Dec. 12, 1939. W. C. GROENIGER 2,183,040

COMBINED SOIL, WASTE, AND VENT UNIT

Original Filed Aug. 19, 1937 2 Sheets-Sheet 1

Fig. 1.

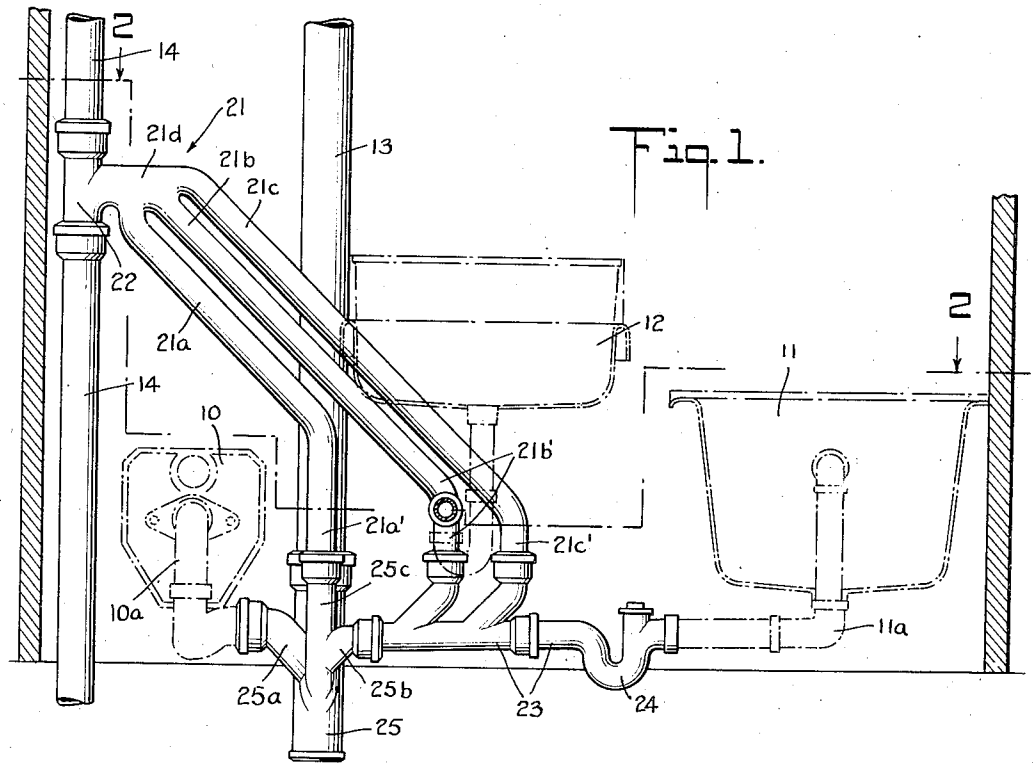
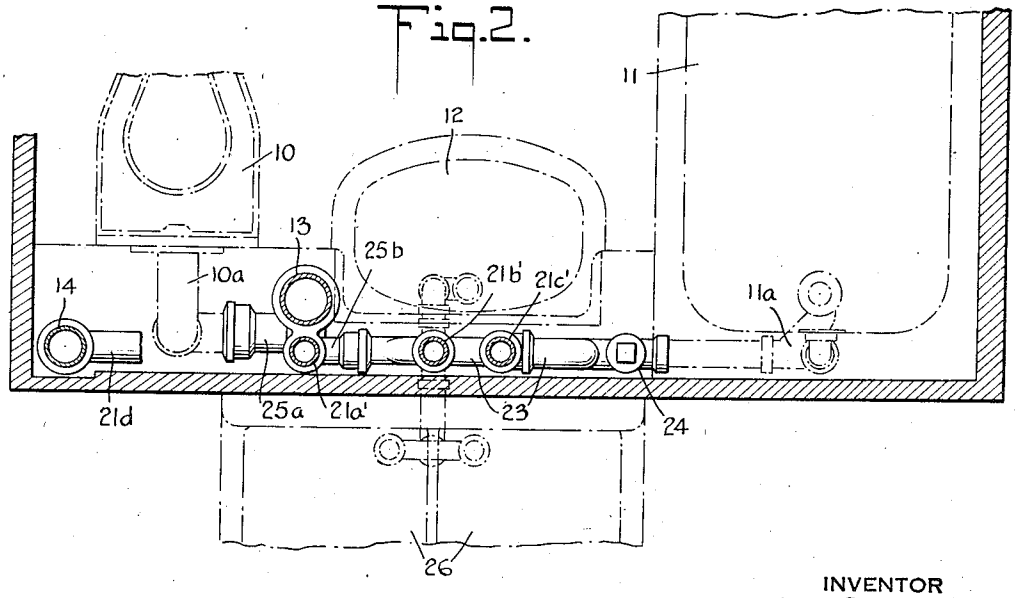


Fig. 2.



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Fig. 3.

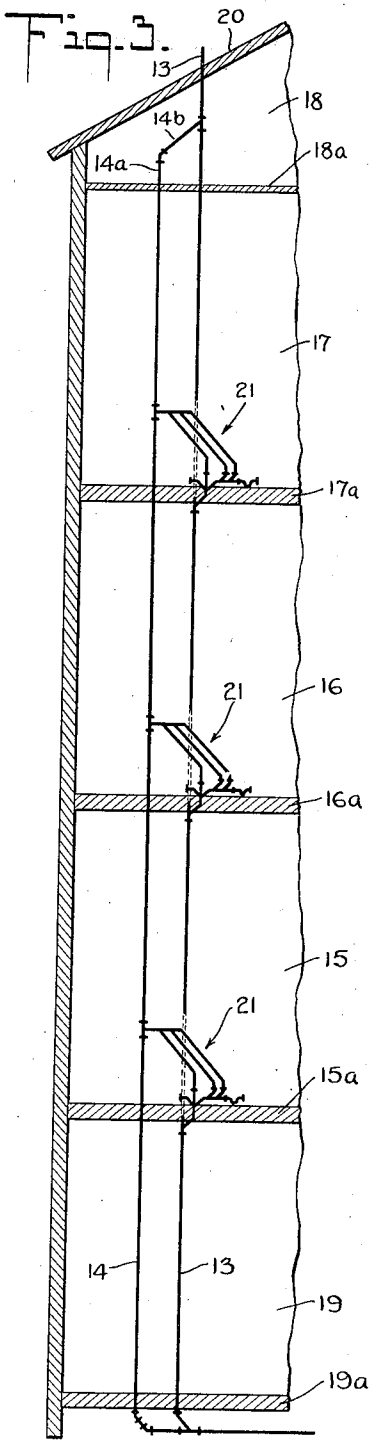


Fig. 4.

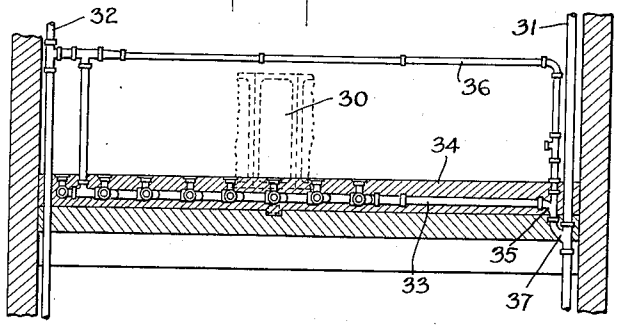
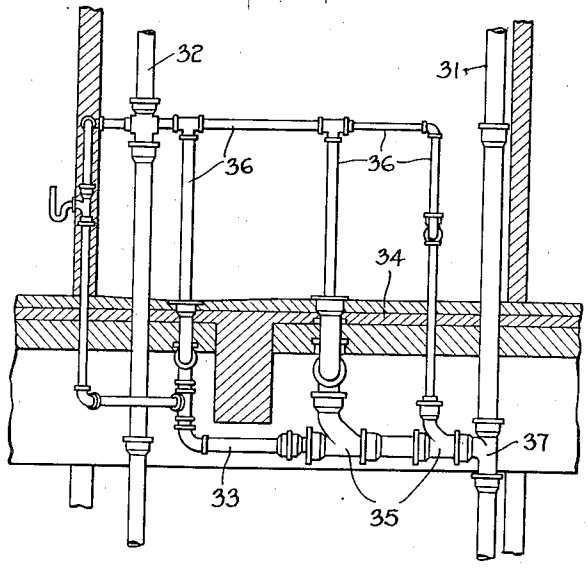


Fig. 5.



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Patented Dec. 12, 1939 2,183,040

UNITED STATES PATENT OFFICE

2,183,040

COMBINED SOIL, WASTE, AND VENT UNIT

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Application August 19, 1937, Serial No. 159,861
Renewed May 2, 1939

6 Claims. (Cl. 4—211)

The invention relates to factory fabricated rough plumbing units.

Concomitantly with the structural and functional features of the plumbing unit invented by Robert L. Davison and disclosed and claimed in U. S. Patent 2,027,371, dated January 14, 1936, the present invention provides for a unitary assembly of waste and air vent pipes and connector members for the discharge and venting of a plurality of fixtures such as closet bowl, lavatory, sink, bath or wash tub, etc., such discharge and venting ensuing under the variant conditions at any given instant from partial discharge of any one fixture to full discharge of all fixtures simultaneously.

The present invention is particularly directed to improved relationship of liquid and air flows under the variant conditions of discharge of one or all possible pluralities of the fixtures served by the unitary assembly, to afford more effectual discharge through the unitary assembly to the stack with respect to the liquid flow and improved path through the unitary assembly with respect to the venting of air to the vent pipe, and at all times insuring the maintenance of liquid within the respective traps during the stages of variant discharge as well as during the stage of non-discharge.

Concomitantly with the invention of the aforesaid Robert L. Davison, the present invention possesses particular advantages for the discharge and venting of a group of plumbing fixtures inclusive of a wall-on type of closet bowl or other receptacle provided with a trapway or equivalent having a lateral discharge outlet, thus affording the locating of the complete plumbing unit inclusive of the stated unitary assembly of waste and air vent pipes and its connector members above the floor level. As afforded by the present invention, the stated unitary assembly together with all of its connector parts are located at or above, at least not below, the floor level nor within the material of the floor on which are located the fixtures served by the unitary assembly, the soil and vent stacks, being required under the accepted sanitary codes to be located within the material outline of each building, necessarily passing through openings made or provided in the material of the respective floors. In certain embodiments of the present invention, connector members appurtenant to the stated unitary assembly may comprise sections arranged to be connected to contiguous lengths of the waste stack and/or contiguous lengths of the vent stack.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawings, in which

Fig. 1 is a side elevation of one preferred embodiment of the invention, showing its application to a group of plumbing units comprising a lateral outlet discharging closet bowl, a lavatory and bath tub;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a schematic vertical section of an end portion of a house, in the illustrated instance showing three floors, a basement and an attic, or equivalent;

Figs. 4 and 5 are vertical sectional elevations typical of present and prior practice, Fig. 4 illustrating a group of fixtures such as urinals arranged side by side, the waste and vent piping extending below the floor level and through drilled perforations through the floor, and Fig. 5 illustrating a typical grouping of waste and vent piping extending through the floor of one story and comprising connector parts located at or below the ceiling of the lower story.

As above indicated, the assembly of waste and vent piping element is contemplated of unitary and preferably integral construction, affording the manufacture of the same at a factory and of predetermined relative sizes of bore.

A typical assembly for a plumbing installation of a home, apartment, or the like, see Figs. 1 and 2, is indicated in Figs. 1 and 2 wherein 10 represents a water closet, 11 a bath tub or equivalent, and 12 a lavatory or equivalent, the stated plumbing fixtures constituting a typical bath room group. 13 represents a waste stack and 14 a vent stack. Assuming a home, apartment house or the like, of variant number of floors, indicated schematically in Fig. 3, showing the first story at 15, second story at 16, third story at 17 and attic or equivalent at 18 and a cellar, basement or the like at 19, a convenient assembly of the respective groups of the above or other bath room or other fixtures is had by locating the waste stack 13 to extend from the floor 19a of the basement, cellar or the like through openings in the respective floors 15a, 16a, 17a, 18a, etc., and thence through the roof 20, and correspondingly locating the venting stack 14 in adjacent relation thereto. Frequently, and as indicated in Fig. 3, the upper terminus 14a of the venting stack 14 may be connected by an upwardly rising connector piping 14b with the waste stack 13.

Typical for the above stated group of plumb-

ing fixtures, such unitary plumbing assembly, see 21, Fig. 1, may comprise three passage sections 21*a*, 21*b*, 21*c* extending at an angle to the vertical and to the horizontal, and communicating in common with the interior of the upper merging passage section 21*d*. Advantageously a connector passage section 22 corresponding in bore to that of the vent stack 14 and having its ends arranged for sealed connection with contiguous lengths of the vent stack, is unitarily connected to and preferably integral with the stated upper merging passage section 21*d*.

In such type of unitary assembly, the respective lower ends 21*a'*, 21*b'*, 21*c'* are arranged to be connected directly or indirectly with a waste piping, such as the waste piping 23, shown at one end connected with the discharge opening 11*a* of the bath tub 11 or equivalent, thence connected to or including a trap 24, then directly or indirectly discharging through the multi-port section 25, the last-named being preferably of a bore corresponding to that of the waste stack 13 and having its ends arranged for sealed connection with contiguous lengths of the waste stack 13. Specifically, the port 25*a* is shown connected with the long syphon leg 10*a* of the water closet 10, and the port 25*b* is shown directly connected with the indicated connector piping, connected to or forming a part of the stated horizontal waste pipe 23, of course having the desired drain pitch. Such multi-port section 25 also includes a vertically extending part 25*c* arranged for connection with the lower terminal 21*a'* of the stated multiple assembly.

As appears from Fig. 1 and Fig. 2 of the drawings while disposed in substantially the same horizontal plane, the port 25*a* communicates with the interior of the multi-port section 25 at a zone effectively distinct from the zone of the port 25*b*. Also, as indicated hereinafter, the mode of communication of the respective port 25 relative to the interior section 25, per se, and the mode of communication of the port 25*b* relative to the sub-section 25*c*, and the mode of communication of the port section 25*c* relative to the interior of the section 25, per se, is pursuant to the principles of my U. S. Patent No. 2,065,523, granted December 29, 1936, and entitled "Method of uniting fluid streams and device therefor".

If desired, a laundry tub 26 or set of same, may be also connected with a passage section of the stated unitary assembly, as with the lower terminal portion 21*b'* of the passage section 21*b*.

From the above, the unitary assembly represented by the illustrated multi-passage means 21*a*, 21*b*, 21*c*, etc., which may be of any desired specific number of such passages, unitarily connected with the uppermost merging and relatively enlarged passage section 21*d*, provides full venting, in cooperation with the connector piping under all variant conditions of discharge of the group of fixtures served jointly by the stated unitary assembly. As illustrated in the typical embodiment, such connector piping may serve, optionally as selected, two or more of such fixtures, instanced by the connector piping 23, or serves but a single fixture instanced by the long syphon leg 10*a*, such connector piping being suitably dimensioned to provide for full discharge under all variant conditions of use, the function of venting served by the stated unitary assembly being had by proper selection of bore of the stated passage sections and at all times, inclusive of the stage of non-discharge of the fixtures, effecting maintenance of the liquid seals of the required traps, such as the illustrated trap 24 and the trap provided in the construction of the water closet 10, etc.

It will be further observed that in the illustrated unitary assembly, the flow of waste takes place through the stated or equivalent connector piping, and thence into the soil pipe 13, effected, as shown, through the intermediation of the multi-port pipe section 25.

An essential structural feature of the illustrated unitary assembly is the provision of venting between the soil stack 13 and the vent stack 14, typified by the passage section 21*a*, which being free from waste flow functions to provide passage for venting either in upward and/or downward direction for all variant conditions of partial and full discharge of one or more of the fixtures served.

An essential structural feature of the stated unitary assembly resides in the upward direction and the angular relationship of the multi-passage sections to the horizontal, less than a right angle, whereby flow of air in proper variant quantity and in proper variant direction or directions is assured under all variant conditions of fixture discharge and non-discharge, singly and plurally.

The assembly illustrated in Figs. 1 and 2 embodies the further advantageous function, present in the multi-port pipe section 25, of the flow of waste for all variant conditions of filling of the thereto connected connector piping pursuant to the principles of flow and venting set out in U. S. Patent granted to William C. Groeniger on December 29, 1936, under No. 2,065,523, and entitled Method of uniting fluid streams and device therefor.

It further appears that the stated unitary assembly is of particular advantage in combination with a water closet of the lateral discharge type, in which relationship the present invention possesses the advantages of embodiments of the factory fabricated rough plumbing unit set out and claimed in the aforesaid U. S. Patent No. 2,027,371.

As is indicated in the schematic drawing, the stated structural and functional features of the present invention are applicable to fixtures located as groups upon the respective floors, including basement or basements, if desired, of a building of whatever character, the above stated complete discharging and venting of the fixtures of each group under all variant conditions of discharge and non-discharge of the same, taking place cooperatively through the interconnecting soil line indicated at 12 and interconnecting vent line indicated at 14.

By reason of the mutual relationship of venting and/or waste flows of certain passage sections of the unitary assembly typified by the passage sections 21*b*, 21*c* and the mutual venting between the soil stack 13 and the vent stack 14 typified by the passage section 21*a*, the connector piping of bore reduced as compared with present and prior accepted practice may be employed within the factors of safety prescribed under various sanitary codes.

Compared with present and prior accepted practices, represented by typical installations shown in Figs. 4 and 5, the present invention embodies marked advantages in all phases of cost of installation, cost and convenience of inspection and repair, and efficiency under all stages of use.

In the plumbing assembly typified in Fig. 4, for a group of fixtures, such as urinals 30, say

of duplicate construction, placed side by side, on the same floor of a building, the stack piping being indicated at 31 and the vent pipe at 32, pursuant to present and prior accepted practice the discharges of such group of fixtures may be had by a piping indicated at 33, or equivalent, in order to obtain the prescribed venting and waste flows, necessitates such piping to extend through the material of the floor, see 34; further, such piping 33, to effect connection with the soil stack 31 requires interconnected fittings such as a Y-fitting, see 35, the upper end of which is required to be vented, as by connection through piping of the nature indicated at 36 with the vent stack 32, and further fittings such as the Y-fitting 37 for connection with the soil stack 31, all or the majority of such fittings being located within the material of such floor 34, and most frequently also below the under face of such floor 26, i. e. ceiling of the lower floor, for the accomplishment of which the material of the floor must be drilled or otherwise perforated, with accessory devices such as thimbles, etc., all necessitated by sanitary code requirements. Fig. 5 represents another type of assembly under present and prior approved practice of a group of fixtures, say, similar to that indicated in Fig. 4, like parts being designated by like reference characters, wherein under sanitary code requirements an even increased number of perforations through the floor material 34 are required, with correspondingly increased number of interconnected fittings, accessory devices, etc., and further entailing the gross disadvantage of locating piping, fittings, etc. exposed below the material of the floor of the fixture group and at or below the ceiling of the lower floor of the building which may be of office or residential character.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1. The combination with vertically extending horizontally spaced vent stack and soil stack, of a group of fixtures disposed above the material of a floor, waste piping connecting the discharges of said fixtures respectively with the soil stack, said fixtures and/or said waste piping including trap formations for liquid sealing of said fixtures, and unitary multi-passage means interconnecting said waste piping with the vent stack and interconnecting the soil stack with the vent stack, certain of said multiple passages of said unitary multi-passage means being free from waste flow functions to provide passage for venting either in upward and/or downward direction for all variant conditions of partial and full discharge of one or more of the fixtures served, and extending upwardly at an angle to the horizontal less than a right angle said certain passages communicating with said soil stack at substantially the same horizontal location and through effectively different zones, said multi-passage means and said waste piping means disposed wholly above said floor material.

2. The combination with vertically extending horizontally spaced vent stack and soil stack, of a group of fixtures disposed above the material of a floor, waste piping connecting the discharges of said fixtures respectively with the soil stack, said fixtures and/or said waste piping including trap formations for liquid sealing of said fixtures, and unitary multi-passage means interconnecting said waste piping with the vent stack and interconnecting the soil stack with the vent stack, certain of said multiple passages of said unitary multi-passage means being free from waste flow functions to provide passage for venting either in upward and/or downward direction for all variant conditions of partial and full discharge of one or more of the fixtures served, and extending upwardly at an angle to the horizontal less than a right angle said certain passages communicating with said soil stack at substantially the same horizontal location and through effectively different zones, said multi-passage means and said waste piping being disposed wholly above said floor material, said multi-passage means including an uppermost passage communicating in common with said certain multiple passages.

3. The combination with vertically extending horizontally spaced vent stack and soil stack, of a group of fixtures disposed above the material of a floor, waste piping connecting the discharges of said fixtures respectively with the soil stack, said fixtures and/or said waste piping including trap formations for liquid sealing of said fixtures, and unitary multi-passage means interconnecting said waste piping with the vent stack and interconnecting the soil stack with the vent stack, certain of said multiple passages of said unitary multi-passage means being free from waste flow functions to provide passage for venting either in upward and/or downward direction for all variant conditions of partial and full discharge of one or more of the fixtures served, and extending upwardly at an angle to the horizontal less than a right angle said certain passages communicating with said soil stack at substantially the same horizontal location and through effectively different zones, said multi-passage means and said waste piping being disposed wholly above said floor material, said multi-passage means including an uppermost passage communicating in common with said certain multiple passage and a vertically extending passage formation adapted to be connected to the vent stack.

4. The combination with vertically extending horizontally spaced vent stack and soil stack, of a group of fixtures disposed above the material of a floor, waste piping connecting the discharges of said fixtures respectively with the soil stack, said fixtures and/or said waste piping including trap formations for liquid sealing of said fixtures, and unitary multi-passage means interconnecting said waste piping with the vent stack and interconnecting the soil stack with the vent stack, certain of said multiple passages of said unitary multi-passage means being free from waste flow functions to provide passage for venting either in upward and/or downward direction for all variant conditions of partial and full discharge of one or more of the fixtures served, and extending upwardly substantially parallel to one another and at an angle to the horizontal less than a right angle said certain passages communicating with said soil stack at substantially the same horizontal location and through effectively different zones, said multi-passage means and said waste piping being disposed wholly above said floor material.

5. The combination with vertically extending horizontally spaced vent stack and soil stack, of a group of fixtures disposed above the material of a floor, waste piping connecting the discharges of said fixtures respectively with the soil stack, said fixtures and/or said waste piping including trap

formations for liquid sealing of said fixtures, and unitary multi-passage means interconnecting said waste piping with the vent stack and interconnecting the soil stack with the vent stack, certain of said muliple passages of said unitary multi-passage means being free from waste flow functions to provide passage for venting either in upward and/or downward direction for all variant conditions of partial and full discharge of one or more of the fixtures served, and extending upwardly substantially parallel to one another and at an angle to the horizontal less than a right angle said certain passages communicating with said soil stack at substantially the same horizontal location and through effectively different zones, said multi-passage means and said waste piping being disposed wholly above said floor material, said multi-passage means including an uppermost passage communicating in common with said certain multiple passages.

6. The combination with vertically extending horizontally spaced vent stack and soil stack, of a group of fixtures disposed above the material of a floor, waste piping connecting the discharges of said fixtures respectively with the soil stack, said fixture and/or said waste piping including trap formations for liquid sealing of said fixtures, and unitary multi-passage means interconnecting said waste piping with the vent stack and interconnecting the soil stack with the vent stack, certain of said multiple passages of said unitary multi-passage means being free from waste flow functions to provide passage for venting either in upward and/or downward direction for all variant conditions of partial and full discharge of one or more of the fixtures served, and extending upwardly substantially parallel to one another and at an angle to the horizontal less than a right angle said certain passages communicating with said soil stack at substantially the same horizontal location and through effectively different zones, said multi-passage means and said waste piping being disposed wholly above said floor material, said multi-passage means including an uppermost passage communicating in common with said certain multiple passages and a vertically extending passage formation adapted to be connected to the vent stack.

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