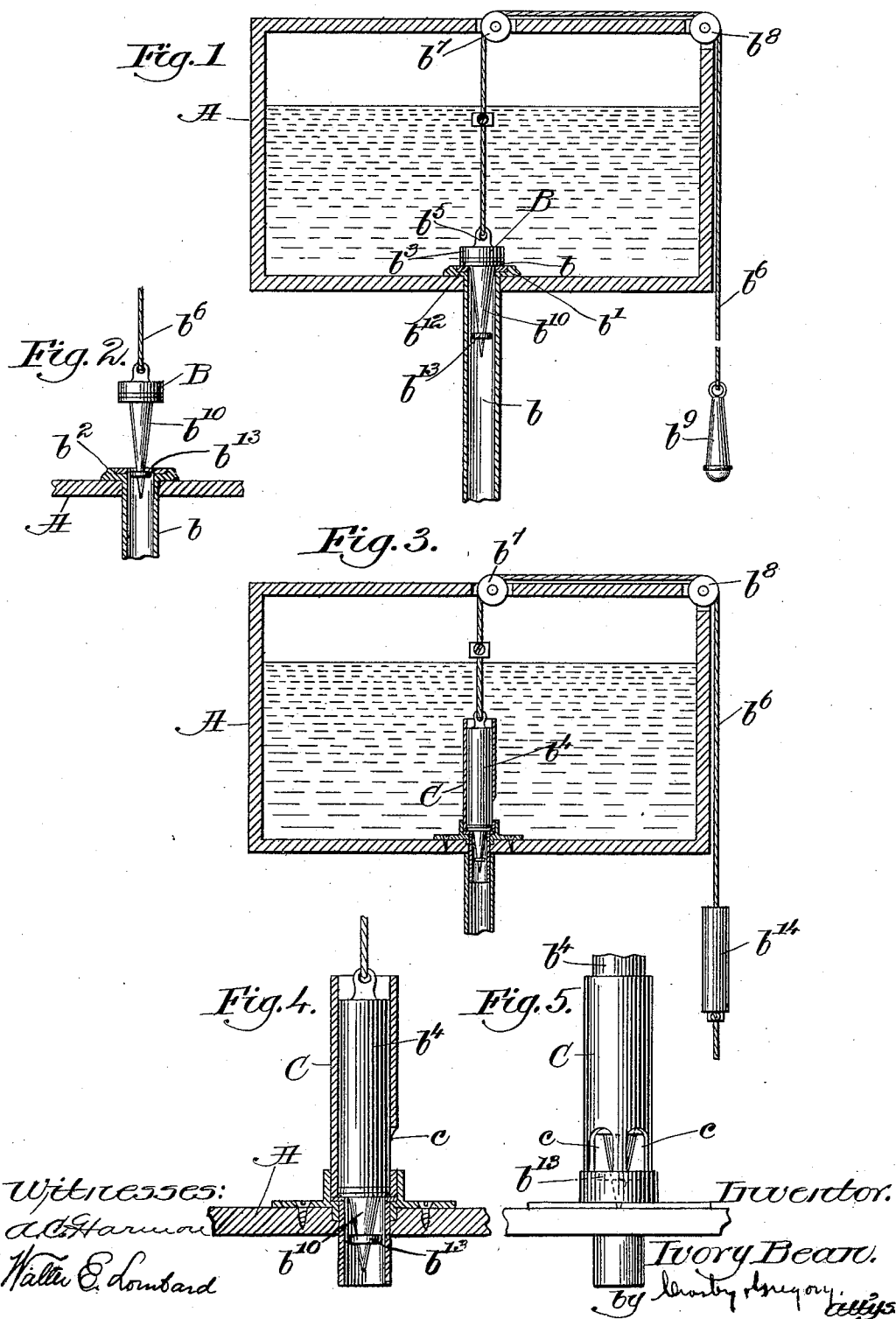


(No Model.)

I. BEAN.
VALVE.

No. 605,989.

Patented June 21, 1898.



UNITED STATES PATENT OFFICE.

IVORY BEAN, OF BROOKLINE, MASSACHUSETTS.

VALVE.

SPECIFICATION forming part of Letters Patent No. 605,989, dated June 21, 1898.

Application filed October 29, 1897. Serial No. 656,849. (No model.)

To all whom it may concern:

Be it known that I, IVORY BEAN, of Brookline, county of Norfolk, State of Massachusetts, have invented an Improvement in Valves, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is a valve particularly intended for use in flushing-tanks, and has for its main object the provision of a self-closing gravity-valve which is noiseless in operation, extremely simple in construction, and is economical of the water being used.

In general terms my invention comprises, in connection with a usual tank, a valve, which, when open, is held suspended, so as to fall by gravity from its open to its closed position, said valve being provided with a conical lower end, in order to render its movement noiseless, and having preferably a flange or collar at its lower extremity which aids in its precision of closing movement, the valve being counterbalanced and operated by a usual cord or chain passing over suitable pulleys.

Further details and the operation of my invention will be more fully pointed out in the following description thereof, reference being had to the accompanying drawings, and the invention will be defined in the appended claims.

In the drawings, Figure 1 is a central vertical sectional view showing my invention in operative position in a flushing-tank. Fig. 2 is a similar sectional view of a fragmentary portion thereof, showing the valve in open or raised position. Fig. 3 is a view similar to Fig. 1, showing a further embodiment or modification of the arrangement shown in Fig. 1. Fig. 4 is an enlarged fragmentary sectional detail of the modification shown in Fig. 3. Fig. 5 is a fragmentary view, in side elevation, of the parts shown Fig. 4, the valve being in open position.

I have herein shown my improved valve in connection with a usual flushing-tank A, although it will be understood that the valve may be used wherever a gravity-valve can be employed.

The outlet or flushing pipe *b* is provided at its upper end within the tank with a flange

b', within which is snugly seated a rubber, leather, or other valve-seat *b²*. In the open end of this outlet-pipe I provide a closure or valve B, shown in Fig. 1 as comprising a short cylindrical body *b³* and in Fig. 3 as having a longer and heavier cylindrical or columnar body *b⁴*. At its upper end the valve is provided with an eye *b⁵*, in which is secured an operating or suspending rope or chain *b⁶*, which passes up over guide-pulleys *b⁷b⁸*, and is provided, as shown in Fig. 1, at its lower end with a weighted handle *b⁹*, which serves the double purpose of a handhold and a counterbalance. At its lower end the valve is provided with a cone-shaped portion *b¹⁰*, which carries at its upper end, immediately adjacent the body of the valve, one or more washers *b¹²*, to seat securely against the valve-seat *b²* and form a water-tight closure therewith. Preferably at its lower end the cone *b¹⁰* is provided with a disk-like collar *b¹³*, which may be of leather or, if preferred, of more rigid material.

The body and cone of the valve may be of metal, such as brass or other non-corrodible metal, or the cone may be of wood or any other substance, if preferred.

As shown in Fig. 3, it will be observed that very much the same construction as I have already described is provided, and that in addition thereto a tubular casing C incloses the valve, this casing having water-inlets *c* at its lower end adapted to be closed by the falling of the valve from its open position, Fig. 5, to its closed position, Fig. 4.

The chain or rope *b⁶* is shown in Fig. 3 as having a counterbalance *b¹⁴*.

In operation as the valve is opened to the positions shown in Figs. 2 and 5 the water is free to flow readily and rapidly out through the outlet *b*. As it flows it impinges on the collar *b¹³* and gives the valve a slight and gentle downward movement, the valve being very nearly counterbalanced by the weight *b⁹* or *b¹⁴*, as the case may be. As the outlet is a tube, the flange or collar *b¹³* chokes it uniformly, being in all positions precisely the same distance from the vertical walls of the tube. This gives an even and smooth action. As, however, the valve moves downward toward its closed position the conical shape of the portion *b¹⁰* gradually cuts off the water, and

while the collar b^{13} still serves to insure that the valve shall close tightly by reason of the impinging of the falling water on the upper side of the collar, yet this conical portion b^{10} cuts off the water sufficiently to cause the valve to fall against its seat in an absolutely noiseless manner.

The operation of the modified form shown in Figs. 3 to 5 is the same as that already described, excepting that the collar b^{13} is raised entirely out of the outlet-pipe, as shown in Fig. 5, when the valve is open, so that its initial downward movement due to the striking of the water on the collar is slow, as before; but when the collar gets within the more contracted outlet-pipe the movement of the valve is accelerated considerably, so that this form of valve is quicker in closing than the form in Figs. 1 and 2. As the valve falls its body portion cuts off the inlet-ports in the casing C, and thereby coöperates with the coneshape of the lower end of the valve to cut off the water-supply gradually and render the closing of the valve noiseless, as before.

It will be obvious that the construction of my valve is extremely simple and inexpensive, this being an exceedingly desirable feature in this class of invention, for the reason that such valves are commonly used by the inexperienced and as commonly constructed are quite liable to get out of order.

I do not restrict my invention otherwise than as hereinafter expressed in the claims.

I am aware of United States Patent No. 233,662 and disclaim all therein disclosed, my invention being limited to a valve having a long tapering or slender conical projection b^{10} , which does not restrict or interfere with the passage of a flood of water for flushing purposes when the valve is raised and having either the closing flange b^{13} at its lower end or the heavy gravity-cut-off body b^4 and casing C, or both of these, so that not merely does the conical portion cut off the water slowly with a cushioning effect, as explained, but the heavy body gradually cuts off the ports in the casing and also closes the valve, and the flange

b^{13} , fitting, as it does, in a tube, evenly and smoothly pulls the valve to a closed position.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A tank having in its bottom an outlet-tube, and a valve located in the upper end of said tube, provided with a flange or ledge presenting a square or plane surface for the direct impinging action of the liquid, in combination with a cushioning-shank or tapering portion for closing the open end of the tube, whereby the same outlet-opening which coöperates with the ledge coöperates with the shank to cushion in one and the same valve-piece, substantially as described.

2. The combination with a tank and its tubular outlet-pipe, the latter being provided at its upper end within the tank with a flange containing a valve-seat, of a valve, means suspending the same within the tank above said valve-seat, said valve comprising a heavy columnar body, a reduced and long conical portion secured to and projecting downward from the lower end of said body and adapted to enter the upper end of said tubular outlet-pipe, and having at its lower end a transverse collar slightly smaller than the outlet-tube, and a casing corresponding in shape to said body and fitting close about said body and secured to said flange, said casing having inlet-ports for the water at its lower end, said body sliding over said ports, opening them as it lifts and gradually closing them as it lowers, and the long tapered conical portion gradually cutting off the flow of water through the outlet-pipe, as the valve is pulled down by the uniform choking of the tubular outlet by the said collar, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

IVORY BEAN.

Witnesses:

GEO. H. MAXWELL,
ALEX. C. PROUDFIT.