

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) PREFABRICATED BUILDINGS

(71) I, FLOYD ELLSWORTH BIGELOW, JR., of Post Office Box 7064, Houston (Harris County), Texas 77008, United States of America; a citizen of the United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to building structures and more particularly to transportable dismountable building structures which may be collapsed or partly collapsed during shipment and readily assembled with minimal effort.

Portable buildings in which single piece roofs and walls are designed to be dismantled for shipping and readily erected into a finished product are well known. (See Bigelow U.S. Patent No. Reissue 25,827.) While these buildings have been arranged and used together in various manners, they have essentially been individual buildings positioned together with suitable access between buildings. Prewired buildings as shown in the mentioned Bigelow Patent where the walls are completed, conventionally employ surface mounted and exposed electrical receptacles and wiring on the walls which is undesirable. The method taught therein permits production line manufacturing of prefabricated housing where wiring is concealed in the walls and ceiling and may be readily joined together with relatively semiskilled labour.

According to the present invention there is provided a building structure which comprises a plurality of interconnected sections which are separable and one or more of which are dismountable for transportation; at least one of said sections comprising a skid or other support means; a floor attached to said skid; a plurality of walls with at least one of said walls comprising spaced vertical studs, a top plate, a covering on opposite sides of said studs, said covering on at least one side ter-

minating short of said top plate to provide an opening, electrical outlets in the wall having wires terminating adjacent to the top plate and accessible through said opening, holes through said top plate, and a removable covering for said opening; a roof adapted to overlie said floor and any walls lying thereon during shipment; and a junction box in said roof with wires extending therefrom to the perimeter of the roof and hanging down therefrom for extension through the holes in said top plate when the sections are erected and for connection to the wires in the walls.

The wiring of the building structure may be totally concealed, giving the appearance of a home fabricated on the site; and the building will preferably be prewired before shipping.

Furthermore, some of the sections forming the building may be collapsed for transportation and a skirt will be provided to depend from the roof and may engage with the floor or with a disposable piece which extending from the floor to protect the interior of the package during shipping. The skirt incorporates with the outer wall of the building to provide a seal between the roof and wall and may be moved to an out-of-the-way position over interior walls where it will not interfere with support of roof sections by interior walls.

The invention will be described further, by way of example, with reference to the accompanying drawings, wherein like reference numerals indicate like parts, and in which:

Figure 1 is an isometric view of four building sections with one section in erected condition and the remaining sections in dismounted condition for shipping, illustrating the manner in which the dismantled sections may be stacked, one upon the other;

Figure 2 is an isometric view of the building when completely erected;

Figure 3 is a cross sectional view through a portion of the building illustrating the manner in which the building is wired and the manner in which building sections are connected together;

Figure 4 is a fragmentary sectional view through an interior wall supporting adjacent roof sections illustrating the manner in which the wiring is handled for electrical outlets on interior walls;

Figure 5 is a top plan view of the roof of the building with the top sheathing removed to expose the ceiling and with interior walls shown in dashed lines and illustrating the manner in which the roof sections are pre-wired;

Figure 6 is an elevational view of an exterior wall of the building with the internal wall covering removed;

Figure 7 is a view on an enlarged scale of a fragment of the building showing the manner in which end walls of the building sections are tied together and the manner in which the roof sections are tied together and a seal provided between adjacent roof sections;

Figure 8 is a fragmentary view section through a dismounted building section illustrating the manner in which the building is sealed against entry of water during shipping; and

Figure 9 is a fragmentary isometric view of a section of a roof to be positioned over an interior wall showing the suspension strap for attachment to a lifting cable.

Referring first to Figures 1 and 2, the building is shown in erected form in Figure 2 to comprise the four sections 11, 12, 13, and 14. If desired, a carport 10 may be added.

The building may be shipped completely equipped with kitchen, bath, and laundry facilities, as well as furniture if desired. In this event, one section 14 would normally be shipped in erected form and all of the furniture would be packed therein. Preferably all utilities are preinstalled at the factory in this section 14. The section 14 may be fully erected with an outside wall from one of the other sections, but it is preferred that the wall indicated generally at 15 be a temporary wall for shipping purposes. The temporary wall might be provided by any desired construction, such as a continuous sheet of plastics material overlaid with sections of plywood 15a. In this manner, the necessity of dismantling one side wall is avoided.

The remaining sections are shipped pre-packed as shown in Figure 1. Sections 12 and 13 are shown in stacked relationship, one upon the other. Section 11 is shown ready to be stacked on section 13. During shipping, section 11 would be supported on the stacking racks 16 of section 13 in the manner taught by the aforesaid Bidelow Patent No. 25827. These stacking racks would be temporarily supported on the skid and would be removed during erection of the building.

The plan of the building is shown in Figure 5. The areas 16, 17, and 18 are open to each other and provide a living room. The areas

19, 20, and 21 are three bedrooms. In area 22, the kitchen is provided. Area 23 is the utility room and areas 24 and 25 are two baths. It will be noted that the bath 25 may be associated with bedroom 21 to give a private bath for one bedroom.

Figure 5 also illustrates the manner in which the wiring for the building is handled in the roof sections. Referring to section 14, the main line power line for the building enters through box 26 and a lead to the other building sections is provided in conduit 27 which passes through junction boxes 28, 29, and 30 on the building sections 13, 12, and 11, respectively. A similar junction box 31 is provided on building 14 and from this box conduit 32 connects to the junction box A in the ceiling of building 14. Like junction boxes B, C, and D are provided in the other sections. In accordance with this invention, all wiring for each building section as exemplified by building 14 is provided by conduit extending from the junction boxes. These conduits extend to the perimeter of the roof at desired points as exemplified by conduit 33 and to points for connection with interior walls as exemplified by wire 34. The conduits extend downwardly from the ceiling and terminate shortly therebelow as will be apparent from Figures 3 and 4 where the wires in the conduits are connected to wires in the walls of the building. Thus, for instance, in Figure 3 the wall receptacle 35 has its pair of leads in a common conduit 37 extending upwardly to a position indicated generally at 38 just below the roof. The conduit 33 extends downwardly through the ceiling 34 of the roof and the top plate 36 of the wall. As shown in Figure 3, the two wires within the conduit 37 are electrically connected to the two wires within the conduit 33.

The construction of the building and the manner in which the building sections are tied together is exemplified in Figure 3. The building sections are supported on skids made up of suitable longitudinal "I" beams 39 and 40 which are tied together at spaced points with suitable cross beams. A metal pan 41 is laid over the skid, and floor sills 42, 43, and 44 are secured together and suitably attached to the skid. A base floor covering, preferably of plywood, 45 is laid over the floor sills and the base floor covering is itself covered with a suitable material, such as linoleum 46.

By reference to Figures 3 and 6, it will be seen that each exterior wall includes studs 47, top plate 36, and lower plate 48. An inner covering, such as plywood 49, covers the inside of the wall. In areas in which electrical connections are to be made between conduits in the roof and in the wall, the inner wall covering 49 will terminate short of the top plate, preferably at a horizontal stringer 51 as shown in Figure 3. The remaining inner wall covering is provided by a removable

panel 52 which is nailed in place after the electrical connections have been completed.

The exterior wall covering is provided preferably by plywood 53 having bonded to the exterior thereof an impervious covering such as an aluminium panel 54. This aluminium preferably has a bonded coating of paint thereon. It will be noted that the exterior covering 53—54 extends downwardly below the bottom plate 48. Preferably, it extends to the bottom of sill 44 to provide a water-tight covering over the juncture between the wall and floor and to conceal the floor sill. The same construction is followed on all of the peripheral walls.

The construction of the interior walls are shown in Figures 3 and 4. The interior wall consists of an upper plate 55 and a lower plate 56 covered with suitable material such as plywood 57. Preferably up to the level of the stringers 51. Where no electrical connections are to be made in a particular wall, the covering 57 may be extended up to the top plate if desired. In the interest of conformity, it is preferred that the portion of the wall above the stringers 51 be covered with the removable panel 52, which may be the same throughout the building. It is pointed out that the panel 52 would also cover the access hole on the exterior wall. In Figure 4, an interior wall having an electrical conduit 58 therein is shown, and the removable panel 52 gives access to secure the wires in the conduit 58 to like wires in the conduit 59 extending down from the ceiling.

It might be noted that the top plate 55 has a hole 61 Fig. 4 cut approximately in its centre to underlie the space between the edges of contiguous roof sections. A notch 62 is cut in the lower edge of the longitudinal rafter 63. The notch also extends down through the ceiling board 34 as shown at 64. Thus, the conduit 59 may turn about a relatively gentle radius and extend downwardly in the space between adjacent roof sections. While the roof sections are shown to be very close together, it will be understood that the conduit is disproportionately large in the drawings and there is room enough for the conduit to extend downwardly between two adjacent roof sections and into the interior wall. By contrast, it will be noted from Figure 3 that the conduit for the exterior walls extends downwardly through the ceiling 34 at a point slightly inboard from the longitudinal rafter 65 and through the hole 66 in the top plate.

One or more of the building sections will be shipped in the dismantled position, as shown in Figures 1 and 8. As shown in Figure 8, the walls indicated generally at 67 and 68 are stacked on the floor indicated generally at 69. A plurality of spacers 71 are laid on the uppermost wall in a position not to interfere with the conduits depending from the roof section. The roof is then set down on

these spacers with the conduits, such as shown at 72, turned in and lying on top of the uppermost wall between the spacers. These spacers may be short sections of 1" by 2" lumber covered with paper to avoid marring the finish on the walls and ceiling. It will be noted that the skirt 66' terminates above the floor. In order to protect the shipping package, a piece of plywood 73 is secured in position and extends from the floor upwardly to a position underlying the skirt 66'. The skirt may then be temporarily secured to the piece of plywood 73, and there results a shipping package which will exclude the elements from the interior of the package. In those instances where it is desired to ship all of the walls in two of the dismantled sections, the third section may be made up merely of the floor and ceiling, and in this instance the skirt 66' would cooperate with the floor to exclude weather from the interior of the shipping package.

At the site the roof is lifted from the shipping package and the several walls stood up and secured in upright position, as shown in Figure 3. Where one of the packages is shipped with the equipment installed, the temporary wall 51 will be removed and the next skid and floor may be positioned immediately adjacent to the erected section. Preferably a foundation not shown is provided upon which the several building sections are erected. The additional sections may be erected one at a time, or they may be erected with the exception of the roof until all are erected and then the several roof sections placed in position. In either event, the skirt 66' on the outer peripheral of the building will extend down over the peripheral wall, as shown in Figure 3, to provide a weather-tight seal. Where roofs butt each other, the skirt 66a is turned upwardly, as shown in Figure 3, to a position where it will not interfere with the roof resting upon the interior wall. Bolts, such as shown at 74, will toe the upper splate of the walls to the longitudinal rafter 65 of the roof structure, as shown in Figure 3, to hold the roof in position.

It will be noted from Figure 5 that at the juncture of each pair of sections of the building at least a short stub wall, such as shown at 66, is employed at the peripheral of the building to support the roof at its corners and to provide a means for securing two sections of the building together as will appear hereinafter.

The roof is made up of the longitudinal rafters 65 and cross members 75, extending therebetween together with ceiling board 76 applied to the underside of the roof, and a top board 77 applied to the upper side of the rafters. An impervious covering 78 is applied over the top board. When the roof is set in position on the walls, the ceiling board 76 rests upon the walls.

From Figure 3 it will be noted that the skirt 66' extends upwardly to a position where it underlies the top impervious covering 78. This covering 78 may be aluminium having suitable paint bonded thereto. It will be appreciated that the covering 78 provides a water-tight structure for each roof section.

In order to tie the roof sections together, wooden members 75 preferably extend the length of each side of each roof. Thus, when two roof sections are positioned side by side, the members 75 will lie parallel to each other. A length of plywood 76 is then placed over the members 75 and nailed into position to secure the two roof sections together. Preferably, suitable caulking material is placed between the aluminium skin 78 over the roof and the member 75 before the members 75 are fastened into place on the roof. An inverted channel shaped section of impervious material 79, preferably aluminium having a suitable paint bonded thereto, is then placed over the plywood 76 and nailed in place with nails passing through the legs of the channel shaped member into the elongated members 75. Suitable caulking material 81 is positioned between the channel shaped member 79 and the roof cover 78 to seal therebetween. At the ends of the roof the legs of the channel are cut away and the web 79a is turned down and nailed into position, as shown in Figure 7.

The peripheral walls of the building are secured together by fastening a metal strap 82 to each peripheral wall at spaced vertical points opposite an interior wall. A bolt 83 is then extended through a hole in the strap 82 into the adjacent stud in the interior wall to thus provide for securing of the peripheral walls to the interior walls at the juncture between adjacent building sections. A strip of material 84, which is the same as the material providing the outer skin 54 of the building, is then placed in position to overlie the joint between adjacent buildings and cover the strap 82. After the material 84 has been placed into position, the channel 79 has its end portion 79a turned down and nailed into position, as shown in Figure 7.

With buildings having roof sections of considerable length, it is desirable in lifting the roof section to attach to the roof section at points along its length. On the peripheral of the roof this presents little problem as a bolt 85 (Figure 3) may be carried in the rafter 65 and a strap 86 having an eye 87 therein may be provided to which a hook can be attached. After the building is erected, the bolt 85 may be removed and the hole filled with caulking compound. However, this type of arrangement cannot be used where roof sections are adjacent to each other, as there is no access to a bolt such as 85. In Figure 9, there is shown a construction of a strap which may be raised for lifting, and after the roof is in place may be lowered into an

out-of-the-way position. The rafter 65 has a notch 88 cut in its lower face. A "J" shaped strap 89 is provided with the hook on the "J" being shown in dashed lines at 89a to extend into the notch and when the strap is raised to hook about the downwardly facing surface of the notch 88 and extend upwardly about the inside of the rafter 65 so that the strap cannot disengage from the rafter. The strap has a slot 91 therein, and a pair of nails or bolts 92 are provided to extend through the slot and hold the strap in place. A suitable eye 93 is provided at the upper extremity of the strap to which a lifting hook can be attached. The strap is shown in its operative position in Figure 9. It will be appreciated that after the roof is in position, the strap is pushed downwardly and at this time the upper end of the strap will be down to at least the level of the upper surface of the wooden members 75 on the top of the roof so that the strap will not interfere with the placement of the sheet of plywood 76 thereover.

The foregoing disclosure and description of the invention are illustrative and explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made without departing from the scope of the invention as set forth in the following claims.

WHAT I CLAIM IS:—

1. A building structure comprising a plurality of interconnecting sections which are separable and one or more of which are dismountable for transportation; at least one of said sections comprising a skid or other support means; a floor attached to said skid; a plurality of walls with at least one of said walls comprising spaced vertical studs, a top plate, a covering on opposite sides of said studs, said covering on at least one side terminating short of said top plate to provide an opening, electrical outlets in the wall having wires terminating adjacent to the top plate and accessible through said opening, holes through said top plate, and a removable covering for said opening; a roof adapted to overlie said floor and any walls lying thereon during shipment; and a junction box in said roof with wires extending therefrom to the perimeter of the roof and hanging down therefrom for extension through the holes in said top plate when the sections are erected and for connection to the wires in the walls.

2. A structure as claimed in claim 1, including means for sealing between the roof and floor of each section when the section is dismounted for transportation including a water proof skirt carried by and extending downward below the ceiling of the roof about its entire periphery, said skirt when said roof is arranged upon the floor being adapted to extend downwardly over the edges of the floor to prevent water from entering during trans-



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The foregoing disclosure and description of the invention are illustrative and explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made without departing from the scope of the invention as set forth in the following claims.

WHAT I CLAIM IS:—

1. A building structure comprising a plurality of interconnecting sections which are separable and one or more of which are dismountable for transportation; at least one of said sections comprising a skid or other support means; a floor attached to said skid; a plurality of walls with at least one of said walls comprising spaced vertical studs, a top plate, a covering on opposite sides of said studs, said covering on at least one side terminating short of said top plate to provide an opening, electrical outlets in the wall having wires terminating adjacent to the top plate and accessible through said opening, holes through said top plate, and a removable covering for said opening; a roof adapted to overlie said floor and any walls lying thereon during shipment; and a junction box in said roof with wires extending therefrom to the perimeter of the roof and hanging down therefrom for extension through the holes in said top plate when the sections are erected and for connection to the wires in the walls.

2. A structure as claimed in claim 1, including means for sealing between the roof and floor of each section when the section is dismounted for transportation including a water proof skirt carried by and extending downward below the ceiling of the roof about its entire periphery, said skirt when said roof is arranged upon the floor being adapted to extend downwardly over the edges of the floor to prevent water from entering during trans-



portation, the sealing means for each section when the walls are carried in collapsed condition between the floor and roof including means underlying said skirt and extending
5 downwardly beyond said floor, said downwardly extending skirt, when the building is erected, extending downwardly about the perimeter of the building and over the juncture of said roof and walls to prevent water from
10 entering the building between the roof and walls.

3. A structure as claimed in claims 1 or 2, in which said downwardly extending skirt is adapted to be bent into an out-of-the-way
15 position when the periphery of the roof of a section rests upon an interior wall.

4. A structure as claimed in claims 1 or 2, in which adjacent roof sections rest upon a
20 common interior wall.

5. A structure as claimed in claims 1 or 2, in which each roof section includes a pair of parallel members along opposite edges of the roof and on the top surface thereof, a
25 downwardly opening channel shaped member overlying adjacent parallel members on adjacent roofs, and means sealing between the roof and channel to seal between adjacent roof sections of the building.

6. A structure as claimed in claim 2, in which said roof sections each include a rafter
30 extending along the side of the roof section adapted to be positioned adjacent to another roof section, a notch extending through said rafter, a "J" shaped lifting strap with the
35 hook of the "J" extending into the notch and when raised adapted to engage said rafter, said strap carried by said roof section with a sliding connection permitting the strap to be raised and engaged by a lifting cable and to
40 be lowered into an out-of-the-way position when the building is erected.

7. A structure as claimed in claim 1 and any of claims 2 to 6, in which said walls are shaped and dimensioned relative to said floor
45 so as to be superimposed thereon with or without substantial overhang.

8. A structure as claimed in claim 1 in which at least one of said sections is adapted to be shipped in an erected condition.

9. A building structure substantially as
50 herein described and illustrated with reference to the accompanying drawings.

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