Feb. 12, 1946. C. H. LINDSAY 2,394,702

PREFABRICATED BUILDING STRUCTURE

Filed Dec. 23, 1944

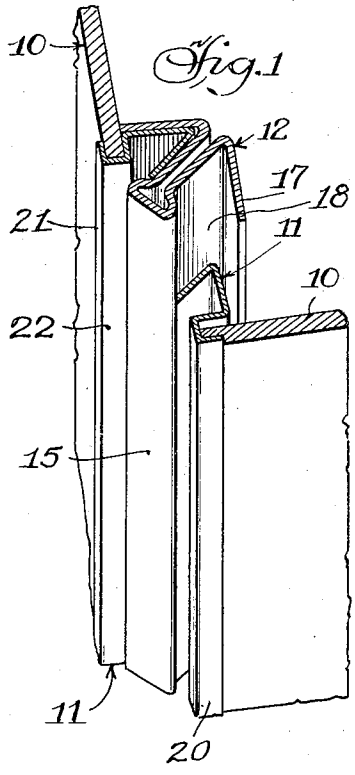


Fig. 1

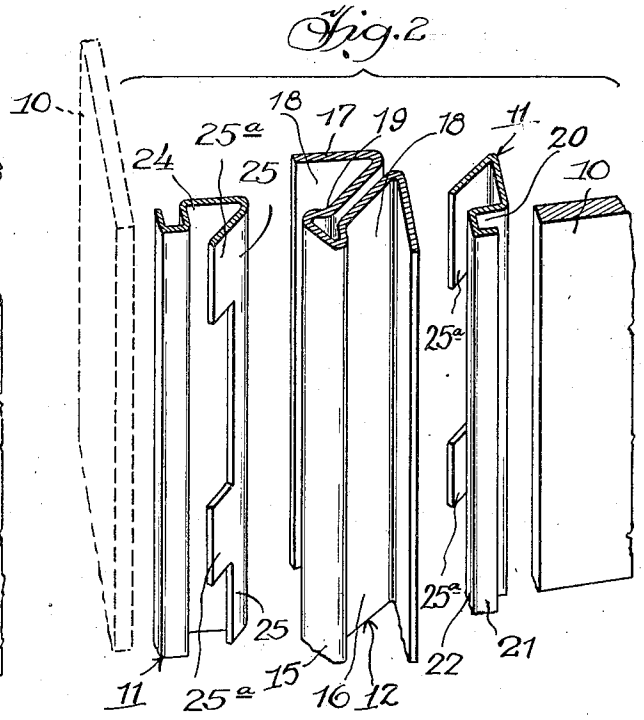


Fig. 2

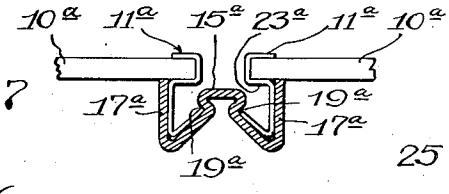


Fig. 7

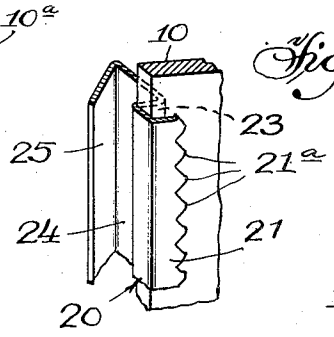


Fig. 6

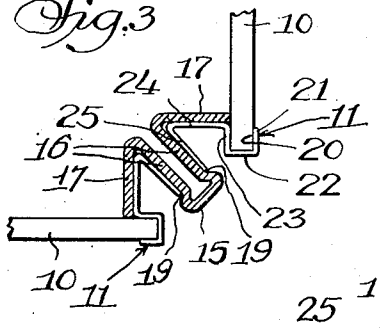


Fig. 3

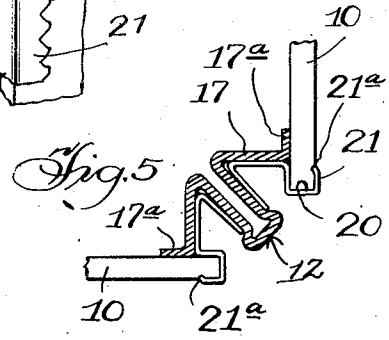


Fig. 5

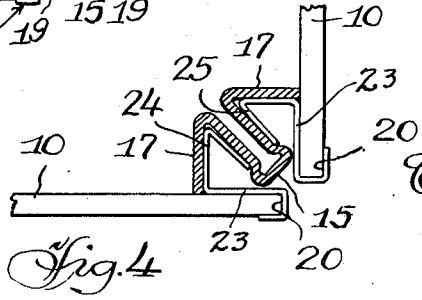


Fig. 4

INVENTOR.
C. Hunter Lindsay,
BY
Clarence F. Poole
Atty.

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UNITED STATES PATENT OFFICE

2,394,702

PREFABRICATED BUILDING STRUCTURE

Charles Hunter Lindsay, Evanston, Ill., assignor to Lindsay & Lindsay, Chicago, Ill., a partnership

Application December 23, 1944, Serial No. 569,485

5 Claims. (Cl. 189—36)

This invention relates to improvements in prefabricated structures of relatively light weight, made of metal frame members and associated parts made of metal or other materials such as fibre composition, plywood, plastics, or the like, adapted for containers, partitions, housing, furniture or similar structures.

More particularly the present invention relates to improvements in the type of prefabricated structure broadly disclosed in U. S. Patent No. 2,364,083 to Harvey B. Lindsay, issued December 5, 1942, in which such structure consists primarily of polygonally disposed frame members having one or more V-shaped grooves therealong and enclosed by relatively thin sheet panel members having flanged margins having interlocking engagement in said grooves.

The principal object of the present invention is to provide a novel form of panel and interlocking marginal structure therefor, whereby the panel body may be made substantially thicker than the marginal flange portion which has interlocking engagement with the frame members, and said panel body may also be made of different materials, such as fibre composition, plywood, plastics, or the like. Other objects will appear from time to time as the following description proceeds.

The invention may best be understood by reference to the accompanying drawing, in which:

Figure 1 is a fragmentary perspective view showing a frame member with two adjacent panel members connected thereto by locking strips, in accordance with the present invention.

Figure 2 is a composite perspective view showing fragmentary portions of a frame member, locking strips and panels before assembly, and showing a locking strip of different form from that illustrated in Figure 1.

Figure 3 is a transverse section showing a frame member with a pair of locking strips and panels in assembled relation thereon.

Figure 4 is a transverse section showing a modified form of locking strip arranged so that the proximate edges of the panel bodies approach each other and partly enclose the frame member at the corner of the structure.

Figure 5 is a transverse section showing another modified structure, especially adapted for use when the panel bodies are made of relatively compressible material, such as fibre, plywood, or the like.

Figure 6 is a fragmentary perspective view of the structure shown in Figure 5; and

Figure 7 is a sectional view showing the invention as applied to a modified form of frame member which may be employed as an intermediate support between two panels disposed in the same plane.

Referring now to the details of the embodiment of my invention illustrated in the drawing, Figures 1, 2 and 3 show my improved form of panel 10 and locking strip 11 as applied to a frame member 12 of the type broadly disclosed in Patent No. 2,364,083 hereinabove referred to. It will be understood that the frame member 12 is adapted to constitute a part of the framework of a complete structure, while the panel 10 and its locking member 11 will be connected to the framework to form a wall of such a structure.

The frame member 12 consists of a length of relatively stiff material, such as sheet metal, which is formed by bending a sheet longitudinally upon itself, so as to provide an enlarged C-shaped head 15, a pair of laterally spaced parallel webs 16, 16 extending inwardly from the opposite inner ends of the head 15, and a pair of reversely bent, outwardly extending webs 17, 17, disposed at equally acute angles to their respective webs 16, 16, the connecting webs 16 and 17 thus forming outwardly opening grooves 18, 18 along the frame member 12 at opposite sides of the head 15. In the form of frame member shown, the two outer webs 17, 17 are disposed substantially at right angles to each other and their connecting webs 16 are arranged at an angle of about 45° thereto.

The C-shaped head 15 forms an overhanging shoulder 19 at the outer end of each of the inner webs 16 of the frame member.

Referring now more particularly to the novel form of panel structure and its locking means, which constitutes the principal feature of the present invention, the panel body 10 consists of a flat sheet of any suitable material, such as metal, fibre composition, plywood, plastic, or the like. The sheet 10 is cut to fit in a U-shaped marginal groove 20 of a locking strip 11. Each locking strip is preferably formed of relatively thin sheet metal, bent to produce an outer flange 21, a cross web 22, and an inner web 23 of the groove 20, and also having a somewhat wider web 24 bent at substantially right angles to the web 23. A terminal or locking web 25 is bent outwardly at an angle of slightly more than 45° from the web 24, as clearly shown in Figure 3.

The webs 24 and 25 of each locking strip are proportioned so as to have snug wedge-fitting engagement in the V-shaped grooves 18 of the frame member 12, with the web 25 along the

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inner web 16 of said frame member, and with its outer or free edge fitting beneath and engaging the overhanging shoulder 19 formed by the C-shaped head 15. As previously stated, the webs 24 and 25 are disposed normally at an angle slightly greater than 45° to each other, so that they can be inserted in the V-shaped groove 18 under moderate pressure, and the outer edge of the web 25 will readily yield and snap into place beneath the overhanging shoulder 19 so as to maintain the locking strip 11 under tension within the groove 18, as shown in Figures 1 and 3.

It will be noted further that the inner web 23 of the U-shaped groove 20 which holds the panel member 10 is bent at right angles to the web 24, and that the latter web is slightly less than the depth of the proximate web 17 of the frame member 12. Thus, when the parts are assembled as in Figure 3, the outer margin of the web 17 will engage the inner face of the panel 10 under a slight pulling tension of the strip 11, to provide mutual support for the several parts.

In the modified form of locking strip shown in Figure 2, portions of the terminal web 25 are cut away so as to leave individual longitudinally spaced fingers 25*a*, 25*a* for providing locking engagement beneath the shoulders 19 of the grooves 18. This alternative form of locking fingers is broadly disclosed in the application for patent, Serial No. 537,142, so need not be more fully described herein.

In assembling the parts shown in Figure 3, the panel 10 may be initially inserted in the U-shaped groove 20 of the locking strip 11, and said locking strip is then snapped into place in the groove 18 of the frame member 12. As an alternative method of assembly, the locking strip 11 may be initially snapped into place in the V-shaped groove 18 and the panel 10 may then be inserted in the U-shaped groove 20, where conditions permit. In either case the outer flange 21 of the U-shaped groove is preferably arranged with respect to the webs 24 and 25 of the locking member 11 so that the edge of the panel 10 will be retained under a holding tension between said flange 21 and the abutting edge of the web 17 of the frame member 12, when the parts are in fully assembled relation.

In the form shown in Figure 3, it will be observed that the U-shaped groove 20 extends only part way across the locking groove 18 in frame 12 when the parts are in fully assembled relation. This arrangement is preferable in many cases where it is desired to disengage the locking strip from the frame member, by insertion of a suitable tool between the shoulder 19 and the outer edge of the locking web 25, or the fingers 25*a*.

The modified form of construction shown in Figure 4 is similar to that shown in Figure 3, excepting that the U-shaped grooves 20, 20 are extended outwardly over the C-shaped head 15. This construction offers the advantage of bringing the marginal edges of the panel members 10, 10 closer to each other along the corner of the structure, but it will be understood that this latter construction is not as readily adapted for disengaging the locking strip from the groove 18 after the parts are once assembled.

In the modified structure shown in Figures 5 and 6, the parts are more especially adapted to a structure in which the panel members 10 are of relatively compressible material, such as fibre composition or plywood. In this form of structure the edges 21*a* of the outer flange 21 of the U-shaped grooves 20 which receive the margins of the panel 10 are serrated and bent inwardly so as to become positively engaged with, or even embedded in the outer face of the panel 10, when practicable. In this form, the outer webs 17 of the frame member 12 may also be flanged outwardly at 17*a* so as to provide a greater bearing surface against the inner face of the panel 10. Thus, when the panel 10 is made of soft material, it will be nevertheless securely held in place when the parts are in assembled position. The inturned serrated margin of the U-shaped groove 20 may be initially embedded in the outer surface of the panel 10 as a means of retaining the locking strip 11 firmly on said panel during shipment, and prior to the application of the panel and the locking member to the frame member 12. Moreover, when the panel member is made of especially soft material, it will be understood that the compression exerted on the outer face of the panel by the serrated edge of the U-shaped groove produced by locking the parts together in their finally assembled form, may itself be sufficient to embed said serrated edge in the panel surface.

Figure 7 shows a modified form of frame member 12*a* which is particularly designed for use as an intermediate cross brace to support two panel sections disposed in the same plane. It will be observed that the intermediate frame member 12*a* has substantially the same general form as the corner frame member 12 shown in the preceding figures, excepting that the inner webs 16*a*, 16*a* are spread apart at an angle of approximately 90° instead of being parallel to each other. When this intermediate type of frame member is used, it will be observed that the panel receiving grooves 20*a*, 20*a* of the associated locking strips 11*a*, 11*a* are disposed at substantially 45° to the inner flanges 24, 24 instead of at an angle of about 90° thereto, as in the case of the forms of locking strips shown in the preceding figures. In either case the panels have wedge-fitting engagement with the frame member 11 or 11*a* by substantially the same interlocking action.

Although I have shown and described certain embodiments of my invention, it will be understood that I do not wish to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a composite structure a frame member, a panel sheet and a locking strip for forming a connection between the edge of said panel and said frame member, said frame member being relatively stiff and having a groove formed therealong with opposed side walls and with a locking shoulder overhanging the edge of said groove farthest removed from the intended position of connection of said panel sheet, said locking strip having two flat flanges formed therealong bent at an acute angle to each other for wedge-fitting engagement in the groove in said member with the free edge of the outermost flange engaged beneath said locking shoulder, and the innermost flange of said locking strip having a groove formed along its outer margin for receiving the margin of said panel sheet in detachably fitting engagement therein, the last named groove being arranged so that the inner face of said panel sheet engages the adjacent outer edge of said

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frame member when said locking strip is retained in the groove of said frame.

2. In a composite structure a frame member, a panel sheet, and a locking strip affording detachable connection between said frame member and said panel sheet, said frame member having a groove formed therealong with opposed side walls with a locking shoulder overhanging the edge of said groove farthest removed from the intended position of said panel sheet, said locking strip having two flat flanges formed therealong having wedge-fitting engagement in the groove in said frame member with the free edge of the outermost flange engaged beneath said locking shoulder so as to secure said locking strip in said groove affording a snap-fitting engagement of said locking strip in said groove, and the innermost flange being bent along a line substantially coincident with the proximate edge of said groove, to form an open groove for receiving the edge of the panel sheet, with the inner face of said panel sheet in engagement with said proximate edge of said first-named groove when said panel sheet and locking strip are in fully assembled relation on said frame member.

3. In a composite structure a frame member, a panel sheet and a locking strip for forming a connection between the edge of said panel and said frame member, said frame member being relatively stiff and having a groove formed therealong with opposed side walls and with a locking shoulder overhanging the edge of said groove farthest removed from the intended position of connection of said panel sheet, said locking strip having two flat flanges formed therealong bent at an acute angle to each other for wedge-fitting engagement in the groove in said member with the free edge of the outermost flange engaged beneath said locking shoulder, and the innermost flange of said locking strip having a groove formed along its outer margin for receiving the margin of said panel sheet in detachably fitting engagement therein, the last named groove being arranged so that the inner face of said panel sheet engages the adjacent outer edge of said frame member under tension of said locking strip when the flanges of the latter are retained in interlocking engagement in the groove of said frame.

4. A composite structure, comprising a panel, a frame member, and a locking strip connecting the edge of said panel and said frame member, said frame member having a groove formed with two opposed side walls, the side wall of the groove farthest from the intended position of the panel having an overhanging shoulder therealong defining with the opposed wall a relatively wide opening for said groove, and said locking strip being provided with two acute angled flanges formed along its margin and having wedge fitting engagement with said groove by the initial insertion of the apex of said flanges and the subsequent engagement of the free edge of the outer flange beneath said shoulder by expanding tension of said flanges, and the inner flange of said locking strip having a groove formed along its margin opening in a direction away from said outer flange for receiving the margin of said panel in detachably fitting engagement therein, the last-named groove being arranged so that the inner face of said panel engages the adjacent outer edge of said frame member under the tension of said locking strip when the flanges of the latter are retained in interlocking engagement in the groove of said frame member.

5. A composite structure comprising a panel, a frame member, and a locking strip for connecting the edge of said panel and frame member, the locking strip having an inner flange extending transversely thereof and an outer flange extending at an angle thereto, said flanges being relatively yieldable, the frame member having an outwardly facing groove, one wall of said groove having an overhanging shoulder engageable by the free end of said outer flange and flexing said outer flange toward said inner flange when the flanges are inserted in the groove, said flanges being at an acute angle to each other when inserted, said shoulder also forming a locking abutment for the free edge of the outer flange and maintaining the inner flange against the opposite wall of the groove when the outer flange is pressed beyond said shoulder, and the inner flange of said locking strip having a groove formed along its margin opening in a direction away from said outer flange for receiving the margin of said panel in detachably fitting engagement therein, the last-named groove being arranged so that the inner face of said panel engages the adjacent outer edge of said frame member under tension of said locking strip when the flanges of the latter are retained in interlocking engagement in the groove of said frame.

C. HUNTER LINDSAY.

4

Certificate of Correction

Patent No. 2,394,702. February 12, 1946.

CHARLES HUNTER LINDSAY

It is hereby certified that the above numbered patent was erroneously issued to "Lindsay & Lindsay, of Chicago, Illinois, a partnership," as assignee of the entire interest therein whereas said patent should have been issued to *The Lindsay Corporation, of Chicago, Illinois, a corporation of Illinois, as assignee by mesne assignments*, as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of June, A. D. 1946.

[SEAL]

LESLIE FRAZER,
First Assistant Commissioner of Patents.

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