

PATENT SPECIFICATION

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(54) BUILDING PACKAGE

(71) I, FLOYD ELLSWORTH BIGELOW, JR., a citizen of the United States of America, of P.O. Box 7064, Houston, Texas 77008, 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 a knock-down building package.

In the past knock-down buildings have been stacked one upon the other for shipping. One system for shipping stacked knock-down buildings is shown in United States Reissue Patent No. 25,827. While the system described in this patent is highly satisfactory for camp-type buildings, it is not suitable for the construction of a building which is to be assembled to closely resemble a conventionally built home. In the system of U.S. Reissue Patent No. 25,827 there are skids which extend beyond the building to permit the use of stacking racks and this is objectionable when it is desired to provide a building which resembles a conventionally built home.

According to one aspect of the present invention there is provided a knock-down building package characterised by, a plurality of stacked building modules, each including a roof and a skid with building parts sandwiched between the skid and roof, a protective member extending between the skid and roof and surrounding said building parts, each skid including elongate members extending along the periphery of opposite sides of the associated module and each elongate member including at locations spaced therealong a vertically extending section and horizontally extending upwardly and downwardly facing surface portions projecting from said section, a plurality of stacking members, each stacking member extending between a pair of skids and having a downwardly facing surface engaging a respective one of said upwardly facing surface portions and an upwardly facing surface engaging a respective one of said downwardly facing surface portions to support one module above an

other module, and means removably securing the stacking members to the skids.

According to another aspect of the present invention there is provided a knock-down building package characterised by, a plurality of stacked building modules, each including a roof and a skid with building parts sandwiched between the skid and roof, a protective member extending between the skid and the roof and surrounding said building parts, each skid including outwardly facing channel members extending along the periphery of opposite sides of the associated module, one of the building parts providing a floor having an upper layer extending to and overlying said channel members, stacking plates secured to said channel members, each plate having a vertical surface, a respective support flange extending outwardly from the vertical surface of each stacking plate, a respective stacking member supported on an upper surface of each support flange, each stacking member including a flange extending inwardly and engaging the lower flange of a channel member on an upper module, and means for removably securing the stacking members to said stacking plates.

The invention will be described now by way of example only with particular reference to the accompanying drawings. In the drawings:

Figure 1 illustrates a knock-down building package having three modules in stacked condition ready for shipment;

Figure 2 is a sectional view through a lower module and a portion of an upper module;

Figure 3 is a fragmentary exploded view of skids and a floor assembled therewith which are used in the modules of Figure 2;

Figure 4 is a view along the lines 4—4 of Figure 3, and

Figure 5 is a fragmentary view showing a modified form of this invention.

The knock-down building shipping package of Figure 1 includes modules indicated generally at 10, 11 and 12.

As best seen in Figure 2, each module includes a skid indicated generally at 13 and

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including channel members 23, 24, a roof section indicated generally at 14 and a plurality of other building sections 15 such as walls stacked between the skid and roof.

5 Each module has a floor indicated generally at 16 which is preferably secured to the skid at the factory and underlies the building sections 15 as illustrated. The floor extends to and overlies the channel member
10 23 on opposite sides of the module.

A protective member extends between the skid and roof section and surrounds the building parts. This member may be provided by sheets of plywood 17, 18 and
15 19 which are secured to the roof by nails 21 and extend down to a point below an upper flange 22 of the peripheral channel member 23. The roof section 14 is provided with a weather-proofing material over
20 its upper surface and a Z-shaped member 20 provides a weather-tight joint between the roof section and the upper end of the plywood protecting members 17, 18 and 19. This assembly gives a substantially
25 water-tight package for shipping.

The peripheral channel members 23 and 24 which are interconnected at points spaced therealong by I-beams 25 (only one shown). Each channel member 23, 24 has secured
30 thereto at points spaced therealong nailing blocks 26 to which the protective members 17 and 18 are secured as illustrated. These blocks also provide an attachment point when the walls are attached to the skid.

35 As shown, each floor 16 is made up of modular sections of upper and lower facing material 27 and 28 spaced apart by peripheral wooden spacers 29, 30 and 31 (Figure 4). The cavity in between these
40 members is filled with insulating material 32.

The modules are linked by stacking members 38 which are secured to the channel members 23, 24 of each module at positions
45 spaced along each channel member. In the preferred form illustrated, an angle iron member indicated generally at 36 is secured at each of the spaced positions to the lower flange 35 of a channel member 23 as
50 by welding. Each angle iron 36 has a vertically extending section 33 which provides a vertically extending section to which a stacking member can be secured. An outwardly extending flange indicated generally
55 at 37 is secured to the vertically extending section 33 of the angle iron and its upper surface 34 provides an upwardly facing surface. The lower surface of lower flange 35 of the channel member 23 provides a
60 downwardly facing surface.

Each stacking member 38 is arranged to extend between the skids of adjacent modules. Each stacking member 38 has a lower
65 edge 39 which provides a downwardly facing surface which engages the upwardly

facing surface 34 to support the stacking member on a lower skid. Each stacking member also has upwardly facing surfaces provided by an upper edge of the member and a flange 41 secured to the upper end
70 of the stacking member. The upwardly facing surface provided by the flange 41 engages the downwardly facing surface of the flange 35 of an upper skid and said upper surface of the stacking member 38 engages
75 the downwardly facing surface of the flange 37 to support the upper module upon the lower module.

Means are provided for removably securing the stacking members to the skids. In the illustrated form this is provided by bolt and nut assemblies 42 extending
80 through several holes 43 in the vertically extending section 33 and holes 44 in the opposite ends of the stacking members.

In assembling the stacking members it is customary to secure each stacking member to a lower skid and to then rest an upper module on the upwardly facing surface of the flange 41 of each stacking member. There is a tendency for the stacking
85 members to bow outwardly during this operation and the flange 41 is therefore designed to project a sufficient distance under the surface of the downwardly facing surface of the flange 35 to support an
90 upper module even though the stacking member may tend to bow outwardly.

In the alternative form as shown in Figure 5, the flange 37a is carried on the
100 vertically extending section 33a and has at its free end a short vertically extending flange 45 which extends above and below the flange 37a. This provides an H-shaped configuration in cross-section which receives
105 the upper and lower ends of the stacking members 38 to limit their movement in an outer direction.

A downwardly facing V groove 46 in angle member 36 and hole 47 in a flange
110 between the angle member and channel flange 35 provide for the attachment of gear to lift or move the module.

WHAT I CLAIM IS:—

1. A knock-down building package
115 characterised by, a plurality of stacked building modules, each including a roof and a skid with building parts sandwiched between the skid and roof, a protective
120 member extending between the skid and roof and surrounding said building parts, each skid including elongate members extending along the periphery of opposite
125 sides of the associated module and each elongate member including at locations spaced therealong a vertically extending section and horizontally extending upwardly and downwardly facing surface portions projecting from said section, a plurality of
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including channel members 23, 24, a roof section indicated generally at 14 and a plurality of other building sections 15 such as walls stacked between the skid and roof.

5 Each module has a floor indicated generally at 16 which is preferably secured to the skid at the factory and underlies the building sections 15 as illustrated. The floor extends to and overlies the channel member 10 23 on opposite sides of the module.

A protective member extends between the skid and roof section and surrounds the building parts. This member may be provided by sheets of plywood 17, 18 and 15 19 which are secured to the roof by nails 21 and extend down to a point below an upper flange 22 of the peripheral channel member 23. The roof section 14 is provided with a weather-proofing material over its upper surface and a Z-shaped member 20 provides a weather-tight joint between the roof section and the upper end of the plywood protecting members 17, 18 and 19. This assembly gives a substantially 25 water-tight package for shipping.

The peripheral channel members 23 and 24 which are interconnected at points spaced therealong by I-beams 25 (only one shown). Each channel member 23, 24 has secured 30 thereto at points spaced therealong nailing blocks 26 to which the protective members 17 and 18 are secured as illustrated. These blocks also provide an attachment point when the walls are attached to the skid.

35 As shown, each floor 16 is made up of modular sections of upper and lower facing material 27 and 28 spaced apart by peripheral wooden spacers 29, 30 and 31 (Figure 4). The cavity in between these 40 members is filled with insulating material 32.

The modules are linked by stacking members 38 which are secured to the channel members 23, 24 of each module at positions 45 spaced along each channel member. In the preferred form illustrated, an angle iron member indicated generally at 36 is secured at each of the spaced positions to the lower flange 35 of a channel member 23 as 50 by welding. Each angle iron 36 has a vertically extending section 33 which provides a vertically extending section to which a stacking member can be secured. An outwardly extending flange indicated generally 55 at 37 is secured to the vertically extending section 33 of the angle iron and its upper surface 34 provides an upwardly facing surface. The lower surface of lower flange 35 of the channel member 23 provides a 60 downwardly facing surface.

65 Each stacking member 38 is arranged to extend between the skids of adjacent modules. Each stacking member 38 has a lower edge 39 which provides a downwardly facing surface which engages the upwardly

facing surface 34 to support the stacking member on a lower skid. Each stacking member also has upwardly facing surfaces provided by an upper edge of the member and a flange 41 secured to the upper end 70 of the stacking member. The upwardly facing surface provided by the flange 41 engages the downwardly facing surface of the flange 35 of an upper skid and said upper surface of the stacking member 38 engages 75 the downwardly facing surface of the flange 37 to support the upper module upon the lower module.

Means are provided for removably securing the stacking members to the skids. In the illustrated form this is provided by bolt and nut assemblies 42 extending through several holes 43 in the vertically extending section 33 and holes 44 in the opposite ends of the stacking members. 85

In assembling the stacking members it is customary to secure each stacking member to a lower skid and to then rest an upper module on the upwardly facing surface of the flange 41 of each stacking member. There is a tendency for the stacking members to bow outwardly during this operation and the flange 41 is therefore 90 designed to project a sufficient distance under the surface of the downwardly facing surface of the flange 35 to support an upper module even though the stacking member may tend to bow outwardly. 95

In the alternative form as shown in Figure 5, the flange 37a is carried on the 100 vertically extending section 33a and has at its free end a short vertically extending flange 45 which extends above and below the flange 37a. This provides an H-shaped configuration in cross-section which receives 105 the upper and lower ends of the stacking members 38 to limit their movement in an outer direction.

A downwardly facing V groove 46 in angle member 36 and hole 47 in a flange 110 between the angle member and channel flange 35 provide for the attachment of gear to lift or move the module.

WHAT I CLAIM IS:—

115 1. A knock-down building package characterised by, a plurality of stacked building modules, each including a roof and a skid with building parts sandwiched between the skid and roof, a protective 120 member extending between the skid and roof and surrounding said building parts, each skid including elongate members extending along the periphery of opposite sides of the associated module and each 125 elongate member including at locations spaced therealong a vertically extending section and horizontally extending upwardly and downwardly facing surface portions projecting from said section, a plurality of 130



- stacking members, each stacking member extending between a pair of skids and having a downwardly facing surface engaging a respective one of said upwardly facing surface portions and an upwardly facing surface engaging a respective one of said downwardly facing surface portions to support one module above another module, and means removably securing the stacking members to the skids. 35
2. A package as claimed in claim 1 wherein means are provided for limiting outward movement of said stacking members after they have been secured to a first module and while they are supporting another module above said first module and before the members have been secured to the other module. 40
3. A package as claimed in claim 1 wherein one of said building parts provides a floor having an upper layer extending to and overlying said elongate members on opposite sides of the module, and the securing means fastens the stacking members to said vertically extending sections. 45
4. A knock-down building package characterised by, a plurality of stacked building modules, each including a roof and a skid with building parts sandwiched between the skid and roof, a protective member extending between the skid and the roof and surrounding said building parts, each skid including outwardly facing channel members extending along the periphery of opposite sides of the associated module, one of the building parts providing a floor having an upper layer extending to and overlying said channel members, stacking plates secured to said channel members, each plate having a vertical surface, a respective support flange extending outwardly from the vertical surface of each stacking plate, a respective stacking member supported on an upper surface of each support flange, each stacking member including a flange extending inwardly and engaging the lower flange of a channel member on an upper module, and means for removably securing the stacking members to said stacking plates. 50
5. A knock-down building package substantially as hereinbefore described with reference to and as shown in the accompanying drawings. 55

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