Aug. 14, 1934. G. D. TESCH 1,970,404

PORTABLE BUILDING

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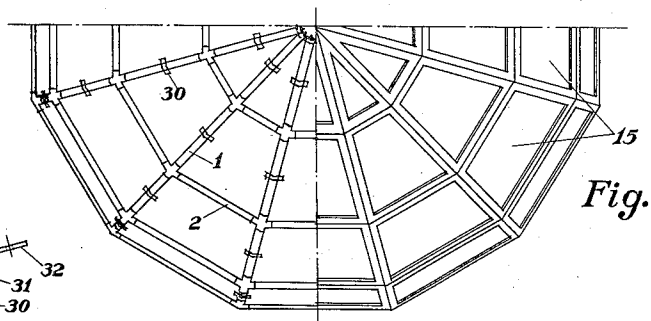


Fig. 1

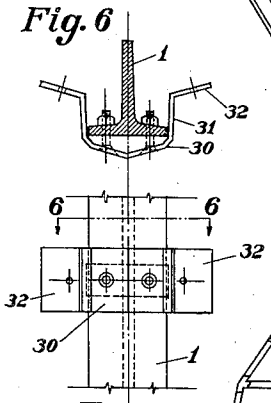


Fig. 6

Fig. 5

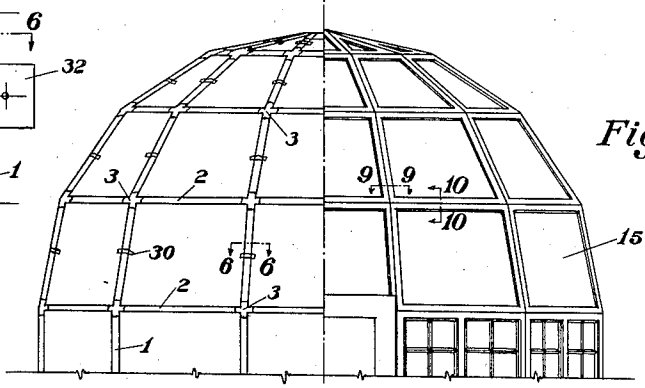


Fig. 2

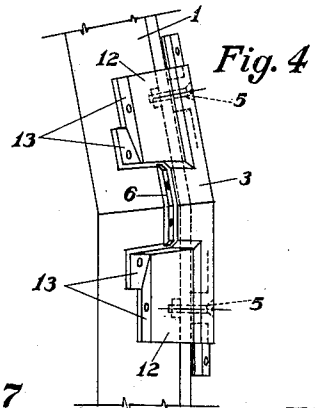


Fig. 4

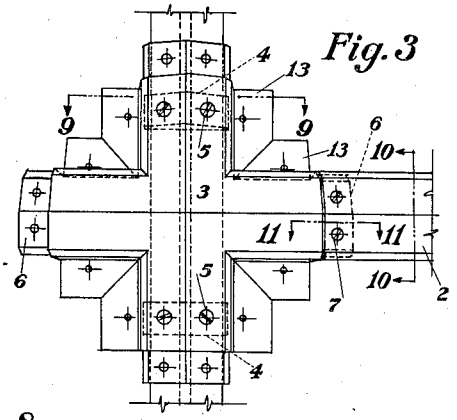


Fig. 3

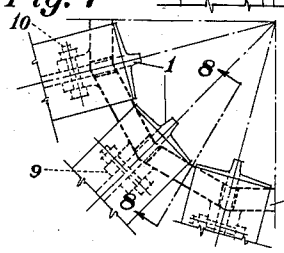


Fig. 7

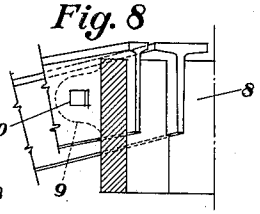


Fig. 8

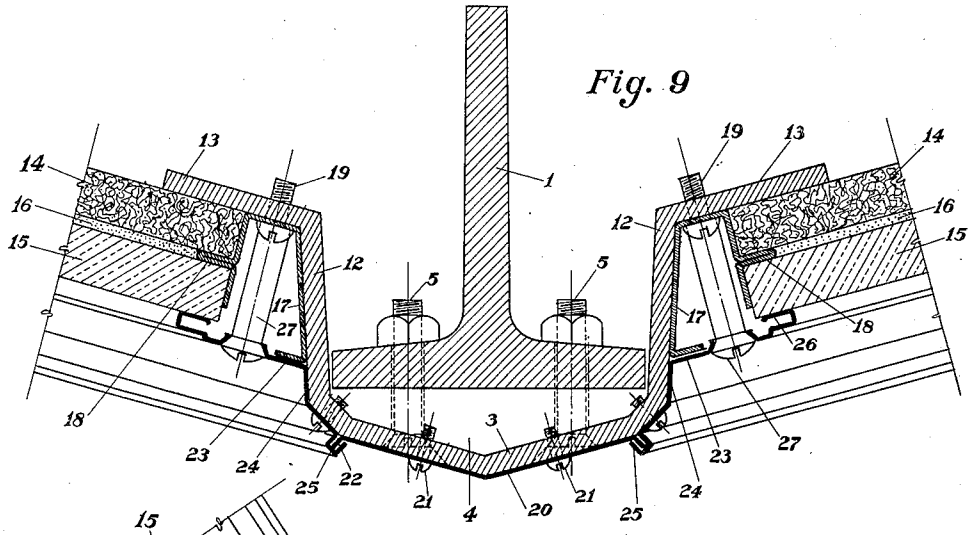
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Fig. 9



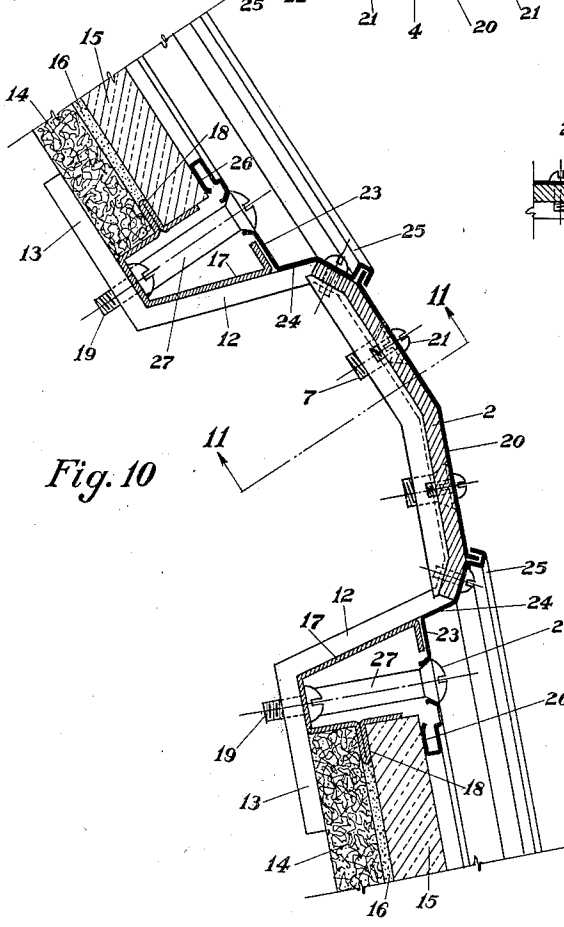


Fig. 10

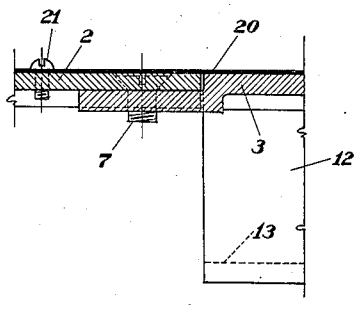


Fig. 11

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Patented Aug. 14, 1934

1,970,404

UNITED STATES PATENT OFFICE

1,970,404

PORTABLE BUILDING

George D. Tesch, Chicago, Ill.

Application April 15, 1932, Serial No. 605,395

12 Claims. (Cl. 189—2)

The object of the present invention is to produce a simple and novel building structure composed of metal in the form of frame elements and slabs or panels of opaque structural glass or other suitable material, whose separate parts may be fabricated and be set up anywhere by simply securing them together with suitable mechanical fastenings.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a top plan view of one half of a building structure embodying the present invention, one quarter of the building being shown completed and only the skeleton or frame of the other quarter appearing; Fig. 2 is a side elevation of the building as it appears in Fig. 1; Fig. 3 is an elevation, on an enlarged scale, showing a fragment of the frame at the juncture of one of the upright beams with adjacent cross pieces; Fig. 4 is a side or edge view of the parts appearing in Fig. 3; Fig. 5 is an elevation, on the same scale as Fig. 3, showing a fragment of one of the uprights and an intermediate panel support; Fig. 6 is a section on line 6—6 of Fig. 5 and may also be said to be a section on line 6—6 of Fig. 2; Fig. 7 is a bottom plan view of a fragment of the frame at the apex of the structure; Fig. 8 is a section on line 8—8 of Fig. 7; Fig. 9 is a section, on a still larger scale, on line 9—9 of Fig. 2, and it is also a section on line 9—9 of Fig. 3 with the addition of the slabs or panels; Fig. 10 is a section on line 10—10 of Fig. 2, or on line 10—10 of Fig. 3, showing the slabs or panels that do not appear in Fig. 3; and Fig. 11 is a section on line 11—11 of Fig. 10, as well as on line 11—11 of Fig. 3, with the addition of the weather strip to the parts shown in Fig. 3.

Referring to the drawings, 1, 1 represent the uprights and 2, 2 the cross pieces of a skeleton or openwork frame structure in the form of a dome. The uprights are in the form of structural steel beams, preferably T-shaped in cross section. These beams are not curved gradually from end to end but consists of straight sections, each lying at an angle to the sections adjacent thereto. Similarly, the cross pieces 2 may be straight, so that the dome, before the panels are added, consists of numerous adjoining four-sided frames, all of whose sides or elements are straight. When the panels or slabs are set into the openings in these frames, as will hereinafter be described, the surface of the dome will be composed of numerous comparatively small, flat areas or facets.

The cross pieces of the framework are connected to the upright beams by means of anchor plates that may conveniently be in the form of castings. As shown, each anchor plate comprises a cross-shaped part 3 the halves of which on each side of its major axes, slope in opposite directions from these axes; the angle between oppositely sloped faces corresponding to the angle between the two sections of the upright beam at whose juncture the anchor plate is located. One of these anchor plates is secured to each bend, elbow or angle in each upright beam. In order to avoid making the anchor plates too heavy, the vertical arm of each is provided on the inner or under side with a pair of lugs 4 that rest against the flange of the underlying upright beam; each plate being detachably fastened to the underlying beam by means of bolts 5 passing through the plate and the flange or flanges of the beam. The transverse arms of each anchor plate are offset downwardly, as indicated at 6, 6, to form seats for the ends of the cross pieces 2. The cross pieces are made just long enough to fit between the corresponding anchor plates on two of the uprights, resting at their ends on the seats 6 on the anchor plates. The cross pieces are detachably fastened to the anchor plates by small screws 7 extending through the cross pieces and the underlying seat portions 6 of the plates.

The uprights terminate a short distance from the apex of the dome, being set into deep notches cut into a thick ring 8 having its axis coincident with the central vertical axis of the dome. The ring is provided with ears 9 that engage with the sides of the web portions of the upright beams and are bolted through by means of bolts 10. The ring 8 may be regarded as the cap of the dome, as it may support any suitable covering element, not shown.

After the framework has been set up, the openings in what may be termed the individual frames, each formed of cross pieces, and a section of each of two uprights must be filled. This I accomplish by providing preformed panels that are simply set into the openings, are secured to the framework by a few screws, and have their joints with the framework sealed by what

may be called weather strips which are quickly and easily placed in position.

I prefer to support each panel or slab at its corners from the anchor plates. To this end each anchor plate is provided with wings 12 that extend inwardly therefrom on opposite sides of the supporting beam and on opposite sides of the transverse arms which may be regarded as continuations of the cross beams; the wings of each pair diverging somewhat from each other. At the inner end of each wing is a comparatively wide flange 13. Therefore, after the framework has been assembled, each panel-receiving opening has in its corners little shelves, which are the flanges 13, set inwardly a considerable distance from the exterior of the structure. It will be evident that, if a slab or panel cut to the proper size and shape is set into one of the openings in the framework, it will be adequately supported at its corners by the shelves or flanges.

While, in the broadest aspects of my invention, the slabs or panels may take any desired form and be made of any desired material, I have illustrated what I believe to be an exceptionally good type of panel for this purpose. The panel which I have illustrated consists of a stiff, tough backing layer 14, which may conveniently be fiber board, and a thick sheet 15 of opaque structural glass united to the backing layer by means of cement 16. Each of the composite slabs or panels is surrounded by a frame 17 of sheet metal, trough-shaped in cross section, one side wall of the trough being folded lengthwise of the trough to produce an outwardly and laterally projecting rib 18 that fits into the joint between the backing layer and the vitreous layer of the composite panel. Each slab or panel, with its surrounding sheet metal frame, is adapted to fit into its opening in the framework, resting on the supporting seats or shelves forming part of the anchor plates at the corners of this opening. By making the sheet metal frames of these slabs or panels trough-shaped, the outermost sides will yield so as to permit the slabs to be wedged firmly between the anchor plate wings which bound this opening at the corners, as best shown in Figs. 9 and 10. The sheet metal frames are secured to the underlying flanges 13 by screws 19.

It is necessary, not only for appearance sake, but also to prevent wind and water from passing through the joints between the slabs or panels and the framework, that these joints be properly sealed. I have, therefore, shown an arrangement of weather strips or covering strips that will serve both of these purposes. There are two sets of these strips, one of them extending along the structure just outside of the uprights and the other set following the cross pieces. Each of these strips has a central panel 20 overlying and extending from the transverse arm of each anchor plate to the next anchor plate in the same horizontal row; or overlying and extending from the vertical arm of each anchor plate to the next anchor plate above or below it the section 20 being secured to the anchor plates by screws 21. The marginal portions of each of the sections 20 at its long edges are turned outwardly, as indicated at 22, to produce narrow flanges. Cooperating with each central section 20 are two side sections 23, 23, each consisting of a strip of sheet metal bent to produce a part 24 fitting against a small part of the top of each anchor plate and a portion of the adjacent wing; the part 24 having at its long outer edge a trough element 25 into which the corresponding flange 22 on the central section 21 extends. The body portion of each of the sections 23 extends over the corresponding member or section of the sheet metal frame 17 and has its free, long marginal portion bent inwardly, as indicated at 26, to overlie and engage with the composite panels. Long screws 27 extend through the body portions of the sections 23 into the bottom walls of the sheet metal trough-like frames on the composite panels, thereby securing these sheet metal frames and the weather stripping together and pressing the weather stripping yieldingly against the composite panels.

Where the distance between a cross piece and the next higher cross piece is comparatively great, it may be desirable to provide supports for the panels in addition to those at the four corners. In that event, I may employ saddles, such as indicated at 30 in Figs. 1, 2, 5 and 6; these saddles being U-shaped plates set upon and secured to the uprights in substantially the same manner as are the anchor plates. These saddles have wing portions 31 and flanges 32 corresponding to the wings 12 and flanges 13 on the anchor plates. These saddles may be placed on each straight section of the uprights, between consecutive anchor plates. Then, when the panels are placed in position, they rest on the flanges 13 and engage with the wings 12 of the anchor plates.

While I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:

1. A frame for a building comprising beams extending continuously between the top and bottom, anchor plates overlying and secured to the beams, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, and cross pieces each spanning the space between and secured to corresponding anchor plates on adjacent beams, the anchor plates at the four corners of each opening bounded by two adjacent beams and two adjacent crosspieces having seats to receive the four corners of a slab or panel closing such opening.

2. A frame for a building comprising beams extending continuously between the top and bottom, anchor plates overlying and secured to the beams, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, cross pieces each spanning the space between and secured to corresponding anchor plates on adjacent beams, and means cooperating with the anchor plates to secure slabs or panels in positions covering the openings in the frame.

3. A wall for a building comprising beams extending continuously between the top and bottom, anchor plates overlying and secured to the beams and projecting laterally therefrom in both directions, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, cross pieces each spanning the space between and secured to corresponding anchor plates on

adjacent beams and forming with the beams a framework, slabs or panels fitting into the openings in the framework, and there being seats on the anchor plates for the corners of the slabs or panels.

4. A wall for a building comprising beams extending between the top and bottom, anchor plates overlying and secured to the beams, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, cross pieces each spanning the space between and secured to corresponding anchor plates on adjacent beams and forming with the beams an open framework, slabs or panels fitting into the openings in the framework, seats on the anchor plates supporting the corners of the slabs or panels, weather strips overlying and spanning the gaps between the edges of adjacent slabs or panels, and means securing said strips to the anchor plates.

5. A wall for a building comprising beams extending continuously between the top and bottom of a dome-shaped structure, a cap detachably connecting the upper ends of the beams together, anchor plates overlying and bolted to the beams, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, cross pieces each spanning the space between and detachably secured to corresponding anchor plates on adjacent beams, preformed slabs or panels fitting into the openings in the framework formed by the beams and cross pieces, and means on the anchor plates to support and secure said slabs or panels.

6. A frame for a building comprising structural steel beams extending between the top and bottom, anchor plates overlying and secured to the beams, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, and cross pieces each spanning the space between two beams and resting on and secured to the corresponding anchor plates, each anchor plate having wings extending inwardly beside its beam and cross pieces in all four angles, and said wings having laterally-projecting flanges at their inner ends.

7. A frame for a building comprising structural steel T beams extending between the top and bottom, anchor plates overlying and detachably secured to the beams, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, and flat metal cross pieces each spanning the space between and detachably secured to corresponding anchor plates on adjacent beams, said plates having seats at each side to receive the cross pieces and hold them flush with the outer faces of the plates.

8. A frame for a building comprising structural steel T beams extending between the top and bottom, anchor plates overlying and bolted to the beams, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, and flat metal cross pieces each spanning the space between two beams, corresponding anchor plates on adjacent beams, screws securing the cross pieces to the anchor plates, the anchor plates at the four corners of each opening bounded by two adjacent beams and two adjacent cross pieces having outwardly-opening seats at a considerable distance inwardly from the outer faces of the plates.

9. A wall for a building comprising structural steel beams extending between the top and bottom, anchor plates overlying and bolted to the beams and projecting laterally therefrom in both directions, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, metal cross pieces each spanning the space between and secured to corresponding anchor plates on adjacent beams and forming with the beams a framework, preformed slabs or panels fitting into the openings in the framework, there being seats on the anchor plates inwardly from the outer faces of the plates for the corners of the slabs or panels, metal strips projecting from the slabs or panels at the edges of the latter, screws holding the aforesaid strips to said seats, weather strips spanning the gaps between adjacent slabs or panels, and screws detachably securing the weather strips to the underlying strips on the slabs or panels.

10. A building comprising structural steel beams extending from top to bottom of a dome-shaped structure, anchor plates on and secured to the beams, there being a series of anchor plates on each beam and the distribution thereof along the beams being the same for all of the beams, cross pieces each spanning the space between and secured to corresponding anchor plates on adjacent beams and forming with the beams an open framework, each anchor plate having on opposite sides of the corresponding beam and cross pieces inwardly-extending diverging wings provided at their inner ends with flanges projecting into the corresponding openings in the framework, slabs or panels each arranged in one of the openings in the framework and resting on the flanges in that opening, sheet metal elements projecting from the edges of the slabs or panels and bent laterally to fit against the adjacent wings on the anchor plates, screws securing the said sheet metal elements to the flanges on the anchor plates, weather strips overlying and spanning the gaps between the edges of adjacent slabs or panels, and means securing said strips to said sheet metal elements.

11. A wall for a building comprising an openwork metal frame structure, said structure having at the sides of and extending into each opening seats that lie inwardly from the outer face of the frame, a compound slab arranged in each opening in the frame structure and resting on the seats therein, each slab being composed of a stiff fiber backing and a panel of vitreous material cemented thereto, each slab having a surrounding frame of sheet metal flanged to engage with the parts of the frame beside the seats, means to secure the sheet metal frames to the seats, weather strips spanning the gaps between adjacent slabs, and means to hold said weather strips in contact with the underlying slabs.

12. A wall comprising a metal frame structure having large openings therein, slabs each arranged in one of said openings and having an outer layer at least of opaque structural glass, a sheet metal frame surrounding and forming part of each slab, rests on the frame structure for the slabs and their sheet metal frames, means to secure said sheet metal frames to the said rests, weather strips overlying and spanning the gaps between adjacent slabs, and means to secure said strips to the metal frames on the slabs.

GEORGE D. TESCH.