

April 14, 1942.

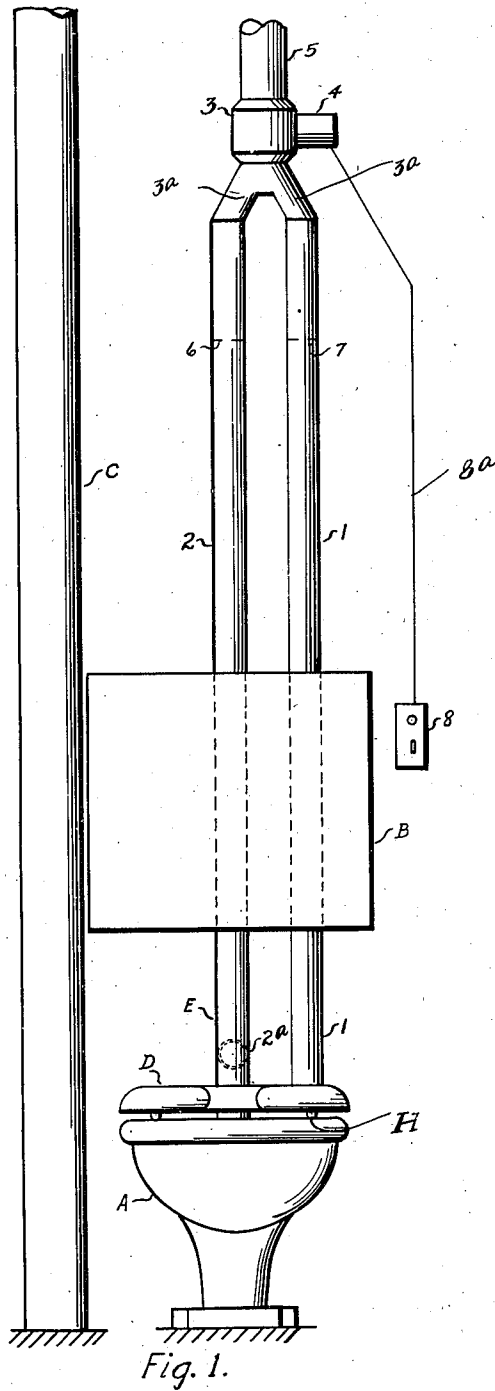
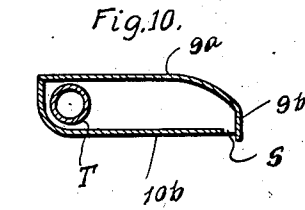
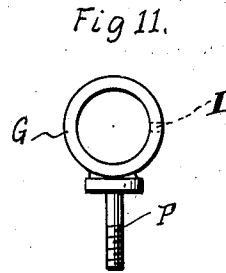
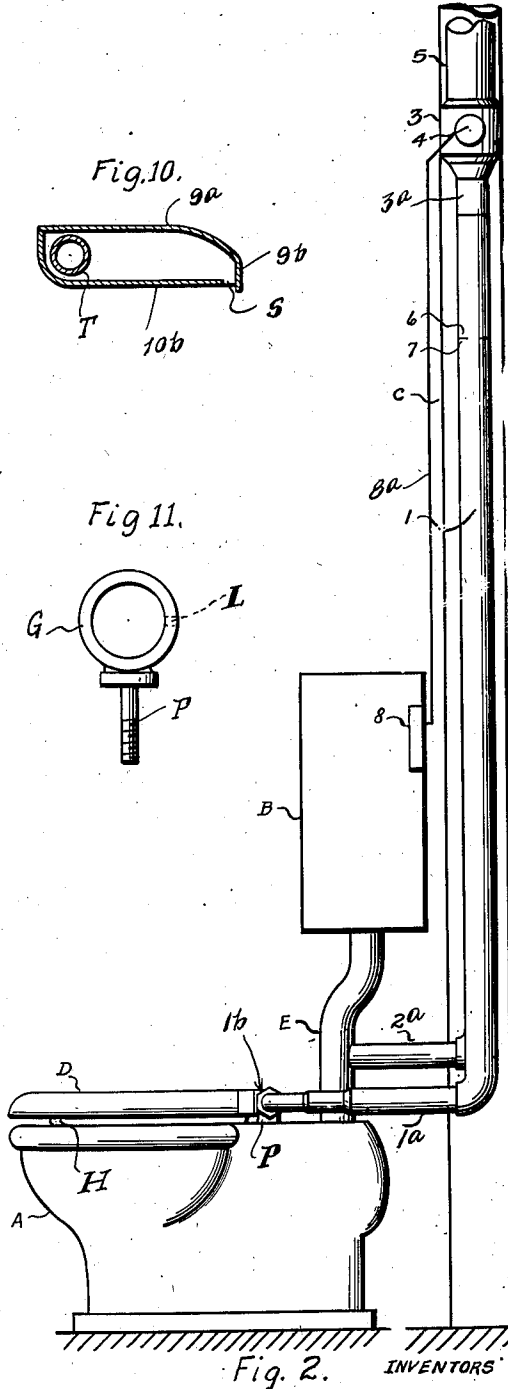
R. W. JOHNSON ET AL

2,279,870

VENTILATION OF WATER CLOSET BOWLS AND SEATS

Filed June 7, 1940

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

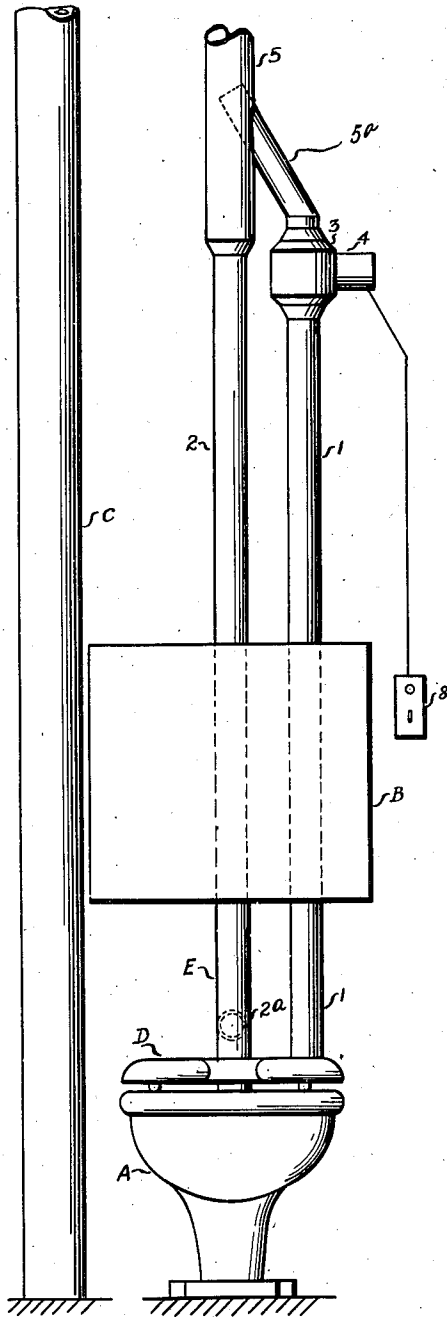


Fig. 3.

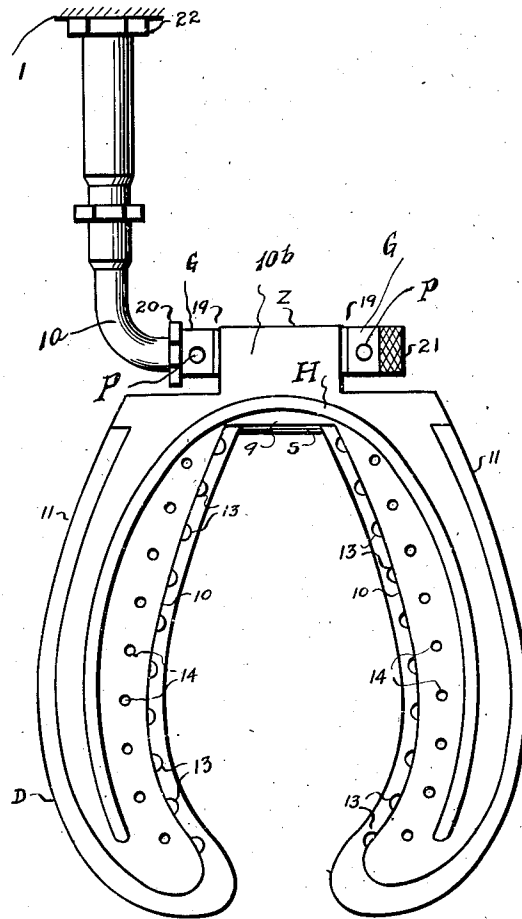


Fig. 4.

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3 Sheets-Sheet 3

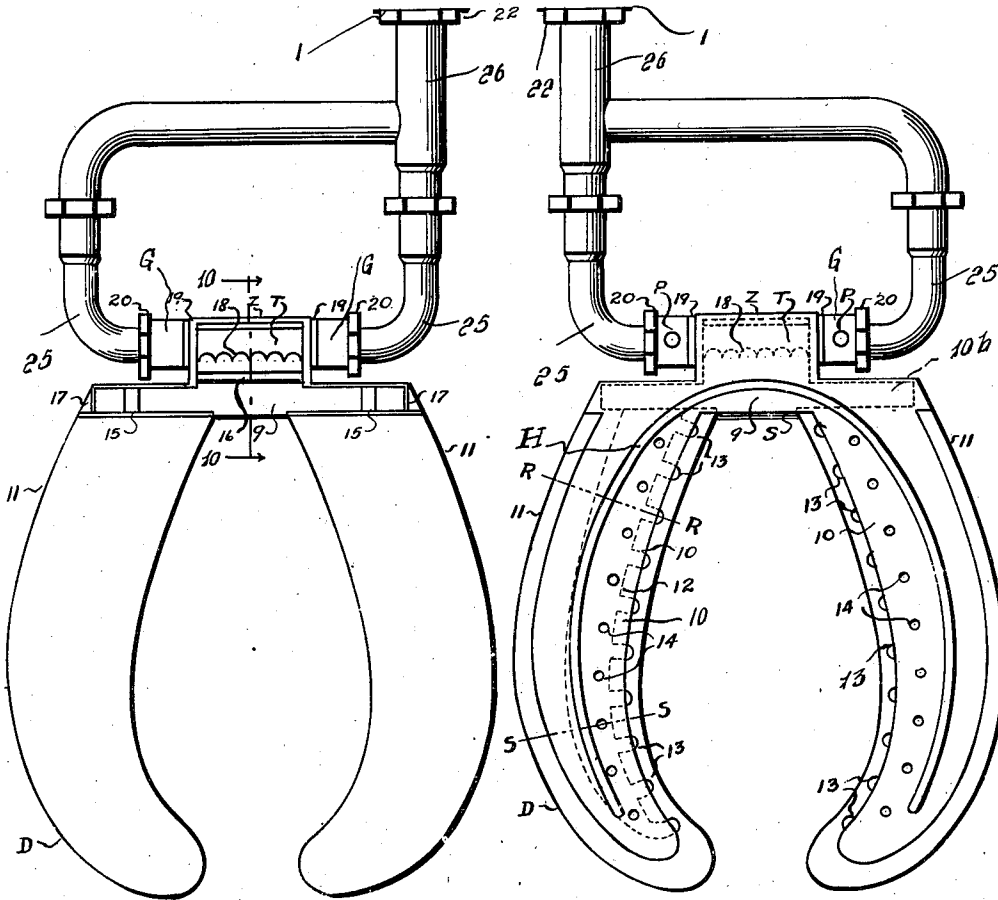


Fig. 5.

Fig. 6.

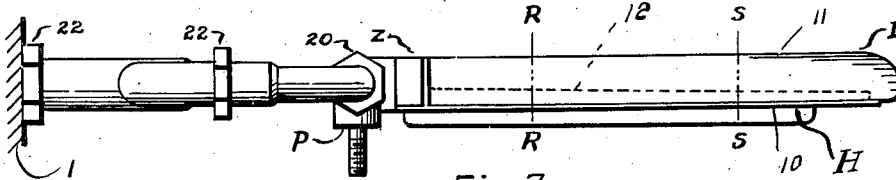


Fig. 7.

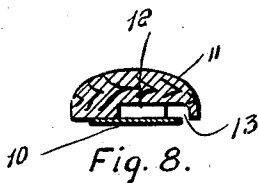


Fig. 8.

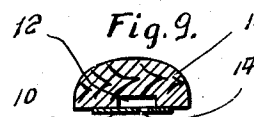


Fig. 9.

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## UNITED STATES PATENT OFFICE

2,279,870

VENTILATION OF WATER CLOSET BOWLS  
AND SEATS

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Application June 7, 1940, Serial No. 339,366

2 Claims. (Cl. 4—216)

This invention relates to the ventilation of water closet bowls and seats.

It is common practice in the prior art to provide suitable vents for a main sewer to avoid objectionable odors and dangerous gases escaping therefrom, and such art teaches the use of water traps and seals to assure the effectiveness of such vents and thereby prevent the venting of such objectionable odors and dangerous gases until the water closet is flushed and the water trap operated, but in such prior art devices venting is only momentarily effective.

The primary object of the present invention is to provide a comparatively inexpensive, simple and thoroughly effective device which will adequately ventilate the water closet during the entire period of use, and also when not in use.

A further object of the invention is to provide a novel device of the foregoing character which will adequately function entirely from the water closet seat through the medium of suitable vents.

With the above and other objects in view that will become apparent as the nature of the invention is better understood, the same consists in general of certain novel details of construction and combination of parts hereinafter more fully described, illustrated in the accompanying drawings, and claimed.

In the accompanying drawings:

Figure 1 is a front elevational view of a water closet installation embodying the present invention, and showing separate vent pipes extending from the bowl and seat to a single outlet pipe exhausting to the atmosphere,

Figure 2 is a side elevational view showing the vent pipe for the water closet bowl communicating with the flush pipe connection between the reservoir or flush tank and the bowl,

Figure 3 is a front elevational view showing a modified form of venting attachment for the water closet installation,

Figure 4 is a bottom plan view of the water closet seat with a single vent duct connection therewith,

Figure 5 is a top plan view of a water closet seat with a double or loop form of vent pipe connection associated therewith, the cover or lid for the vent box being removed,

Figure 6 is a bottom plan view of the seat shown in Figure 5,

Figure 7 is a side elevational view of the seat and the associated vent pipe connections shown in Figures 5 and 6,

Figure 8 is a cross-sectional view taken on line R—R of Figures 6 and 7,

Figure 9 is a cross-sectional view taken on lines S—S of Figures 6 and 7,

Figure 10 is a detail sectional view taken on line 10—10 of Figure 5 with the cover or lid for the vent box in position thereon, and

Figure 11 is a side elevational view of the supporting post for the seat hinge.

As shown in Figures 1 to 3, the water closet installation comprises a hopper or bowl A having a flushing reservoir or tank B associated therewith through the medium of a flushing pipe connection E, the bowl A being provided with a hingedly mounted seat D, while the usual sewer vent pipe is designated by the reference character C, all of the foregoing features being of standard construction with the exception of the hinged seat DD that forms a part of the present invention.

The hinged seat D is of channeled construction and has air vents and ducts provided therein that extend into and through the hinged mounting for the seat and such seat construction is shown in detail in Figures 4 to 9 and will be later described.

As shown in Figures 1 and 2, venting and induced draft devices are associated with the bowl and seat, the reference numeral 1 designating a vertical vent pipe disposed rearwardly of the bowl A and carrying a horizontal pipe section 1<sup>a</sup> at its lower end communicating with the hinged mounting 1<sup>b</sup> for the seat D and into which hinged mounting the ventilating ducts in the seat extend. A second vertical ventilating pipe 2 adjacent to the pipe 1 has a lower horizontal section 2<sup>a</sup> communicating with the flush pipe connection E between the flush tank B and the bowl A. Metering devices 6 and 7 diagrammatically illustrated may be arranged in the ventilating pipes 2 and 1 adjacent their upper ends to effect equalization of the desired ratio of draft through said pipes and, as shown more clearly in Figure 1, the upper ends of said pipes 1 and 2 merge as at 3<sup>a</sup> into a fan housing 3 having a fan therein operated by a motor 4. The fan housing 3 carries a ventilating stack pipe extension 5 that outlets through the roof of the building for venting to the atmosphere. The motor 4 may be manually or automatically operated through the medium of the light signal switch 8 operatively connected to the motor as at 8<sup>a</sup>, these parts being schematically illustrated.

Induced draft effected by the fan in the casing 3 is present in the ventilating pipe 2 that communicates by means of the vent pipe 2<sup>a</sup> connecting the flush pipe E with the flushing rim of the

water closet bowl A, or if desired, the vent pipe 2 may have direct communication with the flushing rim of the bowl A. In a like manner the fan in the casing 3 induces a draft through the vent pipe 1 that communicates at its lower end with the channeled and vented seat D. When the fan is in operation increased ventilation of the bowl A and seat D is effected, and when the fan is out of operation, there is a natural up-draft through the vent pipes 1 and 2 to carry gases, etc., upwardly into the stack pipe 5 for exhaust to the atmosphere, the ventilating apparatus being operative at all times with the possible exception of the flushing period of the bowl with the ventilation during this period being provided by the usual sewer vent pipe C.

It will be observed in Figures 1 and 2 that the ventilating pipes 1 and 2 communicate with the fan housing 3. It is also intended that the draft impeller may be confined to the vent pipe 1 as shown in Figure 3 with the pipe section 5<sup>a</sup> from the fan housing 3 having an injector connection with the stack pipe 5 with which the vent pipe 2 directly communicates to create an induced draft in the vent pipe 2 that communicates with the flushing rim of the bowl as well as to create a direct suction in vent pipe 1 when that type of installation is used.

The detailed description of the ventilated seat is illustrated in Figures 4 to 9, Figure 4 illustrating a single pipe connection between the seat D and the ventilator pipe 1, while Figures 5 to 7 show a loop form of pipe connection between the seat D and the vent pipe 1. The ventilated seat construction is the same in both forms, the only difference being in the pipe connection between the seat and the ventilator pipe 1. As shown in Figures 4 to 9, the seat D is of the split type comprising side seat portions 11, but it is to be understood that the seat may comprise an uninterrupted loop portion. The vent casing or box designated in general by the reference character Z and being of T-shape is securely attached to the plate 10 and forms a part of the seat D, the cross head 9 of the vent box Z and the arms of the plate 10 having the seat portions D attached thereto while the leg of the T-shaped vent box Z constitutes an element of the hinged mounting for the seat. The upper side of the vent box Z is closed by a cover or lid 9<sup>a</sup> that is suitably secured thereto, the forward edge 9<sup>b</sup> of the cover or lid 9<sup>a</sup> projecting forwardly of the bottom of the box and of the rearward leg of the plate 10 to which the box is attached and is intermediate the side portions of the seat D, as will at once be apparent from an inspection of Figures 4 to 10, to provide an entrance opening or vent passage S at the rear end of the seat D.

The bottom face of each of the side portions 11 of the seat D has a channel 12 formed therein between the side edges of each of said side portions, the rear ends of the channels communicating with the vent box Z. A series of spaced ducts 13 is formed at the inner side of each channel 12 and communicating with said channels 12. An arcuate plate 10 is riveted or otherwise secured to the bottom face of each side portion 11 of the seat D, the rear ends of the side plates 10 carrying a head or leg 10<sup>b</sup> of generally T-formation to provide a base for the bottom side of the T-shaped vent box Z and said head or leg 10<sup>b</sup> is suitably secured to said vent box in any convenient manner. The plate portions 10 overlie the channels 12 with the inner

edges thereof spaced inwardly of the outer ends of the ducts 13 as shown in Figures 6 and 8 to provide entrance openings to the channels 12 and vent box Z, while additional vent openings 14 are provided in the plates 10 in direct communication with the channels 12. The chamber within the vent box Z is braced by struts 15, 16 and 17 as clearly shown in Figure 5.

The hinge mounting for the seat D includes a tube T extending across the leg of the T-shaped vent box Z and through the side walls of the leg with the projecting ends of the tube T extending through the ring portion or band G carried by the upper end of the posts P that is of substantial eye-bolt formation, the threaded end of the posts P being engaged with and anchored to the bowl A in the usual manner. The tube T is anchored in the band G by means of set screws threaded through openings L in the bands and engaged with the tube. Flexible packings 19 are associated with the seat hinge and are interposed between the bands G and the side walls of the leg of the T-shaped vent box, these flexible packings rendering the bent box gas-tight and providing means for lubrication of the seat hinge. As shown in Figures 5 and 6, the side wall of the tube T is provided with an aligned series of openings 18 forming communication between the interior of the vent box and the tube. The tube T has conduit connections with the ventilator pipe 1, packing nuts 20 effecting a slip joint connection between the tube T in the vent box Z and the conduit connections between the tube T and the vent pipe.

As shown in Figures 4 and 6, the side plates 10 and the T-shaped head 10<sup>b</sup> secured to the underside of the seat portions 11 carries a supporting cushion H that is engageable with the upper edge of the bowl A to create a more effective suction area in the top of the bowl, the cushion being preferably in the form of a half round hollow flexible tube cemented or otherwise secured to the underside of the plate 10 and being so positioned as not to interfere with the vent openings and ducts in the under side of the seat.

In the form of invention illustrated in Figure 4, the tube T in the hinged ventilator box Z of the seat has a pipe connection 1<sup>a</sup> extending between one end of the tube and the ventilator pipe 1, the connection being effected by the nuts 20 and 22. The other end of the tube T that projects outwardly of the ventilator box Z, and the band G, is closed by a cap nut 21, or in lieu of said cap nut, said end of the tube may be otherwise permanently closed.

The vent ducts 13 and the ventilator holes 14 are augmented by the ventilator slot S shown in Figures 4, 6 and 10 so that substantially the entire area within the bowl A has access to the ventilator box Z and the ventilator pipe 1.

In the form of invention illustrated in Figures 5 and 6 each end of the tube T projecting from the ventilator box Z and beyond the bands G has a loop pipe connection with the ventilator pipe 1 by means of elbow tubing 25 extending to a single larger pipe 26 that communicates with the vent pipe 1 and is secured to the vent pipe by the nut 22 or by an L screwed onto the outward end of the pipe 26.

From the above detailed description of the invention, it is believed that the construction and operation thereof will at once be apparent, it being noted that venting of the toilet is accomplished through the bowl A that has the vent pipe connec-

tion 2 therewith, while additional venting is accomplished through the channeled seat D having the vent channels 12, the vent ducts 13, the vent openings 14, and the slot S in the bottom faces of the side portions 11 of the seat, and at the forward side of the vent box, the direction of flow of gases or the like being through the side portions of the seat rearwardly to the vent box and from the vent box by way of the openings 18 to enter the tube T and the pipe connections 25 to the vertical vent pipe 1 that leads to the stack 5, outletting through the roof of the building for exhaust to the atmosphere. Draft induction through the pipe may be increased by the fan in the casing 3 effecting an augmented draft through both vent pipes 1 and 2 or the arrangement may be as shown in Figure 3 with the fan element associated with the vent pipe 1 and with said vent pipe 1 having an injector connection with the stack 5 producing augmented draft in the vent pipe 2 as well as direct suction in the vent pipe 1. It is also to be understood that any materials desired or method of construction may be employed in the manufacture of the ventilated toilet seat installation.

While there are herein shown and described the preferred embodiments of the invention, it is to be understood that minor changes may be made in the details of construction, such as will fall within the scope of the invention as claimed.

We claim:

1. In a ventilated toilet of the character described, in combination, a toilet bowl having a flushing rim, a hinged seat mounted on the bowl having vent openings and vent passages extending through the seat hinge, vent pipes connected

with the bowl and seat hinge whereby a natural up-draft ventilation of the bowl and seat is had through the vent pipes, the vent pipe of the seat having an injector pipe connection at its upper end with the other vent pipe, said last named vent pipe communicating with an outlet stack pipe and an air impeller in the vent pipe associated with the seat.

2. In a ventilated toilet of the character described, in combination, a toilet bowl having a flushing rim, a seat mounted on the bowl having vent openings and vent passages therethrough, said seat comprising side arm portions, a vent box of T-shape with the side arm portions of the seat attached to the ends of the cross-head of the T-shaped vent box, said vent box forming a hinge for the seat in communication with said vent openings and passages, said vent box having top and bottom walls with the top wall forwardly and downwardly arched over the central portion of the head thereof and terminating in spaced relation to the forward edge of the bottom wall and between the adjacent ends of the side arm portions to provide an unobstructed inlet opening to the box between said side arm portions vent pipes respectively connected with the bowl and vent box, said vent box including a tube extending therethrough upon which the vent box is journaled, the tube within the box having openings in constant communicating with the box and mounting posts for the seat having bearings at their upper ends in which the ends of the tube are fixed.

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