(No Model.) 2 Sheets—Sheet 1.

W. CLARK, A. CAMERON & C. KIRK.

AUTOMATIC FLUSHING APPARATUS FOR URINALS, &c.

No. 521,907. Patented June 20, 1894.

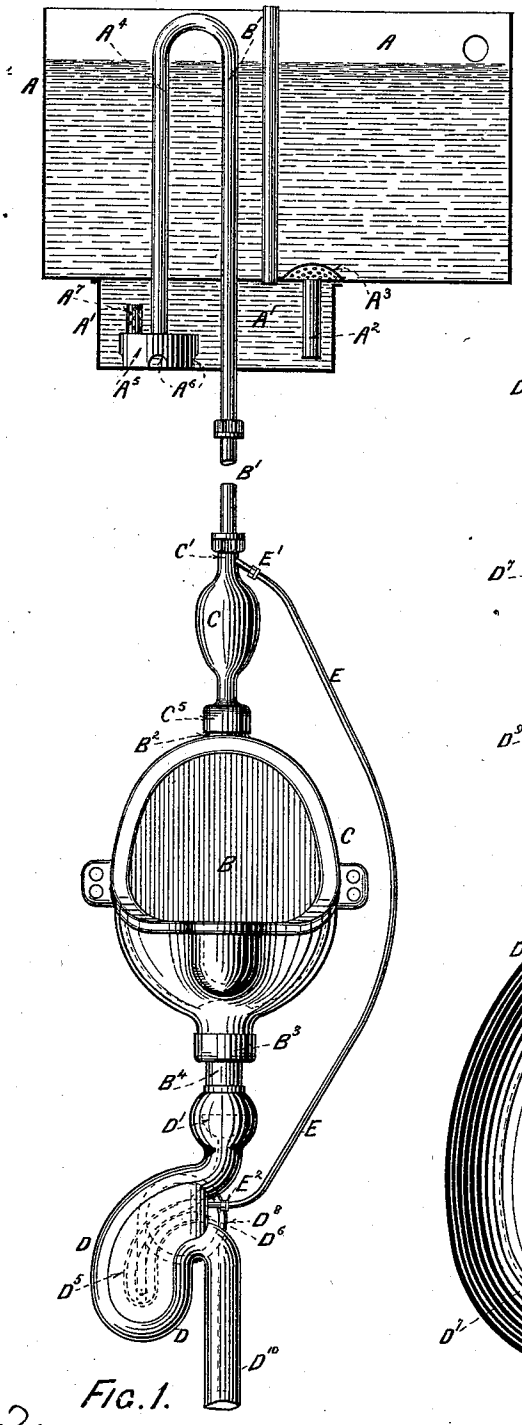

FIG. 1.

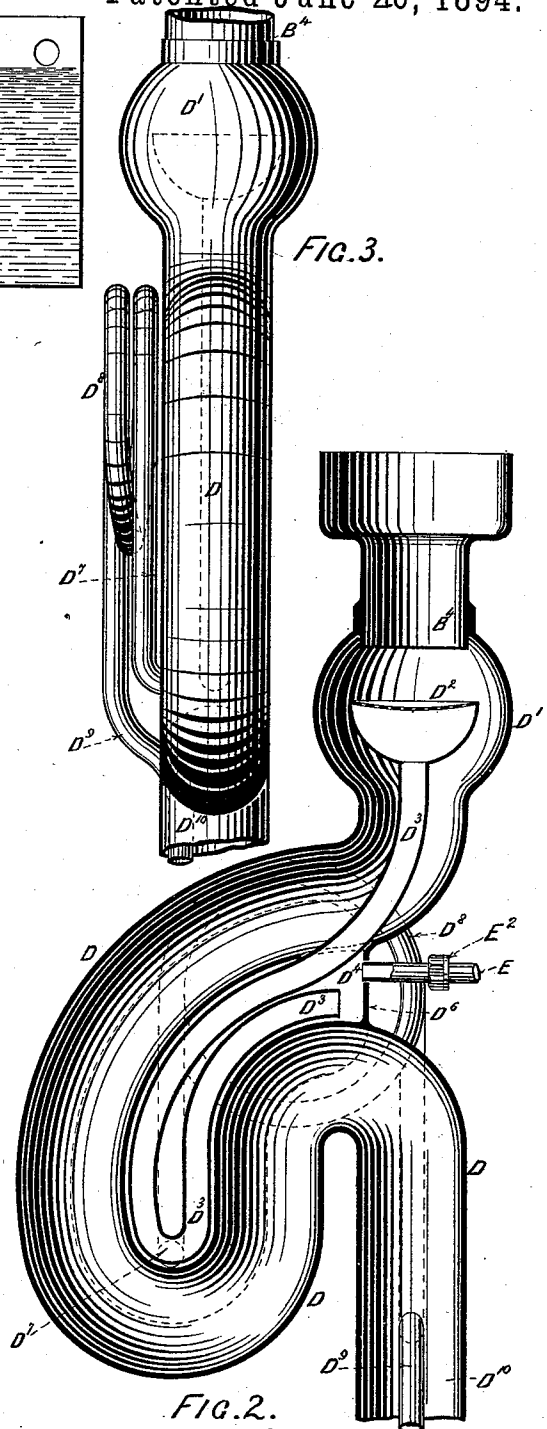

FIG. 2.

Witnesses:
H. G. Dieterich
Henry Orth

Inventors:
William Clark, Alexander Cameron
and Charles Kirk
by Henry Orth
Atty.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. CLARK, A. CAMERON & C. KIRK.

AUTOMATIC FLUSHING APPARATUS FOR URINALS, &c.

No. 521,907. Patented June 26, 1894.

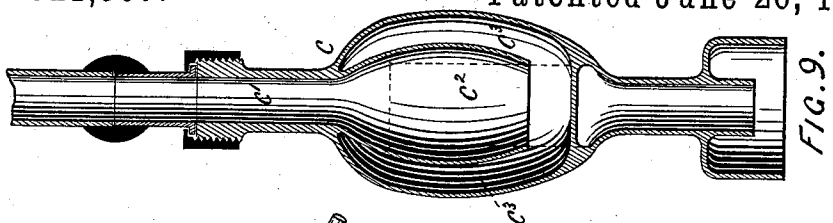

FIG. 9.

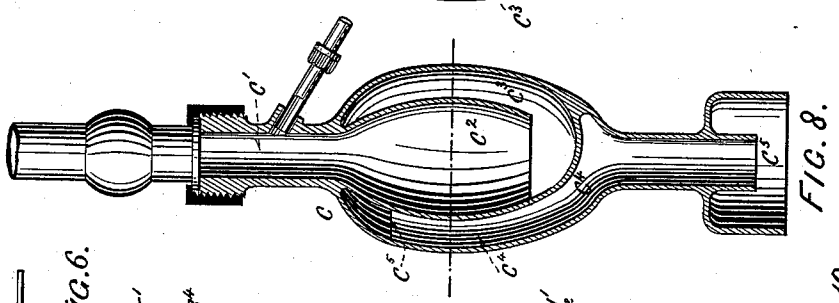

FIG. 8.

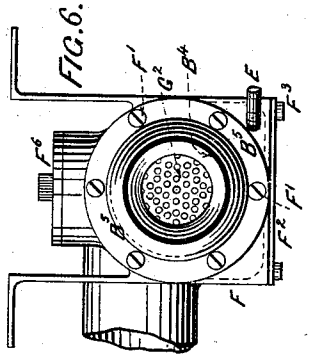

FIG. 6.

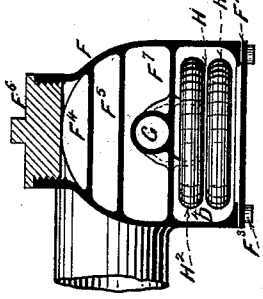

FIG. 7.

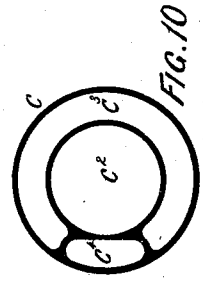

FIG. 10

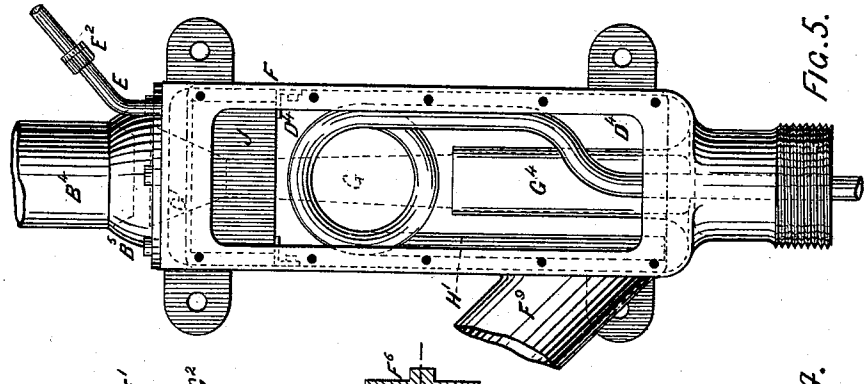

FIG. 5.

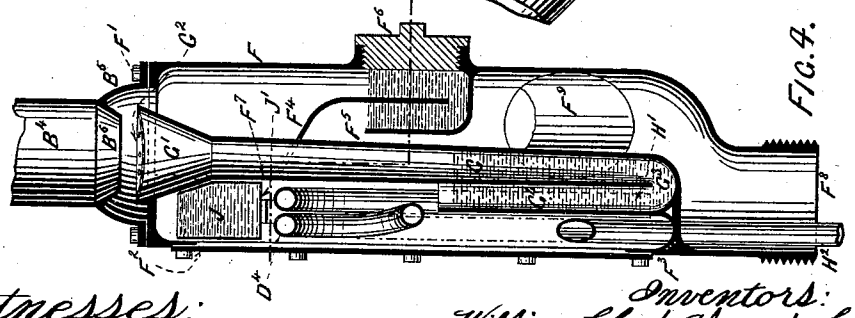

FIG. 4.

Witnesses:
H. G. Dieterich
Louis Bagger

Inventors:
William Clark, Alexander Cameron
and Charles Kirk.
by Henry Orth Atty

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM CLARK AND ALEXANDER CAMERON, OF SYDNEY, AND CHARLES KIRK, OF NORTH SYDNEY, NEW SOUTH WALES.

AUTOMATIC FLUSHING APPARATUS FOR URINALS, &c.

SPECIFICATION forming part of Letters Patent No. 521,907, dated June 26, 1894.

Application filed November 1, 1893. Serial No. 489,746. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM CLARK, inspector of plumbing, residing at Forest Lodge, near Sydney, ALEXANDER CAMERON, master plumber, residing at Sydney, and CHARLES KIRK, master plumber, residing at North Sydney, in the British Colony of New South Wales, subjects of the Queen of Great Britain, have invented new and useful Improvements in Automatic Flushing Apparatus for Urinals, applicable also to other contrivances wherein a predetermined quantity of liquid is siphoned through or over a break or opening in the long leg, of which the following is a specification.

This invention relates to improvements in automatic flushing apparatus for urinals applicable also to housemaids' slop sinks, catch-drains and such like requiring flushing and to other contrivances wherein a pre-determined or measured quantity of liquid is discharged by siphonage through or over a break or opening in the long leg of the siphon.

This invention has been devised specially in order that a urinal may be constructed so that it will be flushed or washed out automatically with no more or less than a pre-determined quantity of water or fluid at or upon every separate use of said urinal that is to say at or upon the supply of the first small quantity of urine flowing into it from each person who uses it.

Although specially devised with the aforementioned object in view this invention is equally applicable to catch-drains and the like which it is necessary or desirable to flush after or during the supply of liquid. And it is further equally applicable to any contrivances or apparatus in which it is desired to intermittently set up siphonage or siphonic action so as to discharge or supply liquid through or over a break or opening in the long leg of a siphon.

An improved automatic flushing apparatus for urinals applicable also to other contrivances wherein a pre-determined quantity of liquid is siphoned through or over a break or opening in the long leg constructed according to this invention consists of the following principal or main parts namely—(*a*) a flushing tank or cistern of ordinary construction and preferably with a measuring chamber (*b*) a receiving vessel or basin connected by the long leg of a siphon with said flushing tank and being a "break or opening" in said long leg (*c*) an air-trap or joint or water lute in said long leg above the said receiving vessel or basin or break or opening (*d*) a peculiarly constructed apparatus hereinafter called a siphon starter in the discharge pipe or continuation of said long leg of the siphon from said vessel or basin and (*e*) a by-pass pipe connecting the siphon starter with the said long leg of the siphon at a point above the said trap or water lute.

These improvements consist then first and essentially in the combination and arrangement together of the above integers or devices or their respective mechanical equivalents and they consist secondly in the peculiar construction and particular combinations and arrangements of mechanical parts hereinafter described and explained and specifically claimed.

In order that this invention may be clearly understood, reference will now be made to the drawings herewith, in which—

Figure 1 is a front elevation with some parts in section of a complete automatic flushing urinal constructed according to these present improvements. Figs. 2 and 3 are sectional front elevation and side elevation respectively on an enlarged scale of the siphon starter. Fig. 4 is a sectional elevation, Fig. 5 front elevation with cover removed, Fig. 6 plan, and Fig. 7 sectional plan of a modified construction of siphon starter for automatic flushing of urinals and other siphon supplied contrivances. Figs. 8 and 9 are sectional elevations on cross diametrical planes, and Fig. 10 sectional plan of an air-trap or water lute for the broken or opened long leg of an intermittent automatic siphon.

The flushing tank or cistern is constructed as ordinarily with reservoir tank A and measuring chamber A′ into the former of which water or liquid is admitted through a float or other suitable cut off valve or cock while the latter compartment A′ has connection with it by pipe A^2 with preferably a perforated plate or rose A^3 at top. The short leg A^4 of

the flushing or discharging siphon extends upwardly from a cylinder A^5 (having side perforations A^6 and sieve pipe A^7) on the bottom of chamber A'. The long leg B' of said discharging siphon extends downwardly from its bend to an air-trap or water lute C of approved construction but preferably urn shaped as shown in Figs. 8, 9 and 10 set just above and in connection with a receiving vessel or basin or urinal pan B. The air-trap or water lute C expands from its top or neck C' into a bottle shaped bottomless chamber C^2 surrounded by a similar bottle shaped outer chamber C^3 out of which is taken a port or passage way C^4 communicating at its top by opening C^5 with the outer chamber C^3 and at its bottom with discharging pipe or socket neck C^6 jointed to the continuation of the long leg of the siphon or the inlet B^2 of the urinal pan B which is of ordinary construction. The discharge outlet of said pan B has a socket B^3 jointed to what may be termed a further continuation of the long leg of the siphon or the discharge pipe B^4. This discharge pipe B^4 is formed into or has therein a plumber's trap or bent piece D above which is an enlargement or bulb D' into which the pipe B^4 slightly intrudes just above a basin or saucer having a perforated or sieve top D^2. A smaller bent pipe D^3 extends downwardly from the basin or saucer pierces the wall of the pipe D to enter a closed or air tight chamber D^4 formed within the bend of said pipe D by side pieces D^5 and end piece D^6 and in this chamber it follows the curve and bends upwardly so as to form an inverted siphon with its short leg terminating at the top of said chamber D^4. Connected with the lowermost point of said closed chamber D^4 a small pipe D^7 extends upwardly into a coil D^8 and thence extends downwardly pierces the wall of the downward extension or discharge pipe D^{10} of bend or trap D and extends as the long leg D^9 of the auxiliary siphon thus formed for a reasonable length downwardly in said pipe D^{10}. A by-pass pipe E is connected by unions E' and E^2 respectively to the long leg B' of the main siphon above the trap or water lute C (say to the neck C' of said water lute C) and to the upper interior of closed chamber D^4.

In use the urine or liquid supplied is let fall or drop or is thrown into the receiving basin or urinal pan B and passing through discharge pipe B^4 falls through the perforated grating top or sieve D^2 whereon all solid matter which might be thrown or drop into the pan B such as fruit skin or stones, matches, &c., is arrested and temporarily retained (and thus prevented from passing into and choking the inverted siphon pipe D^3) until washed off and carried down the main drain by the flushing. Passing through the inverted siphon D^3 the supplied liquid fills the closed chamber D^4 and by its "head" or pressure also passes up pipe D^7 into coil D^8 and when this coil D^8 fills siphonage is at once set up and the chamber D^4 exhausted of its contents through pipe D^7, coil D^8 and pipe D^9. In said chamber D^4 there is thus created a vacuum or partial vacuum whose pressure or absence of pressure is communicated by by-pass pipe E to the long leg B' of the main siphon above the trap or water lute C which pressure or absence of pressure is sufficient to create siphonage in the pipes A^4 and B' and to cause the contents of measuring chamber A' to flow down pipe B' through the trap or water lute C to and over the pan B thence through pipe B^4, bend D and discharge pipe D^{10} to waste or the main drain flushing and cleaning the whole of the parts in its passage through them. The siphonage is broken as well understood when air enters pipe A^4 and the operation of flushing ceases leaving the trap or water lute C in proper trapping order when liquid is again supplied to the siphon starter through small pipe or inverted siphon D^3 the operation of flushing again takes place. After flushing there may or may not be retained some liquid in chamber D^4 and inverted siphon D^3 but it will be clean water or fluid and its presence in said inverted siphon and chamber is an advantage in that but little additional fluid is required to fill these parts and the auxiliary siphon pipe D^7 and coil D^8 and so start the flushing.

In the modified construction of siphon starter shown in Figs. 4 to 7 the discharge pipe B^4 (or continuation of the long leg of the main siphon) terminates in an enlargement and flange B^5 with an internal tapering mouth B^6 therein. A box or casing F containing the inverted siphon the closed chamber the auxiliary siphon and other parts is affixed say by screws F'. This box or casing F is preferably formed square in front with a removable cover F^2 hermetically sealed thereon by screws F^3 while in the rounded back is a screwed plug F^6 to provide access to a catch trap for removing any débris collected therein. This catch trap is formed of bent plates F^4 and F^5 the former depending from a division plate or partition F^7 in the box or casing and the latter extending upwardly from just at the bottom of plug F^6 from the back wall of the box or casing to in front of the former depending plate F^4. The plate or partition F^7 divides the box or casing F into two separate compartments the back one of which communicates at bottom with the main discharge pipe F^8 and has extending upwardly if so desired a vent pipe F^9 to convey away foul gases, &c. In the back compartment is the long leg G of the inverted siphon having a hopper mouth G' covered by a perforated plate or grating or sieve G^2 and piercing at its bend G^3 the plate or partition F^7 forming the back wall of the front compartment or closed chamber D^4. In this front compartment the short leg G^4 extends upwardly as high as possible or convenient. The auxiliary siphon in said front compartment or closed chamber D^4 is

formed of pipe H′ from the lowermost convenient point in said chamber extending upwardly to coil H and downwardly as pipe H^2 piercing the lower wall of the said compartment or chamber into the discharge pipe F^8 for a reasonable and convenient distance. From the top of this front compartment or closed chamber D^4 the by-pass pipe E extends upwardly and is led into the long leg of the main siphon at a point above an air-trap or water lute similarly as described in reference to Figs. 1 to 3. Across this front compartment with its bottom resting on angle pieces from the side walls is a weeping tank J with weeping hole J′ in its bottom and with its top open under the by-pass pipe E.

Fig. 4 shows the siphon starter as it would appear immediately after a flushing has taken place that is with bottom part of the inverted siphon and the weeping tank J filled with the flushing liquid. Said tank J weeps through orifice J′ into the front compartment or closed chamber and partially or almost fills it so that it is necessary to supply but little additional liquid to the receiving vessel or say urinal pan to flow down pipe B^4 through taper end B^6 and through sieve G^2 (whereon all solid matter is temporarily retained) to quite fill the auxiliary siphon formed of pipe H′, coil H and down pipe H^2. When this auxiliary siphonage is immediately set up the front compartment or closed chamber D^4 is emptied and exhausted and the force of the vacuum or partial vacuum communicated by by-pass pipe E to the long leg B′ of the main siphon causing the flushing as before described with reference to Figs. 1 to 3. The rush of water removes all solid matters from off the grating or sieve G^2 and they are caught and retained by the catch trap formed of plates F^4 and F^5 from which they may be removed at intervals by unscrewing plug F^6. During the flushing the tank J is again filled either by liquid through by-pass pipe E or by overflow of the main flushing.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In an automatic flushing device, the combination with a supply tank, a main siphon whose short leg dips into said tank, a vessel to be flushed interposed in the long leg of the siphon and an air cut off in said long leg on the tank and sewer side of the vessel respectively, of an air chamber on said sewer side of the vessel, an inverted siphon arranged therein whose long leg extends into the like leg of the main siphon a receiving basin or saucer on the long leg of said inverted siphon below the discharge from the vessel, an auxiliary siphon connecting the said chamber with the long leg of the main siphon on the sewer side of said vessel below the air cut-off thereat, and a by-pass pipe connecting the air chamber with the long leg of the main siphon on the tank side of the vessel above the air cut-off thereat, for the purpose set forth.

2. In an automatic flushing device the combination with a supply tank, a main siphon whose short leg dips into said tank, a vessel to be flushed interposed in the long leg of the syphon and an air cut-off in said long leg on the tank and sewer side of the vessel respectively, of an air chamber on said sewer side of the vessel an inverted siphon arranged therein whose long leg extends into the like leg of the main siphon a receiving basin or saucer on the long leg of said inverted siphon below the discharge from the vessel, said basin provided with a perforated cover, an auxiliary siphon connecting the said chamber with the long leg of the main siphon on the sewer side of said vessel below the air cut-off thereat and a by-pass pipe connecting the air chamber with the long leg of the main siphon on the tank side of the vessel above the air cut-off thereat, for the purpose set forth.

3. In an automatic flushing device, the combination with a main siphon, a vessel to be flushed interposed in the long leg thereof, said leg of increased cross-sectional area on the sewer side of the vessel, and provided with an air cut-off on said sewer side and on the supply side respectively, of an air chamber on the sewer side of the vessel, an inverted siphon therein whose long leg extends into the like leg of the main siphon a receiving basin or saucer on the said long leg of the inverted siphon below the discharge from said vessel, said inverted siphon and its receiving basin of less cross sectional area than that of the aforesaid long leg of the main siphon on said sewer side, an auxiliary siphon connecting the lower end of the air chamber with the long leg of the siphon below the air cut-off on the sewer side, and a by-pass pipe connecting the upper end of said chamber with the long leg of the main siphon above the air cut-off on the supply side of the vessel, for the purpose set forth.

4. In an automatic flushing device, the combination with a supply tank, a main siphon whose short leg dips into said tank, a vessel to be flushed interposed in the long leg of said main siphon, and an air cut-off in the last named leg on the tank and sewer side of the vessel respectively, of an air chamber on said sewer side of the vessel, an inverted siphon therein whose long leg extends into the like leg of the main siphon a receiving basin or saucer on said long leg of the inverted siphon below the discharge of the vessel to be flushed, an auxiliary siphon connecting the air chamber with the long leg of the main siphon on the sewer side of the vessel below the air cut-off therein, a by-pass pipe connecting the air chamber with the said long leg of the main siphon on the tank side of the vessel above the air cut-off, and a weeping tank in said air chamber adapted to receive a portion of the flushing liquid, substantially as described.

5. In an automatic flushing device, the combination with the long leg of the main siphon,

the air cut-off therein, and the vessel to be flushed interposed in said long leg on the sewer side of its air cut-off, a trap comprising a basin and a partition or plate dipping into the same arranged in said long leg of the main siphon on the sewer side of the vessel, and means for gaining access to said trap, an air chamber, an inverted siphon in the long leg of the main siphon a receiving basin or saucer on said long leg of the inverted siphon below the outlet of the vessel to be flushed, the short leg of said inverted siphon projecting into the air chamber, a by-pass pipe connecting the said chamber with the long leg of the main siphon above the air cut-off on the supply side of the vessel, an auxiliary siphon connecting the air chamber with the long leg of the main siphon below the trap on the sewer side of the vessel, and a weeping tank in the upper part of the air chamber adapted to receive a portion of the flushing liquid, substantially as and for the purpose set forth.

6. In an automatic flushing device, the combination with the long leg of a main siphon, a vessel to be flushed connected thereto, and an air cut-off interposed between said vessel and the short leg of the siphon, of a casing, as F, provided with inlet and outlet branches connected with the vessel and a sewer or drain respectively, an air cut-off in said casing, an air chamber forming part of the casing and provided with a removable cover, an inverted siphon whose short leg projects into the air-chamber and whose long leg is provided with a receiving basin or saucer below and centrally of the inlet branch of the said casing, an auxiliary siphon in the air chamber connecting the same with the outlet branch of the casing, and a by-pass pipe connecting said chamber with the long leg of the main siphon above the air cut-off therein on the supply side of the vessel, substantially as and for the purpose set forth.

7. In an automatic flushing device, the combination with the long leg of a main siphon, a vessel to be flushed connected thereto, and an air cut-off interposed between said vessel and the short leg of the siphon, of a casing as F provided with inlet and outlet branches connected with the vessel and a sewer or drain respectively, an air cut-off in said casing, an air chamber forming part of the casing and provided with a removable cover, an inverted siphon whose short leg projects into the air chamber and whose long leg is provided with a receiving basin or saucer below and centrally of the inlet branch of the said casing, an auxiliary siphon in the air chamber connecting the same with the outlet branch of the casing, a weeping tank in the upper end of said chamber, and a by-pass pipe connecting said chamber with the long leg of the main siphon above the air cut-off therein on the supply side of the vessel, said by-pass pipe adapted to discharge into the weeping tank, substantially as and for the purpose set forth.

WILLIAM CLARK.
ALEXANDER CAMERON.
CHARLES KIRK.

Witnesses:
FRED WALSH,
Fel. Aust. Inst. P. A., Sydney, N. S. W.
ALFRED RICE JAY.