

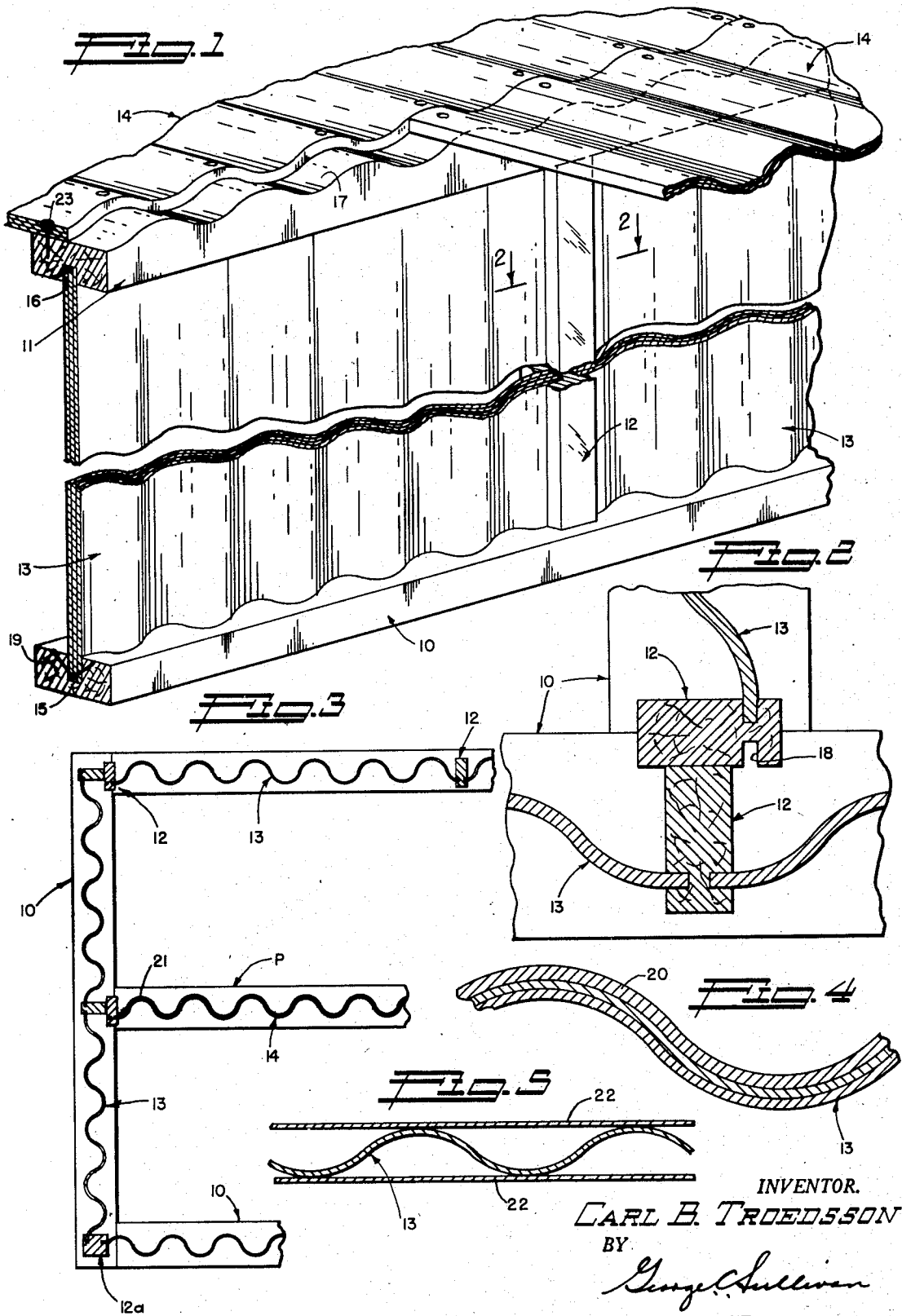
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BUILDING CONSTRUCTION

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BUILDING CONSTRUCTION

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This invention relates to buildings, and relates more particularly to wood buildings or structures fabricated primarily or in part of wood.

In constructing the so-called frame houses and buildings it is the general practice to fabricate the frames for the walls and partitions of multiples of studs, braces, fire blocks, etc., and to employ joists in the floors and ceilings. The studs, joists, etc., are individually cut from wood stock of substantial cross sectional dimensions, and these cutting operations are time consuming and wasteful of material. The studs, joists, braces, etc., are separately nailed in the framework and the constructing of the frame for a simple partition or wall involves many measuring, cutting and nailing operations. When the framework has been erected, both sides of the walls and partitions are provided with lath and plaster, siding, plywood, wallboard or other building material to present the surfaces which are to be finally finished as by painting. Such expensive surface-providing assemblies or materials are not load assuming, but merely present the surfaces for defining the rooms or compartments and in the case of exterior walls, serve to protect the frame against the weather. The fabrication of the frame followed by the application of the surface materials requires considerable skill, is wasteful of building material and is costly.

It is an object of the present invention to provide a building assembly or construction that requires a minimum of material and that may be quickly fabricated or installed by inexperienced workmen.

Another object of the invention is to provide a building construction that necessitates a minimum of framing. In the construction of the invention the surface-providing members may be load bearing and insure a strong, enduring assembly even when the primary framework is reduced to a mere skeleton. This feature provides for great economy in the use of heavy frame members, and materially reduces the measuring, cutting and assembling operations involved in fabricating the frame.

Another object of the invention is to provide a construction of the character referred to which avoids the employment of spaced surface-providing members or assemblies as now commonly found in walls and partitions surfaced by lath and plaster, wallboard siding, etc. The surface presenting elements of the invention provide surfaces on their opposite sides suitable for painting or other finishing to constitute the final surfaces of the structure so that there is no necessity to

erect two surface assemblies for adjacent rooms. The surface presenting elements also constitute load supporting and wrack resisting members so that upright frame elements may be unnecessary at stations between the ends of walls and partitions of moderate length.

Another object of the invention is to provide a construction of the character referred to that is attractive in appearance and that lends itself for use in contoured and ornamental structures.

Another object of the invention is to provide a building construction that is well suited for embodiment in precut and prefabricated structures. The assembly or construction of the invention is such that the various parts may be cut to size at the mill and readily assembled at the building site, and components such as walls, partitions, ceiling and roof sections, etc., may be prefabricated at the mill and shipped to the building site for embodiment in the building.

A further object of the invention is to provide a construction of the character referred to that is well adapted for use in vehicles such as airplanes, trucks, house trailers, ships, etc. The strong, rigid wrack resistant assembly of the invention is useful in truck and trailer bodies and may be built to contour for use as bulkheads, etc., in air and sea craft.

Other objects and features of the invention will be readily understood from the following detailed description of typical preferred forms of the invention wherein reference will be made to the accompanying drawing in which:

Figure 1 is a fragmentary perspective view of an assembly or construction incorporating features of the invention;

Figure 2 is an enlarged fragmentary horizontal sectional view taken substantially as indicated by line 2—2 on Figure 1;

Figure 3 is a reduced fragmentary horizontal sectional view of a building embodying the invention;

Figure 4 is an enlarged fragmentary sectional view of a sheet element of the invention; and

Figure 5 is a fragmentary sectional view of a sheet assembly of the invention.

The invention is capable of extensive variation to adapt it for numerous applications. In the drawing I have illustrated typical structures of the invention, it being understood that these are illustrative examples and are not to be considered as limiting either the scope or application of the invention.

Figures 1 and 2 show the invention embodied in a portion of a structure such as a house, build-

ing, garage, airplane hangar, or the like. This assembly comprises lower and upper frame members 10 and 11, uprights 12, wall or partition sheets 13 carried by the members 10, 11 and 12 and ceiling or roof sheets 14.

The members 10 and 11 and the uprights 12 constitute the frame of the structure. It will be assumed that the members 10 and 11 are integral elements of wood, it being understood that they may be sectional and may be formed of metal or other material. The lower member 10 forms the lower frame element and may serve as a sill. The member 10 may be suitably secured to the floor, foundation, or other supporting means not shown. The lower member 10 is a simple elongate part of substantial cross sectional dimensions. As illustrated, the member 10 is rectangular in cross section and is arranged to have one of its broad faces bear on the support or foundation. The upper longitudinal edges of the member 10 may be beveled, and in practice, the exposed surfaces of the member 10 may be contoured as desired and given any selected finish. A longitudinal channel or groove 15 is provided in the upper surface of the member 10 to receive the lower edge portions of the sheets 13. In accordance with the invention, the groove 15 is corrugated or undulated. The undulations of the groove 15 are uniform and regular and the groove may extend throughout the length of the member 10. The groove 15 is preferably equally spaced between the sides of the member 10 and is of substantial depth.

The upper member or plate 11 is an elongate timber arranged in parallel relation to the sill member 10 to occupy the same vertical plane. The member 11 is supported by the uprights 12 and the sheets 13, and in the construction illustrated, serves to partially support the roof or ceiling sheets 14. The member 11 may be of the same cross sectional dimensions as the sill member 10. Its lower corners may be beveled off and its exposed surfaces may be suitably finished. The lower side of the member 11 has a longitudinal groove 16 to receive the upper edge portions of the sheets 13. The groove 16 is longitudinally waved or undulated in the same manner as the groove 15. The upper and lower members 10 and 11 are related so that the undulations of their respective grooves 15 and 16 are in phase or vertical alignment. The groove 16 may extend throughout the length of the member 11. The upper and lower frame members 10 and 11 may be cut to length from stock previously provided with the grooves 15 and 16. The grooves are easily and inexpensively routed in the stock or members.

Figure 1 illustrates the upper frame member 11 prepared or milled to effectively receive and support the roof or ceiling sheets 14. The upper surface 17 of the member 11 is waved or corrugated, having a continuous series of transversely extending undulations. In the particular construction illustrated, the axes of curvature of the corrugations lie in a common horizontal plane. Where the roof or ceiling is pitched, the axes of curvature of the undulations constituting the surface 17 are correspondingly pitched. The undulated surface 17 extends throughout that portion of the member 11 which carries the roof or ceiling sheets 14. In structures where the roof or ceiling sheets 14 do not rest on the members 11 the upper surface of the members may be flat and plain. In such cases the members 11

may be cut from the same stock as the members 10.

The uprights 12 constitute the vertical elements of the frame. The uprights 12 are provided at the corners of the assembly and at other points where supports or joining elements are required in addition to the sheets 13. The uprights 12 are simple timbers of suitable cross sectional configuration and dimensions. The lower ends of the uprights 12 rest on the lower frame members 10 and the uprights may be fixed to the horizontal frame members 10 and 11 by nails, screws, bolts, dowels, or the like. In the simple construction illustrated, the uprights 12 extend between and are secured to the opposing horizontal surfaces of the members 10 and 11. The uprights 12 are provided with grooves 18 for receiving the vertical edge portions of the sheets 13. As best illustrated in Figure 2 of the drawing, the vertical grooves 18 are provided in opposite sides of the uprights 12 and are offset from the central vertical planes of the uprights. In the assembly shown in Figures 1 and 2, one upright 12 occurs between two adjacent sheets 13 in a single wall or panel to form a joining member and incidentally give the assembly additional strength, and a second upright 12 is provided at one edge of the first upright to receive the edge portion of a sheet 13 embodied in a wall or partition which joins the first wall between its ends. It will be observed that the grooves 18 may be straight.

Figure 3 illustrates the manner in which pairs of abutting connected uprights 12 are provided at the corners of the structure and are provided where a partition P joins or connects with an external wall at a point between its ends. It will be observed from Figure 3 that single uprights 12 may be incorporated in a wall or partition of substantial length to give the partition greater strength and stability. Furthermore, single uprights 12^a of selected cross sectional dimensions may be provided in corners of the structure instead of employing the pairs of connected uprights 12 as illustrated elsewhere. The uprights 12 and 12^a may be cut to the required length from pre-grooved stock. In most cases the uprights 12 and 12^a are of uniform length and of identical cross sectional dimensions so that they may be pre-cut at the mill and merely assembled in the structure at the building site.

The wall and partition sheets 13 are features of the invention. The sheets 13 are corrugated plywood elements. The plywood employed may be of any selected or required thickness and may have any desired number of plies or laminations. The thickness and strength of the sheets 13 depend upon the nature of the assembly and the location of the sheets therein. It is usually preferred to employ corrugated plywood sheets 13 of sufficient thickness and strength to assume all or a substantial portion of the vertical or compression loads as well as other loads imposed on the structure, thus greatly reducing the number of uprights 12 required. In many instances a wall or partition may consist solely of the sheets 13, the upper and lower frame members 10 and 11 and uprights 12 at only the ends of the assembly. Where a wall or partition is of great length, or is to be subject to heavy loads, one or more intermediate uprights 12 may be employed as shown in the top portion of Figure 3. The sheets 13 are corrugated vertically, the corrugations being uniform and extending throughout the lengths of the sheets. The corrugations of the sheets 13 and

the undulated grooves 15 and 16 are such that they mate so that the upper and lower edge portions of the sheets may be fitted in the grooves. Figure 1 shows the edge portions of the sheets 13 engaged in the grooves 15 and 16. The edges of the sheets 13 are made to bottom in the grooves and the grooves are of such width that they snugly receive the sheets.

It will be seen that the engagement of the corrugated sheets 13 in the undulated grooves 15 and 16 positively ties the sheets and the members 10 and 11 together to dependably resist both longitudinal and transverse relative movement. If desired, nails 19 or the like, may be employed to secure the sheets in the grooves and cement or waterproof glue may be used to secure and seal the sheets in the grooves. In the case of outside walls it may be preferred to provide a sealing material in the grooves 15 and 16 and a suitable water repellent glue may serve both as a securing means and a sealing material. The vertical edges of the sheets 13 are engaged in the grooves 18 of the uprights 12. The grooves 18 closely receive the sheets, and the sheets may be sealed and secured therein by nails, glue, sealing material, etc. With the edges of the wall or partition sheets 13 engaged and/or secured in the grooves 15, 16 and 18, the sheets are positively confined in the frame structure. The corrugated sheets secured in the grooves offer a high resistance to deformation in all directions and assure a strong rigid assembly.

It is well known that corrugated sheet metal is employed as a building material. Such corrugated metal is usually merely nailed to the exterior of a frame structure to form a covering or outside wall. The sheet metal is of such thin gauge that it is incapable of assuming any of the loads imposed on the structure. As distinguished from the corrugated sheet metal building material, the corrugated plywood of the present invention constitutes an integral part of the frame or structure and assumes a major portion of all stresses and loads. Furthermore, the plywood sheets engaged and secured in the grooves 15, 16 and 18 may form the primary elements of prefabricated components such as roofs, walls and partitions. The corrugated plywood 13 is preferably such that both of its surfaces are clear and clean, and suited for final finishing as by painting. This eliminates the necessity for providing lath and plaster, wallboard, siding, etc., to surface the walls and partitions. If preferred, standard lengths of the corrugated sheets may be employed, in which case the vertical edges of adjacent sheets are brought into abutment and are maintained in abutting engagement by reason of the cooperation of the sheets with corrugated grooves 15 and 16. Suitable sealing material may be used at such joints. The corrugated plywood sheets 13 may be pre-cut to extend the full distance between the spaced uprights 12, in which case the joints are eliminated.

The wall or partition sheets 13 present surfaces at their opposite sides that may constitute the final surfaces of the walls or partitions. Thus as illustrated in Figure 3 the sheets 13 constitute the walls and partitions, there being no necessity for external siding, shingles, stucco, brick, or the like, and no need for interior plaster, wallboard, etc. In the case of outside walls and roofs, it is preferred to treat at least the outer laminations of the sheets 13 to render them water repellent and weather resistant. In Figure 4 I have shown the outer lamination 20 of a sheet 13 treated with

phenolic resin or the like, to make it waterproof. Where thermal or sound insulation is desired, a layer of suitable insulating material may be provided on one or both surfaces of the sheets 13 as seen at 21. The corrugated sheets 13 are attractive in appearance and are desirable as the final surface-presenting members of the structure. However, in some situations it may be necessary to provide flat vertical wall surfaces. This may be effected by applying flat plywood, wallboard or the like, to the surface or surfaces of the corrugated sheets 13 as shown at 22 in Figure 5. The flat sheets 22 may be suitably secured to the crests of the corrugations in the sheets.

The roof or ceiling sheets 14 may be applied directly to the upper frame members 11. The sheets 14 are corrugated plywood and may be the same as the sheets 13 described above. The corrugations of the sheets 14 conform to the surfaces 17 of the members 11 to evenly bear thereon. The sheets 14 are preferably of sufficient length to extend between the members 11 of opposing walls or partitions. Where the frame members 11 extend longitudinally with respect to the corrugations of the sheets 14, the surfaces 17 are longitudinally corrugated to conform to the sheets. As shown in Figure 1 of the drawing, the members 11 are of sufficient width to receive and support the end portions of sheets 14 which extend across the tops of adjacent rooms or compartments. Nails 23 or other securing means may be used to attach the sheets 14 to the frame members 11. The engagement of the corrugated sheets 14 with the corrugated surfaces 17 assures correct alignment of the sheets and provides good tight joints. Where the sheets 14 constitute the roof of the structure, they are preferably treated to be weather resistant and the joints between their abutting edges are suitably sealed.

It is believed that it will be readily apparent how the elements of the construction may be readily assembled. As above described, the construction lends itself to prefabricated units and to the employment of pre-cut elements. The structure is such that it may be quickly assembled by unskilled labor. The precorrugated plywood sheets engaged in the grooves of the frame members provide for an extremely strong rigid assembly. Following the assembly of the various components, the structure is immediately ready for final finishing or painting.

It is contemplated that the corrugated plywood employed in the structure of the invention may be treated to be fire resistant, weather resistant, vermin and fungi repellent, water repellent, etc., depending upon the particular application or embodiment of the invention. While it is intended that the corrugated sheets are to be primarily of wood, it is apparent that they may be impregnated with other materials such as phenolic resin, chemicals, etc., and may include one or more laminations of plastic material or the like. Accordingly, where the term plywood is employed in the specification and claims, it is to be construed as including such treated and composite laminated sheets. Furthermore, where the term building construction is employed it is to be interpreted as including vehicle structures and assemblies, as well as structures and assemblies of other characters.

Having described only typical forms of the invention I do not wish to be limited to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may ap-

pear to those skilled in the art or fall within the scope of the following claims.

I claim:

1. In a building construction, a pair of vertically spaced one-piece horizontal members having opposing undulated longitudinal grooves formed therein, spaced one-piece vertical members extending between the generally horizontal members and having opposing longitudinal grooves, and a load-assuming vertical corrugated plywood sheet having its upper and lower edge portions inserted into said undulated grooves with its corrugations substantially conforming to the undulations thereof and having its vertical edge portions engaged in the grooves of said generally vertical members.

2. In a construction of the character described, a pair of vertically spaced generally horizontal structural frame members having opposing preformed undulated longitudinal grooves, spaced generally vertical frame members extending between the generally horizontal members and having vertical grooves in their opposite sides, and substantially vertical corrugated load carrying plywood sheets having their vertical edge portions received in said vertical grooves, the corrugations of the sheets extending vertically and the upper and lower edge portions of the sheets being inserted into said undulated grooves with their corrugations conforming to the undulations of the grooves, the upper and lower edges of the sheets bottoming in said undulated grooves so that the sheets may assume compression loads imposed on the structure.

3. In a building construction, spaced upper and lower generally horizontal frame members, the opposing surfaces of the members having undulated longitudinal grooves, vertical frame members extending between the horizontal members and each having a vertical groove in its opposite sides, vertical plywood sheets corrugated vertically and arranged between the horizontal members to have their upper and lower edge portions

engaged in said undulated grooves so that the corrugations mate with the undulations thereof and to have their vertical edge portions engaged in said vertical grooves, and one or more corrugated plywood sheets resting upon the upper frame member, the upper surface of the upper member being contoured to conform to the corrugations of the last named sheets.

4. In a building construction, spaced upper and lower generally horizontal frame members, the opposing surfaces of the members having preformed undulated longitudinal grooves, one or more vertical plywood sheets corrugated vertically and arranged between the members to have their upper and lower edge portions engaged in said grooves so that the corrugations mate with the undulations thereof, the upper surface of the upper member being undulated, and a corrugated plywood ceiling sheet resting on said upper surface with its corrugations conforming thereto.

5. In a building construction, two joined angularly related frames each including spaced upper and lower horizontal frame members, the opposing faces of the members having undulated longitudinal grooves, and vertical frame members extending between the horizontal members and each having a vertical groove in its opposite sides, a vertical corner member extending between the horizontal members of the frames at the point where the angularly related frames join, said corner member having vertical grooves and vertical plywood sheets corrugated vertically and arranged between the horizontal members of said frames to have their upper and lower edge portions engaged in said undulated grooves so that the corrugations mate with the undulations thereof and to have their vertical edge portions engaged in the grooves of said vertical frame members, the sheets in the frames adjacent the point of joinder thereof each having a vertical edge portion engaged in a vertical groove of said corner member.

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