Sept. 20, 1932. W. J. LUFF 1,878,948

PLUMBING SYSTEM

Filed July 15, 1930 3 Sheets-Sheet 1

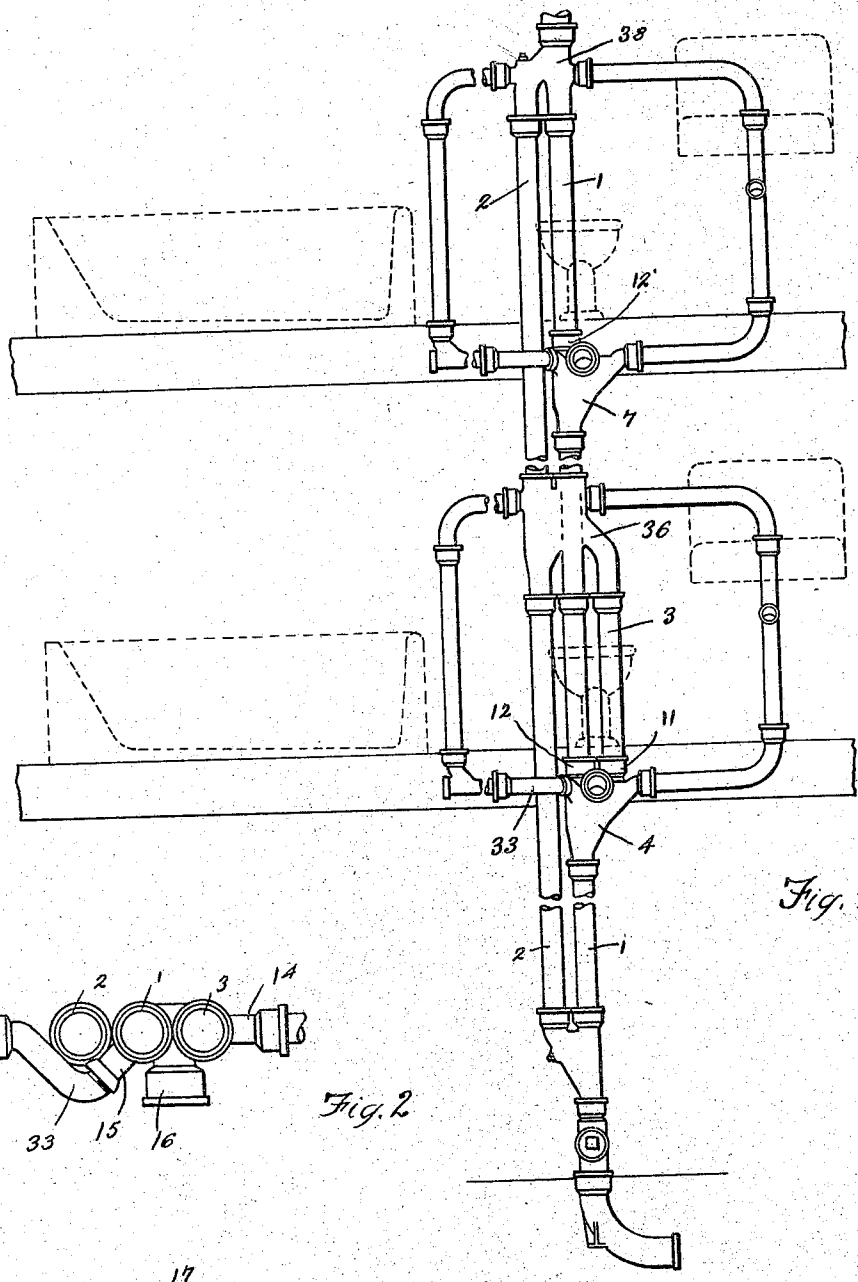


Fig. 1

Fig. 2

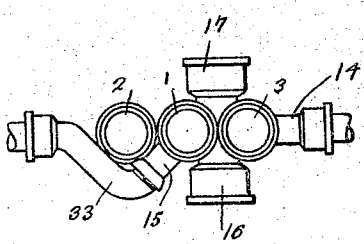


Fig. 3

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PLUMBING SYSTEM

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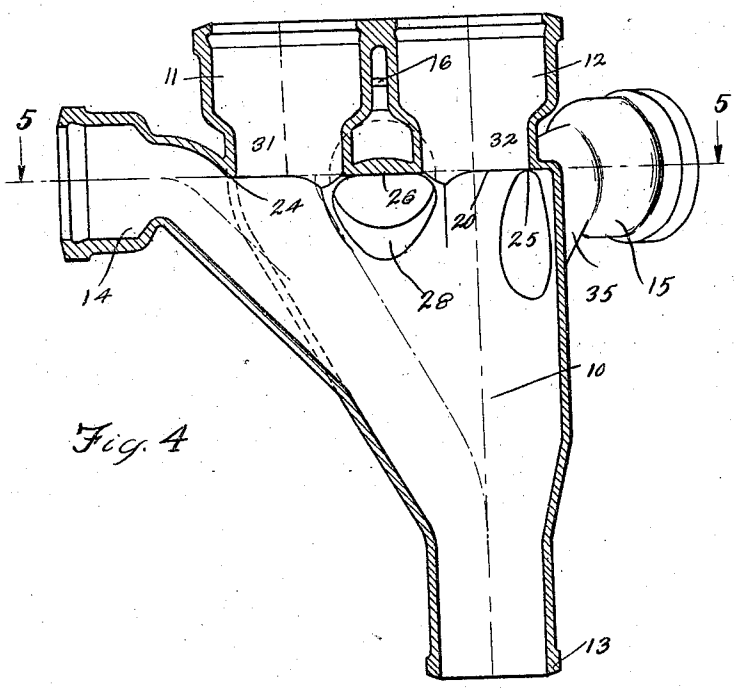


Fig. 4

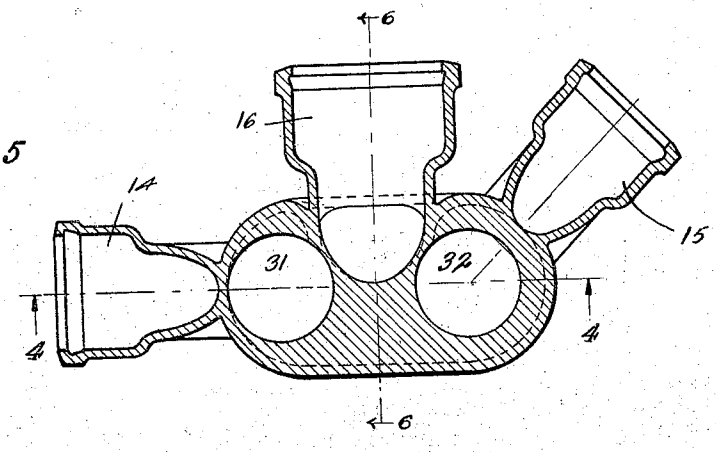


Fig. 5

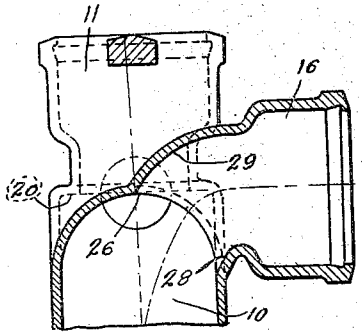


Fig. 6

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PLUMBING SYSTEM

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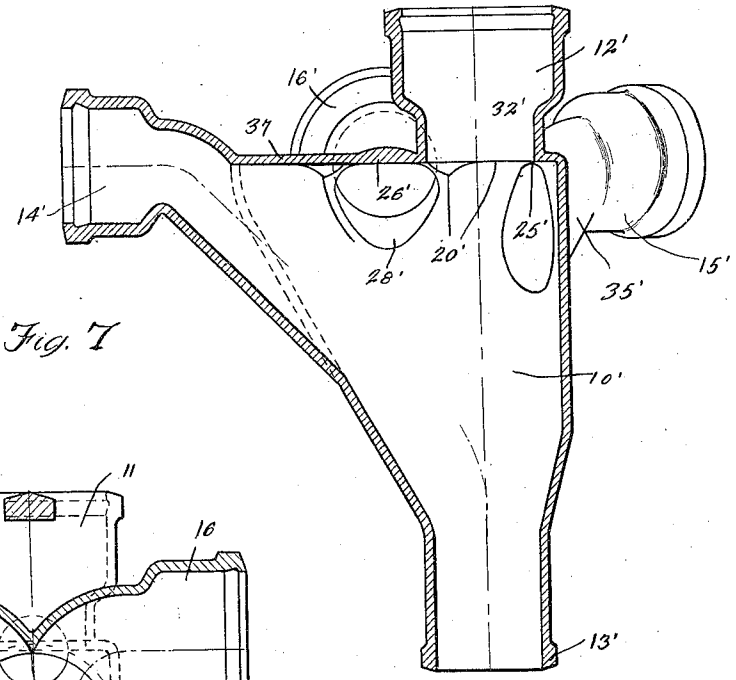


Fig. 7

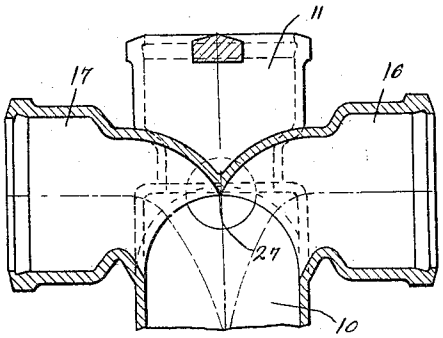


Fig. 9

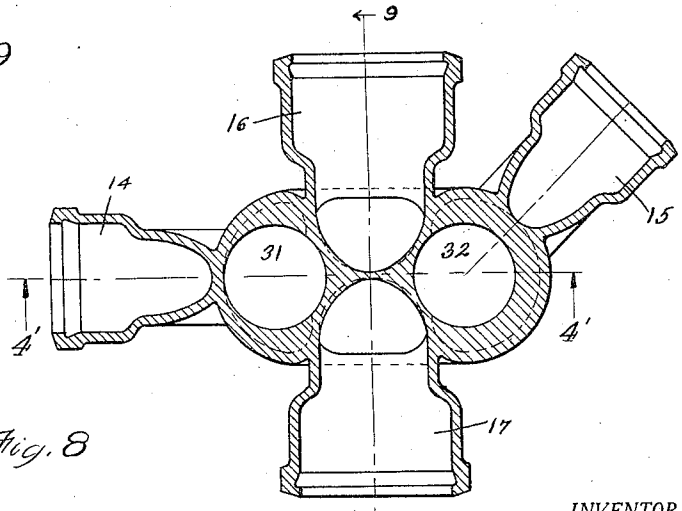


Fig. 8

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Patented Sept. 20, 1932

1,878,948

UNITED STATES PATENT OFFICE

WILLARD J. LUFF, OF CLEVELAND HEIGHTS, OHIO

PLUMBING SYSTEM

Application filed July 15, 1930. Serial No. 468,172.

My invention relates to plumbing systems, and particularly to improvements in building drainage and vent fittings. One of the objects of my invention is to provide fittings to be used to connect a waste and vent stack system to a series of lateral waste branches leading to water closets, bath tubs, wash basins and similar fixtures, in such a way as to effectually prevent the siphonage of the seals of the fixture traps in said lateral branches, and to prevent back pressure from disturbing the seals of said traps, and also maintain an efficient air circulation through the entire system. This invention is also intended to permit the connection of the maximum number of said fixtures into a waste stack, by connecting the lateral branches into the stack in such a manner as to secure the minimum of frictional resistance when the discharge through the lateral branch unites with the discharge in the stack, or with the discharge of other lateral branches. A further object of the invention is to secure the maximum of velocity in the lateral waste branches by connecting them into the waste stack with the maximum of downward grade and also to avoid the encroachment of the branches below the bottom of the ceiling joist, or the front of the studding in the vertical wall in which the waste and vent stacks are located, thus combining compactness with hydraulic efficiency. My invention also aims to secure a vertical branch vent-functioning to protect all the lateral waste branches in the group, carried to a point above the top of all the fixtures in the group to prevent the deposit of solids in the event of solid laden wastes backing up into said branch. To the above ends, my invention therefore comprises the various features which I shall hereinafter describe and claim.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims; the annexed drawings and the following description setting forth in detail certain structure embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a diagrammatic elevation showing the installation of my invention in a ventilated drainage system for a building, the installation on a top floor and on a lower floor being shown; Figs. 2 and 3 are detail plan views showing the connections of my improved fitting; Fig. 4 is a vertical central section through a lower floor form of my improved fitting and is taken either on the line 4—4 of Fig. 5 or on the line 4′—4′ of Fig. 8, looking in the direction of the arrows; Fig. 5 is a horizontal section on the line 5—5 of Fig. 4, looking down; Fig. 6 is a vertical section on the line 6—6 of Fig. 5 in the direction of the arrows; Fig. 7 is a view corresponding to Fig. 4, but showing a form of fitting for the top floor; Fig. 8 is a view corresponding to Fig. 5, but showing a double inlet; and Fig. 9 is a view on the line 9—9 of Fig. 8, in the direction of the arrows.

Referring more particularly to Fig. 1, my fitting is shown as applied to a system including a soil or waste stack 1 and a vent stack 2, and also including, on all floors below the top, an additional vent pipe 3. The lower floor fitting is indicated as 4 and is shown on a larger scale in Fig. 4, while the top floor fitting designated as 7, is shown enlarged in Fig. 7.

As best shown in Fig. 4, my fitting comprises an enlarged body portion 10, having top hubs 11 and 12, a bottom connection 13 and various lateral waste inlets 14, 15, 16 and, in certain forms, 17. The hub 11 receives the bottom of a section of the additional vent pipe 3, the hub 12 receives the bottom of a section of the soil or waste stack 1, while the bottom connection 13 fits into the hub at the top of a lower section of the soil or waste stack 1, while the lateral waste inlets receive the waste or soil pipes from the various fixtures.

In order to keep the lateral waste inlets within the limited space between ceiling and floor, as indicated in Fig. 1, it is necessary to have all so located that their inner surfaces join the body 10 of the fitting at the top, the intersection of the upper inner edge of

the inlets 14, 15 and 16 being indicated at 24, 25 and 26, Fig. 4, all in the plane of the upper edge 20 of the body portion 10. In the prior art lateral inlets of this sort have been given a slope of 1.4 inch to the foot, with the result that, in the event of simultaneous discharge of several inlets, and particularly if the soil or waste stack happened to be carrying a stream at the same time, the capacity of the fitting was exceeded, causing waste or waste and soil to back up in the various fixture outlets. The running off of such an accumulation at times caused the waste seals in the various fixture traps to be siphoned out. My improved fitting avoids such backing up, and consequently permits the waste stack 1 to be utilized at maximum efficiency. This is accomplished by giving each lateral waste inlet a sharp downward inclination so as to direct its stream in a direction to converge with the main descending stream from the top inlet 12 to the outlet 13 instead of across the main stream as in the prior art. Where limitations of space are not important, as on the side where the inlet 14 enters, this downward slant can be imparted by a modified Y fitting, but for inlets such as 15, 16 and 17 which are entirely or partly on what I may term the faces of the fitting, this is not permissible because it would result in an unsightly exposure at the junction of wall and ceiling. Therefore those inlets have their down slope produced by a formation which projects very little from the body of the fitting, as best illustrated in Figs. 6 and 9, and which is received in the space between the vent and waste channels 31 and 32, respectively, Fig. 5.

Referring to Fig. 6 it will be seen that the upper surface of the inlet 16 is sloped down at 29, and the lower surface is sloped down at 28. The surfaces 28 and 29 thus define a channel such that a tangential continuation of the axis of the inner end will intersect the plane common to the axes of the channels 31 and 32 at an acute angle which is very much less than a right angle, and preferably considerably less than 45°. Consequently the entering stream is travelling downward alongside the main waste stream before the two streams join, with the result that the lateral branch discharge does not impede the progress of the main stream, and thus the disadvantages of back water and possible siphoning of the traps are prevented without using an unduly large fitting or one which will encroach upon the ceiling or front wall space.

The branch connection just described may be doubled without departing from the principles of the invention. This is illustrated in vertical section in Fig. 9, where a branch 17 is placed on the side opposite to 16, the tops of the branches meeting in a cusp 27 at the top center of the body 10 and between the channels 31 and 32, Fig. 8.

To let a branch such as 33, Figs. 1 and 2, bent around the vent stack 2, enter the fitting, another lateral connection 15 is provided. This includes a sharply descending neck 35, the top of which joins the body 10 at the point 25 in the plane of the upper end 20 of the body. Thus this stream is also directed tangentially with respect to the channel 31 without having any part of the neck 35 extend far below the hub portion of the inlet 15.

With this fitting no aspirating or inflowing effect can occur in any branch for the reason that the vent channel 31, connected at 11 to the additional vent pipe 3, always gives a free supply of air above the descending waste streams. The pipe 3 is connected to the main vent stack as at 36.

The top floor fitting 7, shown in detail in Fig. 7, differs from those on the lower floors by having only a waste or soil stack connection 12; the remainder of the top of the body 10 being closed off by an integral flat surface 37. Otherwise the fitting is constructed in the same manner as the fitting 4. In Fig. 7 the corresponding parts bear the same reference characters as in Fig. 4, but with prime marks.

The portion of the waste stack 1 above the fitting 7 carries no water and is directly open to the roof vent, with the result that a free supply of air is always available through the passage 32′ to prevent siphoning of trap seals.

It is understood that the objects of this invention do not necessitate any distinction between a soil pipe and a waste pipe and wherever the term "waste pipe" is used herein it is intended to apply equally to a soil pipe.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. A waste pipe fitting adapted for connection with the pipe sections of a ventilated building drainage system and comprising a chamber which is provided at its bottom with an outlet connection for the upper end of a section of a waste pipe and at its top with a vertically disposed connection for the lower end of a section of a waste pipe and a vertically disposed connection for the lower end of a section of a vent pipe, said body portion having a cross-sectional area substantially larger than the cross-sectional area of the waste pipe and having a plurality of branch waste inlets with the axes of their inner ends directed substantially downward and the tops of the interior surfaces of said

inner ends intersecting said body portion substantially at a common plane.

2. A waste pipe fitting constructed at top and bottom for connection into a waste pipe section of a ventilated building drainage system and having a body portion intermediate its top and bottom, a plurality of waste inlets having the axes of their inner ends directed substantially downward and the tops of the interior surfaces of said inner ends intersecting said body portion substantially at a common plane, having the axes of their outer ends substantially in said common plane, with a vent opening entering said body portion substantially at the said common plane.

3. A waste pipe fitting constructed at top and bottom for connection into a waste pipe section of a ventilated building drainage system and having intermediate its top and bottom a body portion with a cross-sectional area substantially larger than the cross-sectional area of the waste pipe, and a plurality of waste inlets of more than one size with the axes of their inner ends directed substantially downward and the tops of the interior surfaces of said inner ends intersecting said body portion substantially at a common plane, said inlets having the axes of their outer ends substantially in said common plane, and a vent opening entering said body portion at substantially the said common plane.

4. A waste pipe fitting constructed for connection with the pipes of a ventilated building drainage system and comprising a body portion provided at its bottom with a waste pipe outlet connection and at its top with a vertically disposed inlet connection for a waste pipe, and a vertically disposed connection for a vent pipe, and also at its top with a waste inlet, the axis of the inner end of said inlet being directed substantially downward, the inner end of the interior surface of said inlet being disposed substantially within the space between said waste pipe connection and said vent pipe connection.

5. A waste pipe fitting connected at its top and bottom for connection with the pipe sections of a ventilated building drainage system and comprising a body portion which is provided at its bottom with an outlet connection for the upper end of a section of a waste pipe and at its top with a vertically disposed inlet connection for the lower end of a section of a waste pipe and a vertically disposed connection for the lower end of a section of a vent pipe, and also at its top with a waste inlet having the axis of its inner end directed substantially downward and entering said body portion with the top of its inner end intersecting said body portion between opposite planes, each of which is a common tangent to said waste connection and said vent connection.

6. A waste pipe fitting adapted for use as an element of a ventilated building drainage system and comprising an elongated body portion having its walls formed in substantially symmetrical relation to a certain plane and provided at one of its ends with an outlet connection for a section of a waste pipe and at the other of its ends with an inlet connection for a section of a waste pipe and a vent pipe connection spaced from said waste inlet connection but in proximity thereto, a waste inlet intermediate said inlet connection and said vent pipe connection, said waste inlet having the axis of its inner end intersecting said certain plane at an acute angle substantially less than a right angle and having a part of the intersection of its interior surface with the interior surface of said body portion between the intersections of the interior surface of said waste inlet connection and of said vent inlet connection, respectively, with the interior surface of said body portion.

7. A waste pipe fitting constructed for connections with the pipe sections of a ventilated building drainage system and comprising an elongated body portion having its walls formed in substantially symmetrical relation to a certain plane and provided at one end with an outlet connection for a section of a waste pipe and its other end with an inlet connection for a section of a waste pipe and a vent pipe connection spaced from said inlet connection for said waste pipe and in proximity thereto, a waste inlet intermediate said inlet connection for said waste pipe and said vent pipe connection, said waste inlet having the axis of its inner end intersecting said certain plane at an acute angle substantially less than a right angle and having the inner end of its interior surface extending substantially beyond a plane tangent to the interior surface of said body portion and parallel to said certain plane.

8. A waste pipe fitting constructed at its ends for connection with the pipe sections of a ventilated building drainage system and comprising an elongated body portion having its walls formed in substantially symmetrical relation to a certain plane, said end construction comprising at opposite ends an inlet and outlet waste pipe connection, and a vent pipe connection spaced from said waste pipe inlet connection and in proximity thereto, a waste inlet intermediate said first-named waste inlet connections and said vent pipe connection, said waste inlet having the axis of its inner end intersecting said certain plane at an acute angle substantially less than a right angle and having the inner end of its interior surface substantially within the space between the interior of said inlet connections for said waste pipe and the interior of said vent pipe connection.

9. A waste pipe fitting having one bottom and two top connections adapted to fit the

pipe sections of a ventilated building drainage system and also having lateral waste inlets, said top connections being vertically disposed and laterally spaced, said waste inlets being disposed between said two top connections and with their axes directed substantially downward.

10. A waste pipe fitting adapted for use as an element of a ventilated building drainage system and comprising an elongated body portion having its walls formed in substantially symmetrical relation to a certain plane and provided at one of its ends with an outlet connection for a section of a waste pipe and at the other of its ends with an inlet connection for a section of a waste pipe and a vent pipe connection spaced from said waste inlet connection but in proximity thereto, a pair of waste inlets intermediate said waste inlet connection and said vent pipe connection, said waste inlets having the axes of their inner ends intersecting said certain plane at acute angles substantially less than a right angle and having parts of the intersections of their interior surfaces with the interior surface of said body portion between the intersections of the interior surfaces of said waste inlet connection and of said vent inlet connection, respectively, with the interior surface of said body portion.

11. A waste pipe fitting connected at its top and bottom for connection with the pipe sections of a ventilated building drainage system and comprising a body portion which is provided at its bottom with an outlet connection for the upper end of a section of waste pipe and at its top with a vertically disposed inlet connection for the lower end of a section of a waste pipe, and a vertically disposed connection for the lower end of a section of a vent pipe, and also at its top with a pair of waste inlets having the axis of their inner ends directed substantially downward and entering said body portion with the top of their inner ends intersecting said body portion between opposite planes, each of which is a common tangent to said waste connection and said vent connection.

12. A waste and vent pipe fitting constructed with a top vent connection and a bottom connection to a waste pipe section of a ventilated building drainage system and having a body portion intermediate its top and bottom, a plurality of waste inlets having the axes of their inner ends directed substantially downward and the tops of the interior surfaces of said inner ends intersecting said body portion substantially at a common plane, having the axes of their outer ends substantially in said common plane, with a vent opening entering said body portion substantially at the same common plane.

13. A waste and vent pipe fitting constructed with a top vent connection and a bottom connection to a waste pipe section of a ventilated building drainage system and having intermediate its top and bottom a body portion with a cross sectional area substantially larger than the cross-sectional area of the waste pipe, and a plurality of waste inlets of more than one size with the axes of their inner ends directed substantially downward and the tops of the interior surfaces of said inner ends intersecting said body portion substantially at a common plane, said inlets having the axes of their outer ends substantially in said common plane, and a vent opening entering said body portion at substantially the same common plane.

Signed by me, this 2nd day of July, 1930.

WILLARD J. LUFF.