

# United States Patent

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[56]

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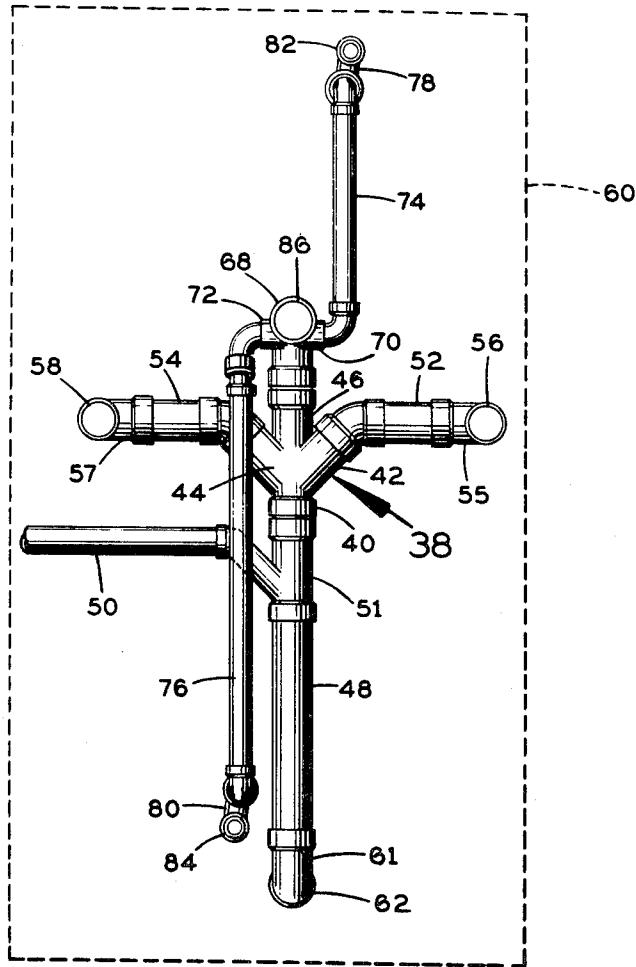
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[54] PLUMBING APPARATUS  
7 Claims, 4 Drawing Figs.

[52] U.S. Cl. 137/357,  
285/150, 52/34, 52/79, 4/211, 4/2  
[51] Int. Cl. A47k 4/00,  
F16L 5/00  
[50] Field of Search 137/357,  
362; 285/150, 153, 155, 156; 4/2, 211, 212; 52/79,  
34, 35

**ABSTRACT:** Plumbing apparatus for draining water from tubs and commodes or the like in a limited vertical space and with a single sewer connection, the apparatus including a connector having four arms, one of which has two inlets, with a sewer drain line connected to one arm, commode drain lines connected to two other arms, and tub drain lines connected to the two inlets of the fourth arm.



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FIG. 1

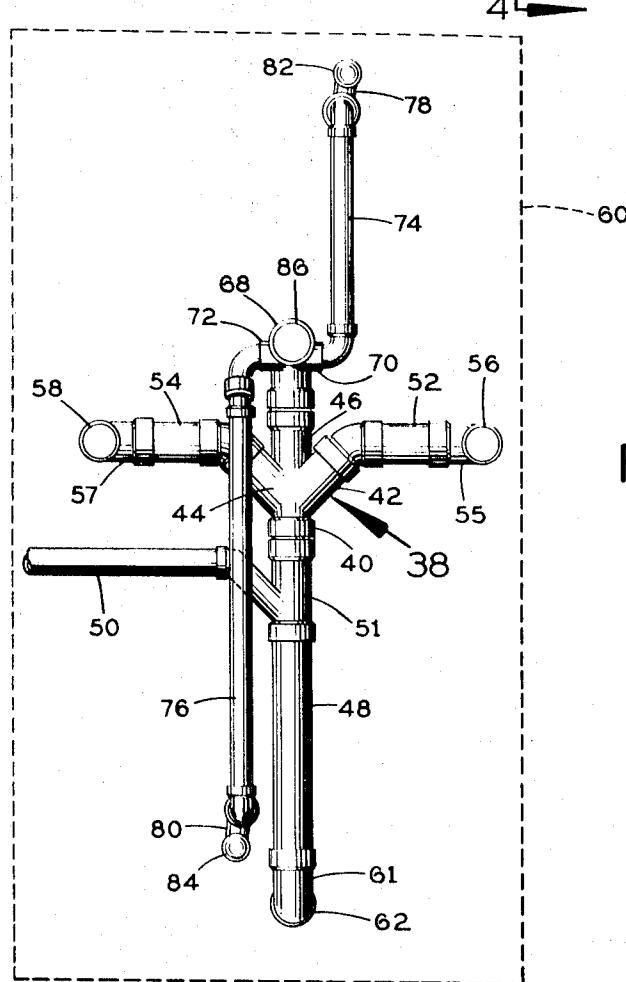
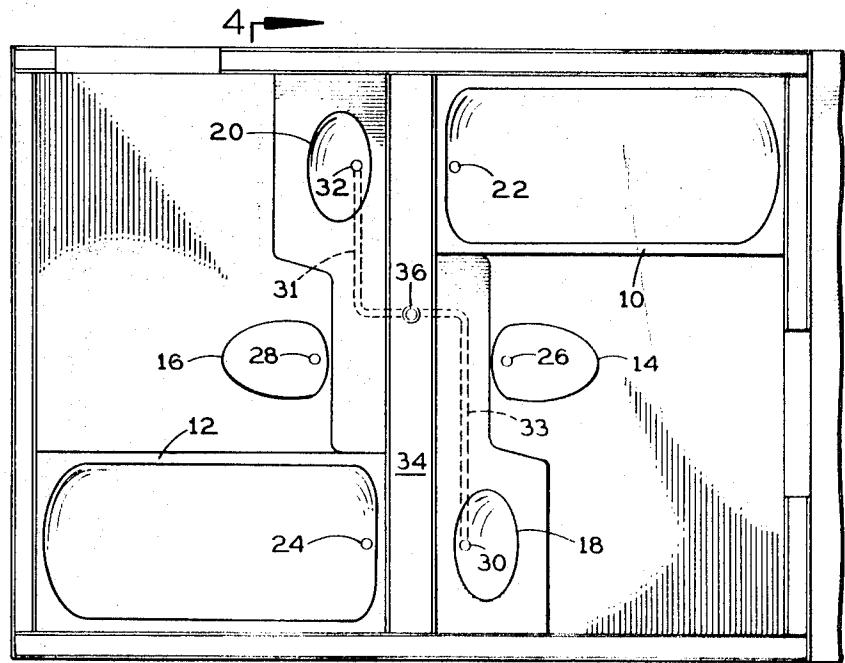


FIG. 2

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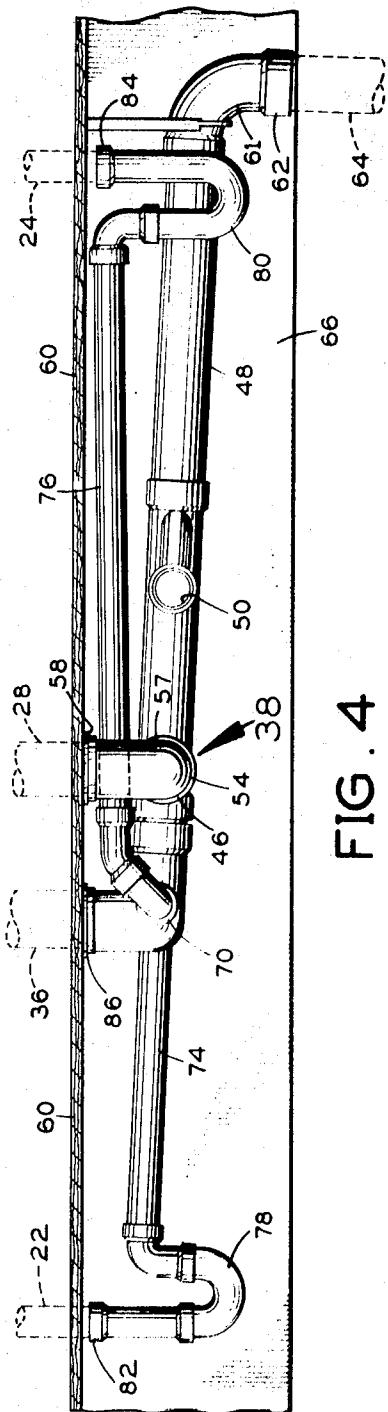
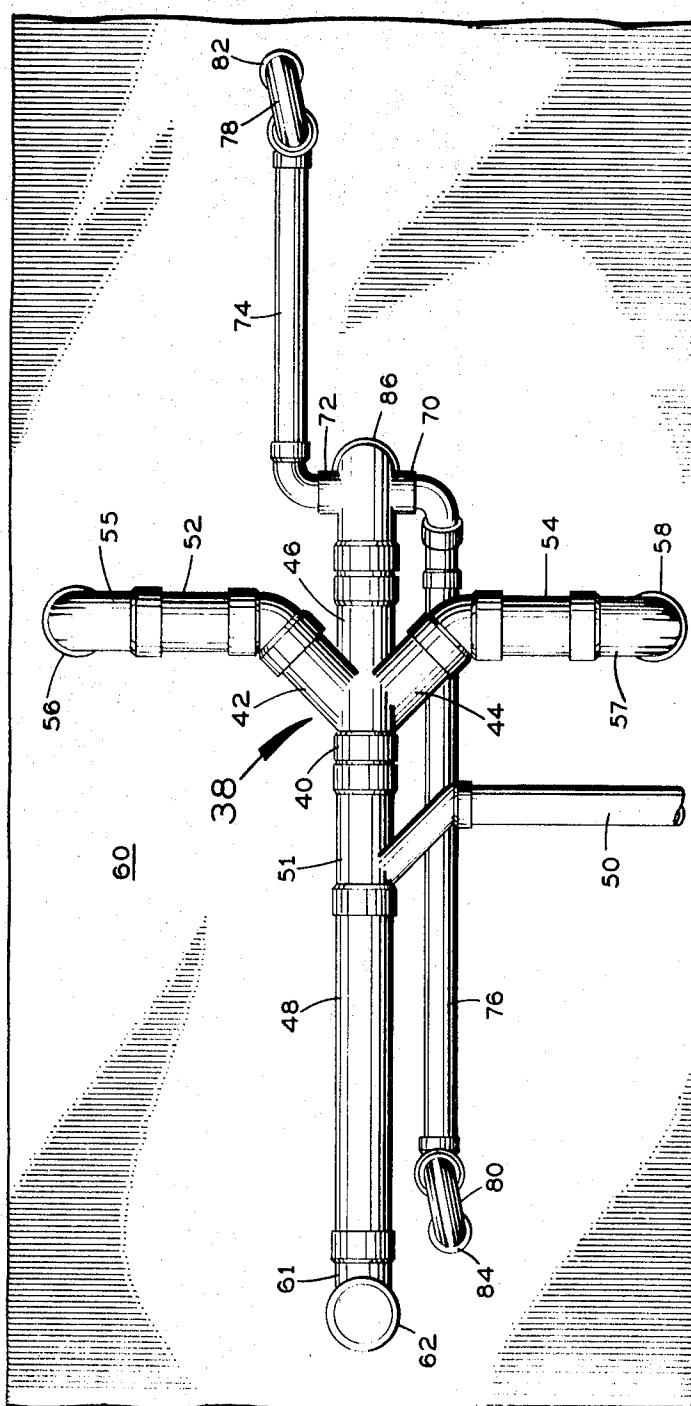


FIG. 3.

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## PLUMBING APPARATUS

## BACKGROUND OF THE INVENTION

Considerable effort is being put forth at the present time to develop new ways of building homes and other buildings. One of the promising approaches is modular construction. In this approach, modules for homes or other buildings are built in a factory in a completed or nearly completed condition, and are then transported to the home site where two or more modules are assembled together into a complete building.

In such modular construction it is desirable for all plumbing to be located in a single module to eliminate any need for plumbing interconnections between modules. In a particular modular home which serves as an illustration, two bathrooms are provided in a single module, the bathrooms being accessible from adjoining bedrooms. The bath tubs, commodes and sinks in these two bathrooms must have drainage plumbing, and this plumbing should connect into a sewer drain line beneath the floor of the module. One problem is that only a very limited vertical space is available beneath the module. The floor of the module is supported by frame means, and the plumbing connections must be made within the vertical limits of the frame means, and in a particular module this vertical height is only about 8 inches. The plumbing cannot project below the frame means because the frame means must be mounted on a truck when the modules are transported.

## SUMMARY OF THE INVENTION

The present invention provides plumbing apparatus, in particular a plumbing tree, which serves to drain water from tubs, commodes and sinks of two bathrooms and empty the water into a single sewer connection, the plumbing tree being generally planar so as to occupy only a very limited vertical space. In a particular embodiment, the plumbing tree includes a connector having four arms, one of which has two inlets, with a sewer drain line connected to one arm, commode drain lines connected to two other arms, and tub drain lines connected to the two inlets of the fourth arm. A vent is provided which can be connected by a vertical line to a roof outlet and into which sink drains may empty above floor level, but this is an optional feature. Thus, with this plumbing tree, all drainage needed for two complete bathrooms is compacted into a generally planar structure which meets the space limitations of a modular building.

Accordingly, it is an object of the present invention to provide a plumbing tree particularly suitable for modular homes or other modular buildings.

Another object of the invention is to provide a plumbing tree of a generally planar configuration.

A further object of the invention is to provide plumbing apparatus wherein tub drain lines and commode drain lines are tied into a main sewer drain line in direct fashion without complicated plumbing connections.

Still another, and no less important object of the invention, is to provide a central plumbing tree occupying only little vertical space but fanning out to diversely located tub and commode drains.

Other objects of this invention will appear from the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

## ON THE DRAWINGS

FIG. 1 is a plan view of two bathrooms included in a module with which the plumbing tree of the invention may be used;

FIG. 2 is a top plan view of a plumbing tree in accordance with one embodiment of the invention;

FIG. 3 is a bottom plan view of the plumbing tree; and

FIG. 4 is an elevational view of the plumbing tree mounted beneath the floor of a module for a modular home.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application

to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

## AS SHOWN ON THE DRAWINGS

10 The bathrooms shown in FIG. 1 are particularly suitable for use in a module of a modular home, but the invention is not necessarily limited to this application. These particular bathrooms include tubs 10 and 12, commodes 14 and 16, and sinks 18 and 20. The tub drains are 22 and 24, the commode drains are 26 and 28, and the sink drains are at 30 and 32. In 15 the wall 34 between the two bathrooms, there is a vent stack 36 which exhausts at the roof of the module. It is desired to empty all of the drains and the vent stack into a single plumbing tree which can be located in a limited vertical space 20 beneath the floor of the two bathrooms.

FIGS. 2, 3 and 4 illustrate a plumbing tree which will accomplish all of the drainage required for the bathrooms of FIG. 1. The plumbing tree includes a connector generally designated 38 which is of a T-Y type. The connector 38 has four arms 40, 42, 44 and 46. The arm 40 is connected to a main sewer drain line 48. A branch line 50 leads into the main sewer drain line 48 from a kitchen sink, but this connection is optional and may be omitted if desired. Where line 50 is used, a branching fitting 51 may be inserted in line 48.

25 The arms 42 and 44 are side arms which form a Y, and it may be seen that they project in generally opposite directions relative to arm 40. The arms 42 and 44 are connected respectively to commode drain lines 52 and 54. Commode drain line 35 52 has a terminal elbow 55 with a mouth 56 which turns upward and is connected to commode drain 26 of FIG. 1. Commode drain line 54 has terminal elbow 57 with a mouth 58 turned up for connection to the other commode drain 28 of FIG. 1. The mouths 56 and 58 are located approximately at 40 the level of the floor 60 as shown in FIG. 4. It may be seen in FIG. 4 that the main drain line 48 has a terminal elbow 61 with a down turned outlet 62 adapted to be connected to a main sewer line 64 shown in dashed lines beneath the module. The mouth 62 is located approximately at the lower boundary 66 45 of the frame of the module. The entire plumbing tree fits within the vertical space between floor 60 and frame boundary 66, and in a particular module this distance is only about 8 inches. Thus, the plumbing tree must provide fanned out connections to all of the drains shown in FIG. 1 and still have appropriate pitch for the various lines. For example, the pitch of line 48 may be about one-fourth inch per foot of length.

50 The arm 46 includes a T fitting 68 having two inlets 70 and 72. Connected to the two inlets 70 and 72 respectively are two tub drain lines 74 and 76. At the ends of the tub drain lines 74 and 76 are traps 78 and 80, and these traps have mouths 82 and 84 which are adapted to be connected respectively to the tub drains 22 and 24. The tub drain line 74 projects away from arm 46 in general alignment therewith, and the other tub drain line 76 projects oppositely from line 74 generally parallel to the main sewer line 48 and crossing over sidearm 44. All of the arms and lines are generally coplanar, but as may be seen in FIG. 4, arm 76 is pitched oppositely relative to arm 74 to provide proper drainage from the tub drains 22 and 24 to the inlets 70 and 72. The arms 74 and 76 may have a pitch of say 60 one-eighth inch per foot of length by way of example.

65 The T fitting 68 has a vent opening 86 which communicates through the vent stack 36 with the vent at the roof of the module. The sink drains 32 and 30 may empty into the vent 70 stack 36 above the floor 60 by means of piping 31, 33 (FIG. 1).

75 In operation, water draining from commodes 14 and 16 passes through drains 26 and 28 into lines 52 and 54 and from there through arms 42 and 44 to arm 40 which feeds the water to the main sewer drain line 48. Similarly, water draining from

tubs 10 and 12 passes through drains 22 and 24 into tub drain lines 74 and 76 and from there into T fitting 68 which is really an extension of and part of the arm 46. The water goes from arm 46 through arm 40 and fitting 51 into the main sewer line 48. Water draining from the sinks 30 and 32 passes through pipes (not shown) above the floor into stack 36 and from there into T fitting 68. This water then flows through arm 46, arm 40 and fitting 51 into sewer drain line 48 for discharge to an underground sewerline. Kitchen water flows through line 50 into fitting 51 and from there into line 48. It may be seen that line 48, fitting 51, arm 40 and arm 46 form a main flow path, and the other arms and lines drain into this main flow path.

Thus, the invention provides a plumbing tree for draining water from tubs and commodes in a limited vertical space and with a single sewer connection. The entire plumbing tree is generally planar to accommodate the small vertical space available, and yet adequate pitch is provided for proper drainage from distributed drains. A vent is included, and auxiliary connections above floor level may be accommodated.

Having thus described my invention, I claim:

1. A plumbing tree for a factory-built modular building having frame means supporting a floor with only limited vertical space available under the floor within the frame means, said plumbing tree comprising

a. connector means having first and second conduits in substantial axial alignment and each lying in a plane pitched only slightly relative to a reference plane which corresponds to horizontal, and third and fourth conduits projecting laterally and oppositely from said first and second conduits substantially in the plane thereof, said second conduit having at least two inlets, and said second, third and fourth conduits communicating into said first conduit,

b. sewer drain line means connected to said first conduit, c. first and second tub drain line means connected respectively to said two inlets of said second conduit and projecting oppositely substantially parallel to said first and second conduits, said first tub drain line being pitched substantially the same as said second conduit, and said second tub drain being pitched oppositely relative to said first tub drain, so that both of said tub drains provide flow into said second conduit and yet remain within the confines of said limited vertical space,

d. first and second commode drain line means connected respectively to said third and fourth conduits and projecting laterally and oppositely from said first and second conduits,

e. said conduits and said line means having a generally planar configuration to fit within the confines of the said space within said frame means.

2. The plumbing tree as claimed in claim 1 in which one of said tub drain line means crosses one of said third and fourth

5 conduits or the commode drain line means connected thereto.

3. The plumbing tree as claimed in claim 1 in which said second conduit also has a vent opening facing at slightly less than a right angle to the plane of said first and second conduits.

4. In a module of a building having frame means supporting a floor with only limited vertical space under the floor within the frame means, a plumbing tree mounted within the vertical confines of said space under a wall and serving to drain two bathrooms on opposite sides of said wall having two commodes generally opposite each other on opposite sides of said wall and two tubs spaced from each other on opposite sides of said commodes, said plumbing tree comprising

a. connector means having first and second arms in substantial axial alignment and third and fourth arms projecting in generally opposite directions from said first and second arms, said first and second arms each lying in a plane pitched only slightly relative to the horizontal plane, and said third and fourth arms lying in the horizontal plane,

b. a pair of inlets leading into said second arm,

c. first and second drain lines leading from said tubs respectively to said two inlets of said second arm, said first tub drain line being generally axially aligned with and pitched substantially the same as said second arm, and said second tub drain line being pitched oppositely relative to said first tub drain line but only slightly pitched relative to horizontal, so that both of said tub drain lines provide flow into said second arm and yet remain within the confines of said vertical space below said floor,

d. first and second commode drain lines connected respectively to said third and fourth arms and projecting laterally and oppositely in a horizontal plane from said first and second arms,

e. a sewer drain line connected to said first arm and pitched substantially the same as said first arm in axial alignment therewith,

f. said arms and said lines having a generally planar configuration and lying entirely within the confines of said space under said floor within said frame means so that said module can be transported without interference of the plumbing tree with the transporting means.

5. The plumbing tree as claimed in claim 4 in which said second arm has a vent leading upward through the floor of the module, and said bathrooms have sinks above floor level with drains leading into said vent.

6. The plumbing tree as claimed in claim 5 in which the pitch of said second tub drain line causes said second tub drain line to cross over the top of said third arm.

7. The plumbing tree as claimed in claim 4 in which said inlets are on opposite sides of said second arm in horizontal alignment and said third and fourth arms are on opposite sides of said second arm in horizontal alignment.

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