United States Patent [19]

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[45] **July 3, 1973**

[54] **UNITIZED UTILITY DISTRIBUTION SYSTEM**

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[73] Assignee: **Anvan M/E Systems Inc.**, Glen Elly, Ill.

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[21] Appl. No.: **178,276**

[52] **U.S. Cl.** **52/221**, 52/169, 52/236, 52/309, 52/79

[51] **Int. Cl.** **E04b 5/48**, E02d 27/46

[58] **Field of Search** 52/228, 221, 309, 52/236, 169, 79, 34

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[57] **ABSTRACT**

A system for distributing energy and utility services from supply sources to consumption outlets, in buildings, particularly buildings of modular construction, wherein the distribution system is made up of prefabricated units, namely, a unitary main supply tunnel having main supply carriers mounted therein for connection with remote supply sources and to distribution carriers mounted in one or more distribution pan units; the supply carriers of the pan units being joined to the lower ends of vertically extending or upright supply stack units adapted to extend upwardly through spaces provided therefor in the building; each stack unit having outlets at selected levels for connection with utility wall units associated with utility consumption outlets.

7 Claims, 11 Drawing Figures

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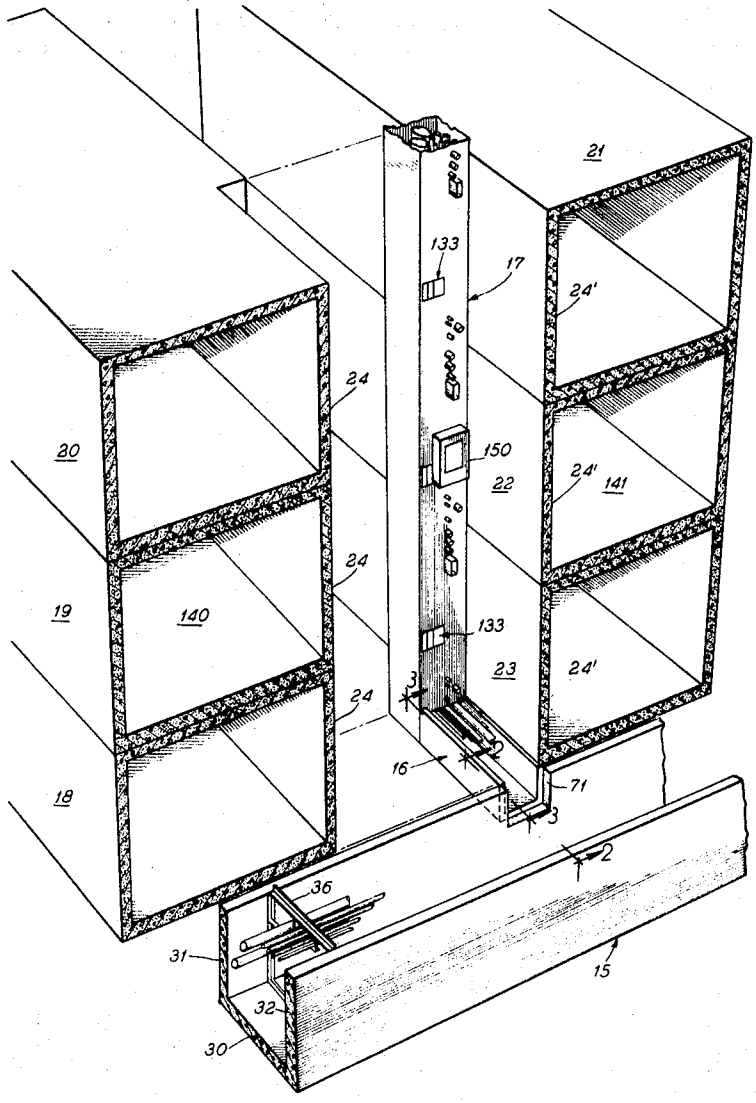
[45] **July 3, 1973**



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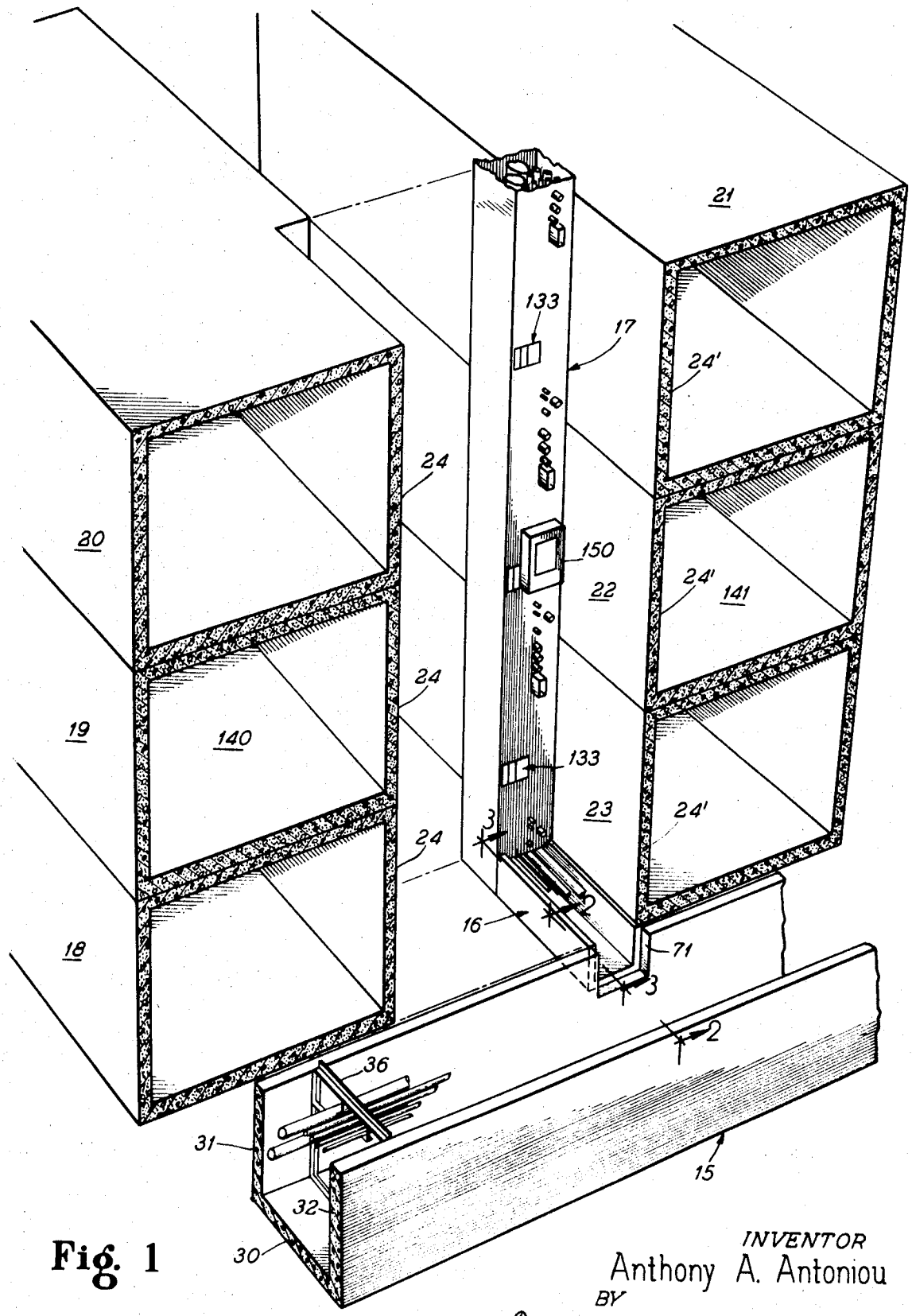

Fig. 1

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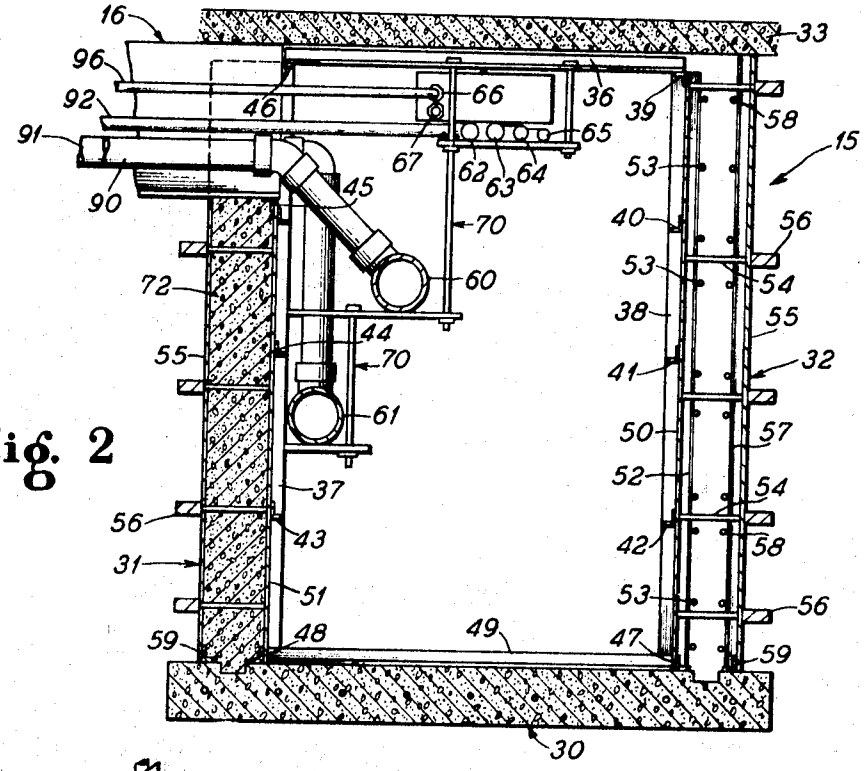

Fig. 2

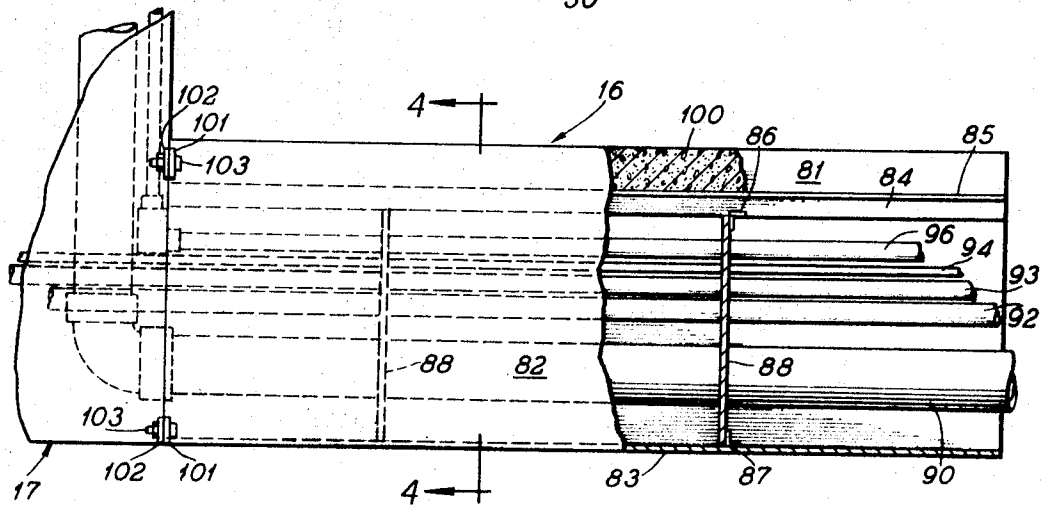

Fig. 3

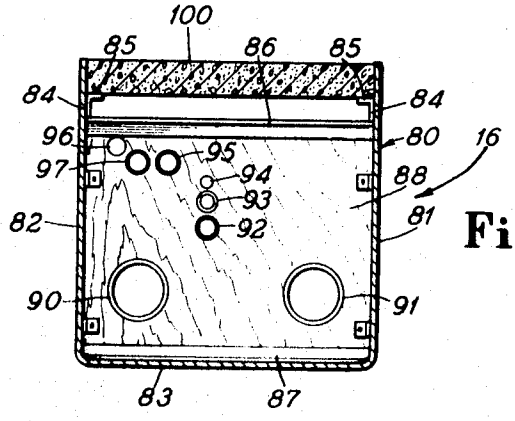

Fig. 4

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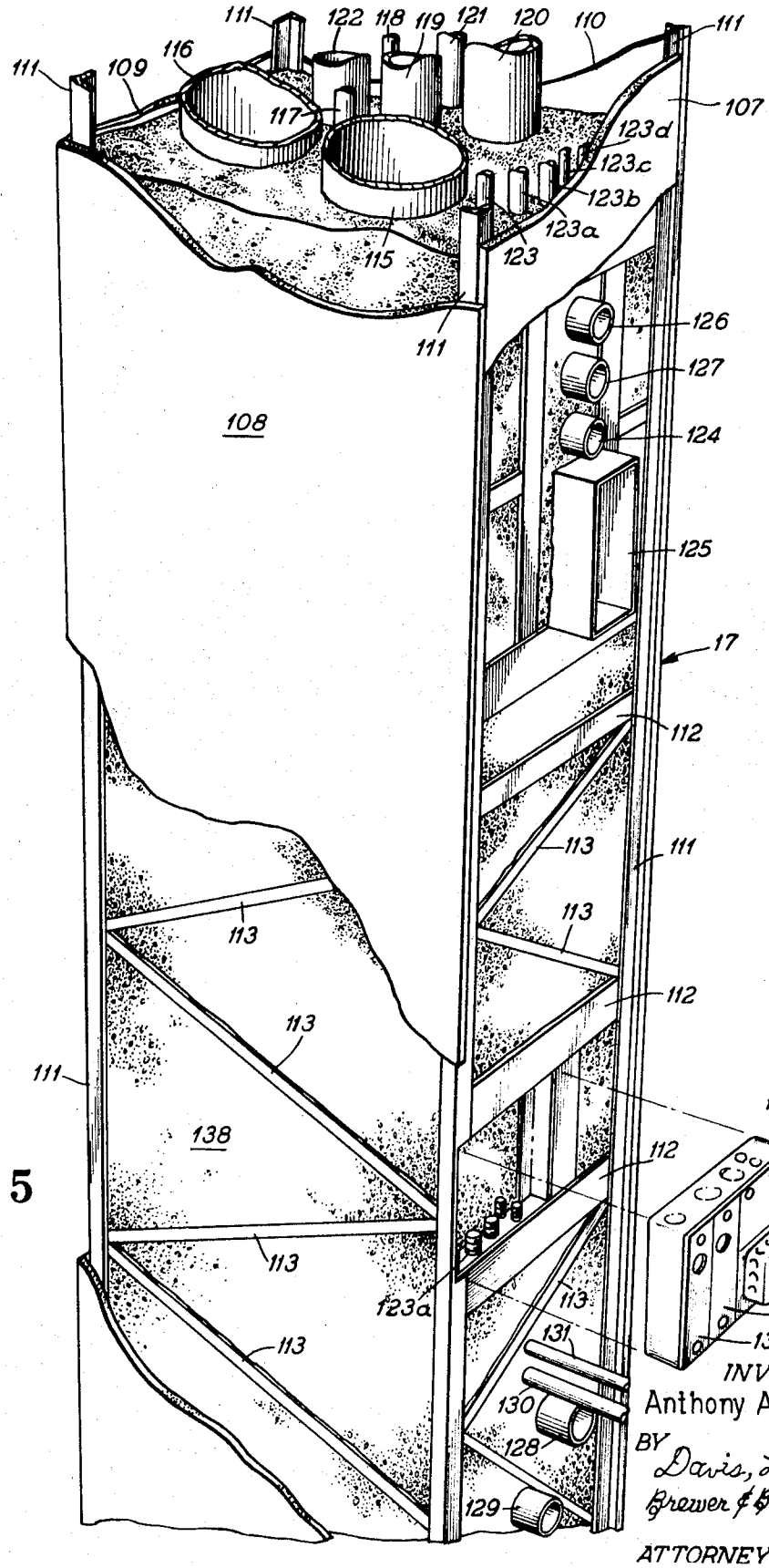

Fig. 5

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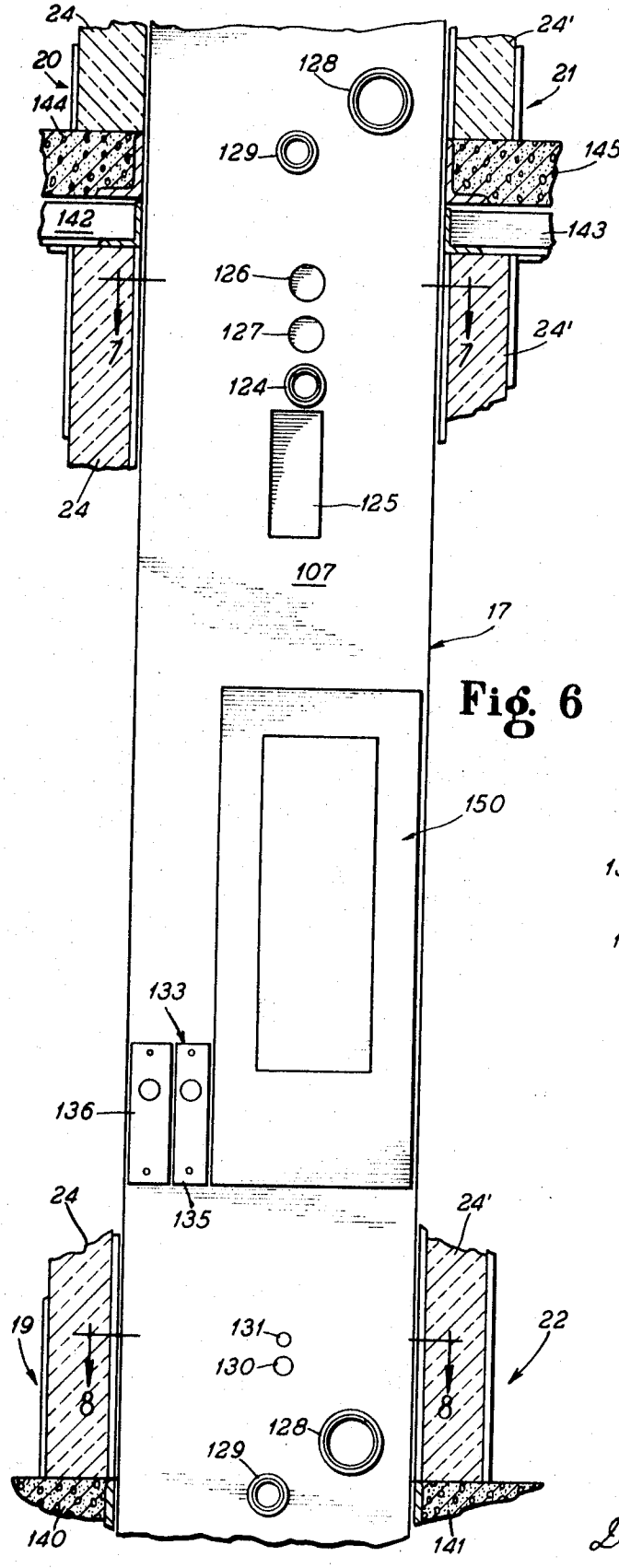

Fig. 6

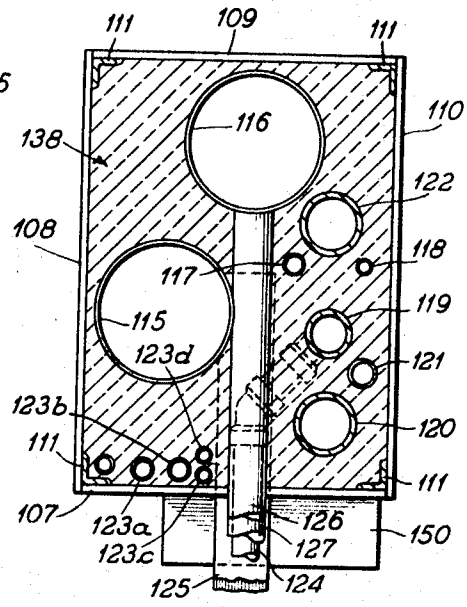

Fig. 7

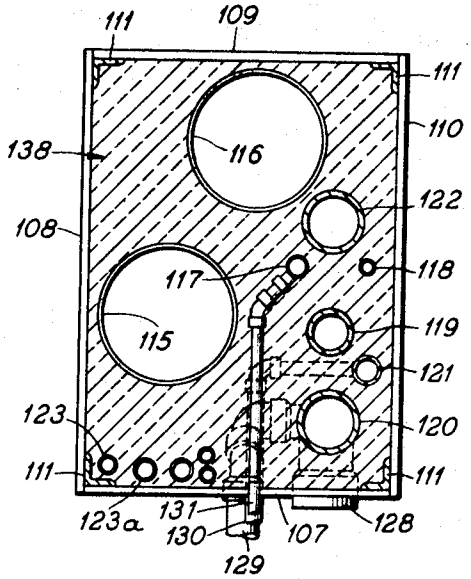

Fig. 8

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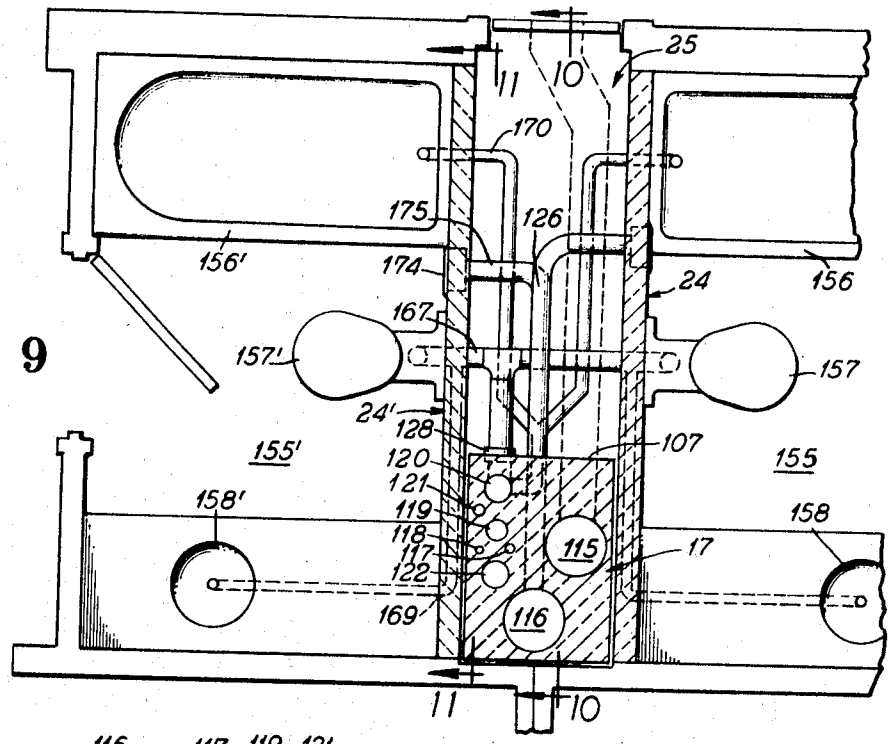
Fig. 9



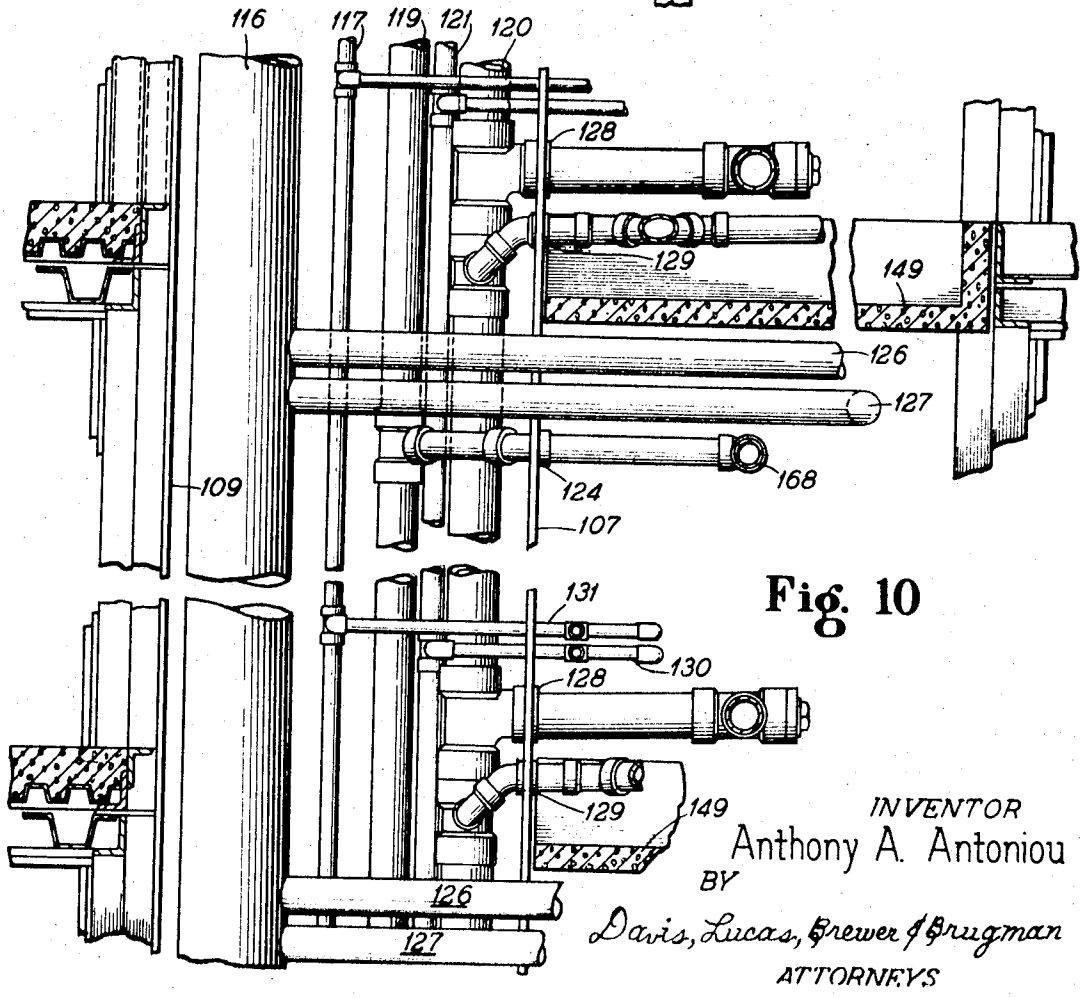


Fig. 10

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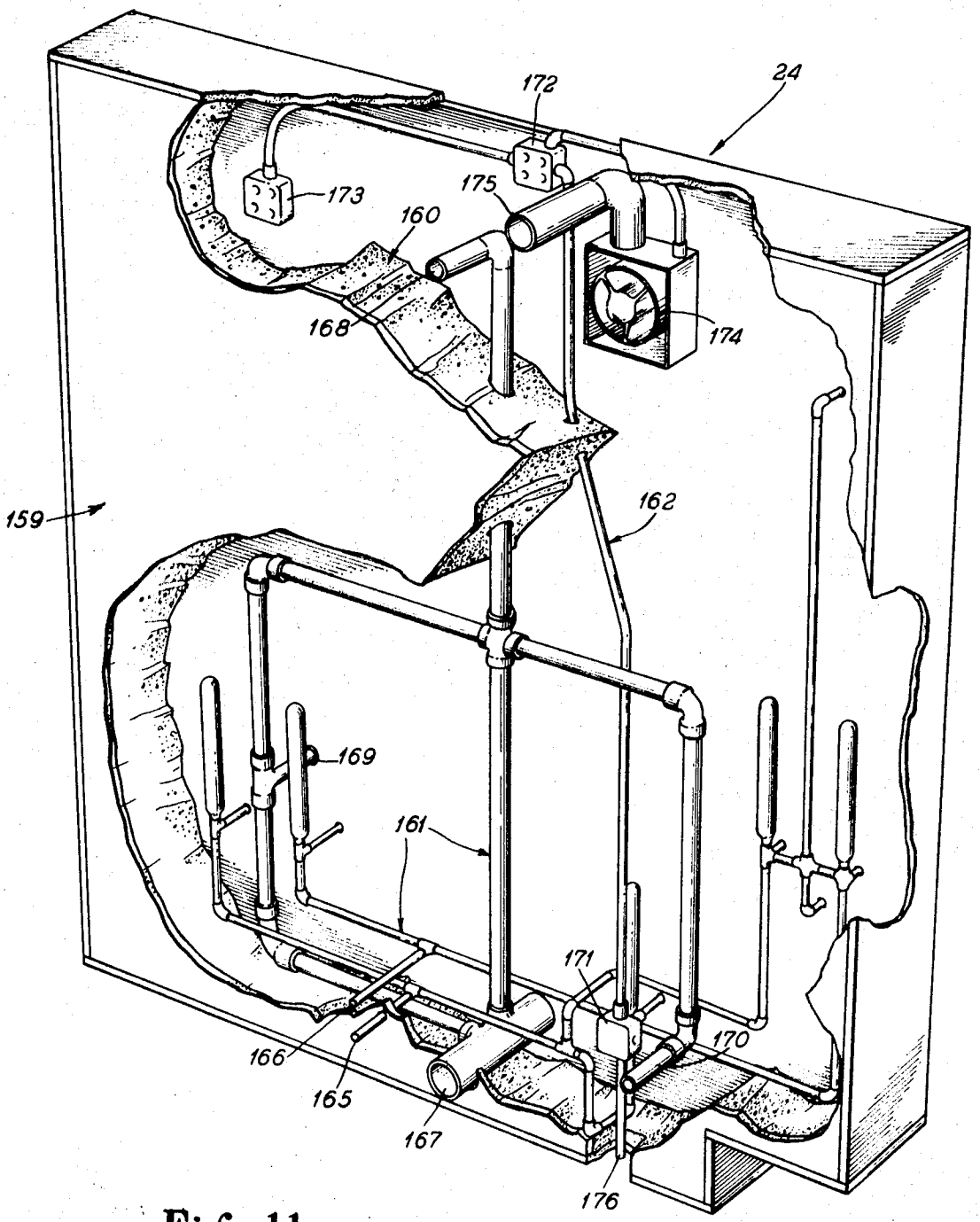

Fig. 11

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UNITIZED UTILITY DISTRIBUTION SYSTEM

This invention relates generally to building structures and more particularly to improved means for structuring the utility supply systems of a building, especially one constructed of a plurality of prefabricated modular units.

In recent times, there has been increasing interest and advancement in modular building construction in which a plurality of prefabricated modular units are erected and assembled into a complete structure or building. One such modular building system is fully described in my co-pending application Ser. No. 157,402, filed June 28, 1971, entitled BUILDING STRUCTURE. Other efforts utilizing the modular concept for buildings center largely in precast concrete units or in some instances in metal and wood units useful mainly for residential construction.

Prior to the present invention, however, to the best of my knowledge, there has been little or no attempt toward modularizing utility supply systems associated with such previously known modular building structures or otherwise. As a consequence, despite advances and achievements in the modular building field, it has heretofore been necessary to construct, on site and by conventional means, the various utility supply or support systems associated therewith. Thus, heating systems, telephone cables, aerials for television, radio, and other communication systems, as well as water, sewer, air conditioning, and like utilities, have been constructed on site in conventional fashion. This practice is time consuming, expensive and not always in keeping with sound engineering practice, particularly as to quality control, because the final integrated system is too difficult to inspect and test. As a result, many costly and poorly designed systems have resulted from past practices.

This invention seeks to alleviate many of the shortcomings previously known in utility supply systems constructed according to conventional on site practice by providing a unique modularized or unitary component system, capable of being constructed in a factory according to specifications and standards capable of being repeated in carefully controlled conditions. The provision of such a unitized system results in a marked economic advantage by way of savings in time and material, both at manufacture and installation, and is productive of a sound supply system of controlled standard quality.

In brief, the present invention provides a unique prefabricated utility distribution system, and while being especially adapted for modular building construction, is nevertheless capable of utilization in other types of structures as well; such comprising a structurally superior combination of prefabricated units or modules, each of which is a complete entity fabricated in a controlled manufacturing environment according to predetermined standards of strength and quality. Such units are capable of being delivered to the construction site, and assembled in the building with minimum erection time to provide an integrated system ready for use with minimum on site construction requirements.

One of the major objects of this invention is to provide a modularized utility distribution system for use in commerical and residential buildings.

Another object of this invention is to provide an improved utility distribution system which is practical and economically superior both as to manufacturing and installation costs and which is capable of being manufactured under controlled standards.

An additional object of this invention is to provide modular structural units for utility supply systems in a building which comprises a plurality of discrete entities, complete with all means necessary for use upon installation in the building.

A still further object of this invention is to provide an improved utility distribution system, especially useful in modular building structures, which is capable of being pre-fabricated in a factory, transported to the building site and installed in the building structure with a minimum of time and labor.

Still another object of this invention is to provide a simplified system for distributing utilities within and throughout a building structure by employing discrete modules that are capable of mass fabrication under assembly line factory conditions using controlled standards of strength and quality to provide a structurally superior system over conventional on site construction practices.

Having thus described this invention, the above and further other objects, features and advantages thereof will be readily apparent to those skilled in this art from the following detailed description of a currently preferred embodiment thereof, illustrated in the accompanying drawings, wherein:

FIG. 1 is an exploded perspective schematically showing a typical modular building structure embodying a supply system according to this invention;

FIG. 2 is a cross-sectional view taken substantially along vantage line 2—2 of FIG. 1 and looking in the direction of the arrows thereon;

FIG. 3 is a cross-sectional view taken through the pan unit of the system taken substantially along vantage line 3—3 of FIG. 1 and looking in the direction of the arrows thereon;

FIG. 4 is a cross-sectional view taken substantially along vantage line 4—4 of FIG. 3 and looking in the direction of the arrows thereon;

FIG. 5 is a perspective view with parts broken away to illustrate the structural features of the improved utility stack unit according to this invention;

FIG. 6 is a front elevational view of a portion of the stack unit illustrated in FIG. 5;

FIG. 7 is a cross-sectional view taken substantially along vantage line 7—7 of FIG. 6 and looking in the direction of the arrows thereon;

FIG. 8 is another cross-sectional view taken substantially along vantage line 8-8 of FIG. 6 and looking in the direction of the arrows thereon;

FIG. 9 is a top plan view illustrating the connection of the stack unit illustrated in FIG. 5 with related utility wall units;

FIG. 10 is a cross-sectional view taken substantially along vantage line 10—10 of FIG. 9 and looking in the direction of the arrows thereon; and

FIG. 11 is a perspective view of a utility wall unit with portions thereof broken away, taken substantially along vantage line 11—11 of FIG. 9.

Turning now to the features of the particular preferred embodiment illustrated in the accompanying drawings which illustrate the features of this invention in the best manner presently contemplated for enabling those familiar with the art to practice and understand the same, reference is first made to FIG. 1. As schematically shown in that figure, the distribution system of

this invention comprises a below ground level tunnel unit **15**, one or more pan units **16**, coupled to the tunnel unit and one or more vertical upright stack units **17**; each stack unit **17** being associated with a single pan unit **16**. Assembled units **15, 16** and **17** are adapted to be associated with a plurality of modular building units **18–23** arranged in side-by-side and superposed relationship to form a building structure. Each building unit includes a modular utility wall unit **24** or **24'** of the order illustrated best in FIG. **11**.

The utility walls **24,24'** of adjacent units are laterally spaced apart in the final assembly of the building in the manner described with greater particularity in my above referred to application Ser. No. 157,402, filed June 28, 1971, so as to provide a vertical stack space or closet **25** extending upwardly through the interior of the building to accommodate a modular stack unit **17** of the present invention (FIG. **9**). It will be appreciated that the structural features of the several modular units **15, 16, 17** and **24** of the present invention, as illustrated in FIG. **1**, are set forth somewhat schematically in that figure as are the illustrated modular building units **18–23**. The detailed features of such units, however, are more fully shown in other figures of the drawings, as will be referred to from time to time in the specific descriptions thereof which follow.

With particular reference now to FIGS. **1** and **2** of the drawings, the modular tunnel unit **15** will now be described. Generally speaking, as best shown in FIG. **1**, unit **15** is formed as a generally elongated U-shaped member having a bottom wall **30**, parallel sidewalls **31,32** and an open top wall **33** (See FIG. **2**). The bottom wall **30** is of reinforced concrete, poured at the site before installation of a factory made structure as will best be understood with reference to FIG. **2**.

As shown in the latter figure, the factory assembly for unit **15** comprises essentially a supporting frame structure about which the concrete sidewalls of the completed tunnel unit are formed at the building site; the unit **15** being otherwise complete in all respects on departure from the factory. To this end the aforementioned support frame structure comprises a plurality of angle iron roof braces **36**, located at spaced intervals along the length of the tunnel top and extending transversely between the upper ends of spaced upright angle irons **37** and **38** associated with the tunnel sidewalls. Additional angle iron members **39–46** extend lengthwise of the tunnel sidewalls to brace the uprights **37,38**; the same being welded together. The lower corners of the tunnel are provided with angle iron floor stringers **47,48** paralleling members **39–46** and removable floor brace members **49** are bolted between the floor level corner stringers **47, 48** at selected intervals along the tunnel length. The interior sidewalls of the tunnel are closed by corregated metal sidewall members **50,51** welded to the side frame members **39–46** and **47,48** to effect a unified structure, which may be in the order of **40** feet or more, depending upon the dimensions of the building in which it is to be installed and the practical limits of transporting the same to building site. It is fully contemplated that in certain instances the tunnel unit **15** also may be made in segments at the factory, capable of being interlocked and connected in end-to-end relation at final installation at the building site. Be that as it may, each of the sidewalls **50** and **51** of the prefabricated tunnel frame work is supported externally thereof by reinforcing metal mesh **52** and vertically spaced, horizontally extending reinforcing rods **53,53**, the wire metal mesh being fixed to the outside of the walls **50,51** and the reinforcing rods **53,53** attached thereto as by wire or other conventional means. Horizontally extending parallel spacer rods **54,54** are welded to the exterior of the wall members **50,51** to extend outwardly therefrom to project through a corrugated metal forming wall **55**, paralleling the interior metal walls **50** and **51**. Externally, of the forming wall **55** are reinforcing locking rails **56** to which the spacer rods **54** are connected. Internally of the forming walls **55** preferably are additional reinforcing wire mesh **57** and reinforcing rods **58**. Angle iron support members **59** extend along the lower margin of the forming wall **55** in spaced relationship to the corner angle iron support members **47** and **48** associated with the interior walls **50** and **51**, respectively; the members **47** and **59** as well as members **48** and **59** being connected by cross reaching support members (not shown herein) but serving to rigidify the overall structure and maintain the lower ends of the walls **50** and **51** spaced in parallel fashion with the exteriorly disposed forming walls **55**.

Extending along the interior of the elongated metal tunnel structure above described, are a plurality of supply means such as a cast iron sanitary main **60**, a storm or waste water main **61**, cold water supply and fire mains **62,63**, hot water supply and return mains **64,65**, electrical conduits **66,67**, for accommodating electrical conductors, television and radio aerials, sound communication conductors and the like. All such supply mains are suitably held by hanger means **70** suspended from the ceiling or top frame members **36** and one of the sidewalls **51** for instance. It will be appreciated, of course, that if steam or circulating water heating means or the like are employed naturally the mains for such heating systems likewise will be mounted within the interior confines of the tunnel unit **15**. Interior lighting means (not shown) for illuminating the tunnel unit **15** per se are also mounted internally thereof at the factory before delivery to the construction site. In any event, it will be appreciated that the elongated box-like tunnel unit having the side forming wall members **55,55** attached thereto is fully fabricated at the factory with all internal mains necessary for supplying the utility systems required for the habitability of the building, such as heat, light, communications, etc., prior to delivery at the building site.

It is to be particularly noted that at spaced intervals along the length of the tunnel unit **15** and particularly in the sidewalls thereof (such as wall **31**) are openings or voids indicated at **71** in FIG. **1** for attaching the laterally extending pan units **16** as will be described presently. Upon delivery to the building site, an elongated trench is formed into which the unit **15** is to be lowered. Before lowering the unit **15** into position, however, the foundation or bottom wall **30** is formed in the bottom of the trench and the factory built support frame of unit **15** is then lowered into position. The spacing between the interior walls **50,51** and the exteriorly supported form walls **55,55** are then filled with concrete as indicated at **72** in FIG. **2** to complete the formation of the tunnel sidewalls **31** and **32**, respectively. The opposite ends of the tunnel **15** are then sealed as by poured concrete walls including doorways if access through the ends thereof is desired. To attain that objective access thereto also may be afforded through one or both of the sidewalls or by suitable

overhead hatches. In any event, once the tunnel unit **15** is in position, several pan units **16** are attached thereto in each of the several openings **71** provided for that purpose and the trench for the tunnel is then backfilled. The top or roof of the tunnel is then closed over by the floor wall of the building modules mounted thereover.

With particular reference now to FIGS. **1, 3** and **4** of the drawings, features of the pan unit **16** will be described. Each pan unit comprises a laterally extending sub-tunnel unit communicating with the major supply tunnel unit **15** whereby the utility carriers within the latter unit may communicate with one or more stack units **17** as required by the distribution demands of the building.

As shown best in FIGS. **3** and **4**, each pan unit is formulated as a unified, open top elongated trough member **80** of substantially U-shaped cross-section and is preferably made of metal to provide parallel-spaced sidewalls **81,82** (See FIG. 4) which are cross-connected at their bottom reaches by an integral bottom wall **83**. Parallel spaced and longitudinally extending angle iron rail members **84,84** are mounted along the interior faces of the two sidewalls **81** and **82** adjacent the upper edges thereof to provide inwardly extending support coplanar flanges **85,85** for purposes which will appear presently. Cross-brace members **86** and **87** extend between the two sidewalls **81,82** at selected spaced intervals along the length of the pan unit **16**, such being located adjacent the bottom wall **83** and just below the members **84** to support planar upright wall members **88,88**. Each of the wall members has a plurality of spaced openings cut therethrough of varying sizes to closely receive and support distribution conduits, such as sanitary drain piping **90**, storm water drain **91**, hot and cold water supply and return pipes **92–94**, and electrical supply conduits **95, 96** and **97**. It will be appreciated that the several utility supply conduits or pipes mounted within the hollow interior of the pan unit **16** are each coupled to a respectively associated supply main carried within the tunnel unit **15** as best illustrated in FIG. **2**, for example.

Each pan unit is mounted with one end thereof resting in an opening **71** in the upper sidewall of the tunnel unit as shown in FIG. **1**. Once the pan unit **16** is in place, precast concrete floor slab **100** is mounted over the upper end thereof, the lower side thereof being under-supported on the flange portions **85,85** of the rail members **84** as best illustrated in FIG. **4**. It will be further appreciated that while one end of the pan unit **16** is coupled to the tunnel unit so as to extend laterally outwardly of one sidewall of the latter, the opposite end of the pan unit abuts against the lower end of an associated stack unit **17** (see FIG. **3**). The stack unit like the pan unit carries a plurality of internal supply conduits and ducts to accommodate the various utilities to be conveyed therewithin. These are coupled to the corresponding conductors and conduits supported within the interior of the pan unit by suitable elbow connectors and the like (see FIG. **3**).

In order to effect positive interconnection between the pan unit **16** and the vertical stack unit **17**, opposing pairs of connecting ear means **101** and **102** are provided on the pan and stack units, respectively, to registeringly oppose one another when the pan unit is abutted against the lower end of the stack unit. Such are then interconnected by bolt-fastener means **103** (see FIG. **3**).

Turning now to the particulars of the stack unit **17** special reference is made to FIGS. **1** and **5** through **8** of the drawings.

As best shown in FIG. **1**, the illustrated embodiment of the stack unit comprises an elongated unitary member of substantially rectangular cross-section adapted to extend from substantially the base or ground floor level of the building to the roof level thereof (not shown). In practice, it has been found that stack units in the order of 50 feet in length can be manufactured with practicality and transported to remote building sites. In occasions where stack lengths exceeding fifty feet are required, the same are constructed in convenient length sections which are then connected in end-to-end abutting relationship to effectuate the desired overall length.

As best shown in FIG. **5** of the drawings, the stack unit **17** comprises four planar exterior walls **107, 108, 109** and **110** which conveniently may be constructed of plywood sheeting, plasterboard, or metal. In any event, the four walls of **107–110** are supported in rectangular configuration by an internal supporting assembly composed of lengthwise extending angle iron corner frame members **111** mounted at each corner of the rectangular cross-sectional configuration and to which the covering material for the walls **107–110** may be attached. The four corner members **111** are rigidly interconnected in desired parallel spaced relationship by cross-connecting horizontal support frame members **112** located at desired spaced intervals along the length thereof and cross-connecting angularly disposed members **113**, which form a latticework support system.

Within the boxlike configuration of the elongated stack structure comprising the described external walls and the interior supporting framework therefor, are supported a plurality of longitudinally extending utility conductors or conduits, such as an air supply duct **115**, air exhaust duct **116**, hot water supply pipe **117**, hot water recirculation line **118** cross-connected to line **117**, a sanitary vent pipe **119**, a sanitary stack **120**; a cold water supply line **121**, a roof storm water drain pipe **122** and a plurality of electrical conduits **123**, **123*a***, **123*b***, **123*c*** and **123*d*** which are located in this particular embodiment adjacent the front wall **107**. It will be appreciated that the exact number, configuration and type of utility conduits mounted within the interior of the stack is susceptible to wide variation and selection to meet the demands of a particular utility distribution system encountered. Principally, however, it is intended that the stack unit **17** shall house within its interior the major distribution conduits for all utilities to be serviced throughout a building.

In the initial stages of constructing the stack unit, the various utility conduits, as hereinabove described, are located along designated axes paralleling the longitudinal axis of the stack housing and held in their desired spaced position by internal brackets or brace systems (not shown) herein. Each of the conduits communicates with one or more lateral outlets or connector stubs in wall **107**. For example, sanitary vent stubs **124** are joined to the vent stack **119**, fresh air ducts **125** are coupled to the fresh air supply duct **115** and spaced pairs of air exhaust outlets **126,127** are coupled to the air exhaust duct **116**. Sanitary stack **120** has a sanitary hub **128** and drain hub **129** at each floor level, while the cold water supply line **121** connects with outlet **130** adjacent each sanitary stub **128** wile the hot water sup-

ply pipes 131 are coupled to the hot water supply main 117. The various electrical conduits 123–123*d* are joined to three-part junction boxes 133 having an electrical circuit section 134, a communication section 135 (principally for telephone) and a radio-television antenna section 136. Principally, conduit 123 is coupled to the antenna section 136; conduit 123*a* is coupled to the telephone section 135 and conduits 123*b*, *c* and *d* are coupled to the electrical circuit section 133.

After the assembled hollow stack structure as hereinabove described is fabricated with the several internally supported utility conduits connected to the related outlets in the one wall 107 thereof, (there being a full set of such outlets provided for each floor level of the building), the entire hollow assembly is placed in an elongated mold, and the covering material for the sidewalls 107–110 are mounted in position about the exterior of the supporting framework. The interior of the stack in the mold is then filled with foaming urea plastic mixture or the like which chemically expands to fill all internal voids thereof and provide a core 138 bonded with all surfaces of the various utility conduits and the interior faces of the planar outer walls 107–110. Any surplus ureafoam is removed at the opposite ends of the stack unit upon completion of the molding operation. This unified structure with the ureafoam core presents a very stable structural combination which demonstrates improved strength in bending, tension, and compression. It has been observed, for example, that the overall structural strength of the unified stack greatly exceeds the structural strength and characteristics of the individual components such as the sanitary piping, the wall covering materials, the framework materials, the electrical conduits and air ducts. The ureafoam, for example, is relatively weak in compression, but has a fairly stable tension factor whereas the plastic piping used for sanitary drains and water mains, while being strong in compression, is relatively weak in tension. Upon combination with ureafoam, which tightly adheres to the exterior of the piping, a unified structure results which has acceptable strength values in both tension and compression. Additionally, the ureafoam core serves to add sufficient bending strength to the elongated stack unit to make it practically usable, particularly when handling the same between factory and erection at the building site.

Having described the basic features of the vertical stack 17, its operational positioning and relationship to the modular building units will best be understood with reference to FIGS. 6 through 10 of the drawings. In FIG. 6 in particular, the stack unit 17, or a section thereof, is shown as it relates to two floor levels of the preferred type of building construction, generally in accordance with that described in my heretofore referred to application Ser. No. 157,402 filed June 28, 1971. As best shown in FIG. 9, stack unit 17 is located at one end of the closet spacing or void 25 provided between opposing spaced utility wall units 24,24′ of adjacently opposing building module units, such as the second floor units 19 and 24 of FIG. 1. It will, of course, be understood that the stack unit 17 extends upwardly through the superposed closet spaces or voids 25 which occur between adjacently opposed units or modules of each floor level in the building. As illustrated in FIG. 6, the stack unit 17, or portion thereof shown, is mounted between opposing walls 24,24′ of adjacent modular units 19 and 22; the floor of such two modular units being designated 144 for unit 19 and 141 for unit 22. Correspondingly, the roof or ceiling wall of unit 19 is designated 142, while the ceiling of unit 22 is designated 143. Correspondingly, the floor of the next over disposed room modules 20 and 21 (see FIG. 1) are respectively designated 144 and 145 in FIG. 6.

As will be recognized from this figure, a portion of the stack unit 17 which resides between ceiling and floor level, or in other words in the closet space 25 for each floor level of the building, has the front wall 107 thereof exposed for accessibility to the interior of the closet. In effect, wall 107, as best illustrated in FIG. 9, comprises the rear wall of the closet space 25 once stack unit 17 is installed. The floor level of the closet space 25, after installation of the stack unit and utility walls 24,24′, is normally covered with the precast concrete floor slab 149 (see FIG. 10). As shown in FIG. 6, the upper end of the stack wall 107 presented to each closet space 25, presents the exhaust air connectors 126,127, a sanitary vent 124, and the fresh air supply duct 125. Adjacent the floor level of the closet space are the cold water pipe 130, the hot water pipe 131, the sanitary hub 128 and the waste water drain 129. In the particular illustrated embodiment of the stack portion set out in FIG. 6, it is to be noted that the electrical outlet box 133 occurs at a level just slightly above the floor of the closet to provide the telephone connection section 135, the antenna section 136 and in lieu of the electrical connection box 134 illustrated in FIG. 5, an enlarged electric control panel box 150, including circuit control fuses or current breakers. Such a control panel box 150 is intended to control the circuitry throughout the stack unit and normally only one such control box will be provided in each stack unit although in multi-story highrise buildings, it is fully contemplated that more than one of such control panel boxes 150 may occur at selected floor locations.

As best illustrated in FIGS. 9 and 10 of the drawings, each of the utility walls 24,24′ of related building module units, comprises one wall of a bathroom 155,155′ for a typical motel room unit, for example. In accordance with conventional practice, the bathroom 155 is provided with a tub 156, a sanitary facility 157 and a washbowl 158.

As illustrated in FIG. 11, the utility wall unit 24 is a unitary modular structure of generally rectangular parallelopiped formation, forming one enclosing wall of the bathroom. Typically, such a utility wall is exteriorly covered with plasterboard 159 while the interior thereof is solidified with a ureafoam core 160. Mounted interiorly of the utility wall unit and held in position by the ureafoam core 160 thereof, is a plumbing harness indicated generally by numeral 161 and an electrical harness indicated generally by numeral 162. The plumbing harness includes a hot water inlet 165, cold water inlet 166, a sanitary drain connection 167, a sanitary vent network and connection 168, a washbowl drain connection 169 and a tub drain 170; it being understood that hot and cold water lines, drains and vents are all accompanied by suitable piping networks according to the requirements of the services being supplied and which will not be described in detail herein.

The electrical harness 162 includes one or more electrical outlet or junction boxes 171,172,173, an exhaust fan 174 and a fan discharge outlet or pipe 175.

As illustrated in greater particularity in FIGS. 9 and 10, the sanitary drain 167, the sink drain 169 and the tub drain 170 of the utility wall unit are coupled to the sanitary drain pipe 120 of the stack unit while the water pipes 165 and 166, serving the sanitary facility 157, the sink 158 and tub 156, are joined, as appropriate, to the hot and cold water supply lines 130,131. Sanitary vent 168 is joined to the vent stack 119 by piping connection with vent 124 of the stack unit 17. The electrical harness 162 is joined by a suitable conduit network (not shown in FIGS. 9 and 10) to the electrical outlet section 134, or the circuit breaker box 150 associated with the stack unit 17. In a similar fashion, the exahust outlet connection or stub 175 of the exhaust fan 174 is joined to one of the exhaust outlets 126 or 127 of the stack unit.

In addition to the electrical circuitry to the bathroom 155 of the typical motel unit, the electrical harness 162 of the utility wall 24 (particularly junction box 171 thereof) is joined to a conduit system 176 (see FIG. 11) serving electrical outlets, telephone outlets and antenna outlets located remotely of the bathroom area throughout the modular room unit and to the stack antenna and phone sections 135,136; such ancillary conduit systems not being otherwise illustrated or further described herein. Of course, it will be appreciated and understood that the stack unit 17 in each closet area 25 supplies the opposing utility walls 24,24' of adjacent room units and that such relationship is repeated throughout the building structure.

From the foregoing, it is believed that those familar with the art will readily recognize and appreciate the novel advancements presented by the hereinabove described invention and will understand that the concept and basic features thereof are not necessarily limited by the specifics of the preferred embodiment herein described. This is particularly true as to the various piping or conduit members and attaching networks present in the tunnel, pan, stack and utility wall units which are susceptible to wide design variation according to the deamnds of a particular building installation.

I claim:

1. A modularized utility distribution system for buildings comprising: a transportable, elongated, prefabricated utility tunnel unit adapted to be mounted horizontally beneath the ground floor of a building and having an open upper side enclosed by said floor, at least one elongated, prefabricated, transportable, distribution pan unit having a removable top wall for gaining access to its interior and including means for attaching one end thereof to said tunnel unit so as to extend laterally outwardly therefrom with its interior openly communicating with the hollow interior of the tunnel unit; a transportable, monolithic stack unit having means for connecting its lower end to the other end of said pan unit so as to extend vertically upwardly therefrom along a vertical access shaftway provided therefor within the building's interior, at least one utility wall unit supported within the building and disposed adjacent said stack unit and shaftway at a selected level therealong, and conduit means mounted within each of said units and having means for interconnection upon assembly of said units in the building to thereby effectuate an integrated system for distributing habitation supporting utility supplies from sources thereof coupled to the conduit means in said tunnel unit to consumption outlets communicating with the conduit means of said wall unit.

2. The invention of claim 1 wherein said stack unit is of unitary modular construction comprising an elongated open sided rigid framework of generally quadrangular cross-sectional configuration, rigid planar covering means overcovering the exterior of said framework and forming enclosing exterior walls for said stack unit, and solid core means filling the interior voids of said stack unit and interjoining said conduit means, walls and framework to unify the same into a monolithic structure.

3. The invention of claim 2, and plural outlet means selectively spaced along one wall of said stack unit and each communicating with an individual conduit means therewithin.

4. The invention of claim 1 wherein said wall unit is a mold formed rigid unitary substantially parallelopiped structure, the outer surfaces of which are faced with planar wall covering materials, a plumbing harness comprising a network of pipes and outlets mounted within the interior of said wall unit, an electrical harness comprising a plurality of interconnected conduit means, junction boxes and outlets mounted within the interior of said wall unit, and lightweight solid core means filling all voids of said interior not occupied by said plumbing harness and electrical harness; and serving to rigidly support and interjoin the same with said wall covering materials to provide a monolithic structure.

5. The invention of claim 1 wherein said pan unit comprises an open top, elongated trough of substantially U-shaped cross-section, a rigid wall member removably covering the open top thereof, and a plurality of bulkhead walls extending transversely of the interior of said trough and having spaced openings therethrough registeringly aligned with one another for the reception and support of utility conveying conduit means, whereby the latter are mounted within the interior of said pan unit.

6. The invention of claim 1 wherein said tunnel unit comprises an elongated U-shaped rigid metal framework of generally quadrangular cross-sectional configuration, rigid wall covering materials mounted over opposite interior sidewalls of said framework, forming wall materials mounted in parallel spaced relation to said sidewalls and supported laterally outwardly therefrom, and means for supporting said conduit means lengthwise along the interior of such framework; the framework being open at the bottom and operationally supported on a concrete floor pad formed along the bottom of a below grade trench with the spacing between said forming wall materials and interior sidewalls thereof being receptive of poured concrete once said framework is mounted on said floor pad to provide a rigidified open top tunnel structure.

7. The invention of claim 1 wherein a pair of parallel spaced utility wall units are provided adjacent said stack unit at each floor level of the building to enclose opposite sides of said shaftway.

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