

March 7, 1950

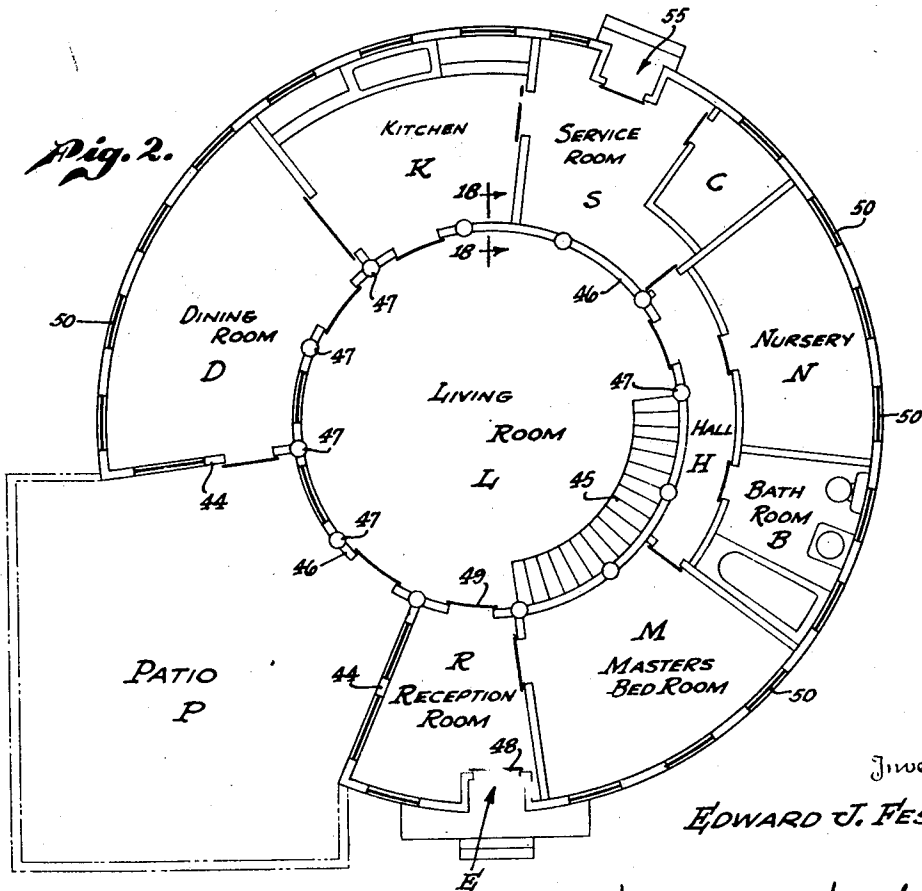
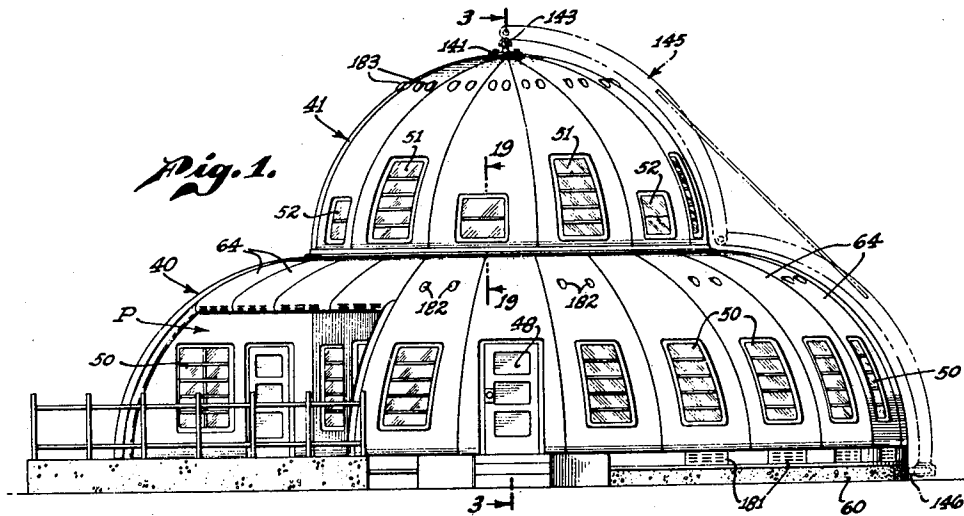
E. J. FESER

2,499,478

FABRICATED BUILDING CONSTRUCTION

Filed May 3, 1943

13 Sheets-Sheet 1



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FABRICATED BUILDING CONSTRUCTION

Filed May 3, 1943

13 Sheets-Sheet 2

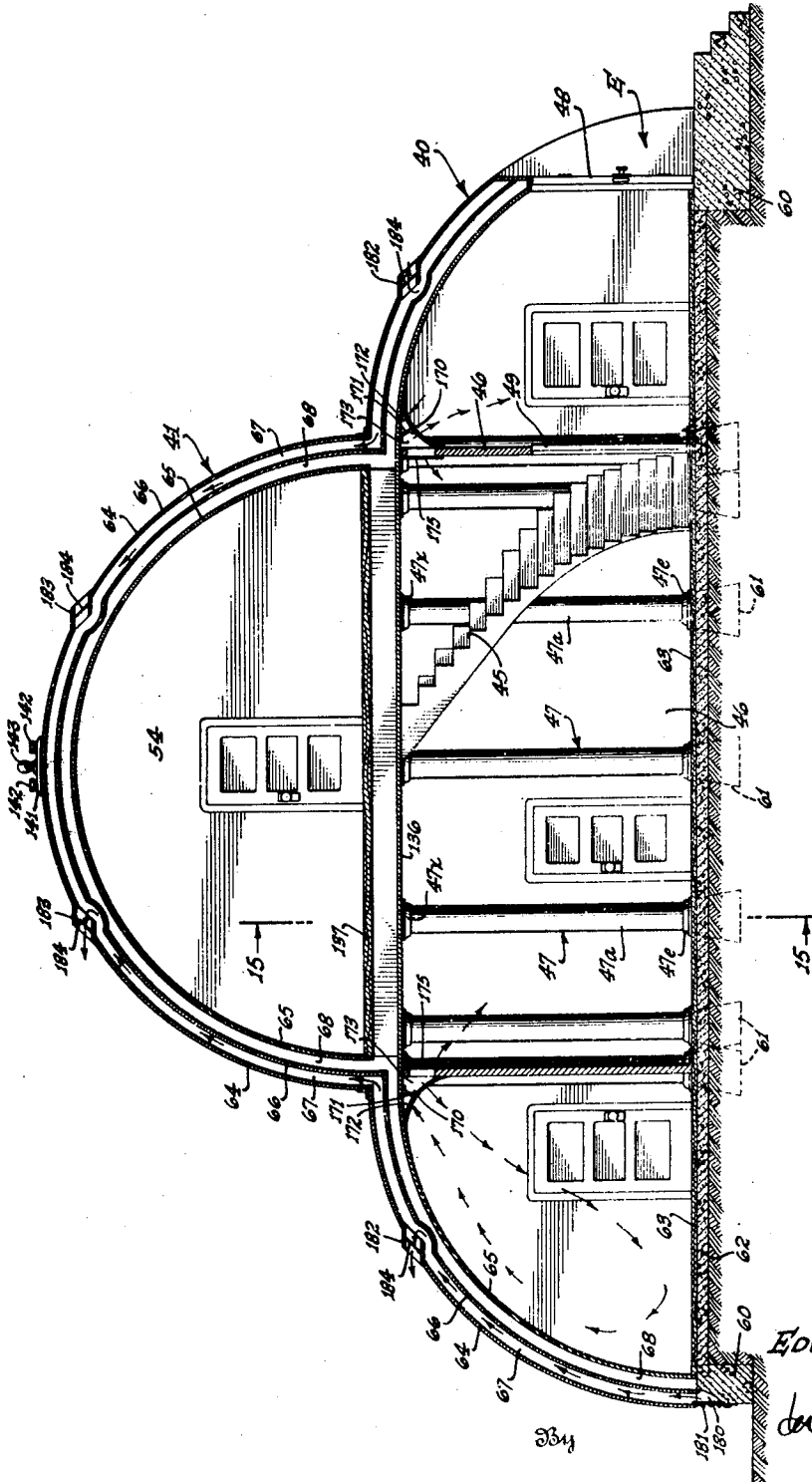


Fig. 3.

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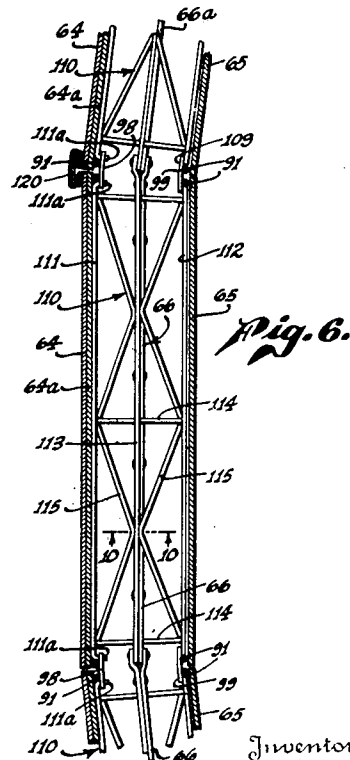
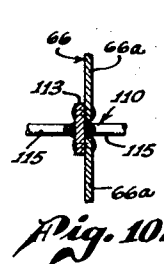
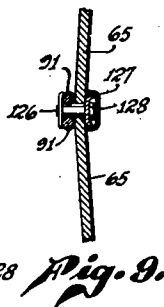
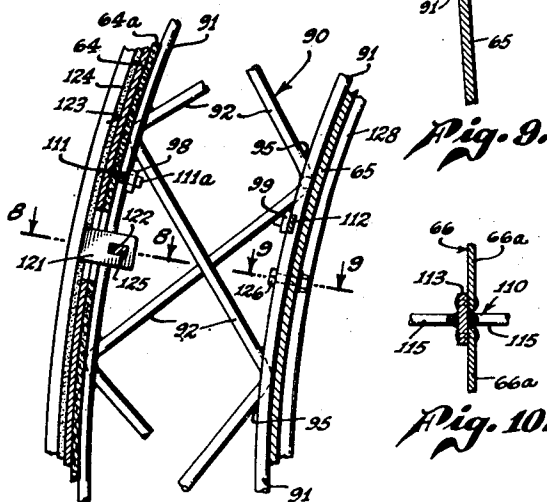
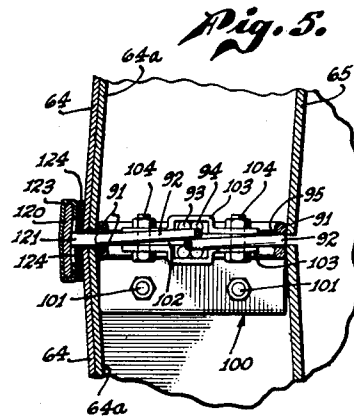
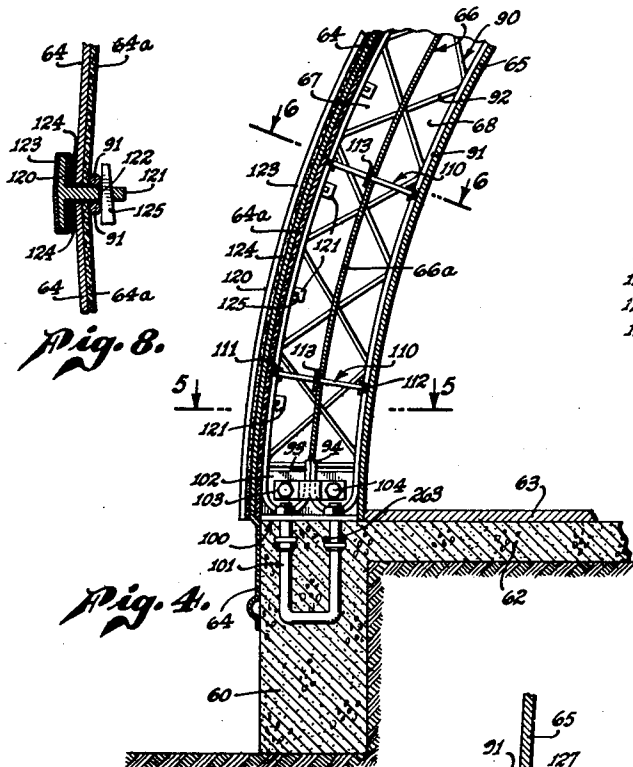
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FABRICATED BUILDING CONSTRUCTION

Filed May 3, 1943

13 Sheets-Sheet 3



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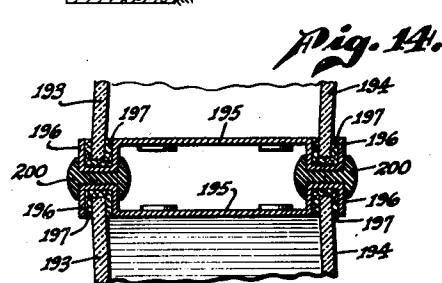
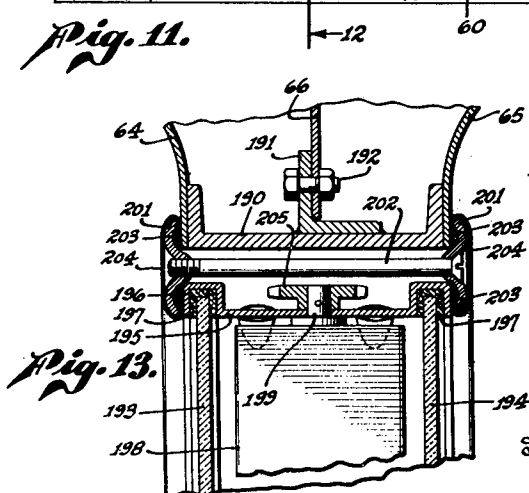
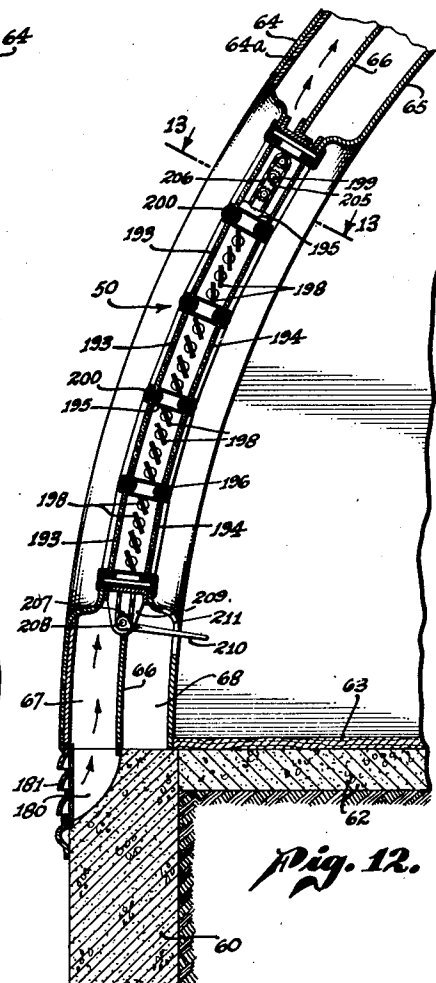
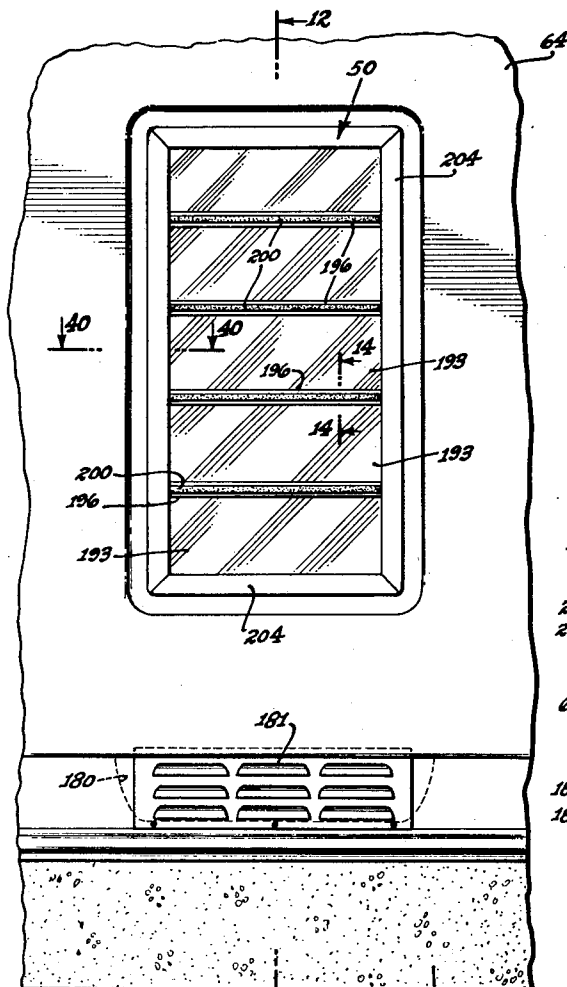
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FABRICATED BUILDING CONSTRUCTION

Filed May 3, 1943

13. Sheets-Sheet 4



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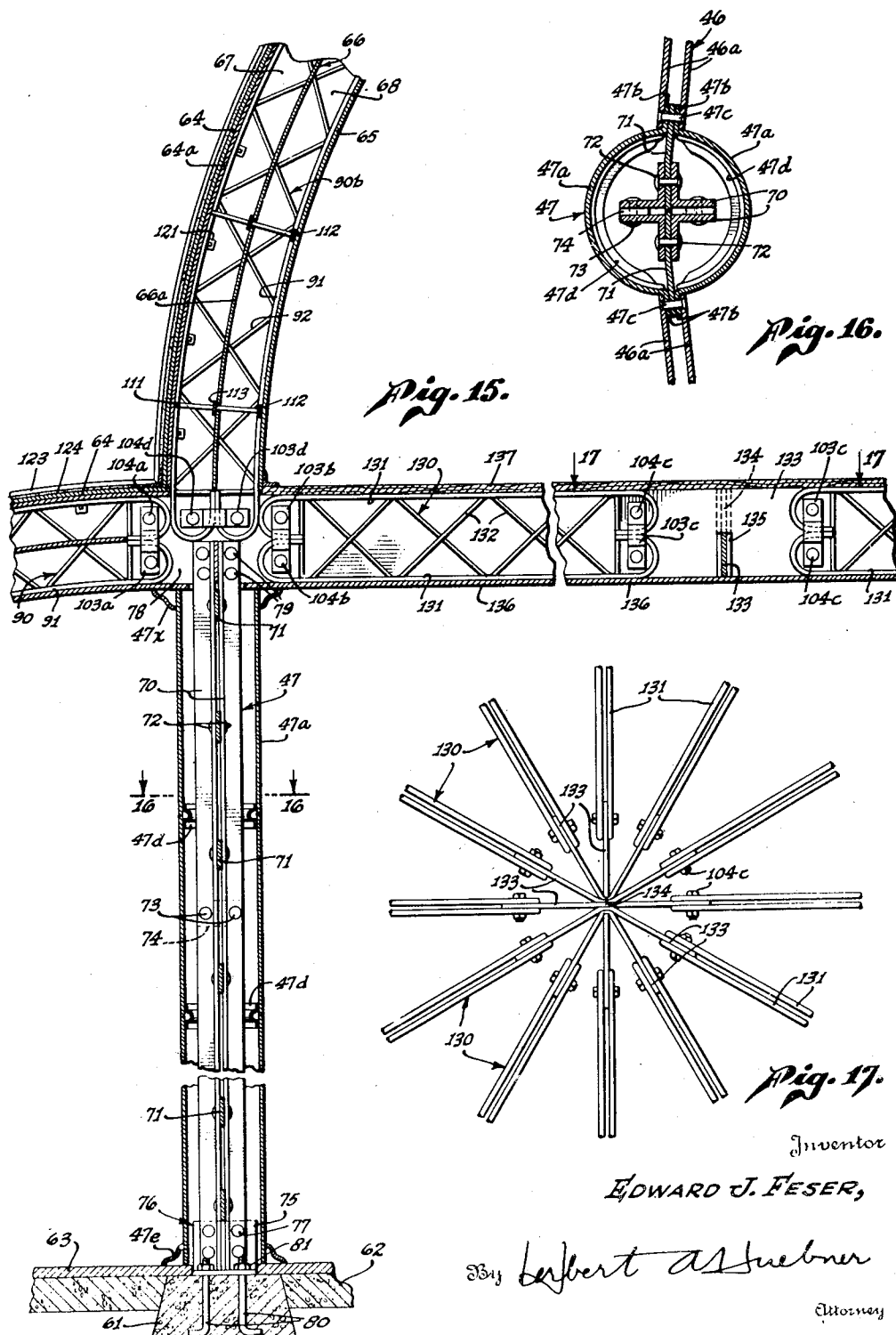
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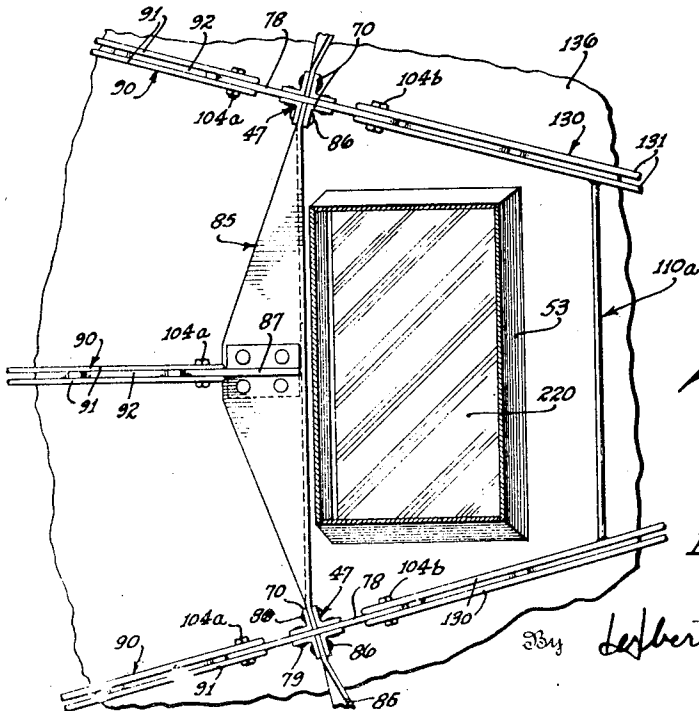
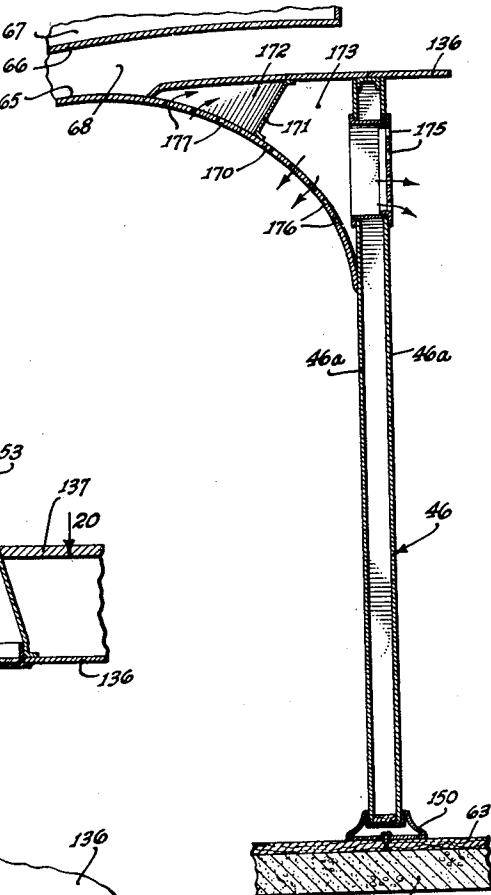
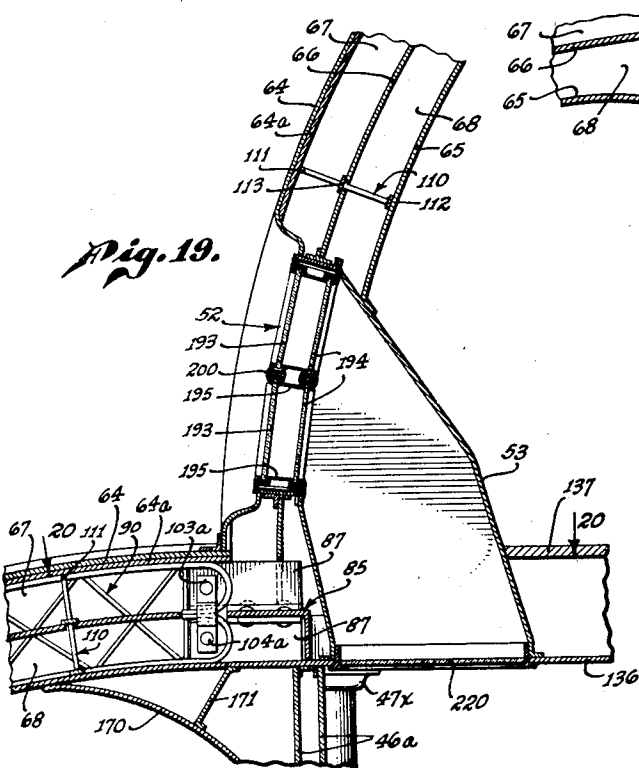


Fig. 18.

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FABRICATED BUILDING CONSTRUCTION

Filed May 3, 1943

13 Sheets-Sheet 7

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2,499,478

FABRICATED BUILDING CONSTRUCTION

Filed May 3, 1943

13 Sheets-Sheet 8

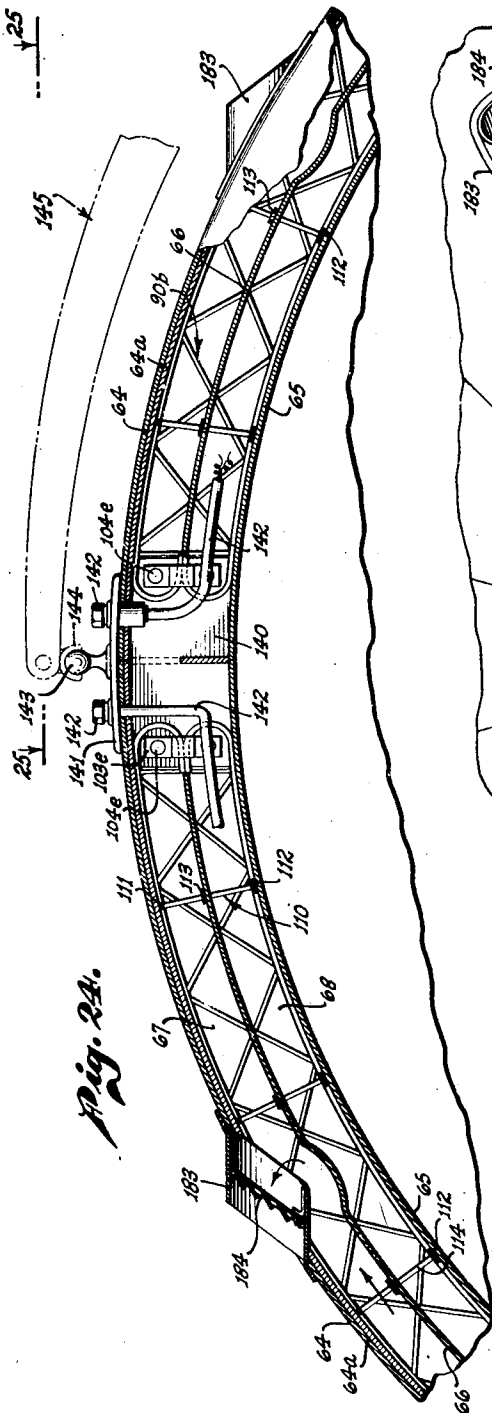


Fig. 24.

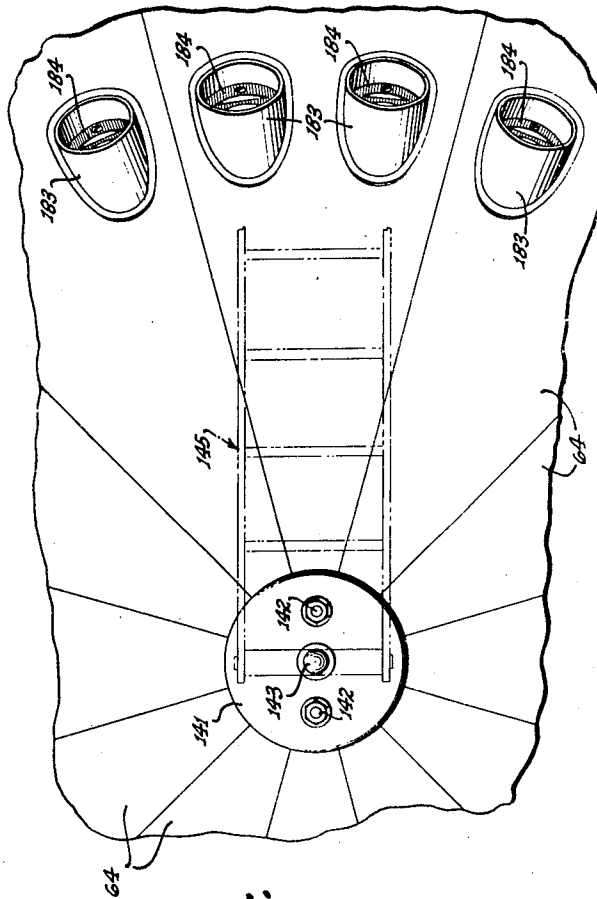


Fig. 25.

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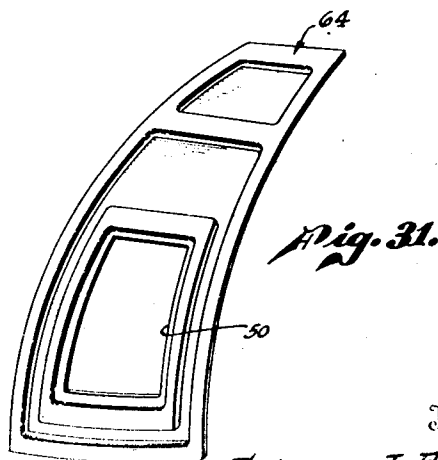
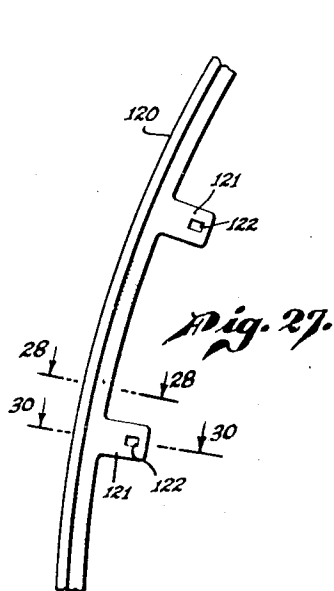
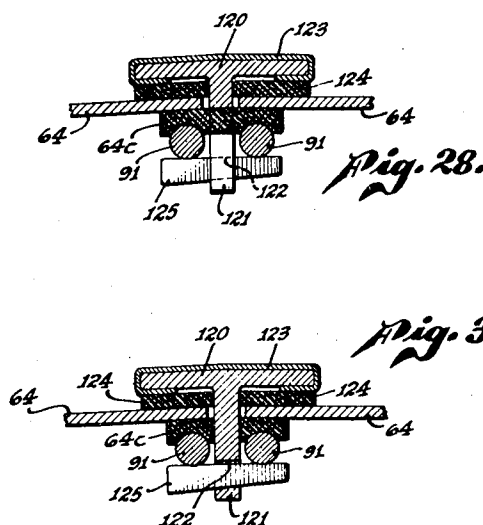
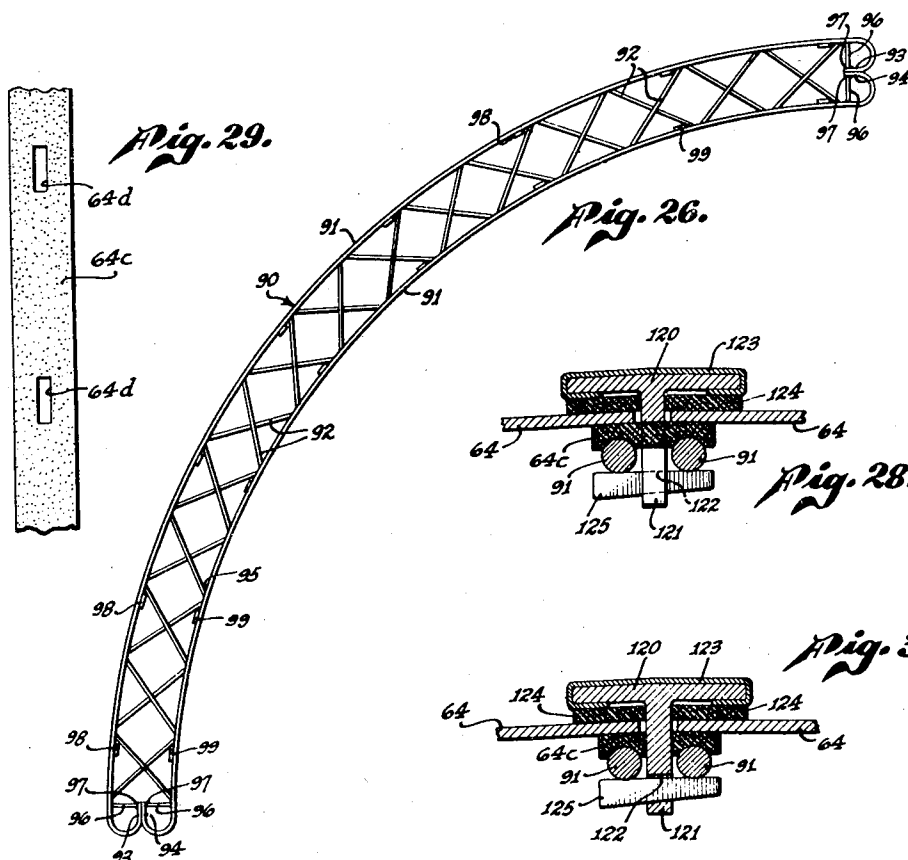
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FABRICATED BUILDING CONSTRUCTION

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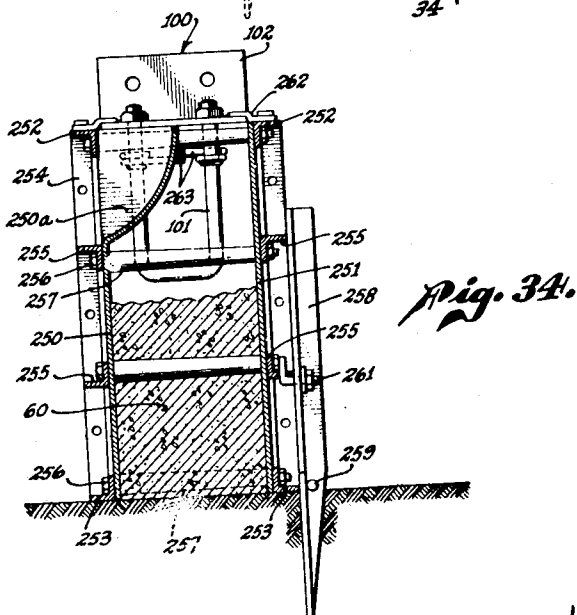
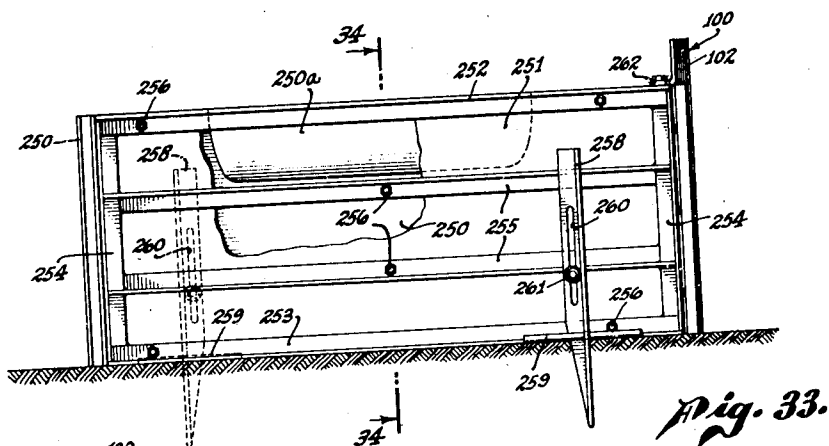
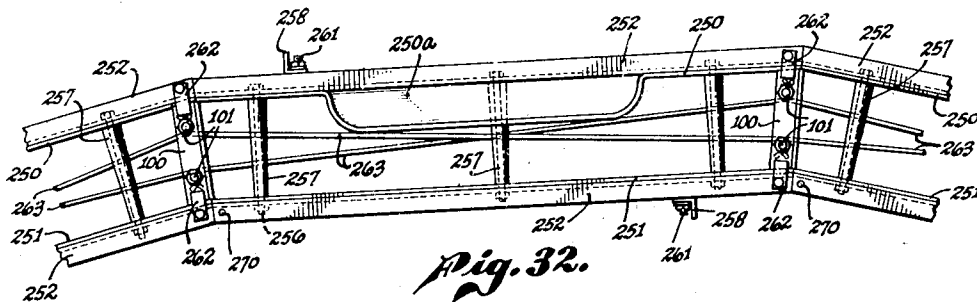


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FABRICATED BUILDING CONSTRUCTION

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FABRICATED BUILDING CONSTRUCTION

2,499,478

Filed May 3, 1943

13 Sheets-Sheet 11

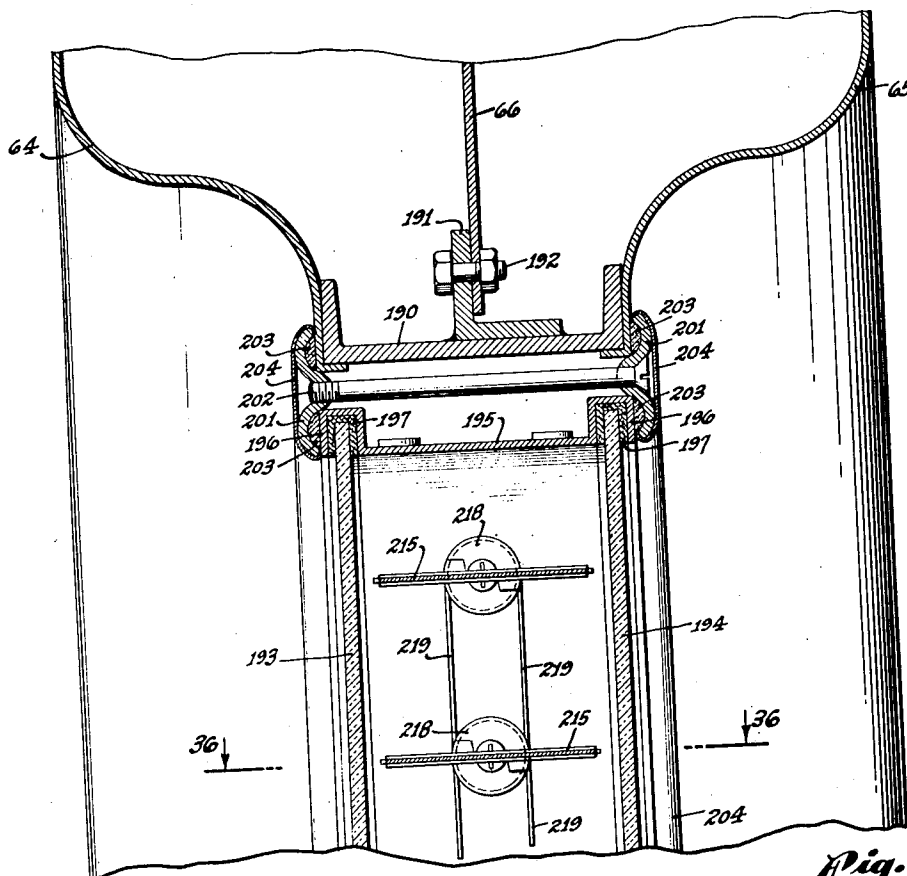


Fig. 35.

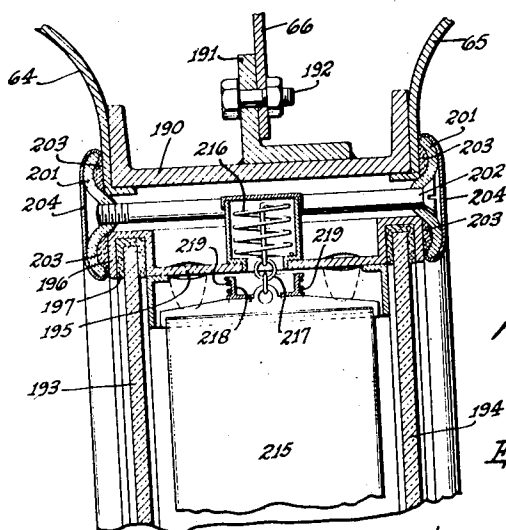


Fig. 36.

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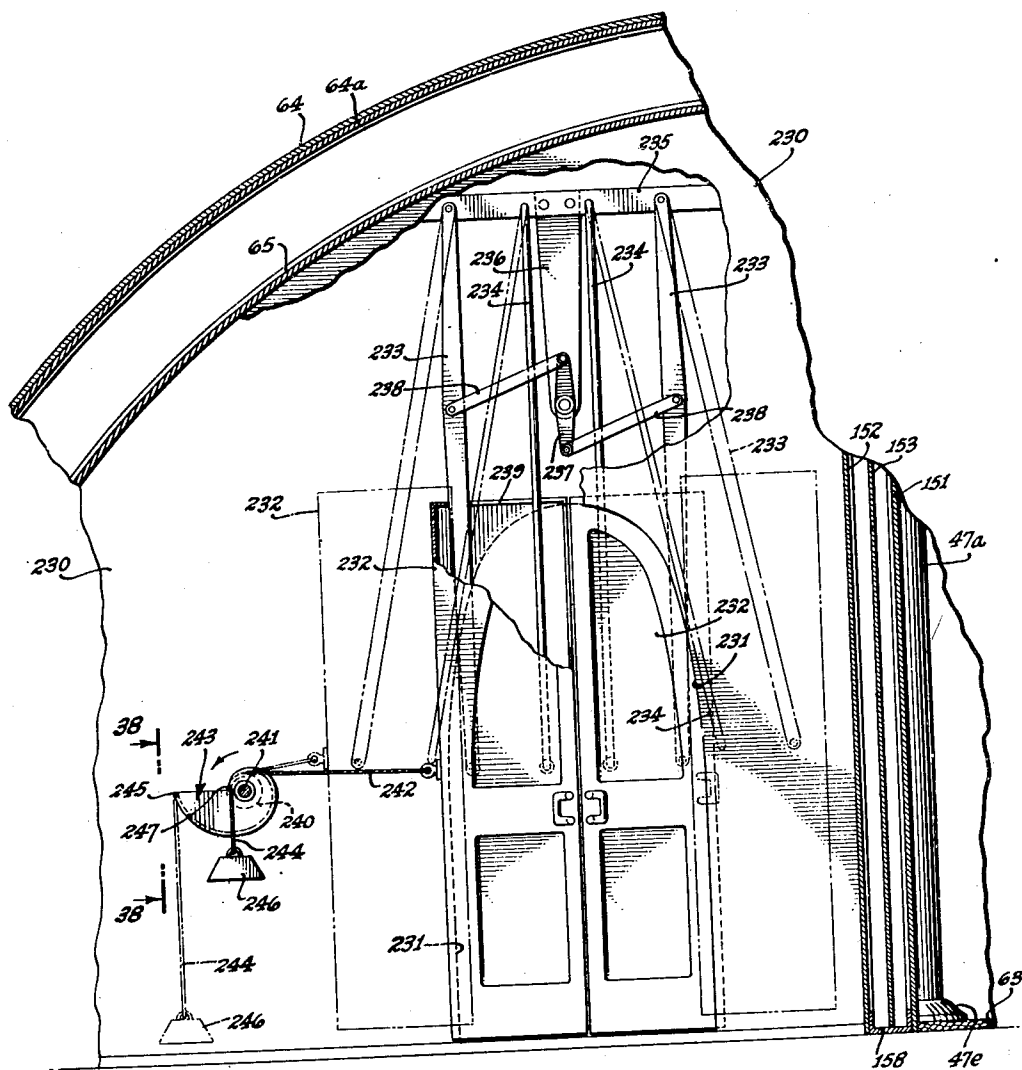


Fig. 37.

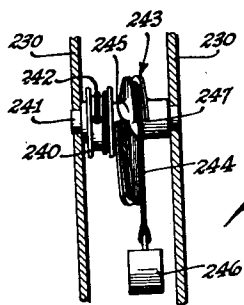


Fig. 38.

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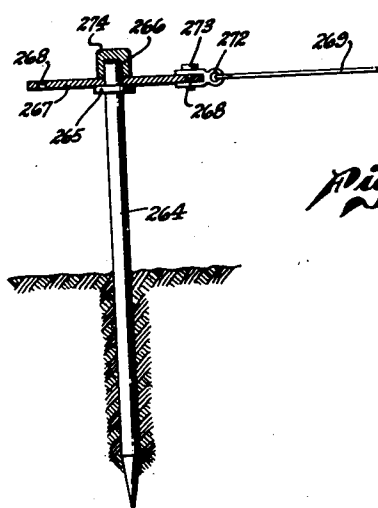
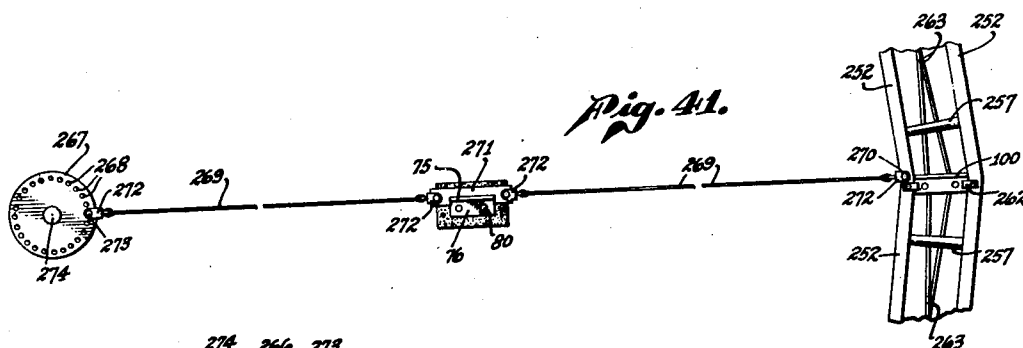
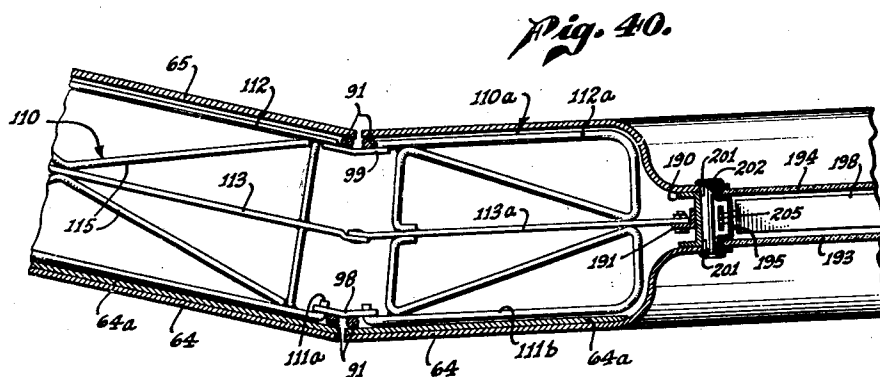
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FABRICATED BUILDING CONSTRUCTION

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13 Sheets-Sheet 13



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UNITED STATES PATENT OFFICE

2,499,478

FABRICATED BUILDING CONSTRUCTION

Edward J. Feser, Los Angeles, Calif.

Application May 3, 1943, Serial No. 485,414

4 Claims. (Cl. 189-1)

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This invention relates to building construction and is particularly directed to a type of building the parts of which may be manufactured or fabricated in a manufacturing establishment and shipped to various locations for assembly. There is a uniformity of many of the parts which can be fabricated in large quantities resulting in economy of manufacture and ease of assembly at the location of the building.

My invention contemplates a new form of building construction particularly adapted to insulation against external heat and cold, as well as lending itself readily to artificial heating and cooling equipment within the building.

This new type of building construction is suitable for many uses such as homes, stores, restaurants, small office buildings, schools, etc. I do not mean to exclude larger structures such as large office buildings, factories and the like, but I foresee an earlier adoption of my invention in the class of structures which I have particularly mentioned.

Other objects and advantages will become apparent from a consideration of the description which follows and a reference to the accompanying drawings.

In the drawings:

Figure 1 is a front elevation of a building embodying my invention.

Figure 2 is a floor plan of the same building. The preferred form of construction which I have used to illustrate my invention is that of a home or residence.

Figure 3 is a sectional elevation of the building taken on the line 3-3 of Figure 1.

Figure 4 is a fragmentary section illustrating a part of the foundation, the frame and wall construction.

Figure 5 is an enlarged detailed section taken on line 5-5 of Figure 4.

Figure 6 is a detailed section taken on the line 6-6 of Figure 4, particularly illustrating my system of cross frame members in the frame and wall construction.

Figure 7 is an enlarged fragmentary detail in cross section of a part of the frame and wall structure shown in Figure 4.

Figure 8 is a section taken on line 8-8 of Figure 7.

Figure 9 is a horizontal detail section taken on the line 9-9 of Figure 7.

Figure 10 is a vertical detail section taken on the line 10-10 of Figure 6.

Figure 11 is a fragmentary front view of the exterior of the building illustrating one of the

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windows and ventilating louvers in the foundation.

Figure 12 is a section taken on the line 12-12 of Figure 11, particularly illustrating the window construction and the ventilating passage communicating with the louvers in the foundation.

Figure 13 is an enlarged detailed section taken on line 13-13 of Figure 12.

Figure 14 is an enlarged vertical detail section taken on the line 14-14 of Figure 11.

Figure 15 is a vertical section taken on the line 15-15 of Figure 3, illustrating in particular, one of a plurality of supporting pillars and the manner of assembling the associated parts of the frame structure, floors and walls at the upper junction of the pillar.

Figure 16 is an enlarged section taken on line 16-16 of Figure 15.

Figure 17 is a horizontal section taken on line 17-17 of Figure 15, particularly illustrating the central joining of the frame construction in the ceiling of the central portion of the building.

Figure 18 is an enlarged fragmentary cross-sectional detail taken on the line 18-18 of Figure 2, illustrating particularly the construction of the circular partition wall.

Figure 19 is a view generally similar to Figure 15 but taken on the line 19-19 of Figure 1 and shows one of the small windows located in the second story of the building and an associated light well for lighting the central chamber of the building.

Figure 20 is a section taken on line 20-20 of Figure 19.

Figure 21 is an elevation partly in section showing a suggested modification of the general structure to provide for a porch or patio of the character illustrated on the left hand side of Figure 1.

Figure 22 is a section taken on line 22-22 of Figure 21, particularly showing the preferred form of door jamb construction.

Figure 23 is an enlarged fragmentary section taken on the line 23-23 of Figure 21, illustrating the wall and ceiling connection at the point indicated.

Figure 24 is a fragmentary sectional view of the dome on the upper story of the building.

Figure 25 is a fragmentary view taken in plan in direction of the arrows 25-25 of Figure 24.

Figure 26 illustrates one of a plurality of arcuate beams comprised in the frame of my building construction.

Figure 27 is a fragmentary view of an arcuate sheathing securing member of T cross section

employed at the point of joining the exterior sheathing to the frame structure of the building.

Figure 28 is an enlarged section on line 28—28 of Figure 27 similar to the section illustrated in Figure 8, showing a modified form of construction.

Figure 29 is a fragment of a sealing pad used in the modified construction of Figure 28.

Figure 30 is another section on line 30—30 of Figure 27.

Figure 31 is a perspective illustrating a modified form of sheathing plate which may be used in the construction.

Figure 32 is a plan view illustrating a preferred type of sectional forms to be utilized in casting the concrete footing on foundation.

Figure 33 is an elevation, partly broken away, of one of said forms.

Figure 34 is a transverse section taken on line 34—34 of Figure 33.

Figure 35 is an enlarged detail section showing a modified form of Venetian blind structure which may be substituted for that illustrated in Figure 12.

Figure 36 is a detail plan section taken on line 36—36 of Figure 33.

Figure 37 is a vertical section, partly in elevation and broken away, illustrating a sliding door construction which may be employed in any of the vertical walls of the building.

Figure 38 is an enlarged detail section taken on line 38—38 of Figure 37.

Figure 39 is an enlarged section taken on line 39—39 of Figure 21.

Figure 40 is a longitudinal fragmentary section of the wall structure of a window taken along line 40—40 of Figure 11.

Figure 41 is a plan view of a building layout device.

Figure 42 is a vertical section of the pilot post shown in Figure 41.

For convenience in identifying the building construction, I have illustrated a residence comprising a first story 40 and a second or upper story 41. My preferred form of construction utilizes a wall curvature producing a general dome shaped building of the type illustrated.

Referring to Figure 2, which is the floor plan, the building is divided into a central chamber or living room L which is circular in wall outline. Surrounding the living room in a circular arrangement as illustrated is a plurality of rooms such as a reception room R, master's bedroom M, a hallway H, a bath room B, a nursery N, a linen closet C, a service room S, a kitchen K, and a dining room D, all on the first floor of the building. I have also shown a patio P.

A circular stairway 45 leads from the first floor to the upper floor following the curvature of the circular wall 46 between the living room and the adjacent outer rooms. The circular wall 46 includes a relatively spaced series of load supporting columns 47 which support the second story of the building, as will later be described.

The front entrance to the house is indicated at E and is provided with a door 48 opening into the reception room R. Opening from the reception room into the living room is a door 49, and other doors illustrated in the same manner as the doors 48 and 49 provide communication between various rooms of the house as shown.

I provide a plurality of windows as indicated at 50 on the lower floor, the upper floor also incorporating windows 51 similar to the windows 50, 75

and intermediate smaller windows 52 associated with light wells 53, the latter of which (shown in Figure 19) provide exterior lighting for the living room.

The upper story 41 may be divided into two or more rooms by means of suitable partitions as indicated at 54.

I may also provide a rear entrance generally indicated at 55.

The basic elements of the house structure include a foundation, a frame structure, and suitable sheathing. These will all be described in more detail subsequently.

Referring to Figure 3, the preferred form of foundation comprises a concrete footing 60 which is generally circular in plan to conform to the outer wall of the house. This circular plan is broken at the patio and the foundation generally defines the rectangular configuration of the patio or whatever configuration it may be given. The foundation also includes concrete piers 61 disposed below the several columns 47 to support the load sustained thereby.

I provide a base flooring of concrete 62 covering the entire ground floor area of the house over which may be laid a finishing material 63 which obviously may be of hardwood, linoleum, tile, or any other desired or suitable finishing material. In some types of building the concrete itself may be utilized as the finished floor.

From an examination of Figures 1 to 3 of the drawings, it will be observed that the lower story 40 of the building has a general exterior contour of somewhat spherical frustum shape and includes an arcuate exterior wall structure whose lower peripheral edge is supported upon the foundation footing 60.

This exterior wall structure curves upwardly and inwardly and is so arranged that its upper end portion will be supported upon the several columns 47 which also support the floor joists of the second or upper story 41. The several columns 47 also support the upper story 41 which has an exterior wall structure of semi-spherical dome contour that connects with and forms a continuation of the exterior arcuate wall structure of the lower story. It will further be observed that these exterior wall structures are of similar construction and that they have, besides the exterior sheathing 64, an interior sheathing 65 spaced from said outer sheathing, and an intermediate dividing wall 66 spaced from both the outer and inner sheathings.

The building thus includes a triple exterior wall structure which provides an outer air space 67 and an inner air space 68. As will be subsequently explained, these air spaces are utilized for insulating purposes.

Proceeding with a description of the framework of the building, and with particular reference to Figures 3, 15, 16 and 20 of the drawings, it will be noted that each load supporting column 47 is substantially cross-shape in transverse section and is, after erection, surrounded by a hollow finish housing 47a of pillar form.

Each column 47, as a pre-fabricated unit, comprises two or four structural steel angles 70 of substantially equal lengths arranged in relatively spaced back-to-back relationship and in pairs upon opposite sides of a plurality of diametric flange plates 71 to which the finish housings 47a and the partitions 46 will subsequently be connected. These angles are secured to the plates 71 at intervals by means of rivets 72 and their opposite flanges are secured together by rivets 73

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which pass through spacer plates or washers 74, as shown in Figure 16.

In Figure 15 it will be seen that the lower ends of the angles 70 extend somewhat beyond the lower edge of the flange plate 71 to embrace the vertical web 75 of a base bracket 76 and that said web 75 is disposed at right angles to the plates 71 and is connected to the projecting ends of said angles by means of rivets 77.

In like manner the upper ends of the angles 70 extend somewhat beyond the upper edge of the flange plates 71 to embrace a vertical gusset plate 78 which is disposed at right angles to said plates 71 and is connected to the upper projecting ends of said angles by means of rivets 79.

The horizontal web of the base bracket 76 is provided with suitable apertures to receive anchoring bolts 80 which have been set in the respective concrete piers 61 during the construction of the foundation.

In the erection of the building the several prefabricated columns 47 are mounted upon the respective piers 61 to engage the anchoring bolts 80 thereof and are rigidly secured in place by nuts 81, as shown in Figure 15.

I connect the upper ends of the several columns 47 by means of intermediate horizontal bridge beams 85 which are of angle form in cross section as shown in Figures 19 and 20. The several bridge beams 85 are of duplicate construction and their opposite ends extend between the upwardly projecting ends of the angles 70 of the adjacent columns 47 and are connected thereto by bolts 86, in the manner illustrated in Figure 20. The medial portion of each bridge beam 85 is provided with a pair of vertically aligned anchor plates 87 which have angled feet by means of which they are secured, as by riveting, to the respective upper and lower sides of the horizontal web of said beam.

The frame structure, as thus far described, provides a circular series of relatively spaced load supporting columns having their lower ends anchored to a part of the building foundation and their upper ends connected by intermediate bridge beams. This structure also includes a gusset plate for each column and anchor plates positioned at the medial portion of each bridge beam with all of said gusset and anchor plates being radially disposed in relation to the vertical axis of the building.

The frame structure of the outer walls and dome roof of the building will now be described, it being observed that the principal supporting members thereof comprise a plurality of arcuate truss beams 90 of the character illustrated in Figure 26 and that these truss beams supplant the conventional studding and rafters of the ordinary prior building constructions.

These arcuate beams, as complete building units, are preferably fabricated at the factory and shipped in the required quantity to the building site.

Each beam 90 comprises four marginal rod members 91 bent to arcuate form and arranged in two transversely matched longitudinally parallel pairs which are transversely spaced to receive therebetween, diagonal brace members 92 (see Figure 5).

The ends of each aligned pair of the marginal rod members are curved inwardly and the intumed ends 93 and 94 thereof lie flush against one another and are secured together, as by welding.

The several diagonal brace members 92 may be

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separate pieces but in the preferred construction each series thereof will be formed of a length of rod stock angularly bent at intervals to the desired configuration and assembled with the several apexes thereof disposed between the adjacent pairs of the arcuate marginal rods 91, to which they will be secured by welding, as indicated at 95. The extreme ends 96 of the brace rods 92 are bent inwardly at an acute angle and are welded to the intumed ends 93 and 94 of the rods 91, as indicated at 97.

As shown in Figures 6, 7, and 26, each arcuate truss beam 90 is further provided with relatively spaced pairs of oppositely positioned tie plates 98 and 99 which are welded to the adjacent rod members 91 and which serve a purpose to be later described.

In the erection of the first story of the building the arcuate truss beams 90 thereof are relatively spaced around the circular plan of the foundation and their lower ends are supported upon and anchored to the concrete footing 60.

These truss beams converge upwardly and inwardly toward the vertical axis of the building and are disposed in positions so that each alternate truss beam is in radial alignment with one of the load supporting columns 47 and its vertical gusset plate 78 and so that each intermediate truss beam is in radial alignment with the vertical anchor plates 87 of the intermediate bridge beams 85 which connect the upper ends of the adjacent columns.

The means employed for anchoring the lower end of each arcuate beam 90 to the foundation footing 60 is shown in Figures 4 and 5 and comprises an anchor bracket 100 which rests upon the footing 60 and is secured thereto by means of a U-shape anchoring bolt 101 embedded in the concrete. The vertical web 102 of the bracket 100 extends upwardly between the opposite pairs of the rod members 91 at the lower end of the beam and the beam is permanently secured to this vertical web by means of a pair of oppositely disposed generally U-shape clamping members 103 and associated bolts 104 which tightly clamp the engaged parts together.

With particular reference to Figures 15 and 20, it will be noted that the upper end of each arcuate beam 90 that aligns with one of the upright columns 47 is connected to the vertical gusset plate 78 of that column, and from an examination of Figure 20 it will be seen that the upper end of each alternate beam 90 is connected to the vertical anchor plates 87 which are carried by the intermediate bridge beam 85 which connects the upper ends of the adjacent columns. The means employed for connecting the upper ends of the arcuate beams 90 to the respective gusset and anchor plates 78 and 87 are duplicates of the means which clamp the lower ends of said beams to the anchoring brackets 100 and comprise clamp members 103a and associated bolts 104a.

The arcuate beams 90 are supplemented by horizontal braces which connect the adjacent beams at relatively spaced intervals and which are generally designated by the reference numeral 110 (see Figures 4 and 6).

Each of these braces consists of a generally rectangular rod structure having side members 111 and 112 and a central longitudinal member 113, these being connected by transverse members 114 and diagonal reinforcing members 115 welded thereto to form a more or less rigid unit, of the configuration shown in Figure 6. The side member 111 is formed with intumed hooked

ends 111a and in assembling these horizontal braces with the erected arcuate beams 90 these hooked ends 111a are first inserted in holes previously formed in the tie plates 98, and the ends of the side member 112 (which is preferably of flat bar form) are then inserted behind the projecting ends of the inner tie plates 99 as shown in Figure 6, the ends of the member 112 being subsequently bolted at 109 to the plates 99 to maintain this brace unit 110 in position.

Referring to Figure 21, it will be observed that the relatively short arcuate beams 90a which support the roof of the patio P are similar in construction to the previously described arcuate beams 90 and are anchored at their upper ends in the same manner as are the beams 90. However, the lower ends of these short beams 90a differ from the beams 90 in that their side members are continuous at such lower ends and in that said lower ends require no anchoring means such as are employed in connection with the lower ends of the beams 90.

The frame structure which functions as the floor joists of the second story of the building will now be described with particular reference to Figures 15, 17 and 20 of the drawings.

This floor structure comprises a series of radially disposed straight joist beams 130 each formed of four rod members 131 and intermediate diagonal reinforcing members 132, these being shaped and welded together in a manner similar to the rod members 91 and 92 of the arcuate beams 90. These joist beams 130 are secured at their outer ends to the respective vertical gusset plates 78 of the several columns 47 by means of clamp members 103b and associated bolts 104b while their inner ends are secured to a plurality of connecting plates 133 by means of similar clamp members 103c and associated bolts 104c. At the vertical axis of the building these connecting plates 133 cross and for this purpose half of them are notched upwardly, as at 134 and the others thereof are notched downwardly, as at 135, with these notches coengaging in the assembled structure to form what may be termed a notched joint. This assembly of notched plates should be welded at the notched junction point to make them integral. The joist beams 130 are supplemented with braces which connect the adjacent beams at relatively spaced intervals. They are similar to the braces 110 in Figure 6 except that they do not require the flat bar 113. No intermediate sheets are required in this floor.

The ceiling plates 136 may be secured to the rods 131 of the joist beams 130 by means similar to that illustrated in Figure 9 or by any other suitable means, and the second story flooring 137 may be secured to said joist beams in any desired manner.

The exterior wall structure of the dome or second story 41 of the building, except as to details which will later be described, is of the same construction as is the above described exterior wall structure of the first story, and includes arcuate truss beams, horizontal brace units, intermediate wall plates, exterior sheathing and interior sheathing all assembled and connected by the same types of means as are the like parts of the lower exterior wall structure.

In the erection of said upper wall structure, the lower end of each arcuate truss beam 90b straddles the vertical gusset plate 78 of the associated load bearing column 47, and is secured thereto by clamp members 103d and bolts 104d, while the upper ends of radially opposite beams 90b strad-

dle opposite edges of a connecting plate 140 and are secured thereto by clamp members 103e and bolts 104e. The several connecting plates 140 are notched in the same manner as are the connecting plates 133 which join the inner ends of the floor joist beams 130 and function in a like manner to join the several arcuate beams 90b at the apex of the dome.

From the preceding description it will be evident that my improved building includes a continuous exterior hollow wall and roof structure which provides adjacent and separate outer and inner air passages to be utilized for insulating purposes.

At the apex of the dome is secured by suitable means an exterior cap plate 141 through which may project suitable outlets 142 for water and electricity for use in cleaning and polishing the exterior surface of the building.

The cap plate 141 is provided with an axially positioned ball or shaft fitting 143 which may be rotatably engaged by a cup or cylinder fitting 144 carried by the upper end of a ladder 145. As indicated in dotted lines in Figures 1 and 25 this ladder conforms to the exterior vertical contour of the building and may be provided at its lower end with one or more rollers 146 engaging the circular foundation footing 60. This ladder may easily and quickly be propelled around the building to permit easy access to any portion of the exterior building surface for washing and polishing or to perform any necessary maintenance service.

Referring particularly to Figures 15 and 16, it will be noted that the finish housing 47a of each load supporting column 47 is made up of two semi-circular half sections, each formed and spot welded to semi-circular straps 47d which serve to maintain their form. These half sections are provided with opposed longitudinal flanges 47b which, when said half sections are applied to the column, engage the opposite longitudinal side portions of the flange plate 71 of said column.

In the completed building, the vertical edge portions of the opposed wall plates 45a, which form the partition wall 46, will contact the adjacent flanges 47b and these plates and flanges will be joined to the column flange plate 71, preferably by screws 47c.

Each of the column housings include a split base flange 47e and a split cap flange 47f both of which will be secured in place by invisible fastening means. These flanges or caps may be of metal or plastic material.

As is shown in Figure 18, the interior wall 46 (except where it is provided with door openings) rests in a wall footing 150 which is secured to the flooring 63 or to the concrete floor 62 if the flooring 63 is not employed.

With the frame structure erected in the manner above described, the sheathing may be applied thereto, preferably in the following order: 1st, the exterior sheathing, 2nd the intermediate wall, and 3rd the inside wall. Application of sheathing and wall plates should start at the top and progress downwardly.

This exterior sheathing comprises a series of sheet metal arcuate plates 64 which diminish in width from their lower to their upper ends to coincide with the disposition of the several arcuate beams to which they are to be attached.

The plates 64 are fabricated at the factory to contain the desired window and door openings and such other apertures as may be necessary and they may also be stamped to panel form or con-

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tain other decorative design, such for example as shown in Figure 31, if this is desirable or necessary.

Generally these exterior sheathing plates 64 will be backed by a layer 64a of insulating material although such layer may be dispensed with, as will later be explained.

As illustrated in Figures 5 to 8, the sheathing plates 64 are each of the proper width to span the space between two adjacent arcuate beams with their side edges lying against the rear rods 91 of such beams, it being noted that the adjacent plates are, at the center of each beam, slightly spaced from each other so as to permit a plate securing means to be inserted therebetween to extend between the two outer rods 91 of said beam.

Such plate securing means comprises an arcuate bar 120 which is T-shape in cross section and (see also Figure 27) is, at relatively spaced intervals, provided with inwardly projecting lugs 121 having wedge receiving apertures 122 formed therein. The exterior web of this securing bar may, if desired, have pressed thereon a plated or

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which engage the inner rods 91 of the arcuate beams 90 in a manner similar to the engagement of exterior sheathing plates 64a with the outer rods 91 of said beams. This is particularly well illustrated in Figure 9 wherein there is also shown a preferred means which may be employed for securing the inner sheathing plates to the arcuate beams. This means comprises T-head anchor bolts 126 which extend through suitable apertures in a sealing strip 127 and a finish strip 128 which will be subsequently pressed over the strip 127 to hide the bolt ends and their associated nuts. In applying this securing means the bolts 126 will be inserted between the adjacent plates 65 and rods 91 and then turned 90 degrees to cause a hook engagement of their T-heads with said rods 91, the associated nuts then being tightened to clamp the plates 65 to the rods 91.

That portion of the circular wall which defines the patio, and is therefore an exterior wall, is somewhat thicker than the interior walls and comprises relatively spaced inner, outer, and intermediate wall plates 151, 152 and 153, as shown in Figure 21.

These plates are joined to the adjacent columns

winter months and cooled air during the summer months.

Air from the duct 173 will flow through suitable grilles 175 and into the living room L. Air will also flow from said duct 173 through grille openings 176 in the ceiling plate 170 and after circulating in the adjacent outer room will pass therefrom through grille openings 177 in the ceiling plate 170 and through the duct 172 back to the air conditioning unit.

As will be observed from an examination of Figures 1, 3 and 12 at circularly spaced intervals the foundation footing 60 is provided with air intake openings 180 which communicate with the lower end of the outer air passage 67 of the arcuate exterior walls and these openings are each provided with an exterior louvered grille 181. In Figure 3 it will be seen that I provide, in the exterior sheathing of the building, lower and upper series of vents 182 and 183, respectively, which communicate with the air passage 67 and which are provided with louvered grilles 184.

This arrangement provides for a natural circulation of exterior air inwardly through the several grilles 181 and openings 180 and upwardly within the air passage 67 of the exterior wall to discharge partly through the vents 182 and partly through the vents 183, such air circulation producing, during hot weather, a cooling effect which will appreciably reduce the interior temperature of the building.

In winter months when it is desired to maintain within the building the heat generated by the hot air heating system, the several grilles 181 and 184, which are of a removable character as shown in Figures 11, 24 and 25, and may each be closed with an auxiliary plate placed within the perforated plates which will seal the air passage 67 and convert it into a closed dead air space effective as an insulating medium. The inner space 68 is entirely sealed, having no connection with either outside air space or with interior room spaces.

In Figures 11 to 14 is shown a preferred construction of the several windows 50 and 51 that are incorporated in the exterior walls of the building.

At each window location the exterior and interior sheathing plates 64 and 65 are countersunk and are apertured to form a window opening of suitable size to receive the window structure, the intermediate wall plate 66 being similarly apertured.

A rectangular channel frame 190 surrounds the window opening between the sheathing plates 64 and 65, and welded to each perpendicular side of this channel frame at predetermined points is an angle iron 191 by which this frame is secured to the arcuate truss and building framework with bolts 192 through members b and c (Figure 40). The edges of the window apertures in the sheathing plates 64 and 65 are secured to said channel frame by clamp strips 201, which also hold the sash units, as later explained in more detail.

The window structure comprises relatively spaced inner and outer window panes 193 and 194 which are mounted in opposed pairs in individual sash frames 195. Each sash frame 195 is formed to provide two parallel and inwardly opening channels 196 which receive a cushion channel strip 197 that embraces the marginal edges of the glass window pane, as shown in Figure 13.

Disposed horizontally and in vertically spaced

relationship within the chamber between the opposed window panes 193 and 194 of each sash frame 195 are a series of window blind slats 198 each of which is provided at its opposite ends with centrally disposed trunnions 199 that are journaled in the adjacent side walls of the sash frame 195. This pivoted mounting of the several slats 198 enable them to be variously tilted between open and closed positions in a manner similar to the standard forms of Venetian blinds.

The several completed sash units, containing the window panes and the window blind slats, are assembled one upon the other within the window opening, the adjacent sash units having between them double headed sealing strips 200, of rubber or other suitable material, which embrace the horizontal channel portions 196 of said units, as shown in Figure 14.

Means are provided for clamping the several sash units in place within the window opening, and such means is shown in detail in Figure 13 as comprising opposed clamp strips 201 and associated clamp bolts 202 which are tightened to draw said clamp strips tightly against the sheathing plates 64 and 65 around the window opening and against the adjacent sides of the several assembled sash units, there being pliable sealing strips 203 inserted between these clamp strips 201 and the adjacent parts to form a weather proof connection. A relatively thin spring metal finish strip 204 may be pressed upon the clamp strips 201 to conceal the ends of the clamp bolts 202, and forms a neat and attractive window trim.

As shown in Figure 13, one of the trunnions 199 of each tiltable slat 198 of each sash unit is provided with a toothed sprocket 205 and, from an examination of Figure 12, it will be observed that an endless chain 206 engages the several slat sprockets 205 and also a drive sprocket 207 carried by an actuating shaft 208 which is journaled in one or more brackets 209 mounted upon the frame channel 190. This shaft 208 is provided with an actuating lever 210 which extends through a suitable slot 211 in the inner sheathing plate 65 and is accessible from the interior of the building for operation to adjust the several window blind slats 198 in unison.

A modified window blind construction is illustrated in Figures 35 and 36 and contemplates the employment of window blind slats 215 which are formed of thin pliable strips of opaque or translucent material which will either obstruct the passage of light or will suitably diffuse such light. Materials which may be used for this purpose are various fabrics, metals, finely woven screen materials or colored cellophane and like materials.

Window blind slats of such pliable materials must be maintained in a taut condition and for this purpose this modified construction provides at both ends of each slat 215 a pivotal connection embodying a tension means formed of a coil spring 216 carried by the sash frame 195 and centrally connected to the slat 215 by chain links 217 which will permit the required limited tilting of said slat. The ends of each slat are provided with a drum 218, and the means operatively connecting the drums of the several slats comprises an endless cord 219 which is wrapped around each drum of the entire series of window blind slats.

The window frame and window sash units of the windows 52 are similar in construction to

the windows 50 and 51, except that the sash units here employed are not provided with window blinds. However, it will be understood that if it is desirable or necessary to provide these windows 52 with blinds of the character heretofore described, this may readily be done in the same manner as previously described.

Each light well 53 that is associated with one of the windows 52 leads inwardly and downwardly through the second story floor structure to register with a light opening in the first story ceiling, which opening is preferably closed by a sky light 220. The interior surfaces of the walls of the light well 53 should have a highly reflective finish which will reflect the incoming light downwardly through the sky light 220, and this sky light will preferably be of a character capable of diffusing said reflected light before it passes into the living room L.

In Figures 37 and 38 I have illustrated a suspended door mechanism which may be employed in any of the straight partitions of the building, in place of the usual hinged doors.

In this construction the relatively spaced partition walls 230 are provided with aligned door openings 231, and a pair of doors 232 are positioned to swing between said partition walls from the full line closed positions to the dotted line open positions shown in Figure 37.

Each door 232 is hung on the lower free ends of a pair of parallel hanger links 233 and 234 which at their upper ends are pivotally mounted on a fixed transverse supporting beam 235 secured to the arcuate beam on one end and inner wall stud on the other end. A stationary journal bar 236 suspends from the medial portion of the beam 235 and has journaled thereon a toggle lever 237, the opposite ends of which are connected by toggle links 238 with the hanger links 233 of the two doors 232. The doors are preferably of hollow construction and the hanger links pass through suitable slots 239 formed in the top and inner edges of the doors and extend downwardly between the opposite panels thereof.

This link and toggle connection insures uniform comparable opening and closing movements of the two doors.

It will be noted that when the doors are open their hanger links will assume the angular positions indicated in dotted lines in Figure 37. For this reason the doors when released have a tendency to return to their closed positions in which the hanger links are vertical.

To control this tendency so that the doors will remain in open or intermediate positions until manually closed and to enable said doors to be actuated with a minimum of applied physical force I provide a variable counterbalance means which is associated with one of the doors.

This control means comprises a cable drum 240 disposed between the partition walls 230 at one side of the door opening and rotatably mounted on a shaft 241, an actuating cable 242 having one end connected to the outer edge of the near door and its other end secured to and rove around said drum, a snail pulley 243 having a spiral peripheral groove (as shown in Figure 38) and connected to the drum 240 to rotate therewith, a weight cable 244 having its upper end secured in said peripheral groove at the outer end 245 thereof, and a counterbalance weight 246 hung on the lower free end of the cable 244.

With the doors closed, as shown in Figure 37, the snail pulley 243 will be in the position shown and the weight cable 244 will be rove around said

pulley in the peripheral groove thereof to hang downwardly from the inner end 247 of said groove, in the manner shown in Figure 38. Under this condition the weight 246 will, through the weight cable 244, exert the least rotational pull on the snail pulley 243 and its associated cable drum 240 at the point 247 which is closest to the axis of the snail pulley. Thus the snail pulley will at this time function as a relatively short lever arm through which the counterbalance weight will exert on the cable drum 240 and its cable 242 a minimum pull. The weight 246 will be of such poundage that the weight of the doors will overcome said minimum pull to a degree just sufficient to insure the doors remaining in their closed positions.

As the doors are manually opened, the weight 246 will, through its cable 244, rotate the snail pulley and cable drum in the direction of the arrow in Figure 37 to unwind said cable from the peripheral groove of said snail pulley. As the weight cable 244 unwinds, the weight will descend and the counterbalancing pull will be exerted on the pulley at gradually increasing radial distances from the axis thereof until, in the fully open positions of the doors, the weight will be vertically suspended from the outer maximum radius end 245 of the snail pulley, as indicated in dotted lines in Figure 37.

The effect of this unwinding of the cable 244 from the spiral groove of the snail pulley 243 is to cause said pulley to function as a gradually increasing lever arm through which the effective pull exerted by the counterbalance weight 246 is progressively increased as the doors 232 are opened. The effective contour of the snail pulley 243 in relation to the weight of the doors 232 and the poundage of the counterbalance weight 246 will be such that the counterbalancing effect will be sufficient to maintain door openings of any degree.

In Figures 32, 33 and 34 I have disclosed a preferred type of concrete form which may be employed in constructing the footing 60 on the concrete foundation of the building.

The form is of sectional character and is formed of detachably connected parts which may be easily disconnected from each other and from the concrete footing after it has become set.

Each form section includes outer and inner substantially rectangular sheet metal side plates 250 and 251 each of which is backed by a reinforcing angle iron framework welded thereto and comprising top and bottom rails 252 and 253, end rails 254 and two intermediate brace rails 255. The outer plate of the foundation form may be improved with a rock, brick, block or other desired design, giving the exposed side of foundation 60 the respective resultant effect. The reinforced side plates are connected together in parallel spaced relationship by transverse clamp bolts 256 which pass through said plates and through associated spacing sleeves 257 whose opposite ends abut the adjacent side plates 250 and 251. This form section is maintained in its proper position upon the ground by means of angle iron anchor stakes 258 which are driven into the ground and are provided with transverse stop pins 259 that serve to limit the depth to which such stakes are driven. Each anchor stake 258 is provided with an elongated vertical slot 260 which permits adjustment of form to proper foundation level and in which is disposed a bolt 261 having a right angled inner hook end that extends vertically through an accommodat-

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ing hole formed in the horizontal web of the adjacent intermediate brace rail 254 of the associated side plate structure.

Tightening of the stake bolts 261 draws the form sections and the anchoring stakes firmly together and assures maintenance of level established. The stakes also prevent any transverse shifting of the forms.

Wherever necessary, the outer side plate 250 has an indented portion 250a of proper size and shape to form in the cast concrete the previously described air openings 181.

Temporarily associated with each of the form sections is one of the previously described anchor brackets 100 to which one of the arcuate beams 90 will be secured in the erection of the building.

This anchor bracket will be positioned at one end of the form section between the opposed top rails 252 thereof with its lower surface flush with the upper surfaces of said top rails and will be attached thereto in this position by means of two straps 262 which are bolted to said top rails and have their inner ends tacked to said anchor bracket by a relatively small weld.

The previously described U-bolt 101 to be associated with the bracket 100 is assembled therewith as shown in Figure 34.

With the form sections thus assembled, a required number thereof will be disposed in generally circular arrangement in end-to-end abutting alignment, as shown in Figure 32, the adjacent vertical members 254 being bolted together to firmly maintain the circle. The vertical limbs of adjacent U-bolts 101 will be connected by crossed reinforcing rods 263 in the manner shown. Crossing these rods in this manner permits cutting them to the same length and bending their ends to like form and radius and also permits the indentation 250a without exposing them.

After the location and front of the building have been decided upon, the first work the builder does in the process of erecting a metal home of this type is to establish the floor level and the center of the building. A steel rod 264 (Figure 41) provided with a flange 265 and an extended head 266 is provided and set for this purpose. The top of this head 266 establishes the level. A substantial metal disc 267 is placed over the extended head 266. This disc is perforated with a series of holes 268 around its outer edge, equally spaced and corresponding in number with the number of side segments comprised in the building enclosure walls and foundation. From the holes 268 in this disc a corresponding number of substantial radius wires 269 of predetermined length radiate to and terminate in corresponding holes 270 (Figure 32). A position checking plate 271 is provided at a predetermined intermediate point in the radius wires 269, by means of which the correct radius setting of base brackets 76 and vertical web 15 (Figure 15) are checked or verified. Each end of radius wires 269 and 269a is provided with a clevis 272 and a clevis screw eye 273 by which means they are readily attached to their respective plates 267, 271 and 251. Rod 264 and its auxiliaries 267, 271, 269, 272, 273, 274 and the foundation forms (Figures 32, 33, 34) are construction tools and not parts of the building; 274 is a cap used when driving rod 264 in position. It rests on flange 265.

These foundation forms may now be filled with fluid concrete, and after the concrete sets said forms will be removed in the following manner:

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The straps 262 will be unbolted from the top rails 252 and the several clamp bolts 256 will be removed so as to permit removal of the opposed side plates 250 and 251 and withdrawal of the anchor stakes 258. The spacing sleeves 257 may then be driven from the concrete footing, it being noted that these are longitudinally tapered in order to facilitate such removal.

This leaves the foundation with the several U-bolts 101 and reinforcing rods 263 embedded therein and with the several anchor brackets 100 properly assembled with the respective U-bolts.

It will be understood that each pair of straps 262 have thus far remained welded to the adjacent anchor bracket 100 and it will also be understood that in conditioning the foundation for use these straps will be removed and the nuts of the U-bolts will be fully tightened to rigidly secure the brackets 100 to the foundation, the straps 262 being pried off or struck with sufficient force to break the small welds by which they were temporarily tacked to said brackets.

While I have referred to the use of metal, and sheet metal, this represents merely an illustration of one material which may be employed for my building construction. Other materials are contemplated, as for example plastics in sheet and die forms.

From the foregoing it will be evident that my invention provides a new and novel building construction which is fully capable of fulfilling all of the objects primarily stated and while I have illustrated and described a preferred form of embodiment thereof it is to be understood that the invention is not to be limited in this regard for it is susceptible of embodiment in various other forms all coming within the spirit of the claims which follow.

Having described my invention, I claim:

1. In a fabricated building of the character disclosed; a foundation providing a marginal footing concentrically disposed about the vertical axis of the building; a series of circularly spaced load bearing columns concentrically disposed upon said foundation between said axis and said marginal footing; a first story exterior wall framework including a circularly spaced series of convex arcuate truss beams anchored at their lower ends to said marginal footing and extending upwardly and radially inward, the upper ends thereof being connected to the upper portions of said columns, said framework also including horizontal brace units disposed in vertically spaced rows between and connected to the several circularly adjacent first story truss beams; a second story exterior wall framework of hemispherical dome form including a circularly spaced series of truss beams having their lower ends supported upon and connected to the upper ends of the respective columns and disposed to extend upwardly and radially inward toward the apex of said dome, the upper ends of the several dome truss beams being joined by connecting means, said dome wall framework also including horizontal brace units disposed in vertically spaced rows between and connected to the several circularly adjacent dome truss beams; exterior sheathing connected to the outer surfaces of the several truss beams; inner sheathing connected to the inner surfaces of said beams; and an intermediate dividing wall connected to the several horizontal brace units and having adjacent portions extending through said truss beams and being interconnected thereat and maintained thereby in spaced relationship with said exterior

and interior sheathing, said dividing wall and said sheathing forming insulating spaces and ventilating passages.

2. In a fabricated building of the character described: a foundation providing a marginal footing concentrically disposed about the vertical axis of the building; a series of circularly spaced load bearing columns concentrically disposed upon said foundation between said axis and said footing; a vertically disposed gusset plate secured to the upper end of each column; a circular series of horizontal bridge beams connecting the upper ends of the several columns, each bridge beam midway its ends being provided with a vertically disposed anchor plate; a first story exterior wall framework including a circularly spaced series of convex arcuate truss beams anchored at their lower ends to said marginal footing in radial alignment with the respective column gusset plates and alternate bridge beam anchor plates and extending upwardly and radially towards the axis of the building, the upper inner ends of the arcuate beams being secured to the aligned column gusset plates and the upper inner ends of alternate arcuate beams being secured to the aligned bridge beam anchor plates; and exterior sheathing comprising a plurality of sheathing plates spanning the spaces between the several truss beams and having their adjacent edges connected thereto.

3. In fabricated building of the character described: a foundation providing a marginal footing concentrically disposed about the vertical axis of the building; a series of circularly spaced load bearing columns concentrically disposed upon said foundation between said axis and said footing; a vertically disposed gusset plate secured to the upper end of each column; a circular series of horizontal bridge beams connecting the upper ends of the several columns, each bridge beam midway its ends being provided with a vertically disposed anchor plate; a first story exterior wall framework including a circularly spaced series of convex arcuate truss beams anchored at their lower ends to said marginal footing in radial alignment with the respective column gusset plates and alternate bridge beam anchor plates and extending upwardly and radially towards the axis of the building, the upper inner ends of the arcuate beams being secured to the aligned column gusset plates and the upper inner ends of alternate arcuate beams being secured to the aligned bridge beam anchor plates; a second story exterior wall framework of hemispherical dome form including a circularly spaced series of truss beams vertically aligned with said columns and connected at their lower ends to the gusset plates thereof and extended upwardly and radially towards the apex of the dome, said framework including means connecting the upper inner ends of the several dome truss beams; and exterior sheathing comprising a plurality of sheathing plates spanning the spaces between the several truss beams and having their adjacent edges connected thereto.

4. In a fabricated building of the character described: a foundation providing a marginal footing concentrically disposed about the vertical axis of the building; a series of circularly spaced load bearing columns concentrically disposed upon said foundation between said axis and said footing; a vertically disposed gusset plate secured to the upper end of each column; a circular series of horizontal bridge beams connecting the upper ends of the several columns, each bridge beam midway its ends being provided with a vertically disposed anchor plate; a first story exterior wall framework including a circularly spaced series of convex arcuate truss beams anchored at their lower ends to said marginal footing in radial alignment with the respective column gusset plates and alternate bridge beam anchor plates and extending upwardly and radially towards the axis of the building, the upper inner ends of the arcuate beams being secured to the aligned column gusset plates and the upper inner ends of alternate arcuate beams being secured to the aligned bridge beam anchor plates; radial floor joists secured at their outer ends to the respective column gusset plates and means connecting the inner ends of the floor joists at the building axis; a second story exterior wall framework of hemispherical dome form including a circularly spaced series of truss beams vertically aligned with said columns and connected at their lower ends to the gusset plates thereof and extended upwardly and radially towards the apex of the dome, said framework including means connecting the upper inner ends of the several dome truss beams; and exterior sheathing comprising a plurality of sheathing plates spanning the spaces between the several truss beams and having their adjacent edges connected thereto.

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