March 25, 1924. 1,487,815

J. C. SIMONSEN

POPPET VALVE

Filed June 17, 1922

Fig. 3.

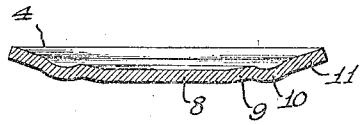


Fig. 1.

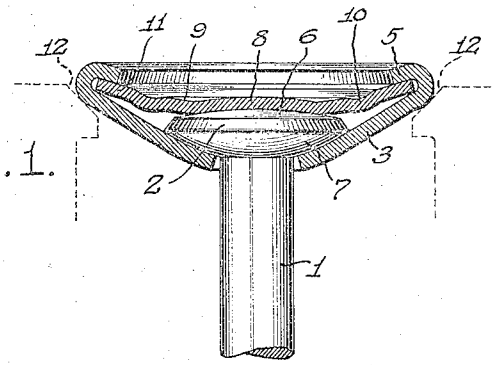
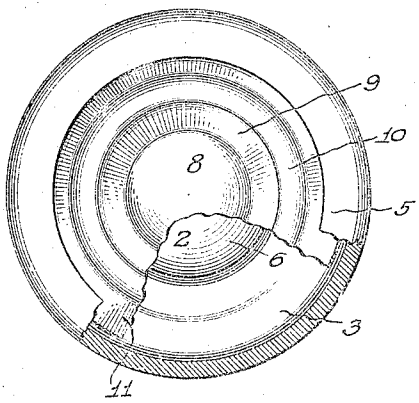


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHAN C. SIMONSEN, OF DETROIT, MICHIGAN.

POPPET VALVE.

Application filed June 17, 1922. Serial No. 568,932.

To all whom it may concern:

Be it known that I, JOHAN C. SIMONSEN, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Poppet Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in poppet valves and has for its object to improve the structure of such valves, whereby they will function efficiently under considerable variations in temperature.

In the drawings,

Figure 1 is a central section through the head of the valve, the valve stem being shown in elevation;

Fig. 2 is a plan view, parts being broken away, and

Fig. 3 is a diametrical section through the disk forming a portion of the valve head.

The valve consists of a stem 1 having at one end an enlarged end 2 upon which is mounted a head 3 of dished or concaved form preferably stamped from sheet metal and secured upon the end 2 by means of a disk 4 which is held within the concaved head 3 by an inturned rim 5.

The end 2 of the valve stem 1 preferably has a convex terminal face 6, the convexity extending transversely of the axis of the stem and upon the side adjacent to the stem, the head is formed with a flaring annular face 7 of a curvature or taper corresponding to that of the central portion of the interior of the head 3. The disk 4 has a central portion 8 which when free as shown in Fig. 3, is substantially flat but which when forced in contact with the convex face 6 assumes a corresponding curvature. Surrounding the central portion 8, the disk 4 is bent out of the plane of the central portion 8 to form a circular tapering portion 9. This tapering portion 9 is surrounded by a concave annular depression 10 and about its periphery outside of the annular depression 10, the disk flares upwardly as indicated at 11, at an angle to the plane of the central portion 8.

When the head 3 is in position upon the stem 1 with the disk 4, resting in contact with the end face 6 of the stem 1 with the rim 5 rolled down upon the outer edge portion 11 of the disk 4, the disk 4 will be held under tension with its central portion flexed upwardly by pressure against the end of the stem 1.

This construction renders the valve head capable of tilting movement in relation to the valve stem, so that when the valve is forced into place upon its seat 12, the head will automatically adjust itself to the seat. However, the resilient disk 4 being held under tension in contact with the face 6 prevents rattling or looseness of the head upon the stem. This automatic adjustment of the valve head upon the seat avoids the necessity of grinding the valve and insures full and uniform compression. The valve finds its own seat, operates quietly and improves in use.

The downward or inward concavity of the resilient disk 4 prevents the parts from becoming loose when heated, since as the disk expands while it is held within the rim 5, the pressure of the central portion 8 upon the convex face 6 increases and the valve head is thus held more firmly upon the stem. The function of the annular corrugation produced by the portions 9 and 10, is to provide greater resiliency than if the disk were in a uniform smooth curvature. From the foregoing description, it will be apparent that there has been provided by the present invention, a valve in which the head is securely held in place upon the stem by a connection which permits sufficient tilting movement to enable accurate adjustment of the head to the seat, while at the same time the construction is such that the increase in temperature in use will result in the clamping action of the securing device becoming greater.

The structure is obviously capable of modification in its form, proportions, details of construction and arrangement of parts without departing from the principles involved or sacrificing any of its advantages. The invention is therefore claimed broadly in any of its possible forms or modifications within the scope of the appended claims

I claim:

1. A poppet valve comprising a stem having an enlarged end portion, a head providing a seat for the enlarged end portion of said stem, and a concavo convex resilient member engaging the enlarged end of said stem and yieldingly holding the same seated upon its seat on the head, said member being engaged adjacent its edge portion

by said head and held under tension thereby with its convex side in contact with the enlarged end of the stem, whereby the tension of engagement of said member with said stem end is increased by expansion of said member under the influence of heat.

2. A poppet valve comprising a stem having an enlarged end portion formed with a convex lower face, a head having an opening in its bottom wall through which the stem projects, said bottom wall being formed to provide a seat for the convex face of the enlarged portion of the stem, and the annular edge portion of the head being turned inwardly to provide an inwardly open groove, and a concavo convex disk in the head with its central portion in contact with the upper enlarged end portion of the stem and with its edge portion engaged in the groove in the head, said disk being held under tension with its convex lower side toward the enlarged end portion of the stem.

3. A poppet valve comprising a valve stem having an enlarged end of greater diameter than the body of the stem, said end having a convex terminal face and an opposite annular curved face adjacent to the stem, a valve head having a central opening therein and a peripheral groove and formed concave to provide a seat for the annular face of the stem end, and a concavo convex disk having its periphery engaged in the peripheral groove of the head with its concave face directed away from the stem and its convex face toward the stem, said disk having its central portion held under tension in contact with the convex terminal face of the end of the stem.

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

JOHAN C. SIMONSEN.

Witnesses:
ARTHUR MINNICK,
KARL H. BUTLER.