

J. E. BOYLE.  
WATER CLOSET BOWL AND TRAP.

No. 423,022.

Patented Mar. 11, 1890.

FIG. 1.

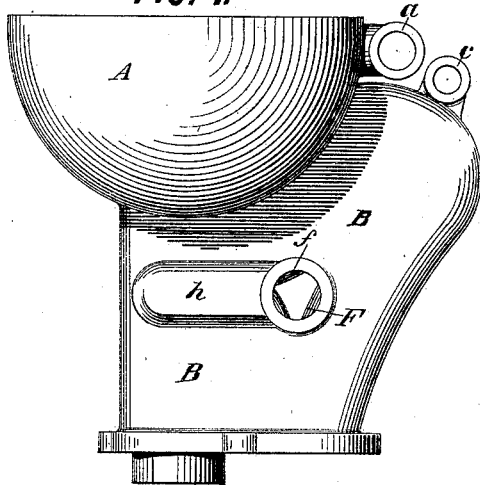


FIG. 3.

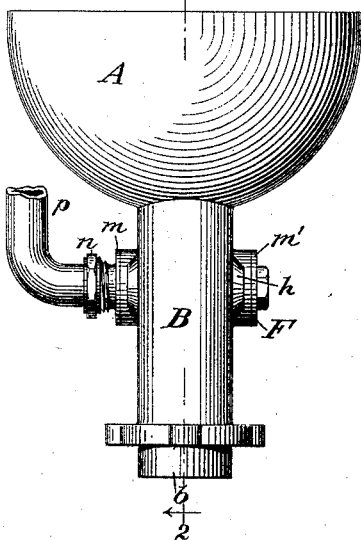


FIG. 5.

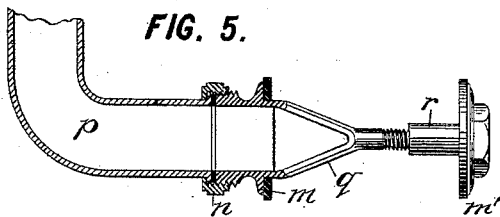


FIG. 2.

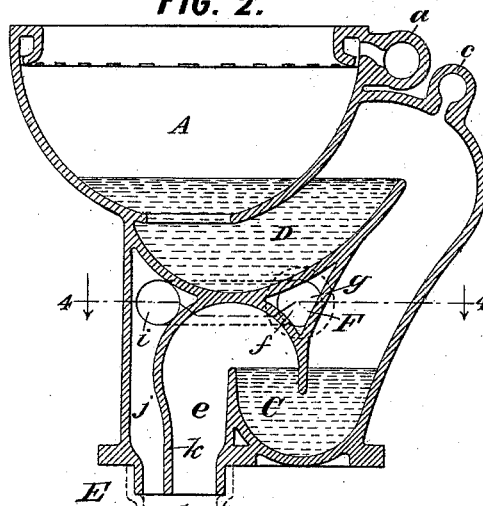


FIG. 4.

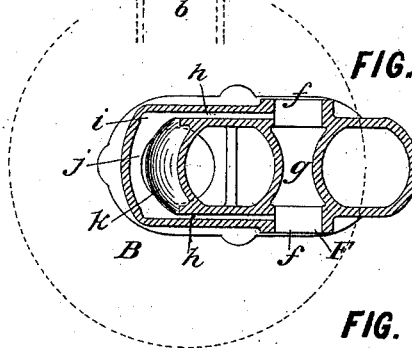
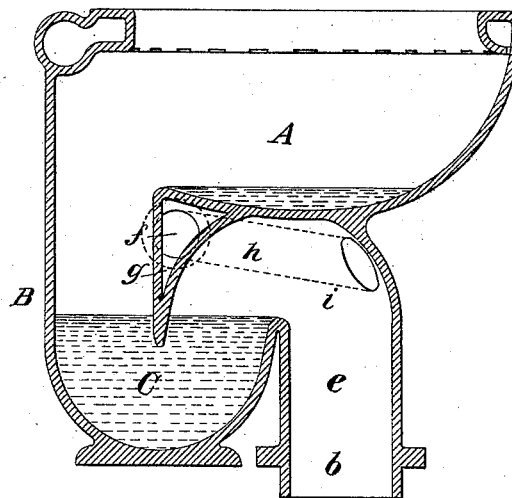


FIG. 6.



WITNESSES:

*J. H. Fairwell*  
*G. H. Fraser*

INVENTOR:

*James E. Boyle*,  
By his Attorneys,  
*Arthur C. Fraser & Co*

(No Model.)

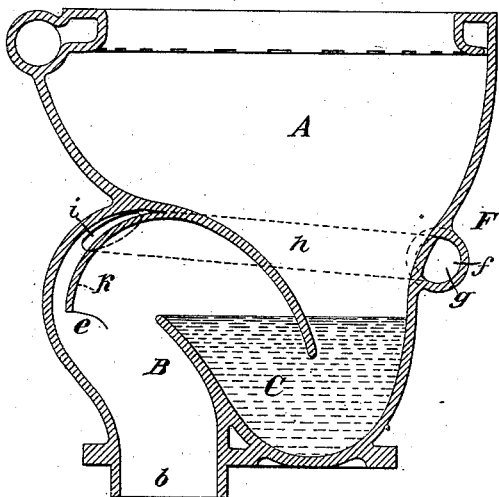
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J. E. BOYLE.  
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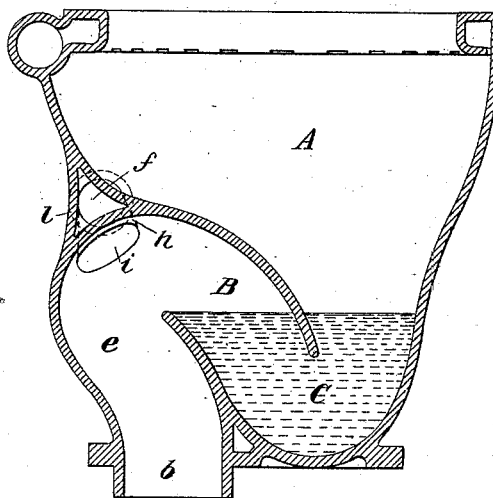
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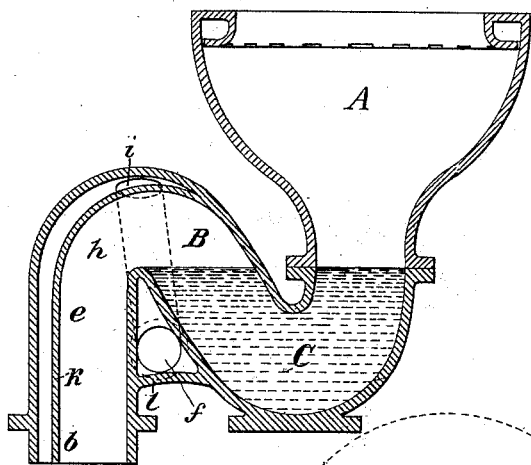
**FIG. 7.**



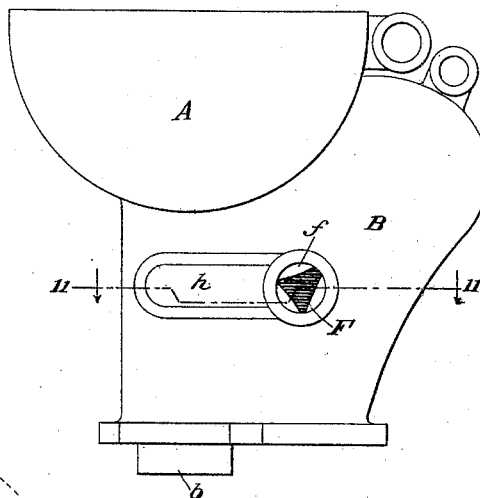
**FIG. 8.**



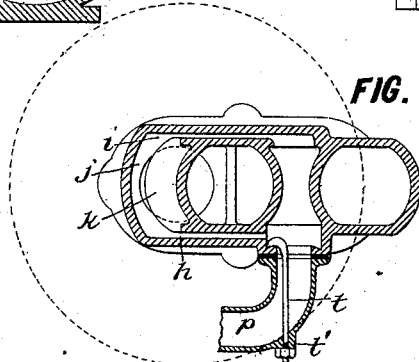
**FIG. 9.**



**FIG. 10.**



**FIG. 11.**



WITNESSES:  
J. A. Griswell.  
C. K. Fraser.

INVENTOR:

James E. Boyle,  
By his Attorneys,  
Arthur C. Trauer & Co.

# UNITED STATES PATENT OFFICE.

JAMES E. BOYLE, OF BROOKLYN, NEW YORK.

## WATER-CLOSET BOWL AND TRAP.

SPECIFICATION forming part of Letters Patent No. 423,022, dated March 11, 1890.

Application filed January 12, 1889. Serial No. 296,135. (No model.)

### *To all whom it may concern:*

Be it known that I, JAMES E. BOYLE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Water-Closet Bowls and Traps, of which the following is a specification.

This invention relates to water-closets which are formed with one or more traps of water seals constructed of earthenware.

The invention pertains to the provision for the "back airing" of such traps—that is to say, for the connection therewith of a ventilating-pipe leading from the space between the water seal and the outlet to the soil-pipe for the purpose of conducting away any foul gases that may arise from the sewer, and for preventing the accumulation of a pressure or the formation of a vacuum in the soil or sewer pipe by affording the latter a free communication with the external atmosphere, so that atmospheric pressure is maintained adjacent to the trap.

Such "back-air" connections for porcelain traps prior to my invention have been formed in various ways. For example, a simple hole or opening has been made in the front of the earthenware trap and the pipe connection attached directly to this hole or opening. This has been found disadvantageous for the reason that it is difficult to make a good connection between the pipe and such an opening, and for the further reason that the opening, being usually at the front, the connection projects forward beyond the earthenware bowl, being unsightly and in the way. A tubular barrel of earthenware has also been molded upon the exterior of the trap and communicating by an opening with the portion thereof between the water seal and the outlet, a through-and-through connection being applied to this barrel, the tie-rod or portion thereof passing through the barrel and drawing the two packed heads of the connection together against the ends of the barrel. Such a connection has the advantage that the metal parts by which the pipe is joined are reversible and are easily applied, but it is disadvantageous because of the projection of the earthenware barrel beyond the general out-

line of the water-closet trap, whereby it is more or less in the way and is liable to become injured.

My present invention provides a back-air connection for earthenware closet-traps, which involves no projection whatever from the general outline of the trap portion of the closet, and which has the further advantage that the connection is applied toward the rear of the closet, thereby carrying it as far as possible out of sight and strengthening the connecting-pipe, whereby the entire structure when set is rendered more sightly and workmanlike.

In the accompanying drawings I have shown my invention as applied to several different kinds or styles of water-closets.

Figure 1 is a side elevation of a double-trapped pneumatic water-closet of what is known in the trade as the "Tidal-Wave Class," the particular closet here shown being known as the "Crystal." Fig. 2 is a vertical mid-section thereof, looking in the same direction as Fig. 1. Fig. 3 is a front elevation thereof. Fig. 4 is a horizontal section cut in the plane of the line 4 4 in Fig. 2. Fig. 5 is a sectional elevation, on a larger scale, of the metallic through-and-through connection, which is preferably used with the construction of bowl shown. Fig. 6 is a vertical longitudinal mid-section of a wash-out closet. Figs. 7 and 8 are vertical longitudinal mid-sections of two different constructions of short-hopper closets, or closets and traps combined. Fig. 9 is a vertical longitudinal section of a short-hopper closet, showing the bowl and trap in two separate pieces of earthenware.

Referring to the drawings, A designates the bowl of the closet, and B designates the trap portion thereof, forming the water seal C and terminating in the outlet *b*, which discharges into the soil-pipe.

In the closet shown in Figs. 1 to 4, inclusive, an additional upper trap or water seal D is provided for holding the water surface in the bowl, and in order to form a confined air-space *d* in that portion of the soil-passage between the traps D and C, as is common with pneumatic closets, and, being well understood, need not be here described.

*a* is the usual standard flushing-connection,

by means of which the flushing-pipe is attached to the bowl, and *c* is the usual standard air-pipe connection for joining the air-pipe leading to a vacuum-tank with the confined air-space *d*.

In Fig. 2 the upper portion of the soil-pipe *E* is shown in dotted lines. This pipe leads downward without being provided with any trap until it communicates with the sewer-pipe in the lower part of the building.

In order to ventilate the sewer-pipe *E* and the space *e* in the trap portion *B* of the closet between the water seal *C* and the outlet *b*, it is customary to provide what is known in the trade as a "back-air" connection. According to my invention this connection, lettered *F*, consists of two coincidently-opposite openings *f f*, preferably circular, and so arranged relatively to the soil-passage that a clear open space or passage *g* is formed between them. This space need not have an area equal to that of the openings themselves, it being only necessary that the two shall be sufficiently large to admit the free passage of a tie-bar extending axially from one opening to the other. In the constructions shown in Figs. 1 to 8, inclusive, this passage *g* is exterior to the outline of the soil-passage, so that an axial tie-bar thus passed through it will not intersect or enter the soil-passage. In the preferred constructions shown in Figs. 1 to 4 and in Fig. 6 the triangular space between the legs of the trap is utilized as this passage, this space, instead of being left open, as heretofore, being closed on both sides, with the exception of the two opposite openings *f f*. In the constructions referred to the openings, since they do not communicate directly with the space *e*, are placed in communication therewith through the medium of one or, preferably, two communicating-passages *h h*, which extend on the exterior of the earthenware, as shown in Figs. 1 and 3, and terminate in an opening *i*, which either directly enters the space *e*, as in Figs. 6, 7, and 8, or communicates indirectly therewith through a downwardly-extending passage *j*, as shown in Figs. 2 and 4. In this latter construction the partition *k*, by which the downward passage *j* is constituted, has the effect of continuing the siphon action of the soil-passage down below the level of the opening *i* and to the level of the outlet-opening *b*, as in the construction shown in my patent, No. 372,199, dated October 25, 1887.

In the two closets shown in Figs. 7 and 8 there is but one trap, the construction being such that no triangular space between the legs of the trap is formed for the passage *g*. In Fig. 8 such a triangular space is formed between the bowl and the crown or upper swell of the soil-passage beyond the trap by the addition of an exterior partition *l*. The exterior side passages *h h* are here very short, because of the close proximity of the openings *f f* to the opening *i*.

In the construction shown in Fig. 7 the passage *g* is built onto the rear of the closet, pro-

jecting slightly beyond the outline of the soil-passage, and the side passages *h h* are necessarily of considerable length. A hood *k* prevents the entrance of water into the opening *i*.

In the construction shown in Fig. 9, where the bowl and trap are made of two separate pieces of earthenware fastened together, as is common, the communicating-passage *g* is arranged beneath the ascending and descending limbs of the trap, being inclosed by a partition *l* applied beneath, and the openings *f f* being formed in the opposite sides and communicating with the opening *i*, which is at the crown or upward swell of the soil-passage, by passages *h*, extending vertically. The partition *k* is applied as in Fig. 2.

In the case of traps of the constructions shown in Figs. 6, 7, 8, and 9 the openings *f f* might be formed directly in the upper part of the space *e*, but this would involve the disadvantage of the connecting tie-bar being in the path of the outflowing stream of water and where it might become foul by contact with excreta. The large openings *f f* might also be entered to some extent by the outflowing water, whereas in the preferred construction the small openings *i* can be arranged so far from the course of this stream that they are not entered thereby.

Fig. 5 shows the preferred construction of metallic through-and-through connections employed with my invention. There are two heads or caps *m* and *m'*, the latter being a blind cap, while the former is tubular and formed with a screw-threaded neck, on which screws the coupling thimble or union *n*, by which the flanged end of a spud *p* is drawn against this neck. The back air-pipe is soldered to the opposite end of the spud *p*. From the inner side of the annular cap *m* projects a forked stem *q*, the two forks of which unite in the center in a screw-threaded rod, onto which screws a boss *r*, projecting from the blind cap *m'*, so that as the latter is screwed up the two caps *m* and *m'* are drawn forcibly together against the exterior faces around the openings *f f* in the porcelain. The caps *m* and *m'* are faced with packing-washers of rubber.

The metal through-and-through connections just described are well known to the trade as those used with the "Standard" connection hereinbefore referred to. These connections are reversible, so that the back air-pipe may be joined to either side of the bowl. The use of this through-and-through connection is not absolutely essential to my invention, since it might be in part availed of by the employment of other connections which do not require that two openings *f f* be provided in coincidence with each other. As an example of such other connections that may be used, I would refer to the constructions shown in Figs. 10 and 11, where the opening *f* on one side of the trap portion *B* of the closet is omitted, the remaining opening be-

ing adapted to be engaged by a connection applied to one side only. Several such connections are already known in the art. In Fig. 11 I have illustrated one such connection that  
5 may be used, consisting of a screw-threaded hooked rod *t*, engaging the inner side of the opening and drawn up by a nut *t'*, screwing on it against a shoulder formed on the spud *p*.

My invention may be modified in other respects than those shown in the accompanying drawings, as will be obvious to mechanics versed in the construction of sanitary earthenware.

I claim as my invention the following defined novel features and combinations, substantially as hereinbefore specified, viz:

1. An earthenware trap formed with coincidently-opposite openings in its sides which enter a space between the several legs or  
20 bends of the trap and within the exterior outlines of the trap, whereby on the insertion of a through-and-through connection the latter does not enter the soil-passage, and said trap having a communicating-passage  
25 extending from said space to the space between the water seal of the trap and the outlet thereof to the soil-pipe.

2. An earthenware water-closet bowl having its outlet or soil-passage curved upwardly  
30 to form a trap, and thence downwardly, and terminating in an outlet for connection with the sewer, and formed with an opening in the side of its trap portion arranged to enter a space between the several legs or bends of  
35 the soil-passage and within the exterior outline of the trap portion, whereby on the in-

sertion of a through-and-through connection the latter does not enter the soil-passage, and a communicating-passage extending from said space to the space between the water  
40 seal and the outlet of the soil-pipe.

3. An earthenware water-closet bowl having its outlet or soil-passage curved upwardly to form a trap, and thence downwardly, constituting thereby a space between and bound-  
45 ed by the several legs of the soil-passage, having no direct communication with the soil-passage, and formed with coincidently-opposite openings in the sides of its trap portion communicating with said space, and  
50 a passage extending from said space and opening into the space between the water seal and the outlet to the soil-pipe.

4. An earthenware water-closet bowl having its outlet or soil-passage curved upwardly  
55 to form a trap, and thence downwardly, and terminating in an outlet for connection with the sewer, the descending leg formed with a partition constituting the soil-passage on one side and the vent-passage on the other, the  
60 trap portion formed with coincidently-opposite openings in its sides, and with a communicating-passage extending thence and opening into said vent-passage.

In witness whereof I have hereunto signed  
65 my name in the presence of two subscribing witnesses.

JAMES E. BOYLE.

Witnesses:

GEORGE H. FRASER,  
FRED WHITE.