No Model.)

J. HOLT.

FLUSHING CISTERN FOR WATER CLOSETS, &c.

No. 494,481. Patented Mar. 28, 1893.

FIG. 1.

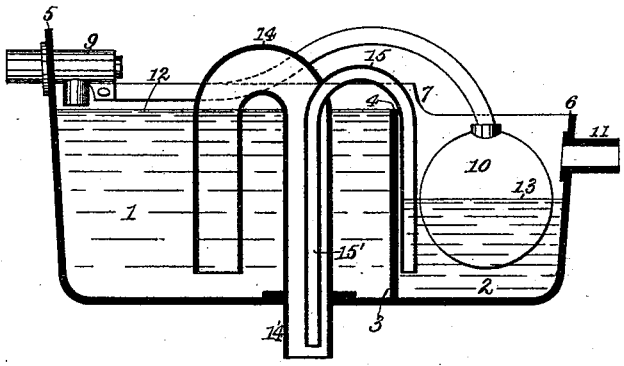
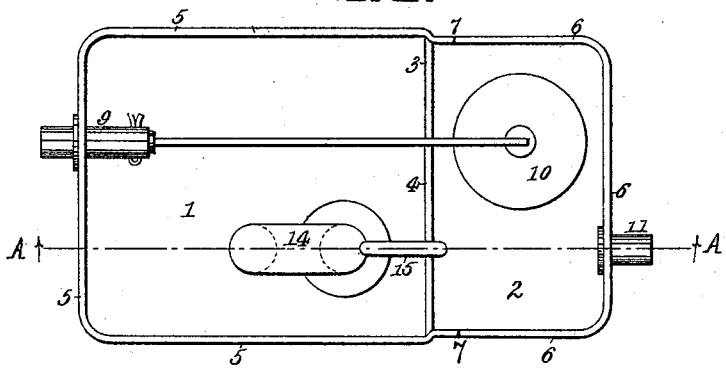


FIG. 2.



WITNESSES:

George Baumann

George A. Roberts

INVENTOR

James Holt

BY

Frederic W. Smedley

HIS ATTORNEY.

UNITED STATES PATENT OFFICE.

JAMES HOLT, OF LIVERPOOL, ENGLAND.

FLUSHING-CISTERN FOR WATER-CLOSETS, &c.

SPECIFICATION forming part of Letters Patent No. 494,481, dated March 28, 1893.

Application filed January 16, 1893. Serial No. 458,512. (No model.) Patented in England January 16, 1891, No. 820.

To all whom it may concern:

Be it known that I, JAMES HOLT, a subject of the Queen of Great Britain and Ireland, and a resident of the city of Liverpool and county of Lancaster, England, have invented Improvements in Flushing-Cisterns for Water-Closets, Urinals, and the Like Purposes, (patented in Great Britain and Ireland, No. 820, January 16, 1891,) of which the annexed is a specification.

The object of my present invention is to provide a siphon flushing cistern which will require a very small amount of energy to start the siphon, and one in which the charge of water will always be practically the same.

In siphon flushing cisterns as usually constructed, water authorities usually require the cistern walls to be kept below the level of the bend of the siphon in order to prevent a continuous waste of water through the latter in the event of the overflow pipe being accidentally or intentionally stopped up; as the overflow pipe is always lower than the top of the cistern walls, and the normal water level lower than the overflow pipe, it follows that the normal water level is necessarily considerably lower than the bend of the siphon, and considerable energy is therefore required to raise the water sufficiently high to start the siphon; moreover, in the case of such cisterns, the flush may vary considerably in quantity,—first because considerable time is required to fully recharge the cistern owing to the gradual cutting off of the supply as the water level rises, so that it may happen that the cistern has to be discharged before it is fully recharged, and secondly, because any alteration or defect in the ball cock, float or level will permanently raise or lower the water level.

In cisterns constructed according to my present invention, the before mentioned objections are obviated, and, while fulfilling the requirements of water authorities, I am enabled to keep the bend of the siphon only a very slight distance (as little as, say, one quarter of an inch) above the normal water level, so that the siphon can be very easily started; also the main compartment of the cistern is rapidly charged, as the ball cock does not begin to cut off the supply until this is accomplished, and further the quantity of the flush is not materially affected by defects in the ball cock, as the main compartment is always charged to the same level exactly. I effect these objects by dividing the cistern into two compartments by a vertical division wall; one of these compartments which I term the main compartment, is preferably considerably larger than the other which I term the secondary compartment; it contains the main body of the flush water and the main discharge siphon and it receives its supply direct from the ball cock; the secondary compartment contains the ball float and is charged by the overflow from the main compartment as hereinafter described. The division wall between the compartments is considerably lower than the remaining walls of the main compartment and the walls of the secondary compartment are lower than the division wall; the secondary compartment is fitted with an overflow pipe in the usual way and I provide for the discharge of this compartment (in order to open the ball cock) by fitting thereto a siphon, which I term the secondary siphon, with its long or discharge leg entering the discharge leg of the main siphon and with its bend above the level of the walls of the said secondary compartment.

The action is as follows:—Both compartments being discharged, the water supply enters the main compartment until it reaches the normal level therein when it begins to overflow the division wall, the ball cock remaining fully open in the meantime; the overflow from the main compartment enters the secondary compartment, raises the ball float therein and cuts off the supply when this compartment is charged to the normal level, which is a little below the overflow pipe thereof. When the cistern is discharged by starting the main siphon, the flow of water through the latter induces siphonic action in the secondary siphon so that both compartments are simultaneously discharged; in order to prevent continuous siphonage through the secondary siphon, it must be made sufficiently large to discharge the secondary compartment and stop the siphonage before this compartment can begin to refill. It will be seen that the water level in the main com-

partment is positively determined by the level of the top of the division wall; the water must always rise as high as this level because the supply is not cut off until it is reached, and the level cannot possibly rise higher unless the walls of the secondary cistern or the division wall are banked up, which is scarcely practicable; any leakage that there may be at the ball cock will escape by the over flow pipe or if this be stopped up it will overflow the walls of the secondary compartment, thus fulfilling the requirements of the water authorities. As the height of the normal water level in the main compartment is thus positively determined I am enabled to lower the neck of the main siphon almost to the same level without incurring any risk of water waste over the said neck.

Any of the well known methods, which are suitable, may be used to start the main siphon and as the energy required to do so is very small the simplest of such methods will suffice and there is very little risk of failure in its action. The ease with which the siphon can be started renders my invention specially useful in automatic arrangements of the class set forth in the complete specification of my prior Letters Patent No. 10,674 of 1888 for flushing urinals, in which the cistern is operated automatically by the weight of urine caught in a cup or receiver, the operating force being in such arrangements necessarily very small.

It will be seen that any variation in the water level due to defects in the ball cock is confined to the secondary compartment and as its capacity is small the variation in the quantity of the flush will be unimportant.

In the accompanying drawings which illustrate my invention Figure I. is a sectional elevation on the line A, A, of Fig. II. and Fig. II. is a plan of a flushing cistern.

Only such details are shown as are necessary to illustrate my invention and throughout the drawings similar parts are indicated by the same reference figures, and in the case of sections, the direction in which they are viewed is indicated by the small arrows placed adjacent to the letters denoting the plane of section.

1 is the main compartment and 2 is the secondary compartment separated by the division wall 3, the top edge 4 of which is considerably lower than the top edges of the walls 5 bounding the main compartment, and higher than the top edges of the walls 6 of the secondary compartment; the walls 5 are continued at the higher level a little beyond the division wall 3 as shown at 7 so as to direct the overflow into the secondary cistern.

9 is the ball cock, delivering into the main compartment 1 and controlled by the ball float 10 placed in the secondary compartment, which is fitted with the overflow pipe 11.

12 is the normal water level in the main compartment, determined positively as shown by the edge 4, and 13 is the water level in the secondary compartment, determined by the ball cock; as already explained accidental variations in this level are unimportant.

14 is the main siphon with its bend slightly above the normal water level 12; practically the only way in which the depth of the normal water level 12 below the neck of the siphon 14 can be varied is by tilting the cistern out of the horizontal and to minimize this possibility the bend may be placed near the division wall 3.

15 is the secondary siphon having its long or discharge leg 15′ placed in the discharge leg 14′ of the main siphon.

No means are shown for starting the main siphon as any of the well known and suitable means may be fitted.

The construction shown may be modified without departing from my invention; for instance, the division wall 3 might be carried higher than the normal water level and notched or pierced at the proper level, and means other than the siphon 15 might be provided for discharging the compartment 2.

The arrangement shown is considered the best as any hole or notch in the division wall might be plugged and so defeat one of the objects of the invention.

It is to be understood that I make no broad claim herein to placing the float ball in a separate compartment which is charged after the main portion of the cistern has been partially or fully charged, nor to the use of a siphon for discharging such separate compartment, nor to leading the discharge leg of such siphon into the discharge leg of the main siphon, but,—

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A flushing cistern having a main compartment containing the main body of the flush water and the main discharge siphon, and having also a secondary compartment in combination with a ball float placed in said secondary compartment, the main compartment receiving the water supply and having an overflow at the normal water level delivering to the secondary compartment, whereby the said water level in the main compartment is positively determined, and the secondary compartment being provided with means for discharging it and having its overflow pipe and walls at a lower level than the overflow of the main compartment so that any waste water necessarily leaves the cistern by the overflow pipe or walls of the said secondary compartment, substantially as and for the purpose set forth.

2. A flushing cistern having a main compartment containing the main body of the flush water and the main discharge siphon, and a secondary compartment in combination with a ball float placed in said secondary compartment, the two compartments being separated by a division wall the top edge of

which is lower than the remaining walls of the main compartment and over which the water supply, which enters the main compartment, overflows, when the normal water level is reached, into the secondary compartment; the secondary compartment having a siphon or other means for discharging it along with the main compartment, and having its walls and overflow pipe lower than the top edge of the division wall so that any waste water necessarily leaves the cistern by the overflow pipe or walls of the said secondary compartment, substantially as and for the purpose described and illustrated.

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

JAMES HOLT.

Witnesses:

S. RIGBY WEIGHTMAN,
Solicitor and Notary Public, Liverpool.

W. A. RICHMOND,
Water Street, Liverpool, Solicitor's Clerk.