United States Patent

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[54] **PREFABRICATED BATHROOM ASSEMBLY**
7 Claims, 5 Drawing Figs.

[52] U.S. Cl. 4/2
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[50] Field of Search 4/2, 3, 4, 5, 68

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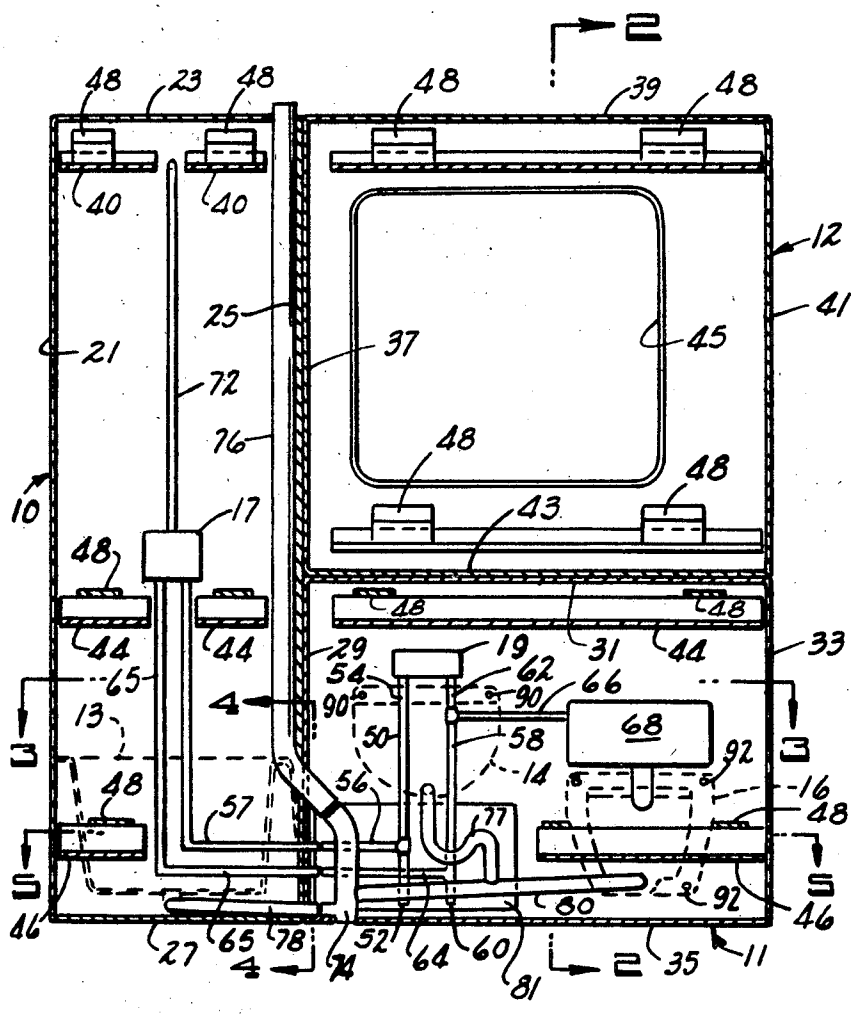
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ABSTRACT: This invention proposes a prefabricated bathroom component built on the order of an appliance such as a clothes washer or dishwasher so that it may be plugged into place in a matter of minutes, as opposed to hours or days. The concept is to build the bathroom appliance as a number of preplumbed panels which can be set against an unfinished bathroom wall and bolted or otherwise secured in place with a minimum of time and effort. This enables the operations requiring skilled effort and know-how to be performed at the factory where precision equipment is available to make low cost mass production operations most feasible.



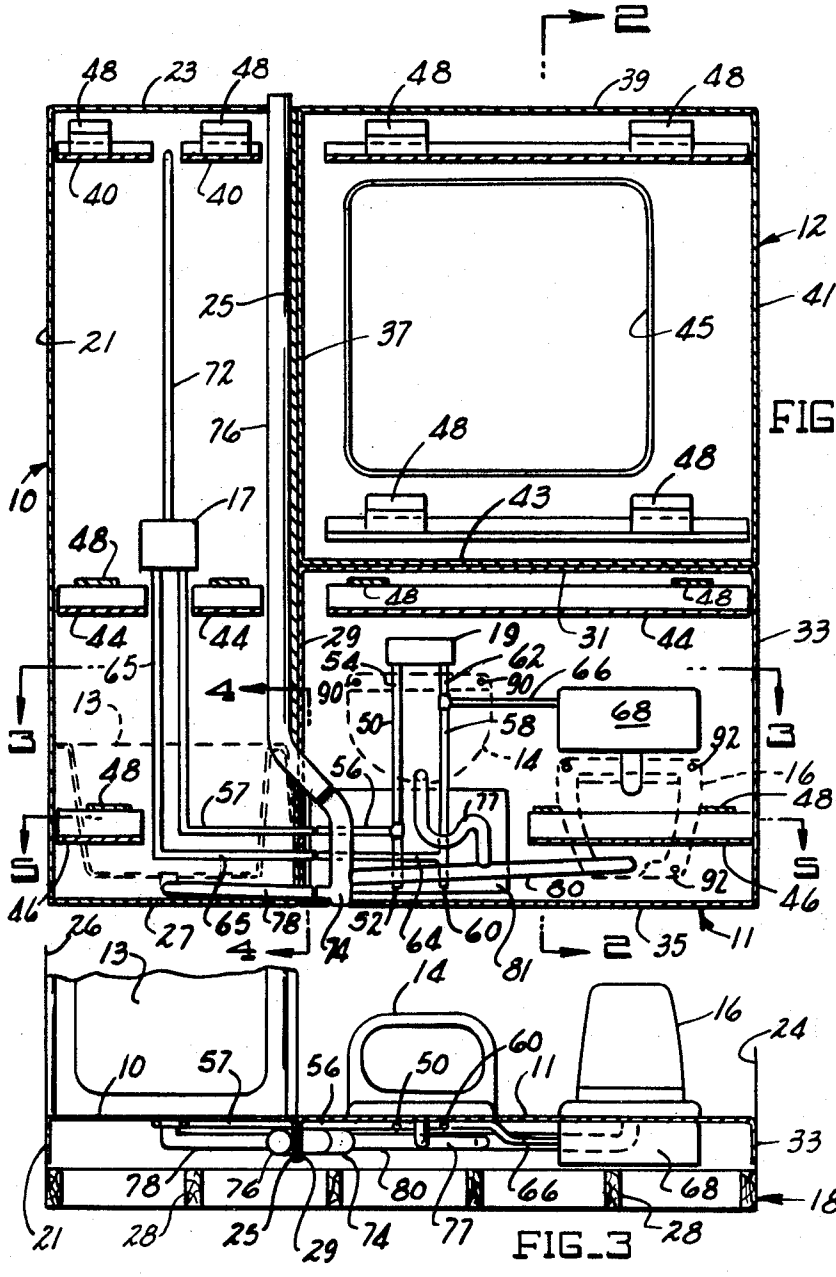


FIG_1

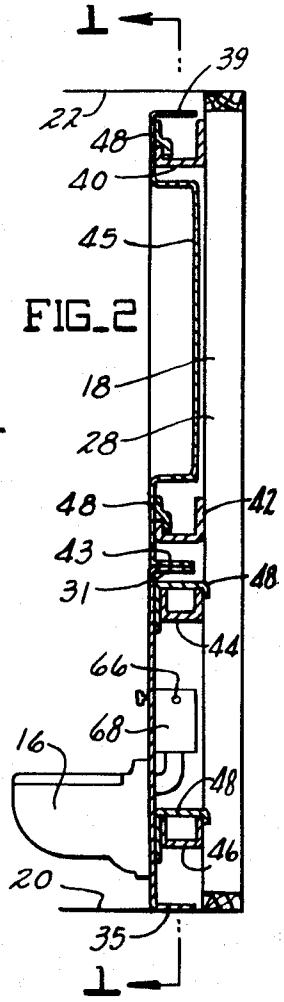


FIG_2

FIG_3

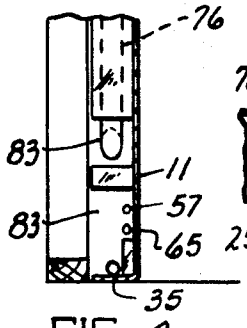


FIG_4

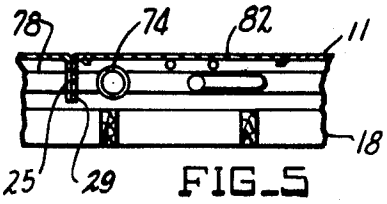


FIG_5

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PREFABRICATED BATHROOM ASSEMBLY

CONVENTIONAL PLUMBING INSTALLATION PRACTICE

Conventional bathroom plumbing comprises a tub, water closet and lavatory or basin, each connected with a source of cold water; the tub and lavatory are additionally connected with a source of hot water. The drains from these three fixtures usually connect to a soil stack leading to the sewer; to prevent back siphonage within the drainage system the soil stack is usually equipped with a vent stack which goes up through the roof of the building.

The plumbing system involves a tortuous maze of various sized pipes, elbows, tees, Y branches, traps, etc. which must be connected at the job site. In forming the drain system usually the soil stack and vent stack are first assembled in sections between the studs of an interior wall. Then the various horizontal drain pipes and trap sections are connected onto the soil stack. Thereafter the fixtures (tub, water closet, and lavatory) are mounted within the room area and connected to the trap sections. In forming the water supply system, the plumber usually runs the piping in horizontally from riser pipes installed between studs in a manner similar to the soil stack. Faucets are installed after installation of the supply piping.

The conventional process may involve such on-the-site operations as cutting and sizing of pipe, pipe threading, soldering, caulking, notching studs and/or joists, and hanging the pipe on whatever support is available. The present invention seeks to eliminate or minimize such operations, thereby considerably reducing the final cost of the bathroom.

THE DRAWINGS

FIG. 1 is a rear sectional taken on line 1–1 in FIG. 2 and showing one embodiment of the invention.

FIG. 2 is a sectional view taken on line 2–2 in FIG. 1

FIG. 3 is a sectional view taken on line 3–3 in FIG. 1.

FIG. 4 is a fragmentary sectional view taken on line 4–4 in FIG. 1.

FIG. 5 is a fragmentary sectional view taken on line 5–5 in FIG. 1.

THE DRAWINGS IN DETAIL

FIG. 1 shows an embodiment of the invention consisting of six main components, namely three panel assemblies 10, 11 and 12, a bathtub 13, basin or lavatory 14, and water closet 16. Panel assemblies 10, 11 and 12 may be shipped from the factory as one package, and the other three components (tub, basin and water closet) as a second package; in some cases the basin and water closet may be wholly or partially nested within the tub for transportation compactness. Final on-the-site installation involves anchoring of panels 10, 11 and 12 against an unfinished building wall or partition 18, and bolting of the other three components to the front faces of panels 10 and 11. The water supply pipes and drainage pipes are located on the rear faces of panels 10 and 11, with the supply pipes being factory-connected to the on-off valves 17 and 19. The preferred arrangement is such that no on-the-site plumbing operations are required, other than connection of the panel-mounted pipes to the main water supply-drainage system.

PANEL CONSTRUCTION

The panels can be formed of metal or plastic. Preferably the three panels cooperate to form a massive panel assembly sized to form one entire wall of the bathroom. Thus, as shown in FIG. 2, the panel assembly extends from floor 20 to ceiling 22. As shown in FIG. 3 the panel extends from building wall 24 to building wall 26. Due to its mass the panel assembly may have to be reinforced against bending or buckling under its own weight and occupant-imposed loads. Therefore reinforced light weight plastic may be an advantageous material for the individual panels. Suitable reinforcements can be incorporated into the panels, either integrally as part of their formation or separately by means of discrete reinforcement strips. The panel assembly might be on the order of 7 feet high and 7 feet wide, and might weigh on the order of 200 pounds.

Panel 10 is illustratively shown as a rectangular panel measuring for example approximately 2½feet wide and 7 feet high. Its peripheral edges are flanged rearwardly, as at 21, 23, 25 and 27, thereby forming a free space behind the panel for accommodation of water supply piping and water drainage piping. Bathtub 13 bolts onto the front face of the panel so that its drain opening connects with the drainage piping carried on the panel rear face.

Panel 11 is shown as a rectangular panel measuring for example 4½feet wide by 3 feet high. Its peripheral edges are flanged rearwardly, as at 29, 21, 33 and 35, thus forming a second free space behind that panel for accommodating additional piping. The basin 14 and toilet 16 bolt onto the ornamental front face of panel 11 after the panel has been mounted in place.

Panel 12 completes the panel assembly, and it also is shown as rectangular member, dimensioned for example to be about 4½feet wide by 4 feet high. Its peripheral edges are rearwardly flanged, as at 37, 39, 41 and 43, whereby the panel can abut against the edges of the other two panels to cooperate therewith in defining the ornamental surface for one entire wall of the room. A portion of panel 12 may be recessed rearwardly, as at 45, to form a panel reinforcement and a medicine cabinet compartment. Hinged or sliding closures, not shown, can be mounted on the front face of the panel to close the compartment opening.

MOUNTING THE PANELS IN PLACE

Each panel is preferably provided with concealed hanger elements which hook onto rails fixedly attached to the rough partition 18. The rail-hanger assemblies are such as to transfer the panel weight onto the rough partition, thus enabling the panels to be formed of thinner gage materials than would otherwise be required. Preferably the panels are individually hung so that the weight of one panel is not transferred to another panel.

As shown in FIG. 2, there are four rails numbered 40, 42, 44 and 46, each nailed or otherwise affixed to the studs 28 which form part of partition 18. The two upper rails 40 and 42 are shown with L-shaped cross sections, while the two lower rails are shown with U-shaped cross sections; however the exact cross section can be varied in accordance with different configurations of the cooperating hanger elements, to be described hereinafter. Each rail may extend laterally for the entire width of the panel assembly, e.g. 7 feet, thus minimizing tolerance buildup problems arising when a large number of rails must be precisely spaced from one another. At certain points along each rail the forwardly projecting portions of the rail must be cut away or notched out to accommodate the panel flanges and/or piping carried by the panels.

Cooperating with the fixed rails are hanger brackets 48 carried by the panels. As shown in FIG. 2, the two uppermost brackets are of a different configuration than the two lowermost brackets; the bracket design is merely a function of the rail cross section, and different hanger bracket configurations are of course usable. As shown, the brackets hook over the rails to thus transfer the panel weight onto the rails and also to prevent pullout of the panels from the partition 18. Due to the nature of the brackets and the plumbing, the panels must be installed in a definite sequence, panel 10 first, panel 11 second, and panel 12 last. In the installed positions the flanged edges of the panels lie closely adjacent one another as shown in FIG. 1. If tolerances are not closely maintained it may be necessary to employ ornamental molding strips (not shown) at the interpanel joints.

Due to the hook-over nature of the mounting brackets some vertical clearance must be maintained between the ceiling 22

and the upper edges of panels **10** and **12**. After installation of the panels this ceiling-panel gap can be closed, either by a molding strip or by the final ceiling finishing operation, depending on the stage in the building operation at which the panels are installed.

PIPING SCHEME

FIG. **1** is a view looking at the rear face of the panel assembly. It shows hot water supply piping comprising an upstanding water pipe **50** having an open lower end **52** adapted to be connected with a source of hot water (not Shown), and having two branches **54** and **56**. Branch **54** leads upwardly to a conventional water faucet **19** disposed above the lavatory or basin **14**. Branch pipe **56** leads laterally to a pipe **57** which connects with a mixing valve **17** positioned above the tub **12**; pipe **72** directs water from valve **17** to an overhead shower fitting (not shown) located above tub **13**. Pipe **56** is factory packaged as part of the panel **11** assembly, while pipe **57** is factory mounted as part of the panel **10** assembly; the two pipes are connected together after the panels have been installed on partition **18**.

Cold water is supplied to the fixtures through a pipe system comprising a main pipe **58** having an open lower end **60** adapted to be connected to a water source (not shown). A first branch pipe **62** leads to the faucet located above lavatory **14**, a second branch **64** leads to a connection with the faucet above tub **12**, and a third branch **66** leads to a water storage tank **68** located above the space behind water closet **16**.

Panel **10** carries a pipe **65** having an open end which registers with pipe **64**. After the panels have been mounted on partition **18** the two pipes can be connected together so that pipe **65** is then able to deliver cold water to mixing valve **17**. Manual adjustment of the valve thus enables the desired temperature water to be delivered to the shower head.

The illustrated piping scheme provides only for shower spray, there being no spigot for delivery of water directly into the tub. The tub thus forms only a standup shower receptacle, and may therefore be somewhat smaller than conventional tubs. However the invention is applicable to conventional tub arrangements having spigots for tub-filling. The spigot could be connected with manual valve means receiving water from pipes **57** and **65**. As with the illustrated arrangement, the valve-piping assemblies would be factory-mounted on panel **10**.

The water drainage system for the illustrated unit comprises a relatively large diameter soil stack **74** connected to a vent stack **76**. Lavatory **14** discharges to the soil stack through a U-trap **77** and part of pipe **80**, tub **12** discharges to the soil stack through a drain pipe **78**, and water closet **16** discharges to the soil stack through a discharge pipe **80**. Vent stack **76** is mounted or carried by panel **10**, while soil stack **74** is carried by panel **11**. The joints between stack **74** and stack **76**, and between stack **74** and drainage pipe **78**, are made after the panels have been installed on partition **18**. Access to the panel interior is through a rectangular opening **81** normally closed by a removable subpanel **82** (FIG. **5**).

PIPE FABRICATION

As previously noted, the various water supply pipes **50**, **54**, **56**, **57**, **58**, **62**, **64**, **65**, **66** and **72** are preferably installed and connected at the factory—not at the job site. These pipes can be connected with one another in large master jigs, said jigs enabling the various pipes to be soldered or otherwise secured together in the FIG. **3** configuration; if the pipes are plastic tubes they can be bonded together with known solvent adhesives. The tank **68** and the various faucets for lavatory **14** and tub **12** can be connected to the pipes while the pipes are still held in the jig; all of this may be accomplished with the panels in the jigs or prior to assembly of the pipes on the rear faces of the panels.

Assembly of the piping on each panel may be accomplished with the panel in a horizontal prone position, the rear surface thereof facing up. With the panel in such a position the water supply piping can be laid or deposited on the panel with the various elbows extending through the panel openings. Thereafter, the water drainage piping can be laid or deposited onto the panel so that the faucet handles and spigots go through the respective panel openings. Final securement of the water supply and water drainage pipes can be accomplished by spraying the pipes, and particularly the pipe-panel joints, with adhesive material. The adhesive material can take various forms and compositions, one suitable composition being discrete fibers dispersed in a cementous or bituminous binder. Such a material, when applied to the rear face of panel **10** will mount the piping in place, will provide some panel stiffening, and will also provide dampening against the hollow or resonant characteristic of a bare metal panel. It may be necessary to use some clamps or hangers in addition to, or in lieu of, the adhesive material, especially for the heavier pipes and for those pipes not lying directly against the panel face.

It will be noted from FIG. **1** that prior to final connection of the system soil stack **74** is connected with its panel **10** only through its association with pipe **80**. Therefore to reinforce the panel **11** shipping package it may be necessary to provide permanent or temporary reinforcement for stack **74**. After the various pipes have been joined together there is some added rigidity to the pipe system, and the problem of support is then not so acute.

Pipes **76**, **57**, **65** and **78** are factory mounted on panel **10**, but extend laterally beyond the panel **10** periphery. The panel flange **25** must therefore be notched, as at **83** (FIG. **4**) to accommodate the piping. The mating flange **29** on panel **11** must be similarly notched. Connection of the panel **11** piping with the panel **10** piping can be accomplished with known types of connectors. If and when permitted by local building codes, the pipes can be joined by short rubber or plastic sleeves telescoping over the pipe ends and held thereon by conventional wire hose clamps.

INSTALLATION OF FIXTURES 12, 14 AND 16

Preferably the tub **12** is connected to panel **10** by some positive means such as bolts or the like (not shown). The operation hopefully involves a gentle forcing of the tub against the front face of the panel so that the tub drain abuts against a seal on the panel; the drain thus connects with pipe **78**. The tub can be bolted to the panel with bolts going through holes at the corners of the tub. These bolts preferably go through panel **10** into nuts welded or otherwise secured to the panel rear face. The panel may be outwardly or inwardly embossed around the tub profile for strengthening purposes.

Lavatory **14** is connected generally in the same manner as tub **12**. Thus as shown in FIG. **1**, bolts **90** can be extended through holes in each corner portion of the lavatory rear wall. These bolts preferably extend through openings in panel **11** into concealed nuts on the panel rear face.

As in the case of tub **12** and lavatory **14**, the water closet **16** can be mounted on panel **11** by means of bolts **92** extending through the panel. FIG. **1** illustratively shows four bolt openings in panel **11** which register with spaced openings in the water closet rear wall. It may be necessary to reinforce the panel in the area directly behind the water closet, as for example by means of reinforcing channels welded or otherwise secured to the panel rear face.

Installation of the three plumbing fixtures **12**, **14** and **16** preferably takes place after the panels **10**, **11** and **12** have been mounted on partition **18**.

GENERAL CONCEPT

It will be seen from the above discussion that the principal feature of interest is the "preplumbed panel" concept whereby the water piping and faucetry is factory-positioned on the panels so that the plumber is no longer required to build up a piping system on the job. The panels preferably occupy one entire wall of the bathroom so that after the panels

have been installed no further finish walls, tiles, or the like are needed to complete that particular wall.

It will be seen from FIG. 2 that the panel assembly is spaced outwardly from building wall 18. The panel assembly thus somewhat decreases the amount of free space in the room. However conventional plumbing installations have usually required some thickening of the hollow wall area to accommodate the relatively large diameter soil stack (which is usually 4 or 5 inches in diameter). In conventional arrangements there is some weakening of the building walls necessary to cut away joists and studs for accommodation of the water piping. With the present arrangement no cutouts are required in the building walls so that these walls can realize their full strength potential for load-bearing purposes.

Previously it has been known to prefabricate complete three dimensional bathrooms comprised of four walls, a doorway, window, flooring, ceiling, piping and fixtures. However, as far as we know, none of these arrangements incorporates each of the three fixtures or the front face of a single panel assembly, and the piping on the rear face of the panel assembly, whereby the panel assembly constitutes the sole mechanism for mounting the entire system of water components. This arrangement is believed to be materially simpler and less costly than the known prior art arrangements.

We claim:

1. In a bathroom having an unfinished floor-to-ceiling load-supporting partition structure defining one entire boundary of the room: the combination comprising ornamental panel means adapted to be hung on said partition structure to conceal same from view; said panel means comprising at least two separate individual panels, each panel having a front ornamental face exposed to the bathroom space and a rear face presented to the partition structure; each panel having hanger devices on its rear face for hanging the respective panel on the partition; the individual panels collectively having a height dimension and a width dimension substantially the same as the partition structure whereby the panels collectively cover the entire face of the partition structure; spacer means spacing the rear face of each panel from the partition structure to define a concealed free space therebetween; a first plumbing fixture mountable on the front face of a first one of said panels; first water piping carried on the rear face of said first panel in said free space; a second plumbing fixture mountable on the front face of a second one of said panels; second water piping carried on the rear face of said second panel in said free space; and means operably connecting the first and second water piping to each other and to the plumbing fixtures.

2. The combination of claim 1 wherein the panel means consists of three individual panels; the first panel being a floor-to-ceiling panel of rectangular shape, the second panel being rectangular and extending from the floor part way to the ceiling, and the third panel being rectangular and extending from the upper edge of the second panel to the ceiling.

3. The combination of claim 2 wherein three fixtures are mountable on the panel means, a first one of the fixtures comprising a tub securable to the first panel, and the other two fixtures comprising a basin and a toilet securable to the second panel.

4. The combination of claim 3 wherein the piping comprises a number of connected cold water pipes and a number of connected hot water pipes; said connected cold water pipes comprising a cold water inlet pipe, a first branch leading to the basin, a second branch leading to the tub and a third branch leading to the toilet; said connected hot water pipes comprising a hot water inlet pipe a first branch leading to the basin, and a second branch leading to the tub; said second panel having an access opening therethrough adjacent its lower edge; the hot water inlet pipe and cold water inlet pipe having their water entrance end portions located behind said access opening to permit connection to water supplies after the panels have been secured to the partition structure.

5. The combination of claim 4 wherein said access opening is located approximately midway between the lateral edges of the panel means and closely adjacent the joined edges of the first and second panels; said hot water inlet pipe and cold water inlet pipe extending upwardly from the area circumscribed by the access opening.

6. The combination of claim 4 wherein the piping comprising drainage piping which includes a soil stack, and drainage pipes extending from each fixture to the stack; said stack including a vertical duct carried by the first panel adjacent the edge thereof which adjoins the second and third panels; the first panel piping being joined to the second panel in the general area circumscribed by the access opening, whereby the piping connections can be effected after the panels are in place on the partition structure.

7. The combination of claim 3 wherein each panel is provided with rearwardly extending flanges on its periphery; the flanges on adjacent edge portions of the various panels abutting flatwise against one another.