(No Model.)

L. H. BRINKMAN.

VALVE.

No. 578,443. Patented Mar. 9, 1897.

Fig. 1.

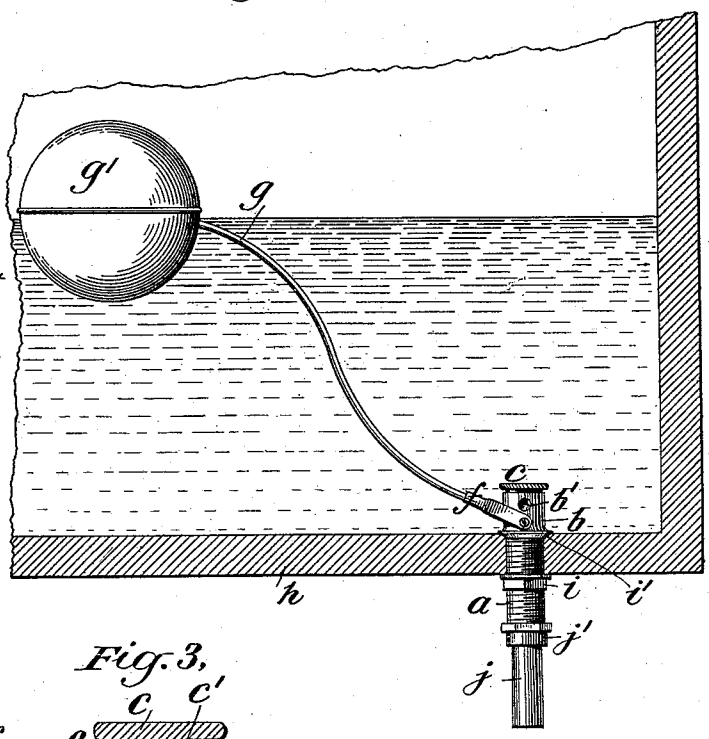


Fig. 2.

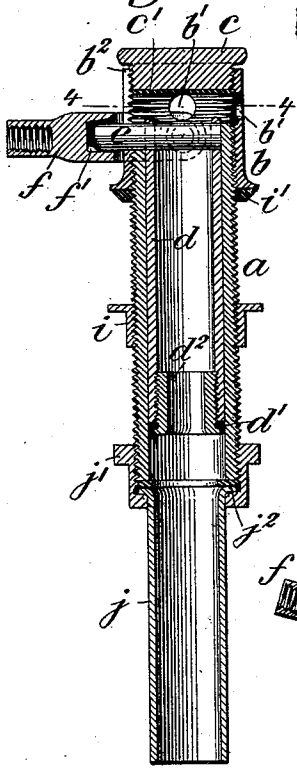


Fig. 3.

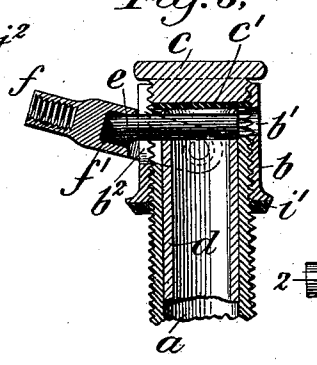


Fig. 4.

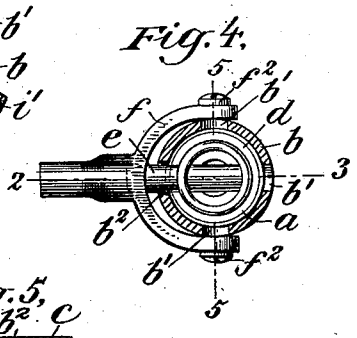
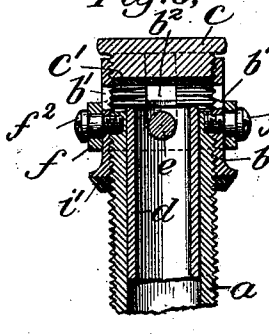


Fig. 5.



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UNITED STATES PATENT OFFICE.

LOUIES H. BRINKMAN, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE NEW YORK PIPE BENDING AND MACHINE COMPANY, OF SAME PLACE.

VALVE.

SPECIFICATION forming part of Letters Patent No. 578,443, dated March 9, 1897.

Application filed September 23, 1895. Serial No. 563,302. (No model.)

To all whom it may concern:

Be it known that I, LOUIES H. BRINKMAN, a citizen of the United States, and a resident of the city of Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof.

This invention relates to valves for controlling the movements of fluids, and as embodied in the construction hereinafter shown and described is particularly adapted for the purpose of automatically supplying a fluid to a tank or other receptacle in which a constant quantity of fluid is to be maintained or which is to be many times emptied and refilled with a measured quantity of fluid, such, for instance, as a flushing-tank.

One of the objects of this invention is to insure a delicate action to such valves, so that notwithstanding heavy pressures of fluid-supply the valves may be opened and closed by the exertion of very slight power; and this invention also has for its objects to simplify and improve the construction of such valves and to cheapen the cost of manufacture and to produce a valve that shall be reliable in operation, not apt to get out of order, and which may be easily repaired by a comparatively unskilled workman.

According to my invention a tubular casing and a valve-tube movable longitudinally relatively to the casing are combined for the purpose of opening and closing one or more fluid-passages, and the tubular casing has peripheral abutments against which the valve-tube comes in contact to close the passages, and a peripheral packing is arranged between the valve-tube and tubular casing, and the fluid-passages are located upon the casing between the peripheral abutment and the peripheral packing, so that the passage of fluid at one end of the valve-tube is prevented by the direct contact of that end of the valve-tube and the peripheral abutment, and the passage of fluid by way of the other end of the valve-tube is prevented by the peripheral packing interposed between the valve-tube and tubular casing. By this simple construction the fluid-pressure upon the valve-tube may be very nearly balanced in all directions, so that the valve-tube may be actuated by a very slight exertion of power.

My invention also includes various improvements in the construction of valves, all of which will be more particularly hereinafter set forth in connection with the accompanying drawings, which drawings illustrate one embodiment of my invention.

Figure 1 is a side elevation of a valve and float for actuating the same and shows the valve as applied to a flushing-tank, which tank is partly shown in vertical section. Fig. 2 is a vertical central section of the valve on the line 2 3 of Fig. 4, showing the valve in open position. Fig. 3 is a similar section of the upper part of the valve, but with the valve in closed position. Fig. 4 is a horizontal section of the valve on the line 4 4 of Fig. 2. Fig. 5 is a vertical central section of the upper part of the valve, taken at right angles to the plane of section in Figs. 2 and 3, or on a plane indicated by the line 5 5 in Fig. 4.

The valve has a tubular casing, of which the main part is the fluid-conveying tube *a*, which tube is shown as externally threaded throughout its length and of smooth bore and may be made by simply cutting an external thread upon a piece of ordinary tubing. At the upper part of the fluid-conveying tube *a* is secured an outer or casing tube *b*, which may also be made of a piece of ordinary tubing with an internal thread cut thereon, whereby it is screwed over the upper part of the tube *a*, and the casing-tube *b* is preferably slightly flanged at its lower end, as shown, to give a broad bearing on the part to which the valve is secured. Suitable openings are formed in this casing-tube *b*, comprising the fluid passages or ports *b'* and an open slot b^2, extending to the upper end of the casing-tube *b*, which latter slot acts as a guide for the valve-stem, as will be hereinafter described. A cap or plug *c* is held in the upper end of the casing-tube *b*, and as shown this plug is externally threaded, so as to engage with the internal threads on the casing-tube *b*, and thus the plug *c* is adjustable and readily removable. The upper end of the fluid-conveying tube *a* terminates a short distance below the lower face of the plug *c* or, as shown, on the line of the lower edges of the ports *b'*, and its upper end is slotted for

the passage of the valve-stem. A packing-disk c', of yielding material, is shown against the lower or inner face of the plug c, and this packing-disk forms a yielding seat for the valve-tube. It is of course evident that in some constructions the packing c' may be dispensed with, although this would require more careful fitting of the seat and valve-tube, as the plug would then have a metallic lower or inner surface for contact with the valve instead of the yielding lower or inner surface provided by the packing-disk c'.

The valve-tube d is fitted to slide longitudinally within the fluid-conveying tube a, and when the valve-tube is in closed position, as shown in Fig. 3, its upper end is pressed against the lower or inner surface of the plug c, shown as formed by the packing-disk c', and thus a peripheral abutment is provided for the upper end of the valve-tube. The upper edge of the valve-tube is shown as slightly rounded; but it may be flat, or where very accurate balancing of pressures is desired it may be tapered toward its outer periphery so that the line of contact between the upper end of the valve-tube and the peripheral abutment shall be substantially at the outer periphery of the valve-tube. At the lower end of the valve-tube a peripheral or annular packing is provided, such packing being shown as a washer d', held against the lower end of the valve-tube by a removable and adjustable tube or gland d^2, threaded into the lower end of the valve-tube. Any suitable packing may be employed and may be held in any suitable manner, and this packing may be located as desired, so as to be below the ports b' when the valve-tube is in closed position, and thus to prevent the fluid from escaping by passing around the lower end of the valve-tube and between the valve-tube and fluid-conveying tube.

When the valve-tube is in closed or upper position, its upper end is pressed tightly against the peripheral abutment shown as formed by the packing c' and its lower end is made fluid-tight by the packing d', and thus the valve is fluid-tight, and as the valve-tube is moved downward from its upper or closed position it moves away from the peripheral abutment and thus permits the fluid to escape through the ports b' and thus freely opens the fluid-passages. Between the upper end of the fluid-conveying tube a and the lower face of the packing c' an annular opening or passage or chamber for the fluid is formed, so that the valve is directly opened around its entire periphery into this annular chamber, from which chamber the fluid escapes through the openings b' b^2.

For actuating the valve-tube I provide a stem or pin e, which is shown as extending transversely across said tube and fitted tightly in perforations formed in the walls thereof and extending outward through the slot b^2, and the outer end of this stem e is engaged by a pivoted lever or yoke f, having a suitable depression or socket f', which receives the end of the valve-stem e, and said yoke f being shown as pivoted upon screws f^2 f^2, which pivot-screws pass through the casing-tube b and enter the fluid-conveying tube a. The pivot-screws f^2 serve to hold the casing-tube b and fluid-conveying tube a together, and these two tubes a and b may also be held together by soldering, if desired. An arm g is shown as attached to the yoke f, or may form part thereof, and this arm is provided at its upper end with a float-ball g', whereby the valve is actuated. It is of course evident that when my improved valve is applied to other uses than that illustrated in Fig. 1 other actuating means than a float may be employed, and for some purposes it may be desirable only to actuate the stem e directly by hand, in which case the yoke f and other parts would not be employed, or it may be desirable to actuate the valve directly or indirectly by hand or otherwise, or through other means than above described.

For the purpose of attaching the valve to a tank, such as the tank h shown in the drawings, a nut i is provided, and this nut fits over the threaded outer periphery of the fluid-conveying tube a, and for the purpose of insuring a perfectly-tight joint a washer i' may also be employed at the lower end of the casing-tube b, so that the valve may be inserted through a suitable opening in the bottom of the tank and then tightly gripped therein by the nut i. In some applications of this valve the pipe with which it is connected may be united thereto by screwing this pipe or a coupling thereon over the lower end of the fluid-conveying tube a, and in such case no other parts than those above described are necessary, but it is sometimes desirable to form a soldered connection with the valve, and for such purpose I provide a smooth neck j, which is held to the lower end of the tube by a threaded coupling-nut j', with suitable packing j^2 interposed between the upper end of the neck j and the lower end of the tube a.

In the application shown to a flush-tank the valve is opened by the downward movement of the float-ball g' whenever for any cause the level of the fluid in the tank is lowered, and the valve remains open until the fluid which enters the tank therethrough has filled the tank to the normal level, and then the valve is closed by the float-ball. The pressures of the fluid within the valve are so balanced that a very small float-ball may be employed, as is highly desirable by reason of the diminished cost of a smaller float and the increased capacity of a tank of given size when a smaller float-ball is employed therein. Indeed, where very high pressures of fluid-supply prevail and these pressures are not balanced in the valve the size of the float-ball is sometimes so great as to make it impracticable to provide float-balls of proper dimensions. Moreover, it will be observed that this balancing of pressures is attained in a structure of ex-

ceedingly simple construction and in which there are no joints which have to be carefully fitted. The valve is largely made up of ordinary tubing and is of light weight and small proportions. The construction is also exceedingly well adapted for the repair or renewal of parts. The plug *c* may be unscrewed and removed whenever access to the valve is desirable, and after removal of the pivot-screws f^2 of the yoke the valve-tube may be lifted upward through the open slot b^2. Then, if desired, the packing *d'* may be renewed, and a new packing-disk *c'* may also be inserted, or other parts may be cleaned, repaired, or renewed.

An advantageous feature of the construction above described embodying my invention is that the position of the valve-seat may be readily adjusted by screwing the plug *c* upward or downward in the casing-tube *b*, and it is of course evident that, if necessary, any suitable means may be employed, as a jam-nut or binding-screw, to prevent the plug *c* from moving out of the position to which it is adjusted, although ordinarily a tight fitting of the screw-threads of the plug and the casing-tube will be sufficient for this purpose. When the valve is used in a tank, as shown, the position of the valve-seat and closing position of the valve may be nicely adjusted or set by moving the plug *c*, and thereby the depth of the fluid in the tank at which the float will close the supply-valve may be determined.

It is evident that various modifications may be made in the construction above described within the purview of this invention. I do not therefore limit myself to the specific details of construction shown in the drawings and particularly described; but

What I claim, and desire to secure by Letters Patent, is—

1. In a valve, the combination of a fluid-conveying tube, a casing-tube sleeved thereon, an end plug held in said casing-tube, and a valve-tube longitudinally movable in said fluid-conveying tube, said fluid-conveying and casing tubes provided with one or more fluid-passages and said valve-tube closing said fluid-passages by contact with said end plug, substantially as set forth.

2. The combination of a fluid-conveying tube, a casing-tube sleeved thereon, an end plug held in said casing-tube, and a valve-tube longitudinally movable in said fluid-conveying tube, said fluid-conveying and casing tubes being provided with one or more fluid-passages and said valve-tube closing said fluid-passages by contact with said end plug, and a yoked lever pivoted upon said casing-tube and means connecting said lever and valve-tube, and means for actuating said lever to open and close the valve substantially as set forth.

3. In a valve, the combination of a fluid-conveying tube, a casing-tube sleeved thereon, a removable end plug adjustably held in said casing-tube and having a yielding inner surface, a valve-tube longitudinally movable in said fluid-conveying tube, said fluid-conveying and casing tubes being provided with one or more fluid-passages, and said valve-tube closing said fluid-passages by contact with the yielding surface of said end plug, a peripheral packing between said valve-tube and casing, said fluid-passages being located between said end plug and peripheral packing, substantially as set forth.

4. The combination of a fluid-conveying tube, a casing-tube sleeved thereon, a removable end plug adjustably held in said casing-tube and having a yielding inner surface, a valve-tube longitudinally movable in said fluid-conveying tube, said fluid-conveying and casing tubes being provided with one or more fluid-passages, and said valve-tube closing said fluid-passages by contact with the yielding surface of said end plug, a peripheral packing between said valve-tube and casing, said fluid-passages being located between said end plug and peripheral packing, a lever pivoted upon said casing-tube and a valve-stem projecting through the casing and engaging with said lever, and means for actuating said lever to open and close the valve, substantially as set forth.

5. In a valve, the combination of a fluid-conveying tube, a casing-tube sleeved thereon, an end plug held in said casing-tube, a valve-tube longitudinally movable in said fluid-conveying tube, said fluid-conveying tube terminating some distance from the inner surface of the end plug so as to form an annular chamber about the upper end of the valve-tube and said casing-tube being provided with one or more fluid-passages leading outward from said annular chamber, and a peripheral packing between said valve-tube and casing, substantially as set forth.

6. The combination of a fluid-conveying tube, a casing-tube sleeved thereon, an adjustable end plug held in said casing-tube, a valve-tube longitudinally movable in said fluid-conveying tube terminating some distance from the inner surface of the end plug so as to form an annular chamber about the upper end of the valve-tube and said casing-tube being provided with one or more fluid-passages leading outward from said annular chamber, and a peripheral packing between said valve-tube and casing, a valve-stem projecting from said valve-tube, a pivoted lever engaging with said valve-stem, a fluid-receptacle adapted to be supplied through said fluid-passages, and a float-ball in said fluid-receptacle actuating said pivoted lever, substantially as set forth.

This specification signed and witnessed this 3d day of July, A. D. 1895.

LOUIES H. BRINKMAN.

In presence of—
M. A. VOSBURGH,
E. R. THORMAHLEN.