United States Patent

Stahl

[15] **3,707,165**

[45] **Dec. 26, 1972**

[54] PLASTIC PLUMBING WALL

[72] Inventor: **Joel S. Stahl,** 746 Golfview, Youngstown, Ohio 44512

[22] Filed: **Aug. 10, 1970**

[21] Appl. No.: **62,586**

[52] **U.S. Cl.** **137/594,** 52/34, 52/220, 137/375, 137/608

[51] **Int. Cl.** **E04f 17/08**

[58] **Field of Search**.....52/34, 615, 220, 221, 309; 137/594, 561 R, 375, 608; 4/211

[56] **References Cited**

UNITED STATES PATENTS

3,402,520	9/1968	Lee et al.	52/615 X
3,601,937	8/1971	Campbell	52/220 X
3,562,985	2/1971	Nicosia	52/309 X
3,503,167	3/1970	Mackie	52/309 X
3,476,912	11/1969	Garrison	52/220 X
2,787,027	4/1957	Baker	52/34 X
3,221,454	12/1965	Togni	52/34 X
3,239,982	3/1966	Nicosia	52/309
3,343,314	9/1967	Smith	52/615 X

FOREIGN PATENTS OR APPLICATIONS

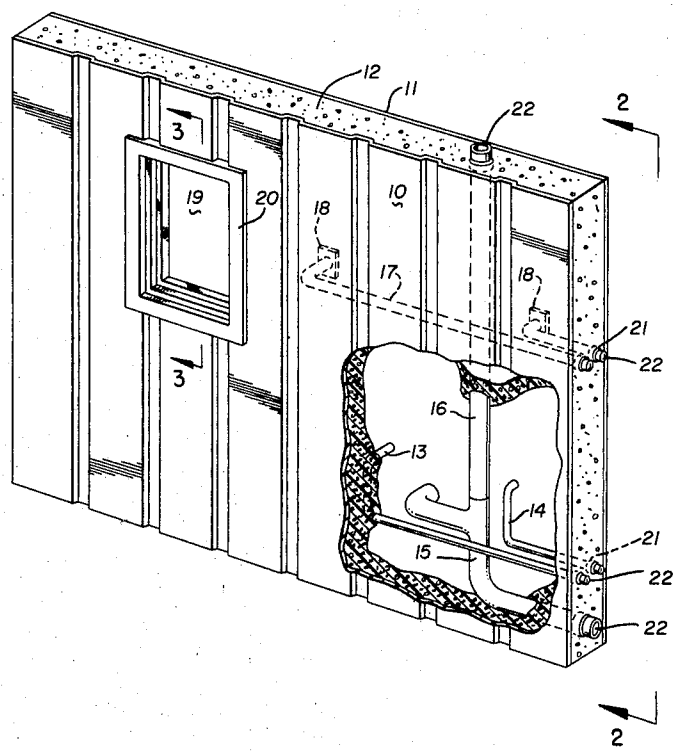
1,452,857	8/1966	France	52/309

Primary Examiner—Price C. Faw, Jr.
Attorney—Webster B. Harpman

[57] **ABSTRACT**

A wall unit having integrally formed surface panels and a foam core encloses supports and positions hot and cold water pipes and drain and vent piping along with electrical wiring. Window and door openings in said panel are defined by thin lightweight frames. The wall unit comprising a bearing wall dependent upon a rigid foam core with plastic facings.

3 Claims, 6 Drawing Figures



PATENTED DEC 26 1972

3,707,165

SHEET 1 OF 2

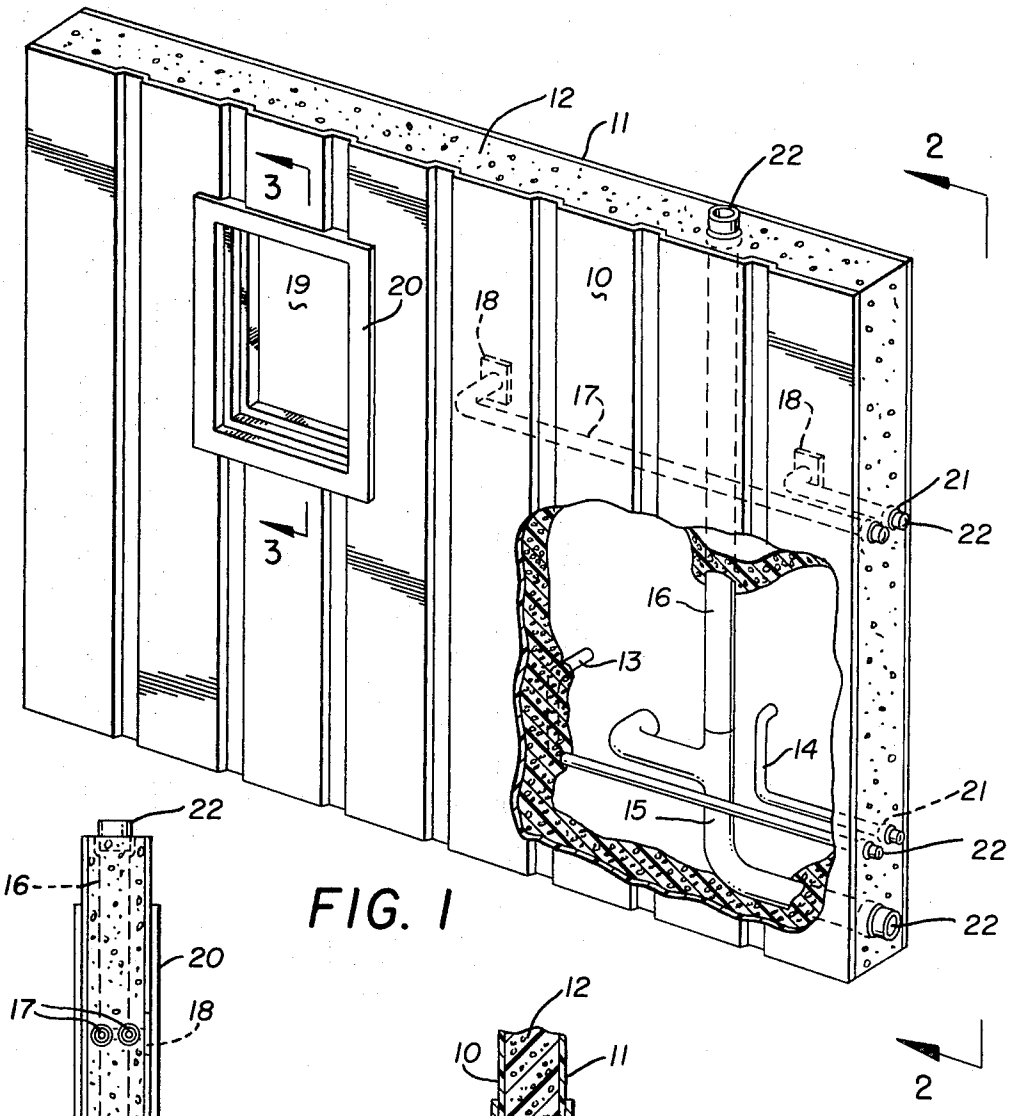


FIG. 1

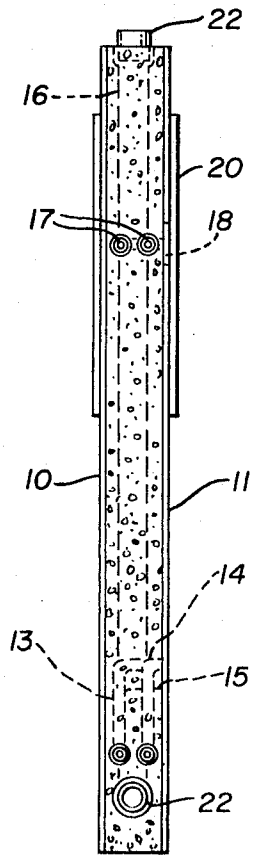


FIG. 2

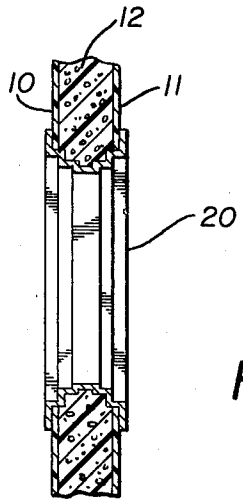


FIG. 3

INVENTOR.
JOEL S. STAHL
BY
W. B. Hardman
ATTORNEY

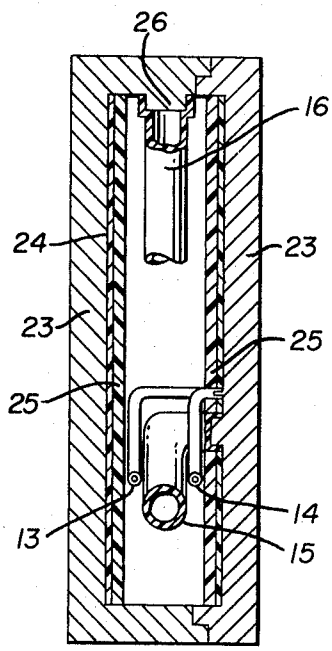


FIG. 4

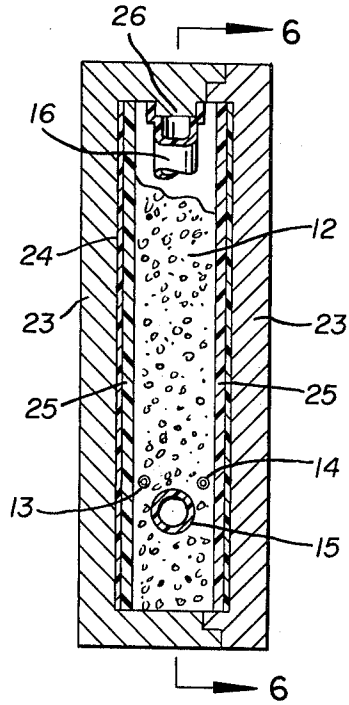


FIG. 5

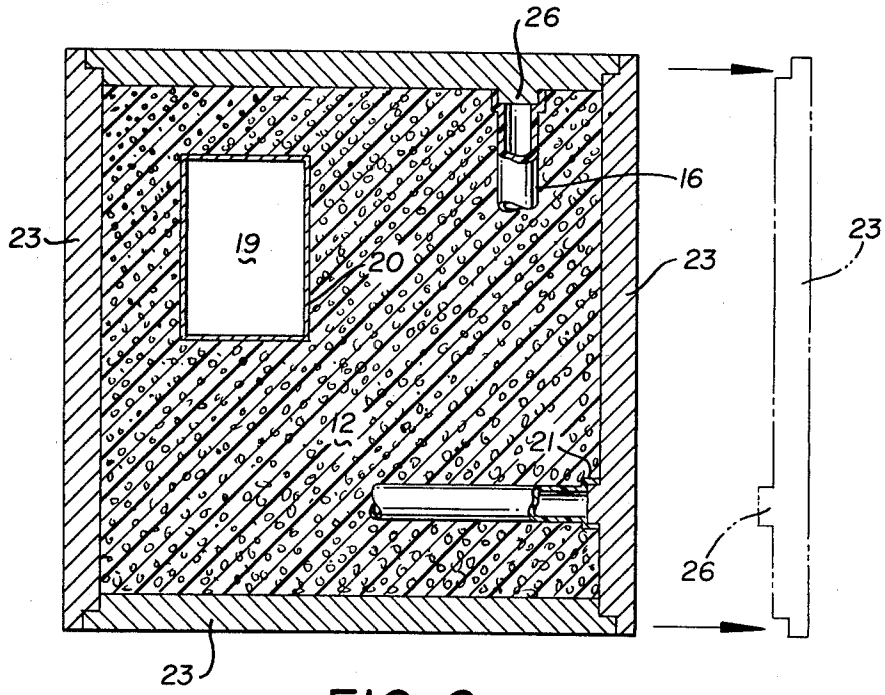


FIG. 6

INVENTOR.
JOEL S. STAHL
BY
W. B. Harpman
ATTORNEY

PLASTIC PLUMBING WALL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to wall units of the panel type prefabricated to include plumbing and wiring systems and/or door and window openings.

2. Description of the Prior Art

Prior structures of this type have comprised frame constructions utilizing wooden studding and bracing with plywood or dry wall surface panels wherein the plumbing comprises sections of metal pipe and fittings assembled in the panel and supported by the frame structure and bracing therein and wherein the wiring is positioned through and carried by the frame structure.

This invention eliminates the framing and bracing wooden studding and the like and the plywood and/or dry wall surface panels and utilizes plastic pipe and piping and plastic insulated wiring positioned directly in and supported by the rigid foam of the panel.

SUMMARY OF THE INVENTION

A plastic plumbing wall comprises a rigid foam core with integral surface panels wherein the foam core positions, holds and secures plastic pipes and piping for water and drain and vent lines and plastic insulated electrical wiring. The foam core and its integral plastic panels are structurally strong and form a bearing wall usable in a dwelling house and apartment house constructions. Connection means between the plumbing and wiring components of the wall units are provided and door and window openings are defined by lightweight non-bearing frames.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the plumbing wall unit with parts broken away and parts in cross section.

FIG. 2 is an end elevation on line 2—2 of FIG. 1.

FIG. 3 is a vertical section through a portion of the panel illustrated in FIG. 1.

FIG. 4 is a vertical section through a mold and a portion of a plastic plumbing wall being formed therein with plastic film separation means and prior to the introduction of the foam core.

FIG. 5 is a vertical section through a mold similar to FIG. 4 and showing the plumbing wall with the foam core introduced therein.

FIG. 6 is a vertical section on line 6—6 of FIG. 5 with broken lines illustrating one of the sections of the mold in open position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In its simplest form the plastic plumbing wall disclosed herein comprises a bearing wall unit usable as an interior or exterior wall or partition. The plastic plumbing wall is formed in panel like units which are structurally strong, weather proof and have a very high degree of sound and heat insulation value.

By referring to the drawings and FIG. 1 in particular it will be seen that a plastic plumbing wall unit has been illustrated as comprising an exterior surface 10 and an interior surface 11 spaced by an integrally formed foam core 12. The foam core 12 positions and supports hot and cold water pipes 13 and 14 respectively and drain and vent piping 15 and 16 respectively. Additionally, electric wires or alternately tubular conduits 17 are positioned in the foam core 12 and extend to desirable outlet boxes 18 which are also positioned and supported by the foam core 12.

A window opening 19 is defined by a rectangular frame 20 which as may be seen by referring to FIG. 3 of the drawings is a lightweight thin-wall suitably shaped frame which merely defines the window opening 19 as the bearing structure defining the frame about the window opening 19 as well as the plastic plumbing wall unit itself comprises the foam core 12 and its integral surface panels 10 and 11.

In one embodiment of the plastic plumbing wall unit the foam core 12 is a rigid synthetic resin foam such as polyurethane or polyvinlchloride and the surface panels 10 and 11 are synthetic resin such as polyester reinforced with glass fiber. Alternately the surface panels may be polyvinylchloride sheets. The hot and cold water pipes 13 and 14 and the drain and vent piping 15 and 16 respectively are advantageously formed of polyvinylchloride and chlorinated polyvinylchloride tubing. The electrical wiring may obviously comprise electrical conductors having tubular jackets of polyvinyl chloride or the duct works in which the electrical conductors may be later positioned may be formed of polyvinyl chloride tubing as may be the outlet boxes 18 which form part of the electrical system.

In forming the plastic plumbing wall unit disclosed herein the hot and cold water pipes 13 and 14 and the drain and vent piping 15 and 16 and the electrical wiring 17 including the outlet boxes 18 and the window frame 20 are positioned in desired relation between carrier sheets of plastic film which support gel like layers of polyester resins which, as hereinbefore noted, may be glass fiber reinforced. The polyurethane foam is then introduced into the panel cavity so as to surround the piping and wiring which makes the entire wall unit an integral structure. The wall unit is formed in suitably shaped molds which insure that all the piping and electrical outlets are in the exact required locations in the wall surface.

A 8 × 8 foot plastic plumbing wall unit complete with plumbing and wiring as disclosed herein weighs approximately 100 pounds and can therefore be easily handled both in its manufacture and subsequent installation in a construction project. It is obvious that if desired the plastic plumbing wall unit can be formed in 4 × 8 foot panels which complete with plumbing and wiring as necessary in a typical plumbing wall would weigh about 50 pounds. Panel thicknesses of approximately six inches are desirable and when such wall units are used as exterior walls they provide approximately 500 percent more thermal insulation than four inches of fiber glass insulation as heretofore commonly used in frame exterior wall constructions.

In order that the hot and cold water pipes and the drain and vent piping can be carried from one wall unit to another, each of the ends of the hot and cold water pipes and drain and vent piping as for example in the edges of the plastic plumbing wall unit as shown in FIG. 1 of the drawings are formed with enlarged sockets 21 in which sleeves 22 having an external diameter engageable in the sockets 21 are positioned so that a tubular connection extends out of the edge of one panel

and into the edge of the other and engages the respective sockets 21 to form a suitable connection.

Those skilled in the art will understand that the sleeves 22 which are actually short lengths of pipe are installed in the socket joints by solvent welding. Similar arrangements and constructions are usable in connection with the electrical wiring and particularly when conduits are supplied through which the wiring is eventually pulled. In the event the wiring is directly embedded in the foam core 12 the sockets then form plug like connections by which the electrical conductors are directly connected to one another.

In the preferred embodiment of the invention as hereinbefore disclosed the surface panels 10 and 11 are integrally formed with the core 12 and by referring to FIGS. 4 and 5 of the drawings, cross sections of portions of the panels in molds may be seen. In FIGS. 4 and 5 of the drawings, the molds are indicated by the numerals 23 and are shown with cellophane sheets 24 forming liners therein. Gel like layers 25 of polyester resin partially set, which may include glass fiber reinforcing mats, are formed on the plastic sheets 24 and thereby spaced from the inner opposed surfaces of the mold parts 23.

The plumbing components, wiring components and window frames are held in position between the gel layers 25 by fixtures 26 or the like in the mold and the same is then ready for the introduction of the foam core.

By referring to FIG. 5 of the drawings the foam core 12 will be seen to have been introduced as by a foaming in place procedure which will be familiar to those skilled in the art. One such acceptable method comprises inserting tubular foam delivery members into the cavity to be filled introducing the foaming resin therethrough while withdrawing the same. In such procedures openings in appropriate portions of the molds are necessary to permit the insertion and withdrawing of the foam introducing members.

In the formation of the plastic plumbing wall unit as disclosed herein the rigid polyurethane foam core 12 bonds integrally with the polyester surface panels 10 and 11 which in their initial form as positioned in the molds 23 comprise the gel layers 25 as hereinbefore described.

It will occur to those skilled in the art that by forming the plumbing components of lightweight flexible polyvinyl chloride and chlorinated polyvinyl chloride resins there is no need of the usual pipe fittings as the sections of pipes and piping are simply shaped and desirably located and so held while the plastic plumbing wall unit is formed as hereinbefore described whereupon the plumbing units, the wiring and the window frames become an integral part of the wall unit.

It will further occur to those skilled in the art that the finish of the surface panels 10 and 11 may be shaped, textured, colored and otherwise decorated as desired. As shown in FIG. 1 of the drawings a vertically channeled exterior surface 10 is disclosed which is particularly suitable for an exterior wall surface. Alternately, the channels may be reversed so that the exterior surface has the appearance of board and batten construction.

While the embodiment of the invention described and illustrated discloses the integral formation of the surface panels and foam core, it will occur to those skilled in the art that advantages of the plastic plumbing wall unit may be obtained by using conventional surface panels such as plywood, hardboard or sheets of metal or preformed plastic and assembling the plumbing and wiring and window components therein and then foaming the core in place therebetween to form the completed wall unit.

Although but one embodiment of the present invention has been illustrated and described it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention and having thus described my invention what I claim is:

1. A plastic plumbing wall unit having spaced surface sections and a foam core therebetween, hot and cold water pipes and drain and vent piping positioned in said foam core and supported thereby, sockets formed on the ends of said pipes and piping, tubular members positioned in said sockets so as to form couplings with similar sockets in similar adjacent wall units, said surface sections and foam core comprising an integral load bearing wall unit.

2. An integral load bearing plastic plumbing wall unit comprising a rigid foam core and integral surface sheets, plastic hot and cold water pipes and plastic drain and vent piping embedded in said foam core and integrally bonded thereto, said pipes and piping serving both to convey fluids and to reinforce said wall unit, said pipes and piping having end portions extending to the edges of said wall units for connection thereto of other pipes and piping, said end portion of said pipes and piping having sockets therein and tubular members sealed in said sockets to form coupling means for connection with similar sockets in similar adjacent wall units.

3. A plastic plumbing wall unit having spaced surface sections and a foam core therebetween, hot and cold water pipes; drain and vent piping and tubular conduits for electric wires positioned in said foam core and supported thereby, sockets formed in the ends of said pipes, piping and conduits, tubular members positioned in said sockets so as to form couplings with similar sockets in similar adjacent wall units, said surface sections and foam core forming an integral load bearing wall unit.

* * * * *