Sept. 3, 1963 L. HELFMAN 3,102,617

PREFABRICATED BUILDING STRUCTURE

Filed Jan. 4, 1960 2 Sheets-Sheet 1

Fig. 1

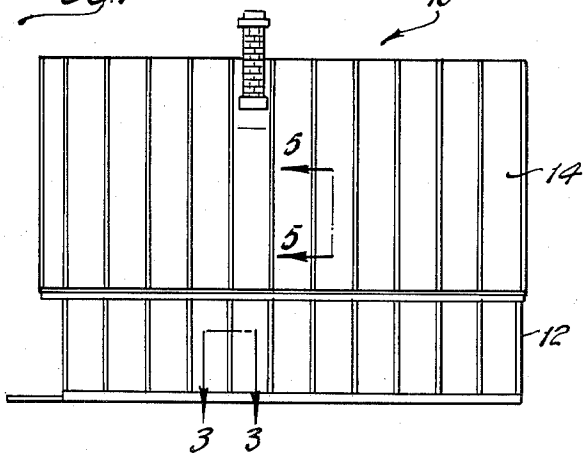


Fig. 2

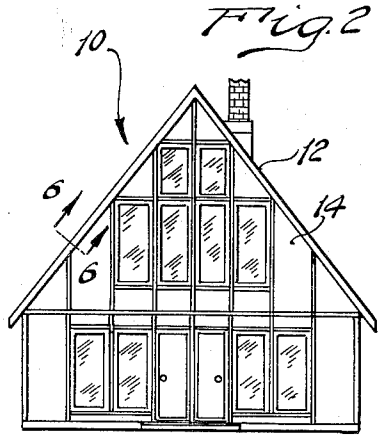


Fig. 3

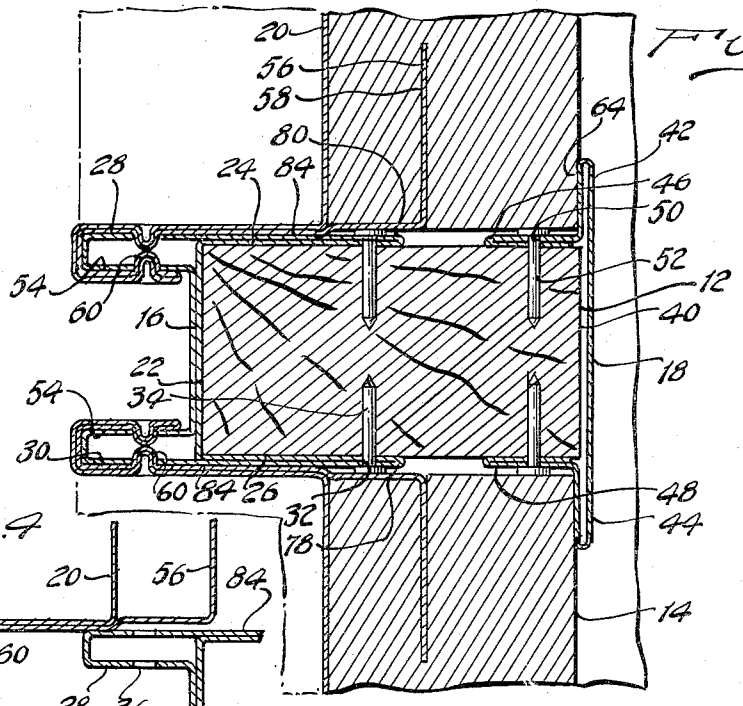
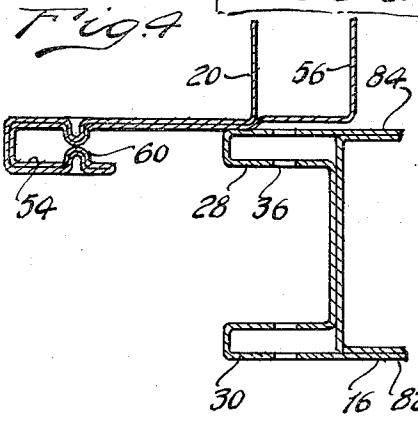


Fig. 4

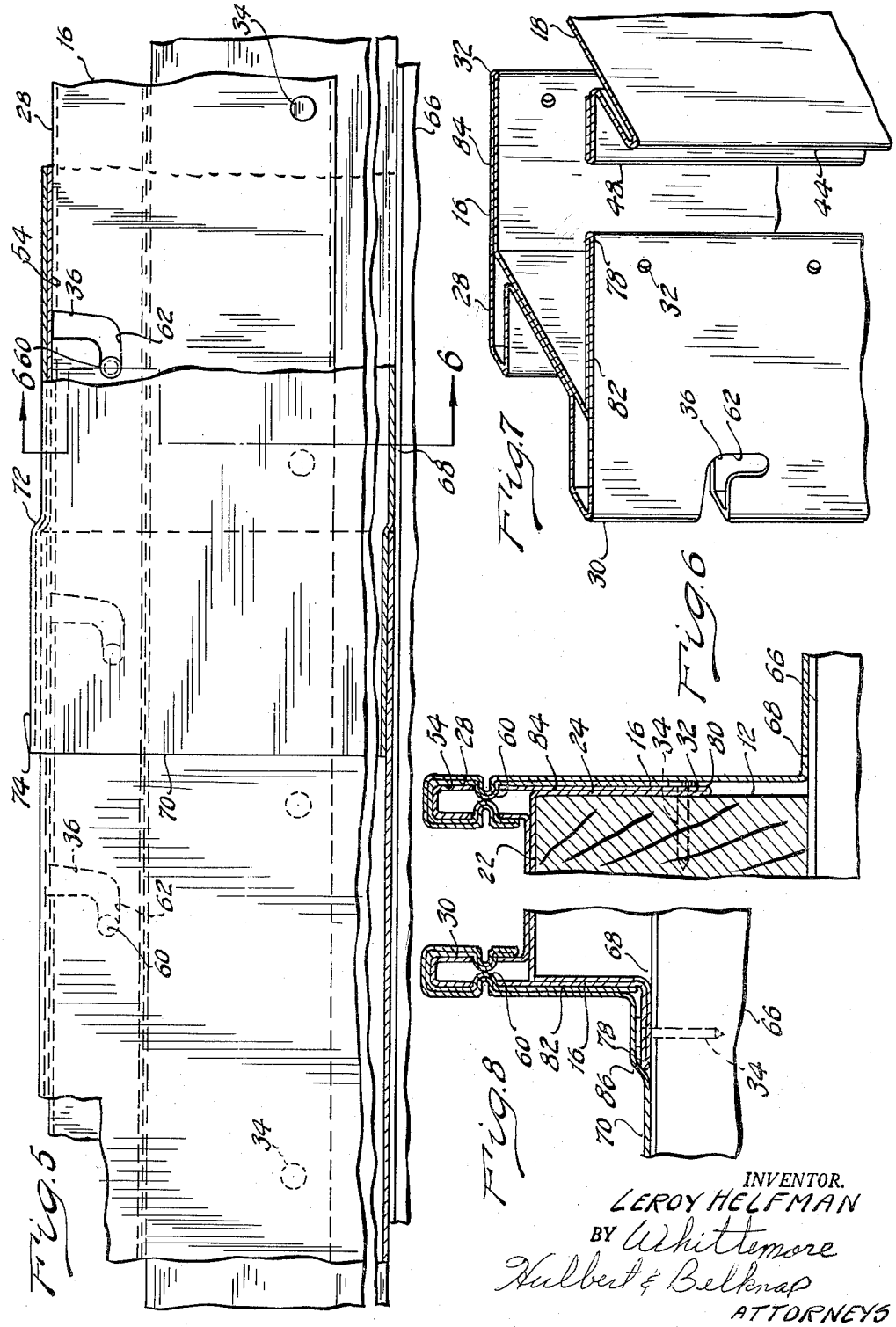


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PREFABRICATED BUILDING STRUCTURE

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6 Claims. (Cl. 189—85)

The present invention relates to building structures and refers more specifically to a prefabricated building structure comprising closure panels extending between laterally spaced vertically extending supporting members having a metal covering, which structure includes means integral with said members and panels for securing the members and panels together in rigid weather-tight joints.

The need for prefabricated building structures has long been recognized. Prefabricated building structures may be erected with great speed. In addition the units of the prefabricated building structure may be factory made so that they are entirely uniform. Also, since prefabricated building structures are built from individual building units the structures may be packaged and shipped economically providing mobility of location of the building structures and factories producing the units of which the structures are constructed.

Prior prefabricated building structures have however been subject to many defects. The structures often are complicated to erect and require the use of trained mechanics and special tools. In addition the prefabricated structures are often unsightly and expensive. Also the prior prefabricated building structures have not made use of contemporary materials such as light metals and are generally unsuited for application to only a portion of an existing building.

It is therefore one of the purposes of the present invention to provide an improved prefabricated building structure comprising laterally spaced vertically extending supporting members, closure panels extending between the supporting members, and novel means of attaching the closure panels to the supporting members in rigid weather-tight joints.

Another purpose is to provide an improved building structure as indicated above which is adapted to be readily applied to existing buildings.

Another object is to provide prefabricated building structure as set forth above wherein both the supporting members and the closure panels have metal coverings.

Another purpose is to provide a prefabricated building structure as set forth above wherein the metal covering of the supporting member and closure panel form a tongue and groove connection therebetween.

Another purpose is to provide prefabricated building structure as set forth above wherein bayonet slots are provided spaced along the length of the tongue and abutments are provided in the groove which are adapted to be received in bayonet slots to insure rigid weather-tight connections between the supporting members and closure panels.

Another purpose of the present invention is to provide a prefabricated building structure as set forth above which is simple in construction, economical to manufacture and efficient in use.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, illustrating a preferred embodiment of the invention, wherein:

FIGURE 1 is a side elevation of a building structure constructed of supporting members and closure panels according to the invention.

FIGURE 2 is a front elevation of a building structure constructed of supporting members and closure panels according to the invention.

FIGURE 3 is a sectional view through a supporting member and portions of two closure panels of the building structure indicated in FIGURE 1 taken on the line 3—3 in FIGURE 1.

FIGURE 4 is a disassembled view of the metal covering of the closure panel and supporting member shown in FIGURE 3.

FIGURE 5 is a sectional view of a portion of an existing building similar to that shown in FIGURES 1 and 2 taken on the line 5—5 in FIGURE 1.

FIGURE 6 is a partial sectional view of a portion of an existing building showing building structure according to the invention applied thereto and taken on the line 6—6 in FIGURE 5.

FIGURE 7 is a perspective view of the metal covering of the supporting member illustrated in FIGURE 3.

FIGURE 8 is a partial section through an existing building similar to the section of FIGURE 6 showing a slightly modified building structure according to the invention applied to the existing building.

With particular reference to the drawings a preferred embodiment of the prefabricated building structure of the invention will now be described.

The building structure generally indicated **10** illustrated in FIGURES 1 and 2 comprises a plurality of laterally spaced supporting members **12** having closure members **14** extending therebetween and secured thereto in a rigid weather-tight joint. As shown better in FIGURE 3 the supporting members **12** have secured thereto metal covering **16** and **18** while the closure panels have metal covering **20** secured to the exterior thereof. As indicated the metal coverings **16** and **20** are connected by means of a tongue and groove joint in combination with a bayonet slot and abutments to insure that the connection between the supporting members and closure panels is rigid and weather-tight.

Such structure is adapted to both construction of new prefabricated buildings or the covering of old building structures as will later be seen. In addition the supporting members and closure panels may be applied to the building structures by unskilled mechanics with the usual mechanic's tools as will be apparent as the description proceeds.

More specifically the supporting members **12** in the embodiment shown in FIGURE 3 are rectangular sections of wood which may be used as vertical posts for the side walls of the building or as vertically extending rafters for the roof of the building. If it is desired the rafters and posts may be connected by means of gusset plates to form truss members in the known manner. Supporting members **12** as shown are spaced at convenient intervals around the building, such as for example four feet with the closure panels **14** extending therebetween and supported thereby.

Metal coverings **16** as shown best in FIGURES 3, 4 and 7 are provided on the exterior surface **22** of the supporting members **12**. The metal covering **16** may be bent as shown to extend in double thickness along the opposite sides **24** and **26** which extend adjacent and at right angles to surface **22** of supporting member **12**. Covering **16** is also provided with tongue portions **28** and **30** formed by open return bending of the metal from which covering **16** is formed, which tongues extend outwardly from surface **22** of supporting member **12** and parallel to surfaces **24** and **26** thereof as shown best in FIGURE 3. Covering **16** is further provided with openings **32** spaced longitudinally thereof adjacent opposite sides **24** and **26** of the supporting member **12** as shown in FIGURE 3. Openings **32** are provided to receive nails **34** or other means for securing the covering **16** to the supporting member **12**.

Further, in accordance with the invention, the tongue portions 28 and 30 of the covering 16 are provided with inwardly and downwardly extending bayonet slots 36 therein as indicated in FIGURE 7. Bayonet slots 36 are provided at spaced intervals along the length of tongue members 28 and 30 and are adapted to receive abutments 60 formed in covering 20 of closure panels 14 to securely lock the closure panels to the supporting member 12 as will later be seen.

Metal covering 18 is further provided on the other side 40 of supporting member 12 as shown in FIGURE 3. The other side 40 of supporting member 12 is opposite from the side 22 thereof and is intended to be on the interior of the building structure illustrated in FIGURE 1, while side 22 is on the exterior side of the building structure illustrated in FIGURE 1. Metal covering 18 as shown is provided with flanges 42 and 44 extending at right angles to sides 24 and 26 of supporting member 12 and parallel to side 40 thereof as illustrated in FIGURE 3. The flanges 42 and 44 provide abutments against which the closure panels 14 may be firmly positioned when the closure panel 14 is in assembly with the supporting members 12 as will later be seen. The metal covering 18 is further provided with portions 46 and 48 extending along the sides 24 and 26 of the supporting member 12 respectively which have openings 50 spaced longitudinally therealong through which means, such as nails 52, are passed to secure covering 18 to supporting member 12 as shown.

Closure panels 14 are comprised of a composition material which may possess desired characteristics such as lightness of weight and sound absorbing and insulating properties. Closure panels 14 as shown best in FIGURE 3 have secured thereto a metal covering 20 which extends entirely across the outer surface thereof and is bent to form a groove 54 of a double thickness of the metal at the outer corners of the closure panels 14. The metal covering 20 is secured to the closure panel 14 by means of the open return flange 56 thereof extending within a slot 58 in the vertically extending edges of the panels 14. As shown best in FIGURES 3 and 4 the grooves 54 formed by open returning a double thickness of the covering metal is provided with abutments 60 extending within the grooves 54 which may be made by deforming the double thickness of the metal at spaced locations along the length of the groove 54. As will be understood the grooves 54 are complementary to the tongues 28 and 30 and the abutments 60 are adapted to fit within the bayonet slots 36 with the tongues securely positioned in the grooves to provide a rigid weather-tight joint between the building panel 14 and supporting member 12.

The building panels 14 may be manufactured with the coverings 20 thereon at a factory and shipped to a building site. The supporting members 12 and the coverings 16 and 18 therefor may be individually manufactured and likewise shipped to the building site. Coverings 16, 18 and 20 may be manufactured of any convenient material, such as thin sheets of aluminum or other metal or of plastic. As previously indicated the supporting member 12 may be of wood or other structural material while the closure panels 14 may be of any of the well known composition boards having properties desired in a particular building.

In assembly the covering members 16 and 18 are nailed to the supporting members 12 and the supporting members 12 are positioned as either posts for side walls or rafters for roofs, as shown in FIGURES 1 and 2. It will of course be understood that the supporting members could first be installed in position and the coverings 16 and 18 applied thereto afterwards if so desired. Likewise, as has previously been mentioned, the supporting members 12 may be formed into trusses before they are erected as will be understood by the building trade. With the supporting members 12 in place with the coverings

18 and 16 secured thereto the closure panels 14 having the coverings 20 secured thereto are positioned between adjacent supporting members 12 with the grooves 54 positioned outward of the tongues 28 and 30, as shown in FIGURE 4. The closure panels 14 are then moved toward the supporting members 12 and the abutments 60 fit within the horizontal portion of the bayonet slots 36 when the abutments 60 rest against the side 62 of the bayonet slots. The closure panels are then forced downward so that the abutments 60 are moved into the vertical portion of the bayonet slots 36 whereby the panels and supporting members are secured together. It will be noted that at this time the surface 64 of panels 14 are firmly pressed against the flanges 42 and 44 of the metal covering 18 as shown best in FIGURE 3. The covering members 20 may extend in an offset portion below the closure panels 14 to overlap vertically as shown in FIGURE 5, where it is necessary to provide a plurality of vertically spaced panels to complete a roof or high wall to provide a weather-tight joint between the vertically adjacent closure panels 14.

Thus, according to the invention, there is provided prefabricated building structure which may be manufactured at a factory under controlled conditions to uniform specifications and which may be easily erected in the field by unskilled personnel using the usual tools of a mechanic. Further the building structure disclosed uses light metals and composition board which are modern building materials in such a way as to take advantage of the special properties of each of these materials.

In addition the building structure of the invention may be applied to existing buildings. Thus as shown in FIGURES 5 and 6 the supporting member 12 may be directly attached to the exterior of an existing building such as a roof having roof boards 66 and old roofing material 68 thereon by convenient means such as nails (not shown) in the spaced relationship as shown in FIGURE 1. Metal covering 16 may be applied to the supporting member 12 as indicated previously and closure panels 70 constructed entirely of light metal such as aluminum and extending to the previous building surface, as indicated in FIGURE 6, may be positioned between the supporting members 12 and secured thereto in a tongue and groove connection in combination with the bayonet slots and abutments previously indicated.

Alternatively insulating material, such as closure panels 14, may be secured to the closure panels 70 in the manner previously shown. As shown in FIGURE 5 and as previously indicated the closure panels 70 may be offset as at 72 and overlapped vertically as at 74 to provide weather-tight vertically spaced joints where necessary.

Also, in applying the building structure of the invention to existing buildings the supporting member 12 may be omitted and the ends 78 and 80 of sides 82 and 84 of metal covering 16 may be turned outwardly of sides 82 and 84 at right angles thereto and nailed directly to the existing structure as shown in FIGURE 8. In such construction the closure panels 70 must be made less deep and are provided with a slight offset 86 as will be understood.

It will be understood that the assembly of such structure is accomplished in a manner identical to the assembly of the new prefabricated structures disclosed previously and that the closure panels 70 as with the closure panels 14 must be put in place starting with the lowest panel and proceeding upward to accommodate the vertical overlap of the covering 20 and the panel 70.

Further, while particular embodiments of the invention have been disclosed it will be readily apparent to those skilled in the art that many modifications thereof are possible. It is therefore the intention to include all such modifications within the scope of the invention.

The drawings and the foregoing specification constitute a description of the improved prefabricated building

structure in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. Prefabricated building structure comprising a plurality of laterally spaced vertically extending substantially rectangular posts, a covering material secured to each of said posts extending over one side and a substantial portion of the adjacent sides thereof for substantially the entire length of the posts including an open returned portion extending substantially in the plane of each of said adjacent sides of the posts and beyond said one side of said posts each having spaced apart parallel sides parallel to said adjacent sides and a side connecting said spaced apart parallel sides parallel to said one side forming tongue members for securing panels to said covering material, panels extending between said posts including covering material having U-shaped edge portions providing grooves closely surrounding the tongue members formed in the post covering material and means integral with and operable between the grooves of the panel covering material and the tongue members of the post covering material for securing the post covering material and the panel covering material together in a water tight connection.

2. Structure as claimed in claim 1 wherein said means for securing said covering material together comprises bayonet slots formed in the tongue portions of said post covering material and abutments formed in the U-shaped edge portions of the panel covering material positioned within said bayonet slots.

3. Structure as set forth in claim 1 wherein the portions of the metal covering of the posts which extend along the adjacent sides of the post are returned along said adjacent sides of the post between the portions and adjacent sides toward said one side and one of said portions terminates in a second portion extending across the one side of the post between the post and covering material extending over said one side to provide a double layer of covering over said one side and adjacent sides of said post and thereby improve the weather resistant characteristic of the building structure.

4. Prefabricated building structure comprising a plurality of laterally spaced vertically extending substantially rectangular posts, a covering material secured to each of said posts extending over one side and a substantial portion of the adjacent sides thereof for substantially the entire length of the posts including an open returned portion extending substantially in the plane of each of said adjacent sides of the posts and beyond said one side of said posts each having spaced apart parallel sides parallel to said adjacent sides and a side connecting said spaced apart parallel sides parallel to said one side forming tongue members for securing panels to said covering material,

panels extending between said posts including covering material having U-shaped edge portions providing grooves closely surrounding the tongue members formed in the post covering material, said U-shaped edge portions being formed from a return folded portion of the covering material to be of double thickness, means integral with and operable between the grooves of the panel covering material and the tongue members of the post covering material for securing the post covering material and the panel covering material together in a water tight connection, a flange portion secured to each of the return folded edge portions of the panel covering material extending parallel to and in spaced relation to the general plane of the panel covering material and an insulating material secured to said panel covering material having edge portions with slots therein receiving said flanges.

5. Structure as claimed in claim 4 and further including additional covering material extending over the side of said post opposite said one side thereof and along the said adjacent sides including flange portions extending substantially in the plane of said other side of said post past both adjacent sides thereof engageable with said insulating material.

6. Prefabricated building structure comprising a plurality of laterally spaced vertically extending substantially rectangular posts, a covering material secured to each of said posts extending over one side and a substantial portion of the adjacent sides thereof for substantially the entire length of the posts including a returned portion extending substantially in the plane of each of said adjacent sides of the posts and beyond said one side of said posts each having parallel sides parallel to said adjacent sides and a side connecting said parallel sides parallel to said one side forming tongue members for securing panels to said covering material, panels extending between said posts including covering material having U-shaped edge portions providing grooves closely surrounding the tongue members formed in the post covering material and means integral with and operable between the grooves of the panel covering material and the tongue members of the post covering material for securing the post covering material and the panel covering material together in a water tight connection.

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