a bleeder hole in the completed article. The only metal wasted in the production of my valve member is that in the cutting away portions 2, 3 and 4 in the first operation and the punching of the stem hole 5 in the fifth operation.

From this, it will be readily seen there is very little waste of material in the forming up of my improved valve member.

In the second operation shown in Fig. 2 the end portion of the strip 1 is cut along the dotted line 6 and simultaneously therewith is produced the cut away portions 2′, 3′ and 4′ of a second valve member and the second steps shown in Fig. 2 separate the stamped portion shown in Fig. 1 from the sheet 1 and simultaneously with the operation described in connection with Fig. 2 the tongue or head 7 is formed up at right angles with the plane of the strip or sheet.

The third operation on the sheet or strip 1 repeats that described in Fig. 2 by separating the portion 8 from the strip along the line 6′, bending the head 7′ up at right angles and producing slots corresponding to 2, 3 and 4 for the third valve member, as previously described.

The bending up of the head 7 produces an enlarged opening 9 completely surrounded with metal which acts as a passage for the fluids through the valve when the valve is fully opened.

In the third operation a portion of the body 10 is bent into a semi-circular form, as shown in Fig. 5, and in reasonably close relation to the head 7, as shown in Figs. 5 and 6.

In the fourth operation the unformed portion of the body 10 is bent round so as to com-

plete the formation of a cylinder in close relation to the head 7 and with a slot 11 between the adjacent edges 11′ and 11″.

In the fifth operation the hole 5 is cut in the head to receive the lower end 12 of the valve stem 13. The hole 5 and the end of the stem 12 are other than circular, but of corresponding shape so that the two when secured together will rotate in unison.

It will be observed that in the completed valve member the bleed hole 4 is opposite the main opening 9 so that when the valve is in its closed position, the bleed hole 4 will permit a slight circulation of the fluid in the system.

The head 7 is formed up out of the metal which once occupied the space of the opening 9 and is secured to the body 10 by means of the neck 14.

The valve body is not particularly unique in any respect, but comprises a cylindrical portion 15 which is machined to a substantially smooth cylindrical surface inside provided with openings 16 and 17 to which pipe connections are secured. The body 15 is provided with an end portion 18 upon which is mounted a threaded gland 19 and which with the packing nut 20 secured thereto comprises a packing chamber in which is positioned packing material 21 which prevents leakage around the stem 13.

To the upper end of the stem 13 may be secured the usual type of handle, either of the round wheel shape or the lever shape or any other suitable form.

It will be noted that the cylindrical body portion 10 at one end is provided with a raised or stepped portion 22 and the edges of this portion form abutments which engage with a stationary stop 23 secured to the inner face of the end 18. The engagement of the edges of the stepped portion 22 with the stop 23 limits the opening and closing movement of the valve member. In order to prevent the inward bending of the head 17 should one stand upon the upper end of the valve stem 13 or the handle thereon, I have provided a shoulder 24 on the stem which engages with a corresponding shoulder on the end of the body and this will support any weight which may be applied to the upper end of the stem and will prevent an inward movement of the stem. The inner end 12 of the stem passes through the opening 5 in the head of the valve member and is headed over at 25, and this then prevents removal of the valve member with respect to the stem and with the shoulder on the stem engaging the valve body it is impossible to raise or lower the valve stem more than an amount equal to the clearances between the valve member and the body and all vertical movement can be eliminated if desired.

Also, the construction thus described prevents the removal of the valve member from the body only when actually necessary, which in the type of valve shown is very seldom, if ever, necessary.

It will be observed that the valve member forms practically a complete cylindrical sleeve excepting for the main opening 9 and what space 11 there may be between the adjacent edges of the valve member, and this insures a bearing surface between the valve member of the valve body over a larger area, and this is bound to give a much smoother operation of the valve member when the valve is opened and closed.

The slight opening 11 in the valve member permits a yielding or spring action between the valve member and the body, thereby insuring the valve member to fit the inner surface of the valve body sufficiently close to limit leakage past the valve member, when closed, to a negligible quantity as the valve is usually used on what is known as hot water heating systems where the pressure is very low and the probabilities are that the leakage through the bleed hole 4 will be greater than any leakage between the valve member and the body.

The hole 5 can be made in the head 7 in the first operation (Fig. 1). The head 7 is connected to the sleeve portion 10 by the neck 14 which is remote from either transverse end of the valve member or intermediate the transverse ends and, therefore, there is less tortional strain set up in the valve member when it is rotated than if the neck were at the extreme end, and the nearer the head is connected to the center of the length of the sleeve then the less the tortional strain becomes.

It is believed from the disclosure herein made that one will appreciate that I have provided a valve in which the valve member is of a decidedly unique construction, and produced with a minimum amount of operations and with the use of a minimum amount of metal in the disc and a minimum amount of loss or waste of metal in the forming up of the valve member.

There will, of course, be modifications which will suggest themselves to those skilled in the art, but I wish to be limited only by my claims.

I claim:—

1. A valve comprising a body provided with a cylindrical bore with an inlet and outlet connection and one end of the body closed, a cylindrical member formed of sheet metal to fit the cylindrical bore of the body, a side opening in the member to correspond with one of the said connections and an end opening to correspond with the other connection, an inturned head adjacent to but not at the upper end of the member and formed of the metal from said side opening, a stem rotatably mounted in the closed end of the body and secured to the head of the member to rotate therewith, a projection on the upper end

of the member having spaced side faces to alternately engage a stop on the interior of the body to limit the rotation of the member to its closed or open position and a bleed hole in the member spaced from the first said opening to register with one of the connections on the body when the valve is closed.

2. A valve member comprising a cylindrical sleeve portion formed of sheet metal, a partially cut out portion in the side of the sleeve and inwardly turned to form a head and leave a passage through the side of the sleeve, a hole in the head to receive a stem and means formed on one end of the sleeve portion to engage with a stop on the valve body to limit rotation of the member.

3. A valve comprising a body provided with a cylindrical bore and side and end connections, a stem rotatably mounted in the body and supported thereby, a valve member mounted within the body and having a side wall corresponding with the cylindrical bore to open and close the valve and formed of sheet metal, an inturned head formed of metal from the side wall of the member and an opening in the side wall of the member left by said inturned head, a portion of the side wall at one end of the member projecting to form abutments arranged to engage a stop on the body to limit the rotation of the member and a hole in the head to receive the end of the stem to rotate in unison therewith.

4. A valve comprising a body provided with a cylindrical bore and side and end openings and connections thereto, a valve member to control the passage of fluid through the openings of cylindrical formation and formed of sheet metal, an opening in the side of the member to register with one of the body connections, a portion of the side wall of the member turned up from a point intermediate the transverse ends of the member and projecting inwardly to form a head and leave said opening and secured to the side walls of the member by a single connection of limited width, and a hole in the head to receive the end of a stem rotatably mounted in the body.

5. A valve member comprising a cylindrical sleeve portion formed of sheet metal, a partially cut out portion in the side of the sleeve and inwardly turned to form a head and leave a passage through the side of the sleeve, a hole in the head to receive a stem, an axially projecting portion of the cylindrical sleeve forming abutments to limit the rotation of the member in a valve body.

6. A valve member comprising a cylindrical sleeve portion formed of sheet metal, an opening through the cylindrical portion intermediate the ends of the sleeve and completely surrounded by the metal thereof to register with an opening in a valve body, an inturned head connected to the sleeve at an edge of the said opening and an opening in the head to receive a valve stem.

7. A sheet metal valve member having a cylindrical sleeve portion, an opening formed in one side, a head formed out of the metal from the opening in the side wall of the sleeve projecting inwardly at a point intermediate the ends of the cylindrical portion and joined thereto and free of the interior surface of the cylindrical portion except where joined to the sleeve and an opening in the head to receive the end of a valve stem.

In testimony whereof I affix my signature.

EDWARD J. KILEY.