

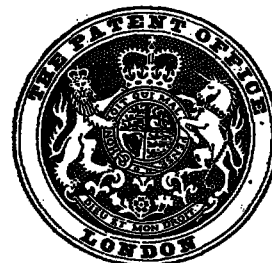
PATENT SPECIFICATION

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(54) A DOWN PIPE CONSTRUCTION

(71) We, MONIQUE LEGG of 3 Avenue Anatole France, Aix-en-Provence 13, France and GEORGES RICHARD of 51 Avenue St. Jerome, Aix-en-Provence 13, France, both of French nationality, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention relates to a down pipe construction for evacuating a mixture of waste liquid and waste matter.

Waste is evacuated in bulk from buildings through down drain pipes in a random way. This produces annoying phenomena such as noises and pressure variations which stop siphons and create smells and splashing.

To reduce these undesirable effects various means have been used: separate down pipes for W.C.'s; wide diameter ducts; primary and secondary ventilation and specially shaped connecting pieces.

The invention reduces these undesirable effects.

25 According to the present invention in one aspect, there is provided a down pipe construction for evacuating a mixture of waste liquid and waste matter, said construction comprising a down pipe and a branch pipe for introducing at least a portion of the mixture tangentially into the down pipe, which

mixture will travel down the down pipe in helical fashion surrounding an air column.

According to the present invention in another aspect, there is provided a down pipe construction for evacuating a mixture of waste liquid and waste matter, said construction comprising a down pipe, a branch pipe for introducing at least a portion of the mixture into the down pipe, and guide means adjacent the communication between the branch pipe and the down pipe for acting on the mixture entering the down pipe from the branch pipe in a gyratory sense, which mixture will travel down the down pipe in helical fashion surrounding an air column.

The present invention will be more readily understood from the following description, given by way of example only, of a number of embodiments thereof, reference being made to the accompanying drawings in which:—

Figure 1 is a diagrammatic vertical cross-section of a down pipe construction according to the invention;

Figure 2 is a cross-section of the construction at the level of a branch pipe along line II—II of Figure 1;

Figure 3 is a cross-section of the construction along line III—III of Figure 1 adjacent the bottom of the down pipe;

Figure 4 is a diagrammatic vertical section of another embodiment of the invention;

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Figure 5 is a cross-section along line V—V of Figure 4, and

Figure 6 is a cross-section along line VI—VI of Figure 4.

5 In the drawings, the same functional elements have been given the same reference numerals. Figures 1 to 3 illustrate flow along a substantial length of the down pipe;

10 Figures 4 to 6 illustrate flow substantially at a given level down the down pipe.

The waste liquid coming from the connected branch pipe 8 is injected tangentially into the flow down pipe 1. The liquid flows in the branch pipe 8 in a straight line as shown by the arrow 9 and in a rotating manner as shown by the arrows 11 in the flow down pipe so that a gyratory movement of the liquid is obtained. The centrifugal force causes the liquid to adhere to the inner wall of the flow down pipe 1 where it forms a laminar film. The centre of the flow down pipe 1 consists of an air column 10 which communicates with the atmosphere 21.

25 The gyratory movement 4 of the liquid is maintained by one or a plurality of oblique deflectors 18 which may be projecting or recessed.

30 The speed of downward movement 7 of the liquid is slowed by a friction surface 6 formed by an enlargement body 5 of the wall of the flow down pipe.

Before the liquid reaches the elbow located at the bottom of the flow down pipe the film 24 is split by a wedge 22. The liquid flows on both sides of the wedge as shown by the arrows 24'. Due to the window 25 which is thus opened in the liquid film, air in a pipe 26 connected to this elbow communicates with the air of the air column in the flow down pipe.

40 The means just described for creating a window in the liquid film at the level of the elbow to provide inter-communication between the air cores in the down pipe 1 and pipe 26 may be used whenever there is a waste inlet into the down pipe no matter at what level that inlet may be.

Figures 4, 5 and 6 illustrate a different and preferred embodiment in which a number of branch pipes feed into a bowl-shaped member which discharges into the down pipe.

55 The liquid above the bowl-shaped member or branch pipe device circulates in the flow down pipe 1 from an upper level 2 to a lower level 3. The liquid flows in a laminar manner according to the arrows 4. The liquid enters the body 5 of the device in which it spreads due to centrifugal force so as to be in contact with the surface 6 where it is slowed down by friction and lengthening of the flow path. The liquid then resumes its descending movement against the wall of the flow down pipe with a gyratory laminar movement 7.

65 The aperture 8 which is adapted to receive a relatively large discharge injects the liquid

coming from a secondary channel tangentially into the flow down pipe in such a way that the oblique axis of the injection is displaced to one side of and surrounds the vertical axis of the flow down pipe. The injected liquid flows in a gyratory descending movement as shown by the arrows 11 and 7. 70

One or more inclined planes 18 projecting or hollowed out and located in the main inlet of the branch pipe device guide and cut the liquid film so as to place in communication the air at the centre of the flow down pipe, which air is at atmospheric pressure, with air in the adjacent secondary inlets 13 which lead to the body of the branch piece. 75 80

The inclined plane or planes 18 regenerate the gyro-laminar movement and cut to pieces the solid waste matter transported by the liquid without stopping downward movement of the waste. This latter result is obtained by the sufficiently receding sharp upstream profile 19 of the or each plane 18. 85

Each of the secondary inlets 13 discharges into the branch pipe device a floor having a relatively small discharge. These secondary inlets enable the liquid 14 to flow down without any planned direction. However they are located at a distance which is sufficiently high above the injection axis 9 of the liquid entering through inlet 8 and having a relatively large discharge to prevent the liquid entering through inlet 8 from flowing upwardly through the secondary inlets 13. 90 95

As an added security, baffles 15 may be used to cut the upper liquid jets 16 and to project them beyond the inlets 13. This way, the movement of the liquid jets does not disturb the pressure in the siphons of the sanitary apparatus connected to the inlets 13. 100

A tympanum 17 located on one side of the relatively large discharge liquid injection axis 9 tends to deviate this axis in the direction of the gyration. In addition to this effect it acts as a baffle for the liquid streams turning in the body 5 preventing these streams from rising into the inlet 8. 105 110

A skirt 12 helps to prevent the obstruction of the central part of the branch pipe device by the liquid injected through the inlet 8 and facilitates the laminar injection. The skirt alone may create by itself the laminar injection in a case where there is no gyratory injection. 115

All the functional elements of the embodiment of Figures 1, 2 and 3 would be connected in operative relationship with the branch pipe device such as described and illustrated in Figures 4, 5 and 6. 120

The invention may be embodied in constructions other than those set forth herein; however the general conception of the invention would be the same, namely ventilated gyro-laminar flow of the waste liquid down the down pipe. 125



WHAT WE CLAIM IS:—

1. A down pipe construction for evacuating a mixture of waste liquid and waste matter, said construction comprising a down pipe and a branch pipe for introducing at least a portion of the mixture tangentially into the down pipe, which mixture will travel down the down pipe in helical fashion surrounding an air column.
2. A down pipe construction for evacuating a mixture of waste liquid and waste matter, said construction comprising a down pipe, a branch pipe for introducing at least a portion of the mixture into the down pipe, and guide means adjacent the communication between the branch pipe and the down pipe for acting on the mixture entering the down pipe from the branch pipe in a gyratory sense, which mixture will travel down the down pipe in helical fashion surrounding an air column.
3. A down pipe construction according to claim 1 or claim 2 including one or more members within the down pipe for cutting the mixture flow to create an opening to allow communication between the air column in the down pipe and air within the branch pipe.
4. A down pipe construction according to any one of the preceding claims including one or more deflectors within the down pipe for acting on mixture flow in a gyratory sense.
5. A down pipe construction according to any one of the preceding claims including a surface for effecting a slowing down of the downward speed of the mixture within the down pipe.
6. A down pipe construction according to claim 5 as dependent on claim 4, wherein the or each deflector is upstream of said surface.
7. A down pipe construction according to claim 5 or claim 6, wherein said surface belongs to an enlarged section having inlet means for the introduction of at least a portion of said mixture into the down pipe.
8. A down pipe construction according to

claim 7, wherein the inlet means comprises first inlet means for a relatively large discharge and second inlet means for a relatively small discharge, the first and second inlet means being so arranged that mixture entering through said first inlet means will not flow through said second inlet means.

9. A down pipe construction according to claim 8 including baffle means for diverting mixture flow away from the second inlet means.

10. A down pipe construction according to any one of claims 7 to 9 including a tubular skirt within the enlarged section to prevent obstruction of a central part of the enlarged section.

11. A down pipe construction according to any one of claims 7 to 10 including a tympanum within the enlarged section for acting on mixture entering the enlarged section in a gyratory sense.

12. A down pipe construction according to any one of the preceding claims including an elbow at the foot of the down pipe and a wedge adjacent the elbow for splitting the mixture flow before it reaches the elbow for providing communication between the air column in the down pipe and air in a pipe connected to the elbow.

13. A down pipe construction substantially as herein described with reference to Figures 1 to 3 of the accompanying drawings.

14. A down pipe construction substantially as herein described with reference to Figures 4 to 6 of the accompanying drawings.

15. A building incorporating a down pipe construction according to any one of the preceding claims.

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