(No Model.)

C. S. BAVIER.

VALVE.

No. 452,357. Patented May 19, 1891.

Fig. 1.

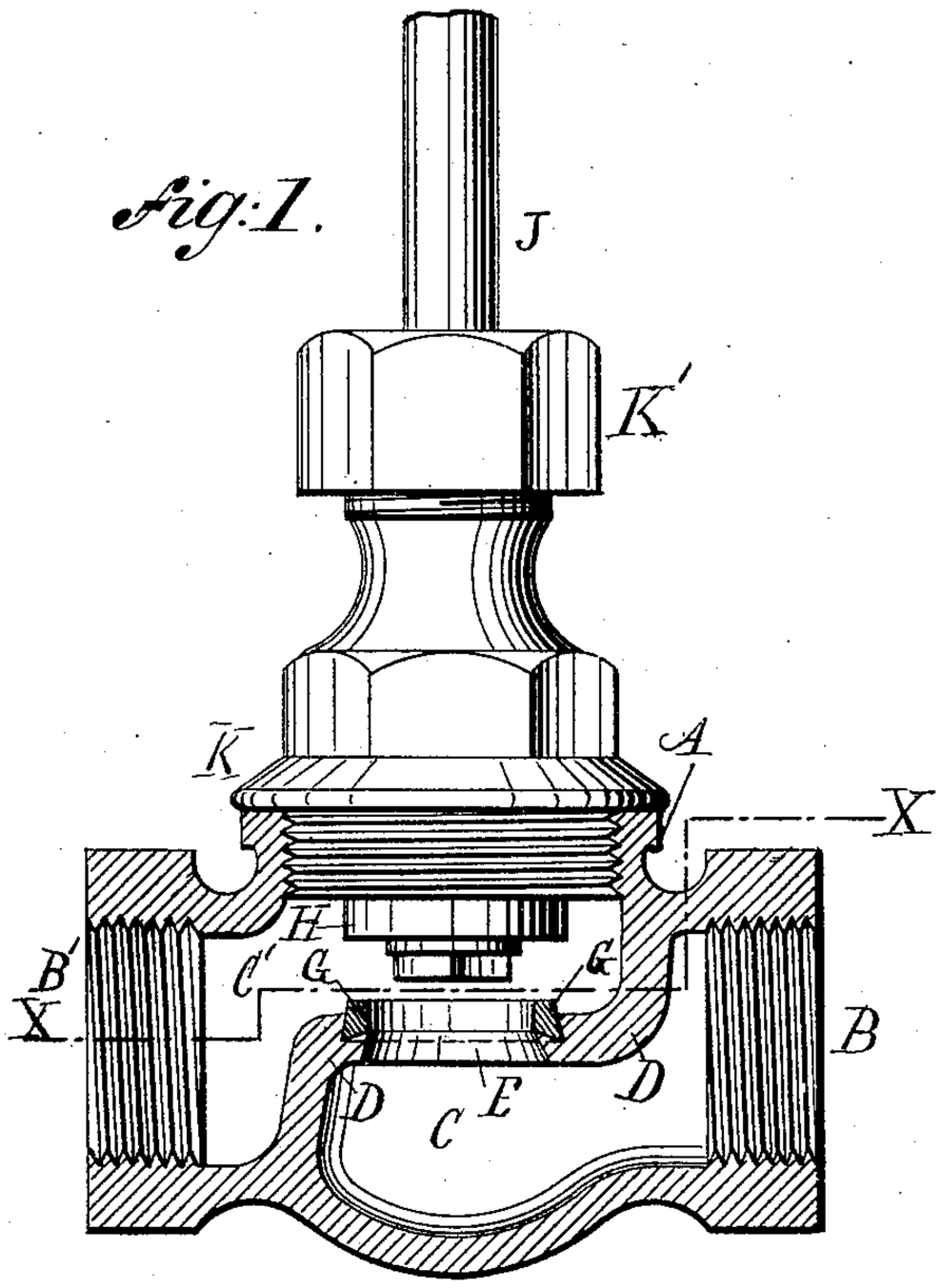


Fig. 5.

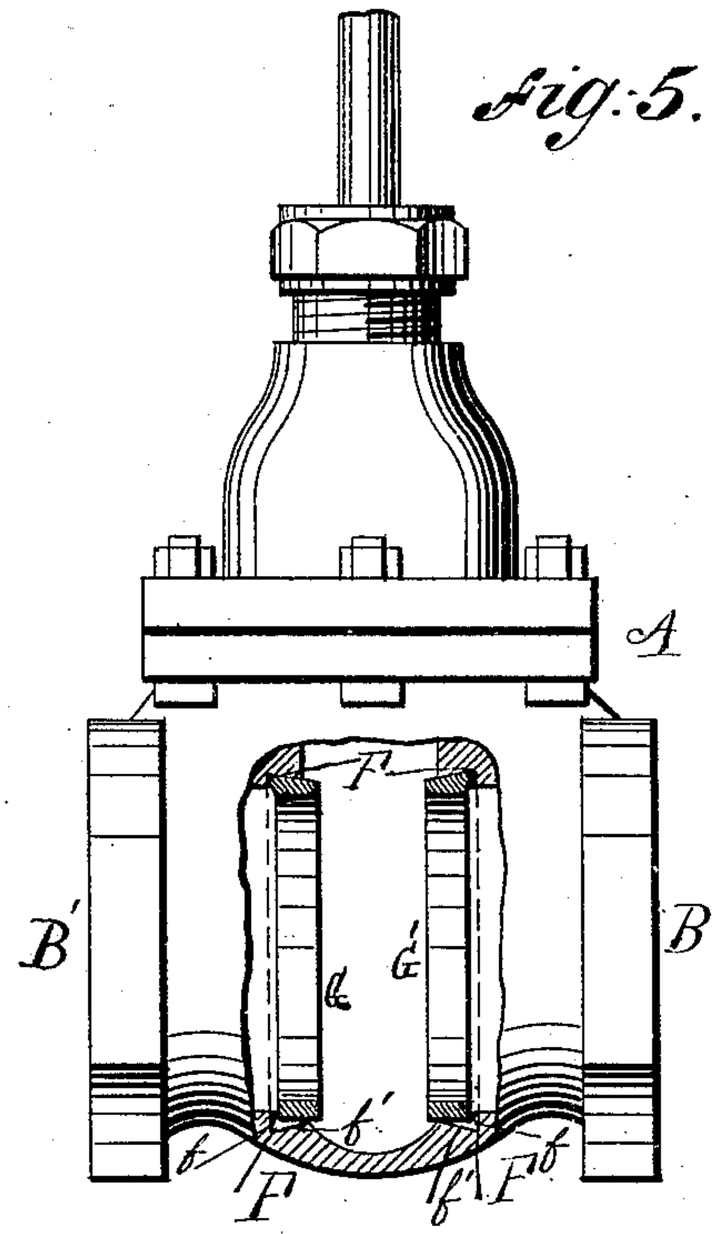


Fig. 2.

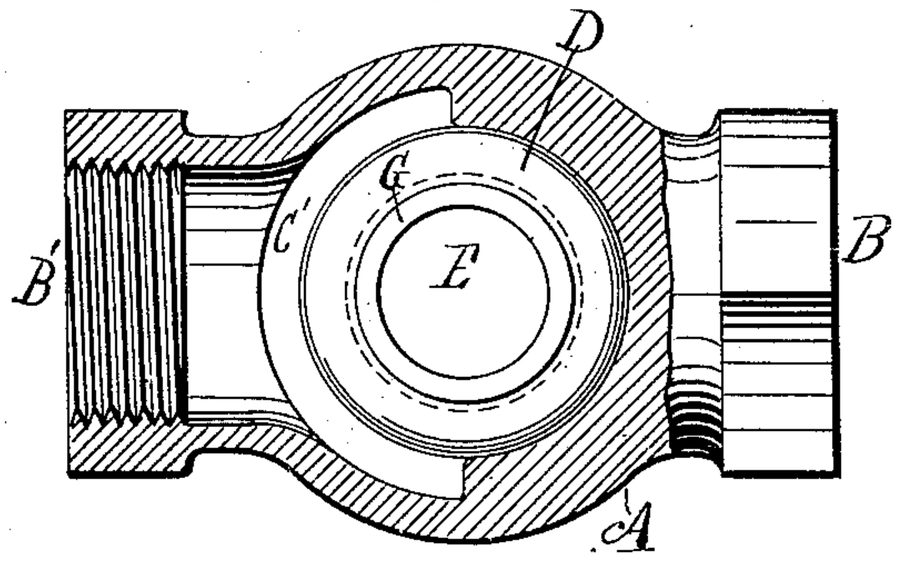


Fig. 3.

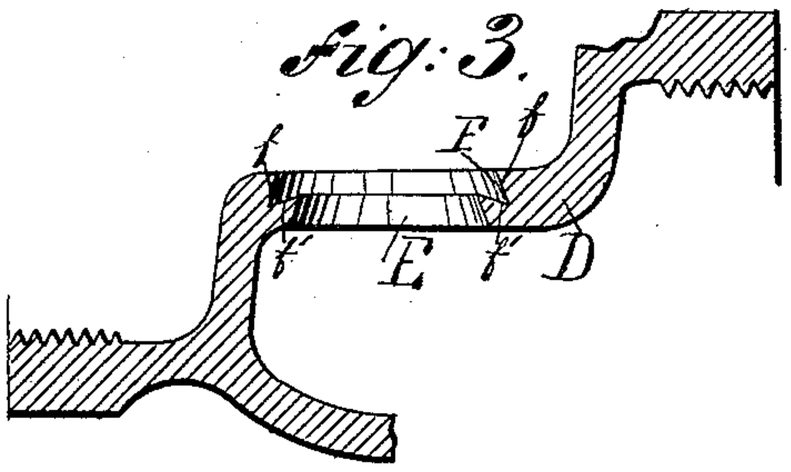
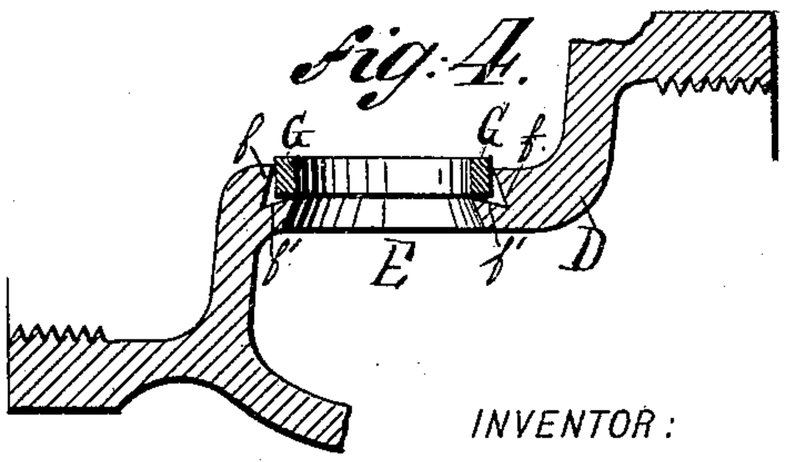


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES S. BAVIER, OF BROOKLYN, NEW YORK.

VALVE.

SPECIFICATION forming part of Letters Patent No. 452,357, dated May 19, 1891.

Application filed June 26, 1890. Serial No. 356,754. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. BAVIER, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification.

My invention relates to improvements in valves for use on steam, hydraulic, and other apparatus, and the purpose of the improvement is to provide valve-seats which shall be easily removable from the body of the valve, so that the seat can be readily renewed when worn.

The purpose of my invention is, further, to provide means whereby seats of materials relatively soft, so as not to cut the disk of the valve when the same is forced home upon the seat, may be readily secured in the body of the valve by expansion of the seat into a recess in the valve-body through the agency of the pressure of the valve-disk upon the seat when the said disk is forced home upon the seat and by means of the inclination of the base of the recess, whereby the seat is expanded laterally against the sides of the recess, which is shaped so as to retain the seat in place and yet to permit the seat to be easily removed. The arrangement is equally applicable to globe, gate, or other valves.

Referring to the drawings which accompany the specification to aid in the description, Figure 1 is a view of a globe-valve, partly in section, showing the valve-seat ring expanded home into its recess. Fig. 2 is a view in plan and section on the line X X of Fig. 1. Fig. 3 is a sectional view of a part of the valve-body and diaphragm, showing the shape of the recess for the valve-seat ring. Fig. 4 is also a sectional view of a part of the valve-body and diaphragm, showing the valve-seat ring in its recess before expansion. Fig. 5 is a view of a gate-valve with the body partly cut away to show the valve-seat rings.

The same letters indicate like parts in the several views.

A is the valve-body, and the valve may be either a globe-valve, a gate-valve, or other form of valve, and the body may be constructed in any usual manner.

Referring now more particularly to globe-valves, as shown in Fig. 1, B B′ are respectively the inlet and outlet openings connecting with the interior chambers C C′ of the valve A. D D is a partition or diaphragm separating the inlet and outlet sides of the valve, and having a port E, which connects the chambers C C′. The diaphragm D D is formed in the casting in the usual manner. In the said diaphragm D D and concentric with the port E is formed a recess F for the reception of the valve-seat ring, as hereinafter set forth. This recess F has its side wall *f* preferably somewhat undercut, as clearly seen in Figs. 3 and 4, and the base *f′* of the said recess F is also cut on a bevel, inclining downwardly and outwardly from the port E, as shown. Thus the side wall *f* and the base *f′* of the recess F form an acute angle with each other, and they are so related to the motion of the valve-disk H, which said motion is downward in Fig. 1, that the pressure of the disk H upon the valve-seat ring G tends to force the said valve-seat ring against the walls *f* and retain the said ring in the recess F. This forcing of the valve-seat ring G against the side walls *f* of the said recess F is attained by making the base *f′* of the said recess F at an obtuse angle with the direction of the pressure of the valve-disk H upon the valve-seat ring G and with a downward and outward inclination from the port E toward the side walls *f*, whereby the downward pressure of the valve-disk G on the valve-seat ring H is converted into a lateral resultant pressure against the said side walls *f*. The said valve-seat ring G is preferably formed of some soft ductible material, like soft copper, and the said rings G may be very conveniently and cheaply made by cutting transverse sections from a copper tube of the proper diameter to just fit within the recess F. The sections of the copper tubing will of course be small annuli or rings G, which should have a width sufficient to allow of the ring G projecting somewhat above the top of the diaphragm D, as shown in Fig. 1.

To secure the rings G in the valve-body A, the bonnet K is unscrewed from the valve-body and the stem J and disk H removed. Then the valve-seat ring G is inserted into the chamber C′ and placed in the recess F by the fingers or a pair of pliers. The valve-seat ring will now rest in the recess F, as seen in

Fig. 4. Then by means of an expanding tool the said valve-seat ring is expanded into the recess F and back upon the undercut side walls *f* in the same manner as a boiler-tube is expanded upon a crown-sheet. When expanded in, the ring presents the appearance shown in Fig. 1.

In place of expanding the valve-seat ring G into the recess F by a tool, as aforesaid, I may leave the said ring loose in the recess and place the disk H, stem J, and bonnet K again in and on the valve-body A, and then by turning the disk H down upon the valve-seat ring G, the pressure of the disk upon the valve-seat ring G will force the said valve-seat ring back upon the undercut side wall *f*, as hereinbefore explained. Thus the pressure of the disk H on the valve-seat ring G may be utilized to force the seat-ring home to its place, and the use of the valve tends always to fix seat G in the recess F. I find, however, that I may even dispense with the inclination of the walls *f*, and may make the wall *f* substantially parallel with the direction of the motion of the disk H, or what is the same thing parallel with the axis of the port E, and yet the seat-ring G will, when expanded against the wall *f*, by the pressure of the valve-disk H, as hereinbefore described, be held sufficiently firm by friction, but I prefer to incline the wall *f* as well as base *f'*, as hereinbefore said.

In place of using soft copper for the valve-seat rings G, other ductible materials, as asbestus, may be employed. Indeed any materials which are ductible enough to be expanded into the recess F can be used. I prefer a quite soft material for the valve-seat rings G as compared with the material of the disks H, in order that the valve-seat ring G may not cut the disk H when the said disk is forced home upon the seat. With soft ring-seats, should there be grit on the face of the disks or seat-rings, then when the disk is forced home upon the seat-ring the grit is simply pressed down into the seat-ring and the disk is not injured. The valve will, therefore, remain tight a long time. After the seat-ring G has been expanded home, as hereinbefore explained, its face may be turned true in any usual manner.

To renew the valve-seat ring G, the bonnet K, stem J, and disk H are removed from the body A. Then the projecting rim of the valve-seat ring G is caught by a pliers or a tool, and the said ring G is crushed inwardly, which frees the ring G from the recess F. A new ring is then placed in the recess F and expanded home, as hereinbefore explained.

In Fig. 5 I have shown the application of the valve-seat ring to a gate-valve. In this case there will be two valve-seat rings G G', which will be expanded into recesses in the body of the valve, as hereinbefore explained for globe-valves. The drawings show the upper half of the rings G G' expanded home, but the lower half not, the better to show the form of the recesses F.

The application of the valve-seat rings G G' will be evident to those skilled in the art without further explanation.

I claim—

The hereinbefore-described member of a compression-joint, consisting of a malleable ring and an annular recess in one of the compression surfaces of a size to freely admit said malleable ring, said annular recess having its side wall undercut and inclining downwardly and outwardly from the circumference of said malleable ring, and said annular recess also having a base which is a continuous plane surface and is inclined downwardly and outwardly from said malleable ring, so that pressure exerted on the face of the ring shall move the same over said plane-base of the annular recess and compress said ring under the side walls of said recess, as described.

Signed at New York, in the county of New York and State of New York, this 25th day of June, A. D. 1890.

CHARLES S. BAVIER.

Witnesses:
LOUIS M. FULTON,
FRANK J. HAYES.