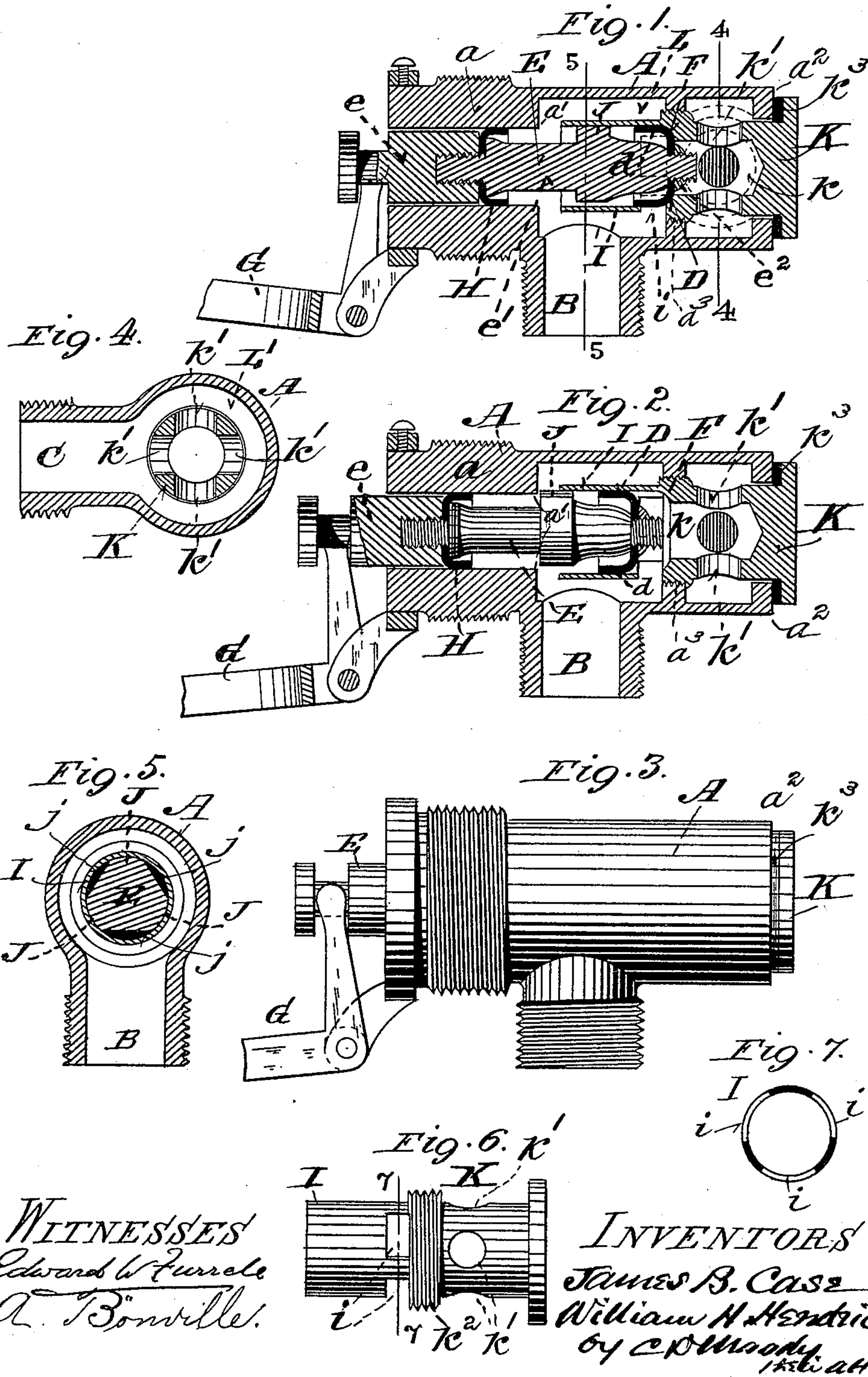


(No Model.)

J. B. CASE & W. H. HENDRICK.  
VALVE.

No. 481,001.

Patented Aug. 16, 1892.



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# UNITED STATES PATENT OFFICE.

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## VALVE.

SPECIFICATION forming part of Letters Patent No. 481,001, dated August 16, 1892.

Application filed August 1, 1891. Serial No. 401,412. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES B. CASE, of Webster Groves, and WILLIAM H. HENDRICK, of St. Louis, State of Missouri, have jointly made  
5 an Improvement in Valves, of which the following is a full, clear, and exact description.

The present invention is well adapted to valves employed in water-closet mechanisms, and it is in connection with the float-lever employed in such constructions that it is illustrated. We do not, however, wish to be restricted thereto in all of its applications. The improvement relates more especially to the main valve and the parts more immediately  
15 therewith associated, substantially as is hereinafter set forth and claimed, aided by the annexed drawings, which illustrate the most desirable mode of carrying out the improvement, and in which—

20 Figure 1 is a longitudinal section of the improved construction, the main valve being seated; Fig. 2, a similar section, the main valve being unseated; Fig. 3, a side elevation of the construction; Fig. 4, a cross-section on the line 4 4 of Fig. 1; Fig. 5, a cross-section on the  
25 line 5 5 of Fig. 1; Fig. 6, a side elevation of the plug, and Fig. 7 a cross-section on the line 7 7 of Fig. 6.

The same letters of reference denote the  
30 same parts.

A represents the casing, which incloses substantially the working parts of the construction and the water-passages. The water enters the casing through the inlet B and is discharged through the outlet C. The main valve  
35 D is in the form of a cup-leather. It is attached to the stem E and it seats at F—that is, with the pressure.

G represents the float-lever, which in the  
40 present adaptation of the improvement serves to operate the valve. Only that portion of the lever which is immediately connected with the valve-stem is exhibited. The lever is constructed and attached in the ordinary  
45 manner, and in its action it operates in the usual manner. The valve-stem is also provided with another cup-leather H, which is turned in the opposite direction from that of the main valve. It serves to pack the valve-  
50 stem as it works through the portion *a* of the casing and it also provides for partly balanc-

ing the main valve, said cup-leather in practice being slightly smaller than the main valve. The stem E is usually made in two pieces *e* and *e'*. The part *e* is screwed onto the part *e'*  
55 and the cup-leather H is held between them, and the main valve is secured to the stem by means of the nut *e*<sup>2</sup>, all substantially as shown.

As thus far described the construction resembles what has been previously used; but  
60 in the features to be mentioned a substantial difference appears.

I represents a tube in which the main valve works. Its function is partly to prevent the flange *d* of the main valve from getting out  
65 of form and partly to guide the valve-stem in its movement. In previous valvular constructions analogous to the one under consideration a cup-leather valve had been adapted to work in an open-work tube or cage, but which  
70 is larger in diameter than the valve, and in consequence the flange of the valve is liable to be flattened or distorted, and in other constructions the valve has been adapted to work in a ribbed chamber, and in which it has been  
75 found difficult to keep the valve in form, especially under a heavy pressure.

We overcome the objections referred to and at the same time provide a passage or passages through which the incoming water can  
80 pass to the valve-seat as follows: The tube I internally coincides in diameter with the valve-seat, with which it connects, as shown, and hence it is just large enough to receive the valve D, and the passage or passages *i i*,  
85 through which the water entering through the inlet B passes to the valve-seat F, are arranged in the tube in the vicinity of the valve-seat, and the flange *d* of the valve in length is long enough to extend, when the valve is  
90 seated, past said passages, substantially as shown in Fig. 1. With the tube and valve thus relatively formed the valve, even under extreme pressure, keeps in form. The surrounding tube closely supports the outer por-  
95 tion of the valve-flange at all times, and there is no need of any deflector upon the valve-stem to divert the water to the outer side of the valve-flange. The valve-stem, however, may be furnished with lateral projections, such as  
100 shown at J J J, which extend to encounter the interior surface of the tube I and in conjunc-



tion therewith serve to guide the valve-stem as the valve is seated and unseated. Said projections J may be of any suitable form for the purpose mentioned, and we consider the one exhibited as desirable as any. The openings *j* between the internal surface of the tube I and the valve-stem in the plane of said projections J enable a sufficient amount of the water to pass into the tube I to produce the desired pressure upon the outer or upper side of the main valve. Said projections incidentally may be utilized to prevent the valve-stem from being forced out of the casing in the event of the float-lever or whatever part is used to operate the valve-stem becoming detached from the valve-stem. To this end said tube I and said projections may be large enough in diameter to cause said projections in the event the valve-stem is moved to the left, as viewed in Figs. 1 and 2, to encounter the shoulder *a'* upon the casing. Said tube I and valve-seat F are preferably made part of a plug K, which is detachable from the casing and which is adapted to be inserted in said casing through the end *a*<sup>2</sup> thereof, or that end which is opposite to the one at which the float-lever is attached. The valve-seat divides the interior of the casing or valve-chamber into the compartments L and L', the last compartment serving to receive the water which passes the valve-seat, and having the outlet C, through which the water is discharged. Said plug extends through said compartment L', and it is chambered out at *k* beneath the valve-seat to receive the water which flows past the valve-seat, and the perforations *k'* *k'* establish communication between the chamber *k* and the compartment L'. The plug is adapted to be secured in the casing, preferably by threading it at *k*<sup>2</sup>, to enable it to be screwed into a bearing *a*<sup>3</sup> upon the casing. A packing-ring *k*<sup>3</sup> serves to close the joint between the casing and the head of the plug, substantially as shown.

The plug K has a special value in that it is a part which can be readily and economically renewed. It can be kept in stock, can be supplied to those desiring to repair a valve which is out of order, and any one, even an unskilled person, can easily insert it in place in the casing. When it is removed from the casing, it provides an opening sufficiently large for the introduction and removal of the valve-stem and parts thereto attached.

We claim—

1. The combination, of a casing provided with an inlet and an outlet and having each end provided with an opening, a detachable plug in each opening, one of which is recessed at its inner end, the walls of the recessed portion being provided with two series of perforations, one communicating with the inlet and the other series with the outlet, and an

interior valve-seat between the series of openings and the plug in the opening at the other end of the casing being provided with a valve which fits within the recess of the first-mentioned plug and is adapted to be seated upon the valve-seat end, closing the opening between the inlet and the outlet, substantially as set forth.

2. The combination of a casing provided with an inlet and an outlet chamber and an opening at each end the partition between the two chambers being screw-threaded, a plug in each end of the casing, one of which is provided with a tubular and a recessed portion at its inner end, and is provided with an external screw-thread to engage with the screw-threaded partition, the walls of the tubular and of the recessed portions of the plug being each provided with perforations and with an interior valve-seat between the two series of perforations, and a plug in the opening in the opposite end of the casing, provided with a valve which fits the tubular portion of the other plug, substantially as set forth.

3. The combination of a casing provided with an inlet and an outlet and an opening at each end, a detachable plug in each opening, one of which is provided with a tubular and a recessed portion at its inner end, the walls of which are provided with two series of perforations and having an interior valve-seat between said series of perforations, and the plug in the other opening is provided with a valve, the middle portion of which is provided with projections to fit the bore of the tubular portion of the other plug, said projections being larger than the opening in the casing at that end, whereby the accidental removal of the valve is prevented, substantially as set forth.

4. The combination of the casing having the inlet and outlet chambers, as described, the detachable plug chambered and perforated and having the valve-seat and perforated tube, as described, the valve-stem, the main cup-leather valve, the cup-leather H, the projections J, and the float-lever G, the flange of said main cup-leather valve fitting said tube and extending past the perforations therein when said valve is seated, said tube normally opening into the inlet-chamber and said chambered plug opening into the outlet-chamber and having its screw-threaded connection with the casing adapted to form said inlet and outlet chambers, substantially as described.

Witness our hands this 28th day of July, 1891.

JAMES B. CASE.

WILLIAM H. HENDRICK.

Witnesses:

W. H. BAKER,

H. E. CALVERT.