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[54] **BUILDING OF TELESCOPING AND INTERLOCKING PARTS**


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[51] **Int. Cl.** ..... **E04b 7/02,** E04b 2/32

[58] **Field of Search** ..... 52/270, 93, 271, 509, 494, 52/497, 498, 499, 272, 274, 281, 294, 296, 299



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 3,420,016 | 1/1969 | Fintlay | 52/274 X |
| 3,738,083 | 6/1973 | Shimano | 52/271 X |
| 2,359,304 | 10/1944 | Davison | 52/299 X |
| 2,883,711 | 4/1959 | Kump | 52/299 X |
| 2,815,831 | 12/1957 | Helt et al. | 52/93 |
| 1,228,327 | 5/1917 | Kohler | 52/499 |

FOREIGN PATENTS OR APPLICATIONS

| | | | |
|---|---|---|---|
| 1,012,818 | 12/1965 | Great Britain | 52/509 |



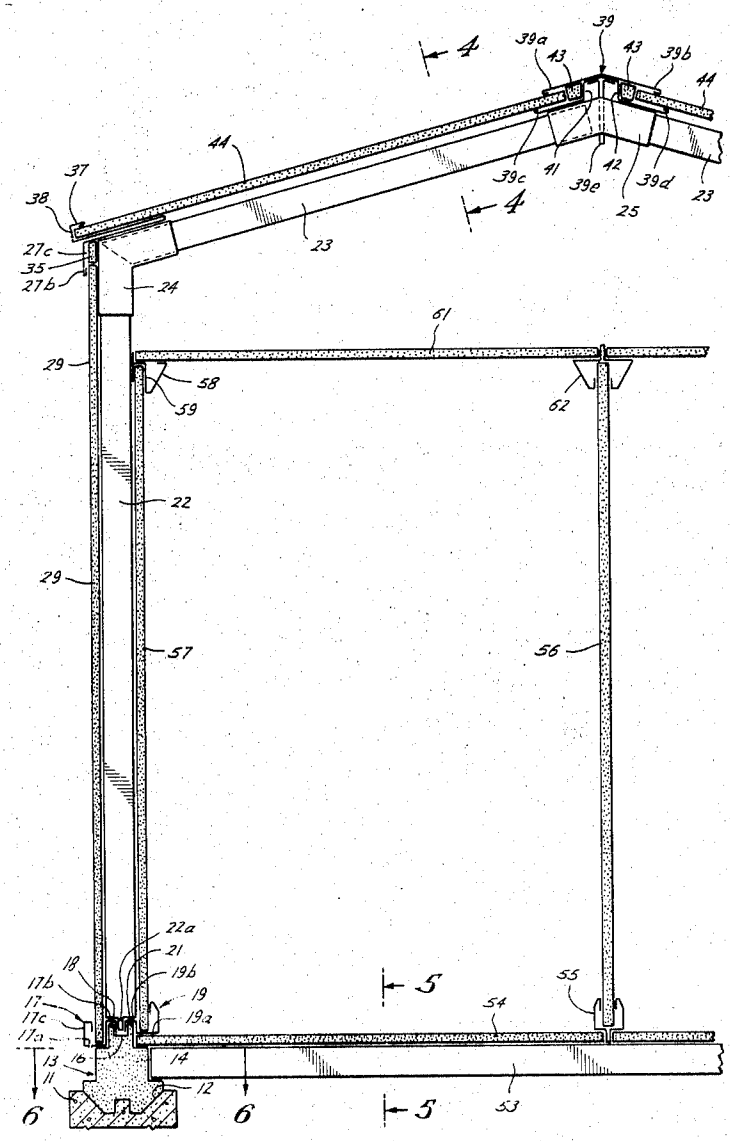
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[57] **ABSTRACT**

A building which can be readily assembled in the field by unskilled labor without the use of nails, screws, bolts or the like, such assembly being provided for by telescoping and interlocking parts together with keys which hold the several parts of the building in assembled form.


**4 Claims, 7 Drawing Figures**



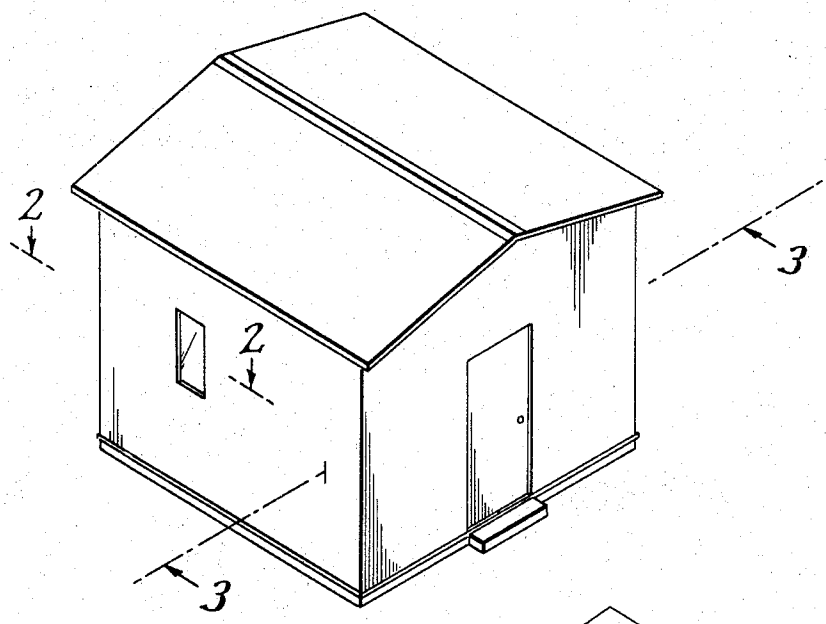



Fig. 1

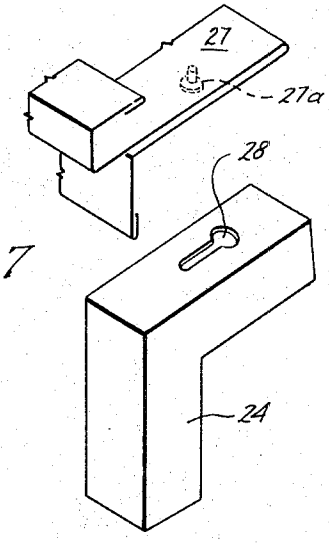
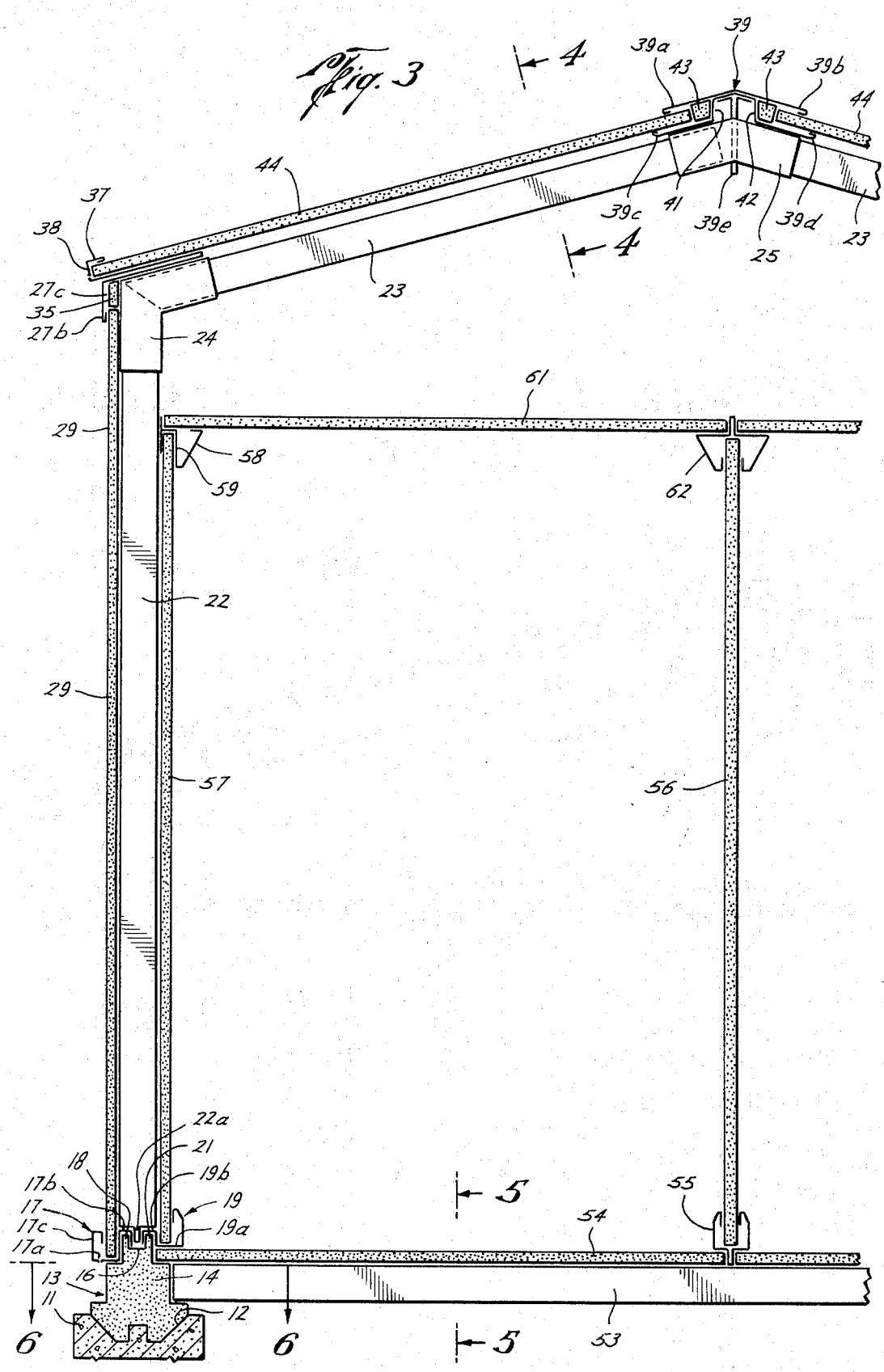



Fig. 7




Fig. 2

Fig. 3


4
4
5
5
6
6
39
39a
39b
39c
39d
39e
41
42
43
43
44
44
23
23
25
37
38
27c
35
27b
24
61
29
58
59
62
22
29
57
56
22a
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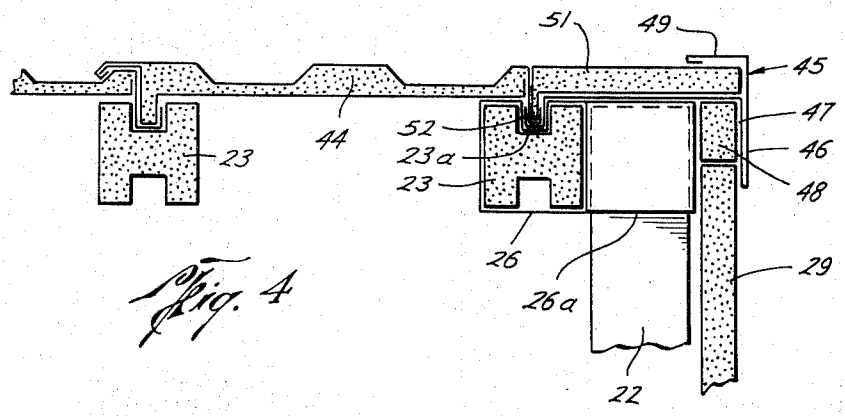
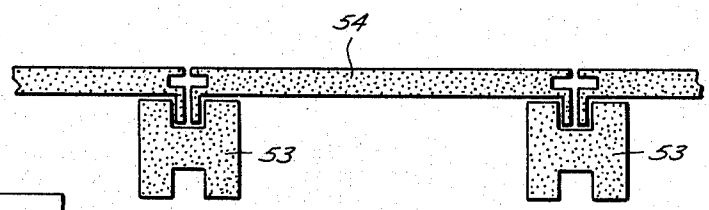



Fig. 4

Fig. 5



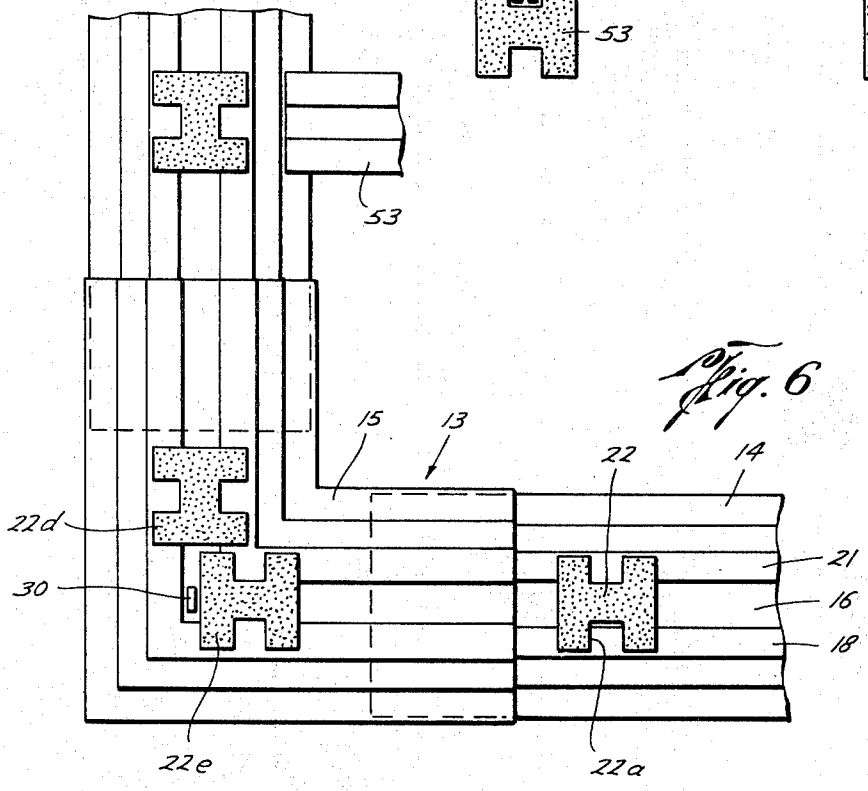




Fig. 6

# BUILDING OF TELESCOPING AND INTERLOCKING PARTS

This invention relates to buildings and more particularly to buildings of the type which can be assembled without the use of screws, bolts, nails or the like.

It is an object of this invention to provide a building which may be assembled from studs, rafters, panels and the like and in which is not necessary to use any bolts, nails, screws or the like to fasten the several components of the building together.

Another object is to provide a prefabricated readily assembled building in which nails, screws, bolts or the like are not necessary to assemble the building and in which parts such as sill, studs, rafter, panels and the like may be fabricated from continuous production members cut to the desired length and in which these parts are held in assembled relationship by telescoping engagement with each other or with suitable brackets and latch and lock means are provided to latch and lock the parts together.

Other objects, features and advantages of the application will be apparent from the drawings, the specification and the claims.

In the drawings wherein like numerals represent like parts and wherein an illustrative embodiment of this invention is shown.

FIG. 1 is an isometric view of a building constructed in accordance with this invention;

FIG. 2 is a view along the lines 2—2 of FIG. 1;

FIG. 3 is a view along the lines 3—3 of FIG. 1;

FIGS. 4, 5, and 6 are views along the lines 4—4, 5—5, and 6—6 respectively of FIG. 3; and

FIG. 7 is an exploded view of a bracket and associated latch structure.

The building of this invention is preferably supported upon a foundation means such as shown in FIG. 3 at 11. The foundation means may be a plurality of blocks arranged about the perimeter of the building or it may be a continuous poured beam. In any event it is preferred that some means be utilized to raise the floor of the building above the surrounding earth and provide a level support for the building. If desired the foundation means may be omitted and the sills may rest directly upon the ground. Preferably the foundation means is provided in its upper face with a latch means 12 which will support and lock the sills in the desired position.

A sill indicated generally at 13 extends about the periphery of the building and where foundation means 11 is employed has a mating surface on its lower face which mates with the surface 12 of the foundation to support the sill in the desired position. The sill is made up of a plurality of beams 14 of the cross-sectional configuration shown in FIG. 3. Preferably the beams are fabricated from a skin of metal filled with expanded plastic such as polyurethane. Where the design requires two or more sills in a straight run or requires corners, the sills are secured together in any desired manner. Preferably, a sleeve is telescoped over adjoining sills to provide a connector therebetween. Preferably the sleeve is of the same cross-sectional configuration as the sill and of a slightly larger size so that it will telescope over a pair of confronting sills or will form a corner between two adjacent sills such as the corner sleeve 15 shown in FIG. 6. It will be appreciated that the foundation 11 will serve to hold the several sills and their connecting sleeves in the desired position. Where the foundation is not used, any desired means may be utilized to pin the several sill members and their connecting sleeves together if desired. The sills and their connecting sleeves are provided with an upwardly facing latch means whose purpose will more fully appear hereinafter.



The sill latch means may be an integral part of the sill or it may be secured to the sill in any desired manner. It is preferable that the latch means be partially provided by the sill and partially by additional members which may be supported upon the sill. For instance, in the illustrated embodiment the sill is provided with an upwardly facing groove 16. On the exterior side of the building a formed latch member 17 which has an upwardly facing groove 17*a* therein is supported on the sill and has a downturned groove 17*b* which mates with the upwardly extending flange 18 on the sill. In like manner there is an internal latch member 19 having an upwardly facing groove 19*a* and a downwardly facing groove 19*b* which cooperates with the upwardly facing flange 21 of the sill.

A plurality of structural ribs are provided which are latched to and held by the sill against movement normal to the sill. The ribs include the studs 22 having the cross-sectional configuration indicated in FIG. 6. At their lower ends the studs are provided with a flange or tongue 22*a* which extends into the groove 16 in the sill to latch the ribs against movement normal to the sill.

The ribs also include rafters 23 which preferably are of the same cross-sectional shape and size as the ribs 22. It is also preferred that the studs and rafters be fabricated of a skin of metal filled with expanded polyurethane.

Suitable brackets are provided to secure the studs to the rafters. The ribs on each side of the building will be connected to rafters running across the top of the building by corner brackets 24. These brackets are hollow sleeves which telescopically receive the studs and rafters. Preferably the brackets are formed on an angle as shown on FIG. 3 to give the desired pitch to the roof. The form of building shown employs a peak type roof and a peak bracket 25 is employed between confronting rafters 23. This bracket again telescopically receives the confronting rafters and is formed on the desired angle of pitch of the roof.

At the front and back of the building the studs 22 are telescopically received in boxes 26*a* carried by sleeves 26 which slide over the rafter adjacent to the front and rear of the building (FIG. 4). These sleeves 26 are attached to the boxes 26*a* at the same angle as the angle of pitch of the roof. The studs will be of differing length to accommodate the spacing between the sill 13 and the rafter 23.

Preferably the studs and rafters as well as their connecting corner and peak brackets will have at least in their exterior surface grooves 22*a* and 23*a* respectively which cooperate with the exterior panels to latch the exterior panels and the studs in proper position (FIGS. 4 and 6). In this connection, it will be noted from FIG. 6 that two side by side studs are positioned in the upwardly extending latch groove 16, one on each side of the juncture of a corner. The studs in the position of stud 22*e* block movement of stud 22*d* due to the engagement of the tongue on the stud 22*e* in the groove 16. If desired a small key or block 30 may be placed between the stud 22*e* and the sleeve 15, that is, in the groove 16 to prevent movement of stud 22*e* towards

the corner of the building but such is not necessary. Double studs of this nature are preferably employed at each corner of the building and this will prevent movement of the studs toward the corner of the building. As will hereinafter appear the panels will lock with the studs in a manner to prevent their movement in the other direction thus effectively locking all of the studs in the desired postion.

Each of the brackets employed is provided with latch means which cooperates with the latch means of other brackets and which cooperates with the latch means of the sill to fasten the exterior and roof panels in place.

Referring first to the corner bracket **24** there is shown therewith an associated latch member which cooperates with the corner bracket **24** to provide a latch means which looks downwardly and confronts the external latch means of the sill. Also, the bracket looks towards and confronts the latch means associated with the peak bracket. The corner bracket and latch means might be a single fabricated piece if desired. Preferably, the telescopic configuration of the corner bracket is a single fabrication and the additional configuration needed for latch purposes is attached thereto. In the illustrated embodiment, an elongated strip of metal is folded to the configuration as shown generally in cross-section at **27.**

The latch member **27** is preferably secured to the bracket **24** by having a downwardly extending button latch-member **27***a* which cooperates with the key-shaped slot **28** in bracket **24** to latch these members together in the conventional way. The bracket **27** has a downturned extremity **27***b* which cooperates with the exterior vertical wall of bracket **24** to provide a downwardly facing slot **27***c*. This slot **27***c* is immediately above and confronts the slot **17***a* of the sill latch structure. One of these pair of confronting slots, preferably slot **27***c*, is deeper than the other for a purpose which will appear below.

A plurality of panels are provided as the exterior wall of the building and one panel is preferably provided to bridge the distance between the grooves **22***a* in each of adjacent studs **22.** Preferably, these panels are formed as shown at **29** of an inner and outer skin of metal filled with expanded polyurethane. The panels have at opposite sides latch configurations to latch the panels to each other and to the studs. On one side of each panel a U-shaped metallic latch member shown at **31** extends from the panel inwardly into the groove **22***a* of a stud. At the other side of the panel a flange **32** extends into the U-shaped metallic latch member **31** and an overlapping flange or finger **33** overlaps the adjacent enlargement **34** on the adjacent panel. This construction latches the panels against movement horizontally to each other and to the studs so that neither panels nor studs may move along the sills.

The panels are shorter than the distance between the bottom of the deeper slot of the two confronting slots **17***a* and **27***c* and the exterior flange of the other slot. Preferably, the deeper slot is the upper bracket slot **27***c* and the panels are shorter than the distance between slot **27***c* and flange **17***c*. The panels are longer than the distance between the bottom of the shallower or lower slot **17***a* and the downturned flange **27***b* of the upper latch means. With this configuration, the panel may be assembled to the building by having its upper end inserted into the slot **27***c* until its lower end passes over the latch means of the sill. It may then be lowered to rest in the slot **17***a* with the upper end of the panel still within the slot **27***c;* that is, above the lowermost extremity of the downturn latch flange **27***b*.

The panels are held in place by a suitable lock means which prevents removal of the panel after it has been installed. This lock means is inserted in the space between the panel and the bottom of the deepest slot. In the illustrated embodiment the lock means **35** is inserted in the slot **28** above the panel **29.** Lock means **35** is preferably provided by several elongated members which bridge several ribs. These are installed prior to installing the corner panels. After installing the corner panels the lock means **35** adjacent to the corner panels are shifted to overlie the corner panels and lock them and the adjacent panels in place.

As shown in FIG. **2** the corner panels **36** are especially fabricated at the desired right angle as viewed in cross-section and the two side extremities of the corner panels have the same latch mechanism as previously described in conjunction with the description of the panel **29.** The corner panels **36** are only a few inches in width and thus the lock members **35** need only be shifted a few inches to lock the corner panels in place. These lock members are of course accessible from the interior of the building to readily shift them after the exterior panels have been placed on the building.

The roof panels and latching systems are handled in a manner similar to the panels and latching system for the side panels just explained. The bracket **27** includes a latch means provided by a U-shaped section **37** of the bracket **27.** This provides a slot **38** for receiving roof panels. The roof panels are identical with the side panel **29.**

The latch means for receiving the end of the panel remote from the bracket **27** may be provided by a latch structure associated with the peak bracket **25.** In the illustrated form of the invention a generally T-shaped member indicated generally at **39** provides such latch structure. The cross of the "T" **39** will be angled slightly to conform to the pitch of the roof. The cross of the "T" includes upper legs **39***a* and **39***b* which cooperate with lower legs **39***c* and **39***d* respectively to provide grooves **41** and **42.** Groove **41** confronts the groove **38** provided by the corner bracket. Groove **42** in like manner confronts a like groove provided by a corner bracket at the other side of the building (not shown). The standard **39***e* of the "T" may be of any desired configuration, preferably it is provided only at intervals which correspond with the spacing of the peak brackets **25** and extends through suitable passages left in the peak bracket as indicated in FIG. **3.** If desired, suitable clips (not shown) may be attached to the exposed lower extremity of the standard **39***e* to lock it to the peak bracket. Clips would only be required where it desired that the building be able to withstand every heavy windloading. It is of course apparent that if desired any of the connections between the several components of the ribs could be latched against disassembly by providing suitable mating holes and pins to prevent disassembly without removal of the pins.

One of the two confronting grooves of the roof latch structure is deeper than the other so that the roof panels may be inserted in the manner previously explained in conjunction with the side panels. Preferably, this is the groove at the peak of the roof. The length relationships of the panels relative to the confronting grooves

is the same as previously explained with regard to the side panels so that a panel may be projected into the peak latch structure and then move downwardly and inwardly into the groove **38** of the corner latch structure. As shown in FIG. **3**, the confronting grooves will then overlap the panel to hold the panel in place.

Suitable latch members **43** are inserted in the grooves **41, 42** between the peak latch structure and the ends of the roof panels **44** to lock the panels in place. Preferably the rafters **23** will have in their upper surfaces the grooves **23***a* (FIG. **4**) previously described in conjunction with the panels **29**, to further latch the roof panels to the ribs.

The gable trim is illustrated in FIG. **4.** As previously explained, the generally rectangular sleeve **26** which is associated with each stud at the front and rear of the building, has attached to the side of the sleeve a downwardly opening box member **26***a* in which the stud **22** is received. Attached to this sleeve and/or box member by any desired means, such as the fastening means shown in FIG. **7**, is an elongated gable trim latch member formed in the cross-sectional configuration illustrated generally at **45.** The downturned extremity or flange-like member **46** provides with the adjacent edge of the box **26***a* a groove **47** which opens in a downwardly direction. The groove **47** receives the panels **29** forming the front and rear walls and provides for locking them in place by use of a lock member **48** in the manner previously explained. The gable trim includes a horizontally extending flange portion **49** for receiving the special roof panel **51.** Panel **51** extends under the flange **49** and has the downturned latch portion **52** to latch with the adjacent roof panel **44.** The gable trim is fabricated of sheet metal and the finger **49** will spring slightly to permit insertion of the special panel **51** and then return to the position shown in FIG. **4.**

Floor joist **53** may be extended at suitable intervals between opposite sections of the sill **13.** Floor panels **54** may be supported upon the joist **53.**

Where internal walls are desired an upwardly opening floor latch member or clip **55** is provided between adjacent floor sections. This clip **55** when installed and supporting the wall panels **56** therein will have the appearance of floor molding.

The side walls may include internal finished panels **57** supported in the groove **19***a* of the sill latch means. The upper end of the panels is held in position by a ceiling molding indicated generally at **58.** This ceiling molding has a downwardly facing groove **59** for receiving the upper end of the wall panel. The ceiling molding may be attached in any desired manner to the studs **22** preferably by a latching system such as shown in FIG. **7.**

Ceiling panels **61** extend between the wall molding **58** and a similar wall molding **62** supported upon the internal wall **58** (FIG. **3**).

As shown in FIG. **2**, suitable window panes **63** preferably of double pane construction, are provided in the internal and external panels at desired positions. Also as shown in FIG. **2**, the internal wall panels may have outturned flanges **57***a* at their side extremities to latch with the grooves in the studs to hold the panels in the desired position.

It will also be apparent that if desired the internal wall **56** may be fastened to the external wall by a suitable clip **64** having a tongue extending into the space between adjacent wall panels **57** and a groove for receiving the vertical side of panel **56.**

From the above it will be seen that all the objects of this invention have been obtained. The building may be assembled in the field without tools, nails, screws, glues, or fasteners being required. All of the cavities in the structural and panel members may be filled with polyurethane to give an excellent "U" factor. All of the rafters, studs, sill, etc., are provided with slide fits to eliminate the need for fasteners.

All of the principal components of the building may be mass-produced with great economy. For instance, the studs and rafters may be identical and may be produced by continuous method and cut into the desired length. The same is true of the exterior wall panels and of the internal wall panels. The roof and wall panels may be identical to further simplify the structure. By providing structural members as well as panels of polyurethane covered with a skin of metal the product may be very strong while at the same time being very light. This permits the use of rafters of substantial dimension.

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 within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

**1.** A building comprising,
a sill extending about the periphery of the building and having an upwardly facing latch means,
said sill comprising a plurality of members telescoped together to provide an integrated base,
a plurality of structural ribs latched to and held by the sill against movement normal to the sill,
said ribs comprising studs and rafters telescoped with brackets therebetween,
said brackets having latch means,
the latch means of the sill and brackets at the top of the studs and the latch means on opposite ends of a rafter providing confronting slots with one of each pair of confronting slots being deeper than the other,
exterior panels held between said slots,
said panels shorter than the distance between the bottom of the deepest slot and the exterior edge of the other of a pair of confronting slots,
said panels longer than the distance between the bottom of the shallower slot and the exterior edge of the other of said pair of confronting slots, and
removable lock means in one of each pair of confronting slots between the panel and bottom of the slot preventing removal of the panel.

**2.** A building comprising,
peripheral foundation means to having an upwardly facing latch means,
a sill extending about the periphery of the building and latched to the foundation means,
said sill having an upwardly facing latch means and comprising a plurality of members telescoped together to provide an integrated base,
a plurality of structural ribs latched to and held by the sill against movement normal to the sill,
said ribs comprising studs and rafters telescoped with brackets therebetween,

said studs and rafters having latch means at least on the side looking to the exterior of the building,
each of said brackets having latch means,
the latch means of the sill and bracket at the top of the studs and the latch means on opposite ends of a rafter providing confronting slots with one of each pair of confronting slots being deeper than the other,
exterior panels held between said slots,
said panels shorter than the distance between the bottom of the deepest slot and the exterior edge of the other of a pair of confronting slots,
said panels longer than the distance between the bottom of the shallower slot and the exterior edge of the other of said pair of confronting slots,
said panels having latch means along their side edges cooperable with the latch means along the studs and rafters to latch the panels thereto,
an elongated removable lock means in one of each pair of confronting slots between the panel and bottom of the slot preventing removal of the panel.

**3.** The building of claim **2** wherein
the means providing the confronting slot of the sill latch means is separate from the sill and is held in place by latching of the ribs to the sill, and
wherein the confronting slots of the other latch means are provided at least in part by means releasably secured to the ribs.

**4.** The building of claim **2** wherein
interior panels are held between confronting slots provided by the sill latch means and a ceiling molding which is releasably secured to the ribs,
and each side edge of an interior panel has latch means cooperable with complementary latch means in the inner surfaces of the studs.

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