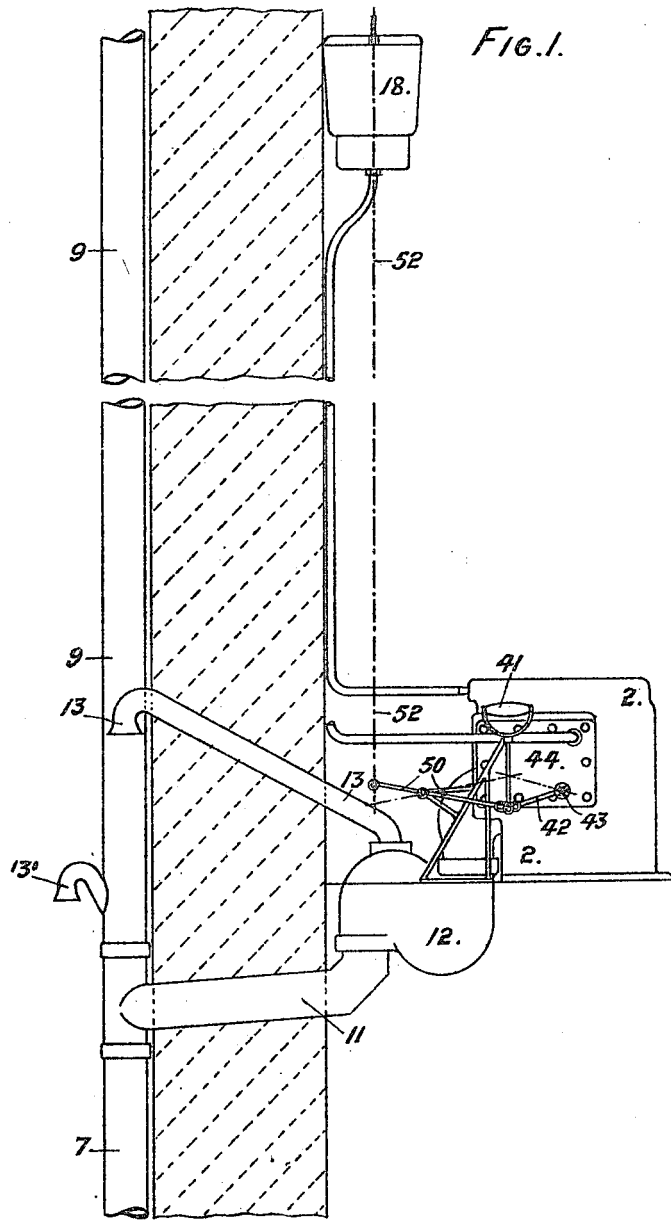


1,137,673.

I. SHONE.
SEWERAGE SYSTEM.
APPLICATION FILED FEB. 26, 1912.

Patented Apr. 27, 1915.
3 SHEETS—SHEET 1.



INVENTOR
I. Shone

WITNESSES

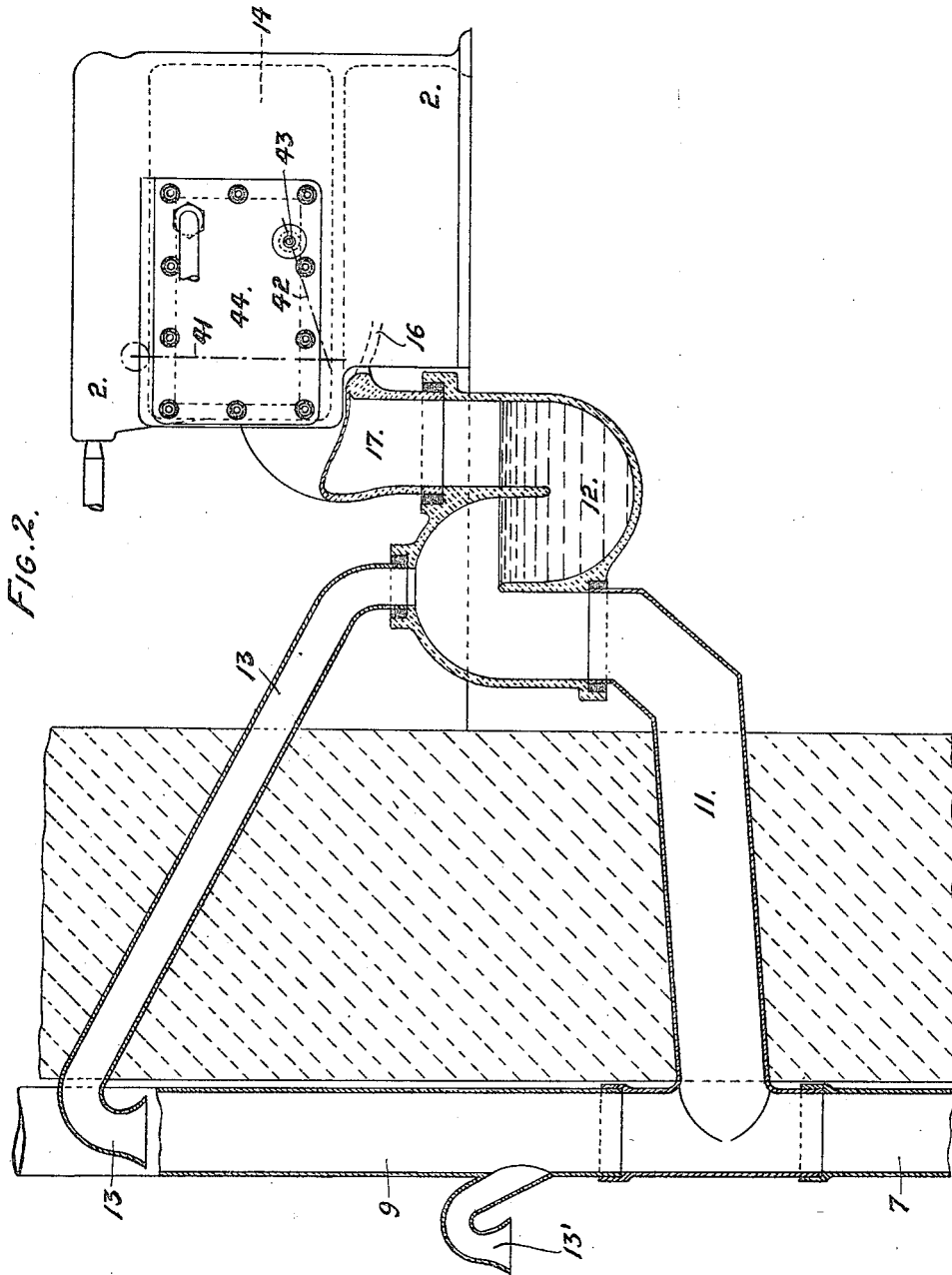
N. Abramson.

By

Raymond P. Cornwall. *[Signature]* ATT'Y.

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3 SHEETS—SHEET 2.



WITNESSES

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Hoyd R. Cornwall.

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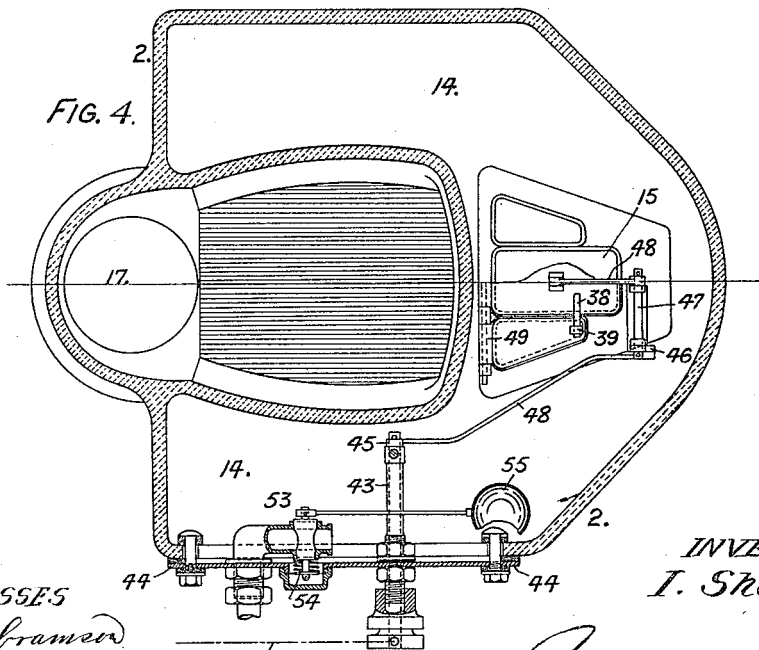
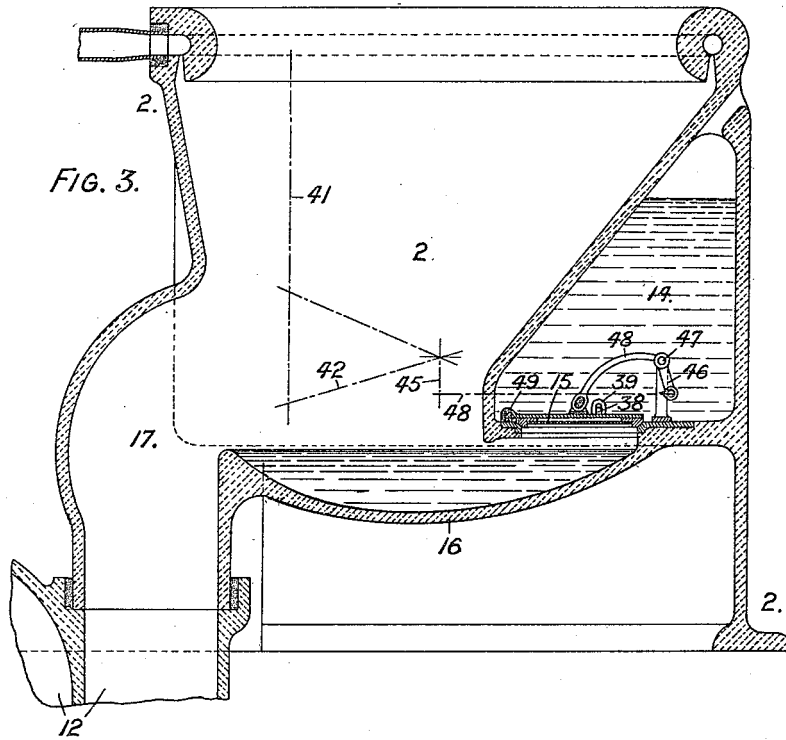
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WITNESSES

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UNITED STATES PATENT OFFICE.

ISAAC SHONE, OF WESTMINSTER, LONDON, ENGLAND.

SEWERAGE SYSTEM.

1,137,673.

Specification of Letters Patent.

Patented Apr. 27, 1915.

Application filed February 26, 1912. Serial No. 680,031.

To all whom it may concern:

Be it known that I, ISAAC SHONE, a subject of the King of England, residing at Westminster, in the county of London, England, have invented certain new and useful Improvements in and Connected with Sewerage Systems, of which the following is a specification.

This invention relates to a sewerage system wherein all the waters or liquids, such as rain water, bath waters, scullery sink waters, etc., which formerly were not used to the best advantage for air and water flushing purposes, are in the present improvements all not only turned and put to use for flushing, but are applied in such a way that their maximum power, as an air moving means for hydraulically and pneumatically flushing the drains and apparatus, and creating a pure atmosphere in all of them, is applied and utilized for the purpose of producing the best possible sanitary results, at a reasonable initial and annual cost.

Other parts of the drainage methods and work according to this invention, and which all co-act and serve to promote a completely sanitary and yet simple and far less costly system than the one now generally in vogue, are hereinafter described; but I will first describe more in general detail the portion of this invention dealing with the waters and liquids just spoken of, and with the water closets and conduits and pipes connected with this portion of the system.

In the accompanying drawings Figure 1 is an elevation illustrating the application of my invention. Fig. 2 is a detail view of the water closet shown in Fig. 1. Fig. 3 is a longitudinal section of the water closet basin shown in Fig. 1. Fig. 4 is a horizontal section of the same.

To illustrate the invention I show it applied in connection with a water closet, although it is to be understood the improvement is applicable to other apparatus connected with a sewerage system.

2 represents a water closet basin; 7 is a soil pipe connected with the water closet basin; 9 is a rain water pipe for carrying roof water from the gutters of a house; 11 is a pipe connecting the water closet trap 12 with the soil pipe 7; and 13 is a ventilating pipe on said trap. Under this invention the discharge from the water closet or the like is utilized and is applied in such a way

as not only to cleanse and ventilate the water closet basin and the trap connected therewith, but also the soil pipes and the house drains and the public sewers into which the latter discharge their contents; while, in addition, rain waters from the roofs of houses or buildings (and other waste waters where possible) can be discharged with impunity into the soil pipes and serve as an auxiliary to, and an additional means of flushing and keeping clean and healthy, all the pipes, and promote the more or less continuous pneumatic flushing of them from their commencement through the house drains and into the street sewer. Thus by this system, under the present invention, a natural means or power is applied to produce an artificial inward flow of air into and through the soil pipe 7 and rain water pipe 9, and other conduits, etc. connected with the sanitary system of houses, etc., for the purpose of rendering them self-cleansing hydraulically, and keeping within them all only pure air. By reason of this it is no longer dangerous or objectionable to connect up the rain water down spouts, 9, bath water discharge pipes and other sources from which water is discharged from a house or building into the soil pipes 7, or house drain direct, but on the contrary they become helpful and greatly assist in the general sanitation of the sewerage scheme. Firstly, with regard to the flushing and discharge of water closets, 2, they are so constructed and adapted to act that the contents, and the water by which they are moved, are caused to flow as a body over the basin and into and through the trap and the soil pipe suddenly, so as to not only force in front of this water the air in the soil pipes and expel it, but also to draw-piston-like, fresh air into and down this pipe behind it. The air in front of the liquid will be forced through and flush pneumatically the drain. Not only this, but the sudden discharge of liquid from the water closet pans, acting pistonlike, flushes and cleanses the soil pipe 7 hydraulically and flows thereafter through the house drain at a "self-cleansing" velocity. Thus it simultaneously flushes and cleanses, hydraulically and pneumatically and replenishes with fresh air, all the pipes and conduits between the source of supply of liquid to them and the place of discharge. This rapid flushing and bodily discharging of the con-

tents of the basin and flushing water, is effected by employing a cistern 14 close to the water closet pan 2—in the case shown it being formed in the earthenware water closet basin itself—and having a discharge valve 15 which will let the contents of this cistern suddenly into the pan 2; and if it—the pan—be of the type shown, having a shallow basin bottom 16, and a vertical discharge outlet 17 directly above the trap 12, of some considerable depth say about 5 to 7 inches deep and of about the diameter of the discharge trap, the flushing water from this cistern 14 (the discharge valve 15 of which is at the opposite end to the discharge pipe 17) will push, suddenly, the contents of the basin 2 into the vertical discharge portion 17; and it will also suddenly fill it and thereby raise the head of liquid in the trap 12 by the depth of this portion, and so force the contents of the pan and the water in the trap, suddenly, and as a body, into the drain pipe 11 leading to the soil pipe 7, and therefore down the soil pipe in this solid or piston-like form the liquid will fall, with the effects referred to.

In ordinary practice, where a cistern is used some feet above the water closet pan, and connected with it by a pipe of $1\frac{1}{2}$ " to 2" in diameter, the action described can never take place because the cistern will take from 5 to 8 seconds to discharge and the rate of flow of liquid into the pan is never such that it will fill the outlet pipe 17 and act on the trap, and generally in the manner described. In addition, however, to this main low-level flushing cistern 14 a further small cistern 18—see Fig. 1—is preferably employed and fitted above the pan 2 as usual, for the purpose of supplying water for washing the surfaces of the pan, and general surface cleansing; but the capacity of this cistern 18 will be small, as will also be that of the low-level cistern; and the total quantity of water necessary to accomplish the complete action need only be relatively small. For example, a closet trap $3\frac{1}{2}$ " in diameter having a 2" water seal, would hold about .34 gallons of water in a length of about $9\frac{3}{4}$ "; but in order to displace the .34 gallon content of the trap effectively therefrom so as to render it self-cleansing, as much water as will fill a $3\frac{1}{2}$ " pipe one foot in length should be suddenly dumped into it in addition to the little volume left in the shallow basin of the pan, after one or both of the cisterns holding the flushing water had been discharged through the water closet and its trap into the soil pipe. If, therefore, the low-level cistern 14 holds say three quarters of a gallon and the upper one three quarters of a gallon, more than sufficient water would be supplied for perfect flushing and cleanliness; neverthe-

less this quantity, one and a half gallons, is a very small one in comparison with that supposed at present to be necessary. In fact it is 50 per cent. less than plumbers generally consider to be necessary for the purpose, and 25 per cent. less than the London Water Board allows their customers to use for the purpose.

The description so far deals only with the water flowing down the soil pipes 7, discharged from the water closet; but in addition to this the rain water falling on roofs, etc., will be conveyed into the soil pipes or the rain water pipes 9, and other waste pipes, as may be most convenient and economical, instead of discharging such waters as is done at present on to or through gully water traps below; and hence these waters coming from the roofs, especially in times of rain storms, will greatly assist in flushing and cleansing the soil pipes and other pipes connected with them, and assist moreover in causing an induction of air into them, and so further assists in their ventilation and the production and presence in the drains, conduits, etc., of an atmosphere which is of a constant relatively pure character.

In connection with the pipe 11 leading to the soil pipes 7, and water closet pan 2, a special air inlet anti-siphon pipe 13, which in Figs. 1 and 2 is in the form of a siphon with an open end, is employed near the entry of each pan discharge into it, and just above it; and this anti-siphon pipe need only be a relatively small one, say $1\frac{1}{2}$ inches in diameter, as a small pipe such as this will readily admit a large and sufficient quantity of air to avoid self-emptying of the trap 12; that is, if this pipe be present, the emptying of the trap is rendered impossible. The air supplied by this pipe passes to the upper part of the trap 12 of the pan, on the discharge side. In addition to this siphon pipe 13 just specified, above the trap 12, (see Figs. 1 and 2), there is a short similar anti-siphon pipe or device also marked 13', for the admission of air into the rain water pipe 9 just above the entry of the pipe 11 into the soil pipe.

In the case of there being more than one closet connected with, and discharging into, a soil pipe, they will all be arranged to act as described, and as in the case shown, each will be provided with the anti-siphoning device 13 as described.

With regard to the valvular apparatus for discharging the water closet cisterns 14 (Figs. 2, 3 and 4) into the pans, as above stated, the valve 15 has a large area so that the contents of the cistern 14 can be dropped into the pan very rapidly with the effect above referred to. To enable this rapid discharge or supply to be effected, without

splashing or disturbance of the contents, the valve is made in several parts, viz., a main or central part and two side parts, as seen clearly in the plan in Fig. 4, the side or wing parts are moved from the central part by projecting pins 38 which extend through the loops 39 on the side or wing parts of the valve 15. The loops 39 are of such a form that the pins 38 only come in contact with them and move the side or wing portions when the main valve has been opened a certain amount. Thus a controlled, yet relatively large supply or discharge of water, is effected.

The valve 15 is operated from a hand-pull 41 on the side of the pan which is connected to an arm 42 on a shaft 43, which extends through a removable metal plate 44 fastened on to the side of the pan, and inside which is an arm 45, which is connected to another arm 46 on a spindle 47 by a connecting rod 48, so that when the hand-pull 41 is pulled up the arm 46 will be pulled forward and through the arm 48 on it, which is connected with the flap valve 15, it will lift this valve up about its hinge 49, and so in turn, lift up the side portions of the valve. The hand-pull (see Fig. 1) 41 also operates the upper small cistern 18 by operating upon a lever 50 carried from a suitable bracket 51, to which is connected the cistern operating chain or cord 52.

As to the form of the water closet pan 2, that shown in the drawing is very suitable and accomplishes the objects in view, which have been fully above explained; the action of the water released from the cistern 14 being such and so controlled by the valve 15—which is a species of controlling valve—that the sweep out bodily of the contents of

the pan without agitation or churning is effected.

The water of the cistern 14 is supplied by a separate inlet valve 53 (see Fig. 3) of the plug type, normally pulled on to its seat or face by a spring 54 and operated and controlled by a floater 55 which is acted upon by the water in the cistern in the well known way.

There will be used on the cistern 14 the usual over-flow pipe leading to the discharge pipe or trap of the pan.

What is claimed is:—

1. A sewerage system comprising trapped house fixtures, a rain water pipe formed with apertures therein for the admission of fresh air said water pipe being directly connected with the said trapped fixtures, and means for rapidly discharging the contents of the fixtures and filling the rain water pipe full bore.

2. A sewerage system comprising trapped house fixtures; a rainwater pipe directly connected with the house fixtures, and inverted siphon shaped air inlet pipes, said latter pipes being attached to the rain water pipe.

3. A sewerage system comprising house fixtures with traps, inverted siphon shaped air inlet pipes attached to the traps, a rain water pipe connected with the traps, and inverted siphon shaped inlet pipes attached to the rain water pipes.

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

ISAAC SHONE.

Witnesses:

GEORGE I. BRIDGES,
S. J. EARL.