(No Model.) 2 Sheets—Sheet 1.

J. A. WILLS & L. E. JORDAN.

LATRINE.

No. 573,744. Patented Dec. 22, 1896.

Fig. 1.

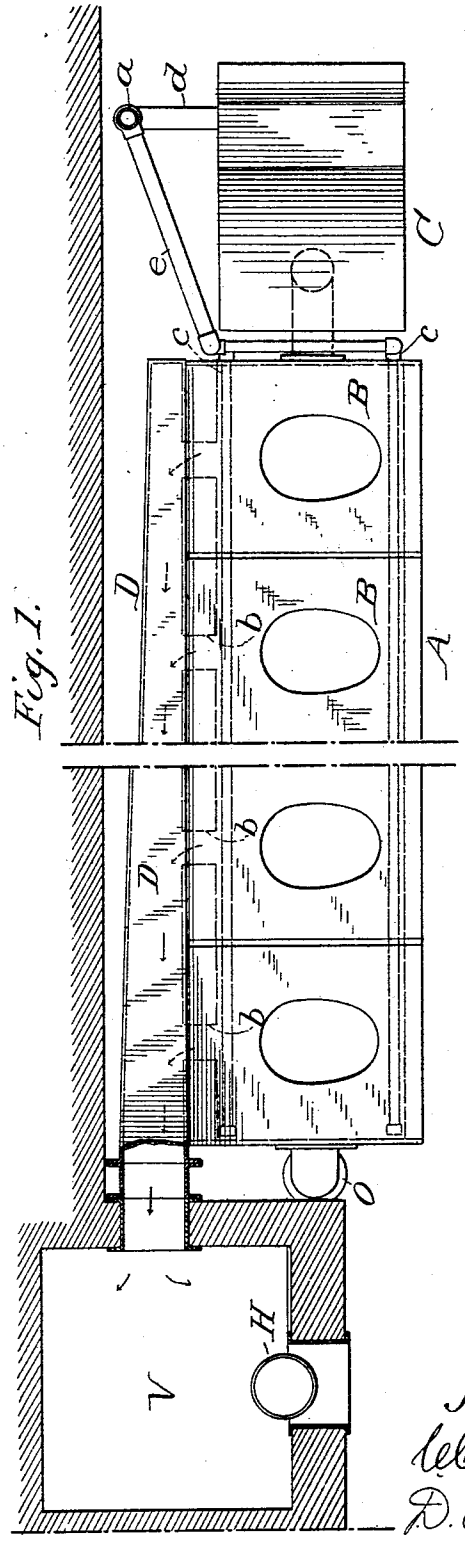


Fig. 3.

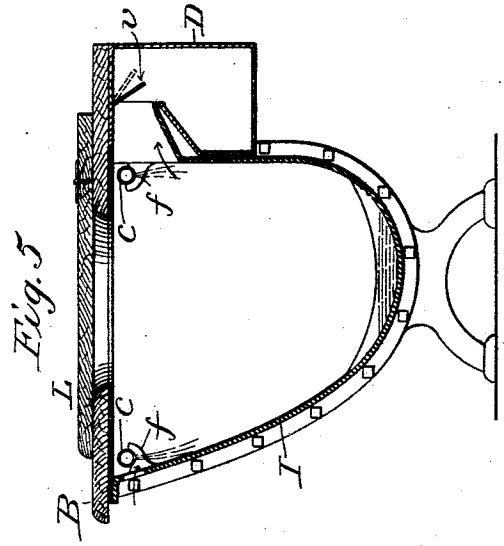
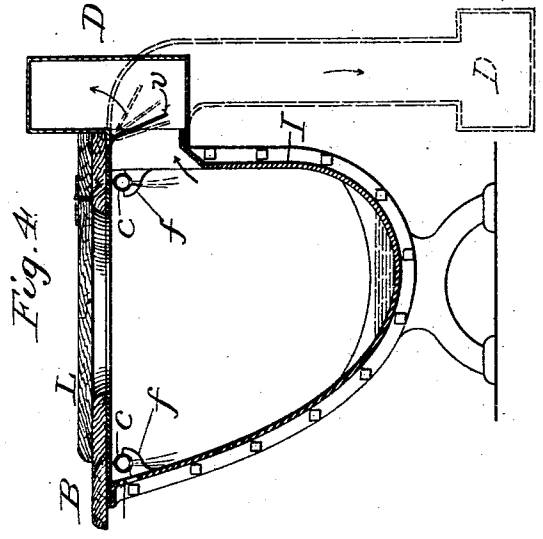


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

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LATRINE.

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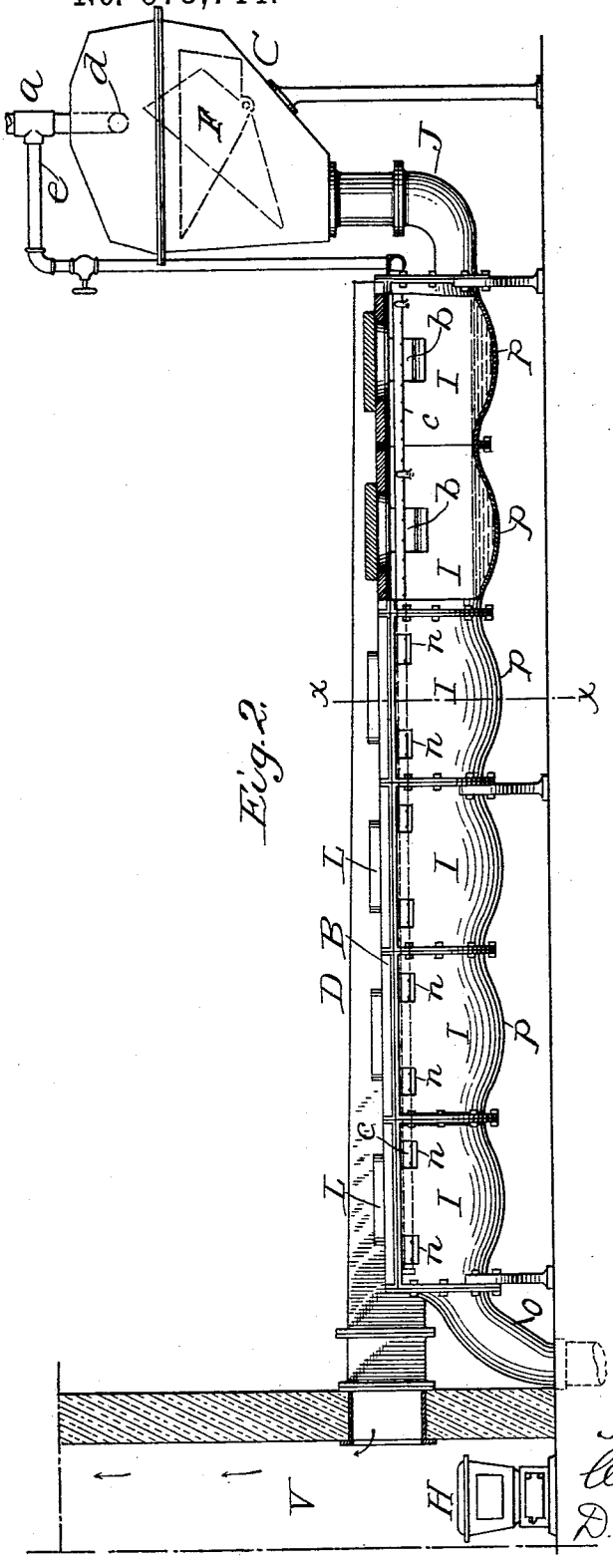

Fig. 2.

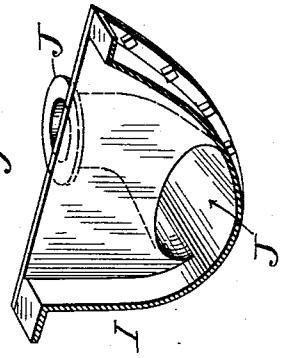

Fig. 6.

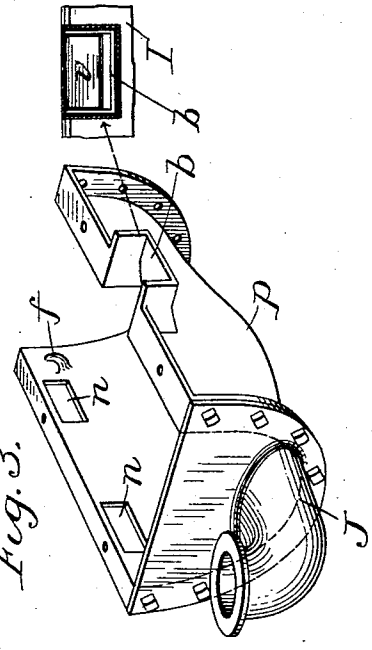

Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES A. WILLS, OF PHILADELPHIA, AND LLEWELLYN E. JORDAN, OF WILKINSBURG, PENNSYLVANIA, ASSIGNORS TO THE SMEAD & WILLS WARMING AND VENTILATING COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

LATRINE.

SPECIFICATION forming part of Letters Patent No. 573,744, dated December 22, 1896.

Application filed July 25, 1896. Serial No. 600,483. (No model.)

To all whom it may concern:

Be it known that we, JAMES A. WILLS, residing at Philadelphia, in the county of Philadelphia, and LLEWELLYN E. JORDAN, residing at Wilkinsburg, in the county of Allegheny, State of Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Latrines, of which the following is a specification.

Our present invention relates to water-closets of that class used in public buildings, such as schools, hospitals, depots, &c., and known as "latrines;" and the invention consists in a novel form of the sections composing the body of the vessel or trough, in an arrangement of water-pipes within the same with an automatic flushing device, and in means for securing a thorough and constant ventilation of the latrine, all as hereinafter fully set forth.

Figure 1 is a top plan view, and Fig. 2 a front elevation, of the apparatus as set ready for use. Fig. 3 is a perspective view of a section (shown detached) and the draft-regulating valve. Fig. 4 is a transverse vertical section on the line x x of Fig. 2, showing the ventilating-duct projecting above the seats; Fig. 5, a similar view showing the duct below the seats. Fig. 6 is a perspective view of a portion of the end section, showing the form of the inlet-pipe.

The object of our invention is to provide a latrine that can be kept thoroughly cleansed with a minimum quantity of water, and which shall be thoroughly and continuously ventilated, and in which these operations shall be automatic when once adjusted and put in operation.

To accomplish these results, we construct the latrine or body A of the trough of a series of cast-iron sections I of the form shown in the several figures, Fig. 3 showing one of the end sections detached and Fig. 2 showing a series of these sections united. In Figs. 4 and 5 the form of these sections is shown in cross-section, in which it will be seen that the front wall is considerably inclined, while the rear wall is nearly vertical, the two walls being united by a curved bottom portion, which is very much narrowed, the object being to so form this bottom portion that a small quantity of water will suffice to fill it at the point where the fecal matter is deposited, as represented in Figs. 4 and 5. These sections I have their bottoms p curved longitudinally also, as shown in Figs. 2 and 3, thereby forming a slight depression or cavity in which a small quantity of water will be held after the flushing has taken place, as shown at the right-hand end of Fig. 2, where two of them are shown in section to illustrate this fact.

Each of the sections I is provided at its front with two openings n for the admission of air, these being located one near each end, so as to leave an unbroken wall at the center of the front opposite the hole in the seat. On their rear side they are provided with a projecting spout or nose b, as shown in Figs. 3, 4, and 5, to connect with a ventilating-duct D at the rear. This ventilating-duct D is preferably made of galvanized iron and may be located below the level of the seats, as represented in Fig. 5, or may project above, as represented in Fig. 4, or be placed below the floor, if desired.

In order to secure a uniform draft through each and all of the sections I, the duct D is made of increasing area from the extreme or end section to the point where it is connected to the vent-shaft V, as represented in Figs. 1 and 2. Ordinarily the draft would be strongest through those sections nearest the vent stack or shaft, more especially when the latrine is made very long; and as a means of regulating the draft at each spout b we secure within the spout b or at its mouth a metallic valve or diaphragm v, as represented in Figs. 3, 4, and 5. This may be simply a piece of galvanized iron, soldered or riveted at its upper edge to the wall of the duct where the latter covers the spout b, as shown, or in any similar manner, it being of a size sufficient to nearly close the spout or air-passage when in a vertical or closed position.

After the air-duct has been connected to the vent-stack, so that the draft at the various spouts can be tested, the several diaphragms or valves v will be adjusted by bending them so as to make the passage through the spouts more or less, as may be required, in order to

equalize the draft through them all, this bending or adjustment being indicated by dotted lines in Figs. 4 and 5. This adjustment can be quickly made, and when once made does not need to be changed. If, however, a change should be required for any reason, it can be instantly done by simply bending, pushing, or drawing the diaphragm or valve outward or inward, according as it may be desired to increase or decrease the draft at any particular spout. It is obvious that these valves might be hinged and be held where adjusted by friction or other means, but the plan described is preferred, because the valve is less liable to be moved when once adjusted.

In practice we find that it is not necessary to put a valve in all of the outlets *b*, as those farthest from the stack will naturally have less draft or current than those near the stack; but as a matter of precaution we prefer to provide all or nearly all the outlets with them, as it is so little trouble to open them where they are not required.

The vent-shaft extends out through the roof of the building, is made of an area sufficient to carry a large volume of air, and to insure a strong draft it is provided with a small stove or heater H, of any suitable kind, as represented in Figs. 1 and 2. This heater may be located either at the base of the stack V or at some distance above, as may be most convenient, it serving in either case to rarefy the air above it and thereby produce a strong upward current and drawing air continuously through the several openings *n* into and through the several sections of the latrine, and from thence through the spouts *b* into the duct D, and thence into and up the vent-stack V to the outer atmosphere.

By making the duct and vent-shaft of the proper capacity or area a strong draft is drawn through the latrine throughout its entire length, whether the lids L be opened or closed, and thus all odor is completely carried away, and at the same time the draft of air from the room in which the latrine is located keeps the room thoroughly ventilated and free from foul odors, a result of great importance, more especially in school-buildings, where a large number of children are confined for hours at a time, and where, as a general rule, these latrines are located in the basement-rooms, from which noxious odors and gases will naturally ascend to and permeate the halls and rooms of the bnilding above.

It is obvious that where electric or other power is at hand a fan located at the mouth of duct D or in the shaft V above may be used instead of the stack-heater to create a draft; but as this is a well-known equivalent and in common use we have not thought it necessary to show it, the only requisite in this respect being that means shall be used to secure a strong draft.

While we have shown the ventilating-duct connected to the stack at one end, it is obvious that it may be connected at any other point, as, for instance, midway of the length of the duct, it only being necessary that the area of the duct shall be increased from its closed ends to the point where it connects with the ventilating-shaft to insure a draft through all the openings *n* and spouts *b*, as before explained.

The point of connection, as well as the location of the duct D, will necessarily depend on the location of the ventilating-shaft and the most convenient position for locating the latrine in the room or building, and as these will vary in different buildings these matters must be left to the decision of the builder and engineer or architect in charge. In some cases it may be desirable or necessary to build the duct D underground, and which may be done by simply using suitable pipes to connect the several spouts *b* with the duct below, as indicated by dotted lines in Fig. 4. These are mere mechanical details to be varied according to circumstances and do not in any manner change the result or mode of operation.

In order to secure a frequent flushing of the latrine, we connect to it an automatic flushing device of any suitable kind, one of the simplest being that shown in Fig. 2. It consists of a water-tight box or case C, in which is pivoted a water-tank F of such form that when filled it will tip automatically and deliver its contents into the case C, from whence the water will flow through the pipe J, Fig. 2, into and through the latrine, carrying with it the deposits out at the opposite end into the discharge or outlet pipe O, which connects with the sewer, with a trap interposed, in the usual manner.

The tank or pan is so pivoted and weighted that when emptied it will at once resume its former position ready to be again filled by the supply-pipe *a*, which will of course be provided with a valve by which the flow of the water can be regulated, and thereby regulate the intervals of flushing. This or any other form of automatic flushing-tank may be used, there being a great variety of such, but this being a simple and efficient device for the purpose we prefer to use it.

The inlet-pipe J, which connects the flushing-tank with the latrine, is made of peculiar shape, as shown in Figs. 3 and 6. As there shown, it will be seen that it changes from the circular to an oval form, the mouth or point where it enters the latrine being very much wider laterally than it is vertically, as shown clearly in Fig. 6, the object being to cause the water to spread out laterally and assume a fan shape as it enters the latrine. By this means not only the extreme bottom but also the side walls for some distance upward on each side of the center are thoroughly washed at each flushing, thereby insuring the removal of all adhering particles, if any, and keeping the walls clean.

In order to keep the walls of the latrine

above clean and free from odors, we arrange a perforated pipe *c* along each side near the top, as shown in Figs. 3, 4, and 5 and in dotted lines in Fig. 1, these pipes being supported on brackets *f*, cast on the walls, as shown in Figs. 3, 4, and 5. They may be supplied with water by a branch pipe *e*, connecting with the supply-pipe *a*, as shown in Figs. 1 and 2, or from any other convenient source. A valve *l* in the branch pipe *e*, Fig. 2, serves to regulate the supply of water to these pipes *c*, it being necessary to use only enough water to keep the walls constantly wet, so that the water will trickle down in a thin film.

By the construction and arrangement of the several parts and devices as herein shown and described we are enabled to produce a latrine which in practice is found to operate perfectly with the best of results. By making them of sections in the manner shown latrines of any desired length can be produced to suit any style or size of building, and by the peculiar form of the several sections each will always retain a small quantity of water, sufficient to prevent the adhesion of the deposits, leaving them free to be entirely removed from all the sections at each flushing, the slight undulations of the bottom not interfering with the washing out of the deposits. At the same time the perforated pipes keep the walls clean and free from odors, and serve to keep the cavities or depressions in the bottom supplied with water after the flushing has occurred, while the means for producing an evenly-distributed draft throughout the entire length of the latrine not only carries off any odors that may be created, but at the same time insures a thorough ventilation of the room in which the latrine may be located, and prevents foul odors or gases from permeating other portions of the building.

We are aware that a latrine has been patented in which the depressions in its bottom are curved longitudinally and transversely and are arranged successively in different planes after the manner of a series of steps; but in the construction shown the longitudinal curve being much more abrupt at one end than at the other causes the deepest portion of the water to be near one end instead of at the center, and the depressions being arranged in different planes necessitates the placing of the seats and the floor or platform below it at different elevations, both of which results are objectionable for various reasons. By our construction we avoid both of these features. The depressions being of uniform curvature at each end secures the greatest depth of water at the center, and all being in the same horizontal plane, with a slight inclination only, (the force and velocity of the water rather than the inclination serving to remove the deposits,) enables the seats and the floor or platform to be arranged in a single horizontal plane.

Having thus described our invention, what we claim is—

1. A latrine having a series of depressions in its bottom, said depressions being transversely and longitudinally curved, the longitudinal curvature being uniform at the opposite ends of each depression, and all being arranged in the same horizontal plane, substantially as shown and described, whereby the bottom forms a continuous horizontal undulated surface from end to end, free from transverse ribs, angles, or steps, as set forth.

2. A latrine having its bottom provided with a series of longitudinally and transversely curved surfaces forming a series of shallow depressions, all arranged in the same horizontal plane, in combination with an inlet or flushing pipe having its mouth made of an elliptical form with its greater diameter arranged transversely of the latrine, the mouth of said pipe being arranged to deliver the water horizontally in the line of the longer axis of the latrine, substantially as shown and described.

3. A latrine composed of a series of sections, each section being provided with one or more air-inlets at its front under the seat, and an air-outlet at the rear, in combination with an air-duct connecting with all of said air-outlets and with a vent-stack provided with means for drawing air continuously through the same, substantially as shown and described.

4. In combination with a latrine having air inlets and outlets arranged at intervals throughout its length, a ventilating-duct connecting to the several outlets, with a ventilating-shaft, with means for producing a draft through the same, substantially as shown and described.

5. In combination with a latrine having a series of air-outlets connecting with an air-duct common to all of said outlets, one or more valves arranged to regulate and thereby equalize the draft through the several outlets, substantially as shown and described.

In witness whereof we hereunto set our hands in the presence of two witnesses.

JAMES A. WILLS.
LLEWELLYN E. JORDAN.

Witnesses:
EUGENE C. BONNIWELL,
FRANK KERNAN.