Sept. 14, 1965 H. E. VOEGELI ETAL 3,206,231

STACK FITTING

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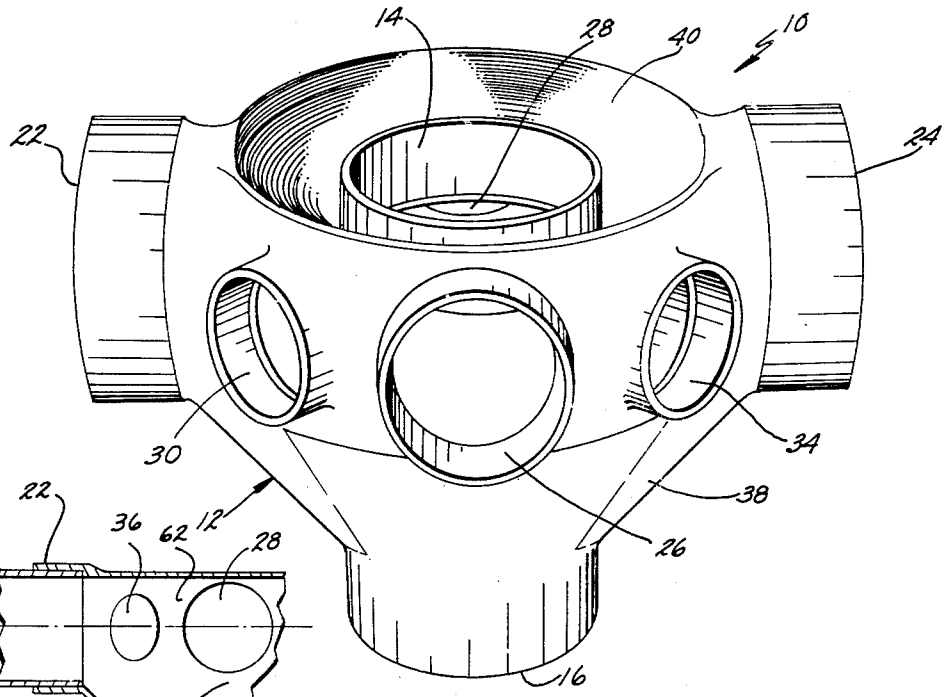

FIG. 1.

FIG. 4.

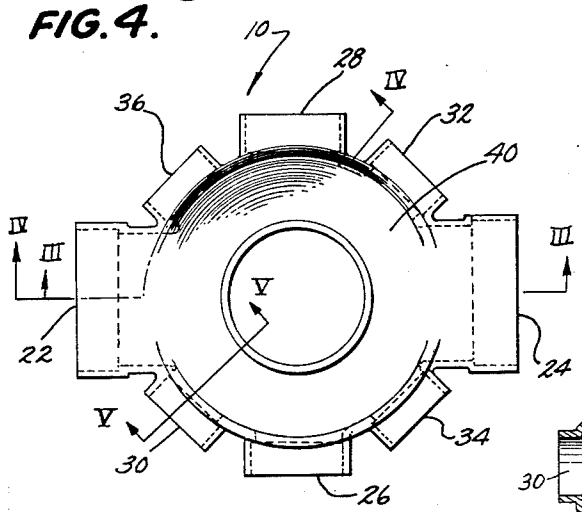

FIG. 2.

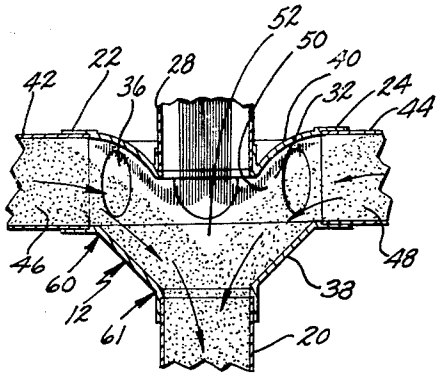

FIG. 3

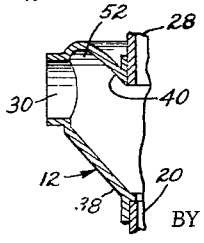

FIG. 5

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STACK FITTING

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This invention concerns plumbing fixtures, and more particularly a multi-connection stack fitting which combines minimum height with the ability to take a large number of connections including a plurality of waste and drain pipes without permitting any cross flow from one pipe to the other, and capable of assuring adequate venting of all input pipe from the central stack connection.

In the construction of certain buildings, particularly duplexes or multi-story apartment buildings, it is often desirable to have a single stack into which all the lines from a plurality of apartments on a single floor can be fed at the same level. For example, the National Plumbing Code provides that as many as thirty fixture units may be connected to a single three inch stack. As the diameter of the stack is increased, the number of fixture units which may be connected to it rises sharply.

Assuming that a pair of apartments in a duplex each have a two fixture unit laundry tub, a two fixture unit lavatory, a three fixture unit bathtub, a four fixture unit water closet, and a two fixture unit sink, the total fixture units for both apartments comes to twenty-six, i.e. less than the maximum number which may be connected to a single three inch stack. This, however, presented several problems in prior art practice. To begin with, it was often desirable to place the fitting in an eight inch standard joist area so that the fittings would not protrude through the ceiling of a room below. Also, it was considered unfeasible to feed one waste pipe into the stack directly opposite a drain pipe coaxial therewith because of the danger of plugging of the drain pipe by solid matter from the waste pipe.

The present invention solves this problem and makes the use of a single stack with multi-unit connections including a plurality of waste and drain pipes at the same level practical by providing a hollow fitting which has centrally located top and bottom openings for receiving the stack and vent connections, and a plurality of coplanar waste and drain pipe connection apertures which are dynamically insulated from one another and from the vent portion of the stack by an annular baffle surrounding the vent pipe and providing just sufficient deflection of the flow from the incoming waste pipes to prevent plugging of the opposite pipe by solids without restricting the flow of the wastes and drains. In addition, the baffle arrangement and pipe entry positions of the invention permit positive venting of all the lines from a common air chamber for non-siphoning, full sanitary flow.

It is therefore the object of this invention to provide a multi-connection, single level, waste stack fitting capable of receiving a plurality of waste pipes at a right angle to the stack.

It is also an object of this invention to provide a multi-connection, single level stack fitting capable of receiving not only waste but drain lines substantially on the same level.

It is a further object of this invention to provide a fitting of the type described which assures positive venting of all pipes discharging into the stack from a common air chamber.

These and other objects of the invention will become

apparent from the following specification, taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of the fitting of this invention;

FIG. 2 is a plan view of the same;

FIG. 3 is a vertical section along line III—III of FIG. 2 showing the flow paths and venting paths through the device of this invention;

FIG. 4 is a fragmentary elevation sectional view taken along the plane IV—IV of FIG. 2; and

FIG. 5 is a fragmentary sectional view taken along the plane V—V of FIG. 2.

Basically, the device of this invention permits the connection of all drain and waste lines from a large number of plumbing fixtures located at the same level of a building to a common stack at substantially the same level, so that all the lines can be vented from a common air chamber fed from an appropriate vent pipe. Such an arrangement positively eliminates any likelihood of breaking the seal of any trap in the various fixtures as a result of a water discharge from a fixture connected to the stack either through the same stacking fitting or at a higher level.

Referring now to the drawings, FIG. 1 shows the fitting of this invention in perspective. The fitting **10** consists of a cast body **12** which may preferably have the shape of a surface of revolution. The body **12** has formed therein a pair of central, vertically axially aligned openings **14**, **16** to which the vent pipe **18** (FIG. 3) and the stack **20**, respectively, are connected. A plurality of apertures or ports (eight in the example shown in the drawings) are formed in the perimeter of the body **12**. The axes of all of the ports may be in the same horizontal plane or the smaller ports may be arranged in a plane somewhat below that of the large ports designed to receive waste pipes. Preferably the ports or apertures are disposed in opposite pairs diametrically of the body **12**. The perimetral apertures or ports may be of varying sizes, for example the apertures **22**, **24** may be for waste lines, the apertures or ports **26**, **28** for large drain lines, and the apertures or ports **30**, **32**, **34** and **36** (FIG. 2) for smaller drain lines.

It will be recognized that drainage pipes in plumbing must be inclined, the average inclination being ¼" per foot. It will be understood that the centerlines of all the openings in the fitting **10** are so inclined although this is not illustrated on the drawings because of the small scale.

The lower portion **38** of the body **12** is generally frustoconical so as to produce a change of the flow direction from the horizontal inlet direction to the vertical outlet direction of the stack **20**. As illustrated in FIG. 3, the fitting provides a double 45° break, one at **60** and the other at **61** as is required by many plumbing codes. The top of the body **12** is countersunk so as to form an annular inclined baffle **40** which surrounds the vent opening **14** and extends downwardly to at least the plane of the axes of the apertures **22** and **24**. Thus, one-half of each of these apertures is curtained by the baffle. Preferably, the smaller ports are located on the same plane and therefore, one-half of their openings are curtained.

Operation

The operation of the device of this invention is best illustrated by FIG. 3. In that figure, the apertures **22**, **24** are illustrated as being connected to waste lines **42**, **44** respectively, such as are designed to service a closet. Sanitary sewage flow from the waste pipes **42**, **44** has been designated as **46**, **48** respectively. It will be noted from FIG. 3 that if the soil pipe **42** or **44** is exactly full at horizontal flow, the increased velocity of the sewage flow at the upper 45° break **60** and the following frustoconical

downturn 38 and in the lower break 61 entering the vertical stack 20 reduces the effective cross section of the flow considerably. For this reason, an air gap 50 is formed at the lower edge of the baffle 40 through which return air from the common chamber 52 which constitutes the interior of the body 12 can enter the pipes 42 and 44. The fact that both pipes are vented from the same common chamber 52 prevents any siphoning of the trap of one closet by a discharge from the other.

Although the lower end of the baffle 40 is, as just pointed out, sufficiently high to provide an air gap for the venting of the pipes 42 or 44, it is nevertheless sufficiently low to deflect downwardly any solid matter which may be carried at the top of pipe 44, for example, and may by its momentum be deflected beyond the surface of the downwardly turning stream 48. The baffle 40 of course is not able to deflect solid matter which is carried somewhat lower in the line 44, as for example near its center, but the flow characteristics of the sewage is such that the momentum of a solid particle located at that level cannot be sufficient to throw it across to the pipe 42. Such a particle, under the most severe conditions, would be deflected by the frusto-conical portion 38 of the body 12 from which it would drop into the stack 20 by gravity even though the normal flushing liquids were not present. It will be understood that this arrangement not only positively prevents solid discharged from one of the waste lines from entering an opposite waste line, but only prevents them from entering any of the drain lines.

The fact that the tops of the smaller ports 26, 28, 30, 32, 34 and 36 are well below the top of the larger ports 22 and 24 and the top of the air chamber 52 is significant (FIG. 4). This creates an annular air chamber 62 which interconnects all the ports which is never sealed from a source of venting air. Thus, in the rare event that one of the waste ports 22 or 24 is entirely filled by an unusually heavy flow, air can get to this port by traveling around the fixture in the annular chamber 62 some portion of which will always be open to the vent port 14. Even though an extra-ordinary flowage occurred which filled the waste ports 22 and 24 at the same time, this would still be true.

It more commonly occurs that the smaller drain pipes which enter through the ports 26, 28, 30, 32, 34 and 36 are occasionally entirely filled. The existence of the air chamber 62 immediately above these ports provides a constant air source which will positively prevent any siphoning of the trap in such a drain pipe or in any of the other drain or waste lines entering the fitting 10.

It will be seen that the present invention provides an effective and practical fitting for connecting a plurality of waste and closet lines to a common stack at the same level without danger of crossflow or plugging, so as to permit venting of all the lines from a common chamber and consequent avoidance of trap siphoning. Obviously, the concepts of this invention can be carried out in many different ways of which the embodiment shown and described herein is merely illustrative. We therefore do not desire to be limited by the embodiment shown, but only by the scope of the following claims.

We claim:

1. A multi-connection, single-level stack fitting comprising: a hollow body having a pair of vertically aligned openings, a pair of first ports and a plurality of second ports smaller than said first ports, all of said ports being disposed in the side of said body; the inner wall of said body having a first portion, that part of said first portion below said ports being downwardly slanted from said ports to the lower one of said openings, the remainder of said first portion extending above said ports; said inner wall being annular and rising above the tops of said second ports, said inner wall having a second portion curving inwardly and downwardly from the top of said first portion to form an annular venting chamber connecting all of said ports, at least a portion of said annular venting chamber being above the tops of all of said first and second ports; the downwardly curving portion of said wall forming a circular central baffle spaced from said first portion and surrounding the upper of said openings and separating said upper opening from said venting chamber, said baffle being spaced inwardly from said inner wall at said ports to form an annular passage for the free flowing movement of liquids.

2. A stack fitting as described in claim 1 wherein said baffle extends downwardly at least to the centerline of said first ports.

3. A stack fitting as described in claim 1 wherein the openings of said ports are all arranged in a common horizontal plane.

4. A stack fitting as described in claim 1 wherein the openings of said ports are all arranged in a common horizontal plane; said baffle extending downwardly at least to the centerline of said first and second ports.

5. A sanitary sewage system comprising: a vented stack; a plurality of branch lines converging toward said stack in a common plane; and a fitting having an outer wall, said fitting connecting said lines to said stack and permitting said branch lines to discharge into said stack through said fitting; said fitting having aligned upper and lower stack openings; said fitting having a generally circular hollow body inserted in said stack and having said lines connected to its periphery through ports arranged in a common plane normal to said stack; said body having a circular baffle means interposed between the upper stack connection to said body and each of said ports and spaced inwardly from said outer wall, said baffle means curving upwardly and outwardly and being integral with said outer wall above all of said ports, said baffle forming a downward deflector in the path of discharge of said ports for deflecting matter discharged from said branch lines and extending downwardly to about the common plane of the axes of said branch lines, said body between said baffle and said outer wall providing a continuous annular air chamber common to and above the tops of all of said ports and surrounding said upper stack opening; said baffle separating said air chamber from said upper stack opening and shielding it from discharge received through said upper stack opening.

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