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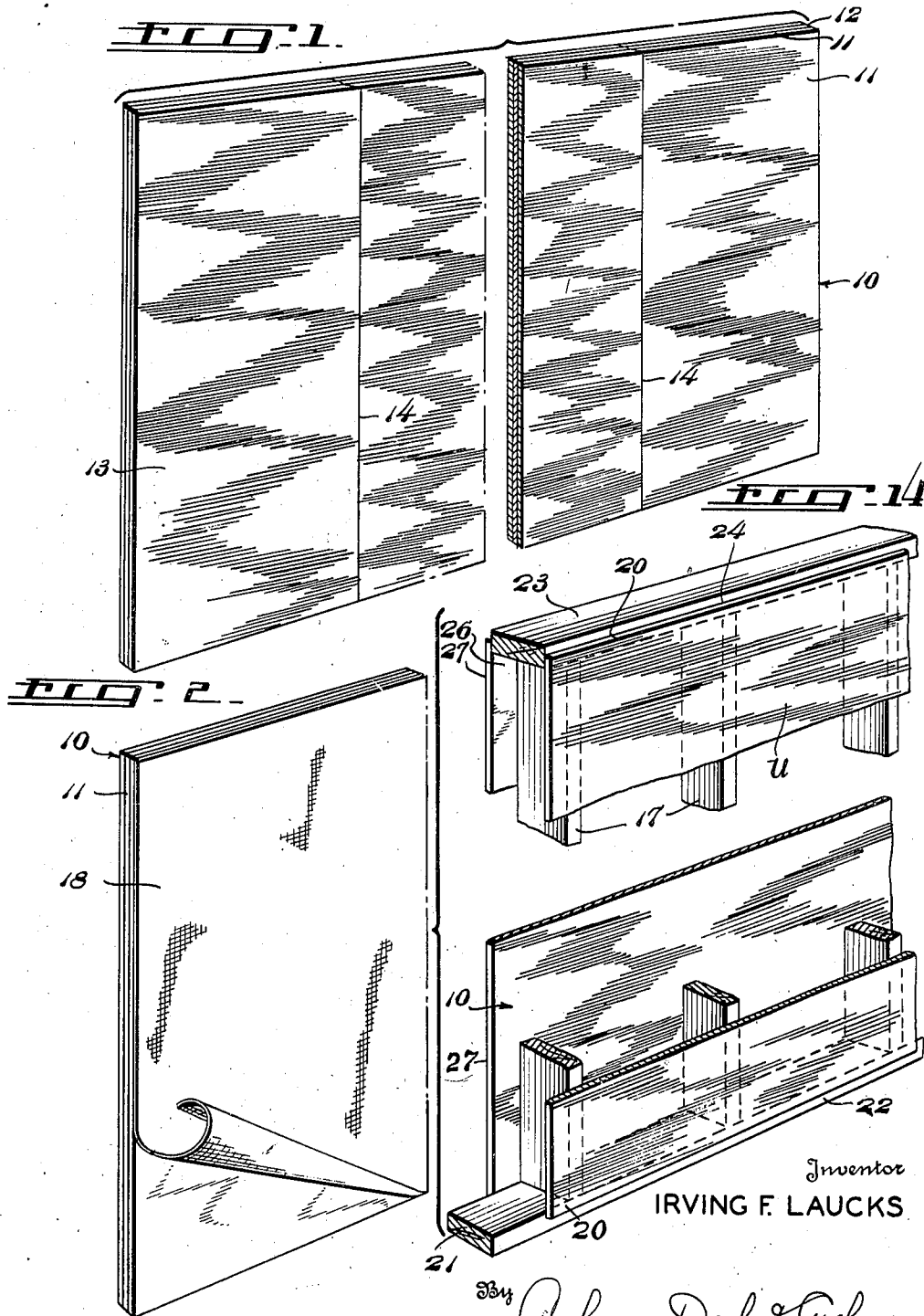
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2,332,732

STRESSED PANEL DOUBLE WALL CONSTRUCTION

Filed Oct. 24, 1942

6 Sheets-Sheet 1



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STRESSED PANEL DOUBLE WALL CONSTRUCTION

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6 Sheets-Sheet 2

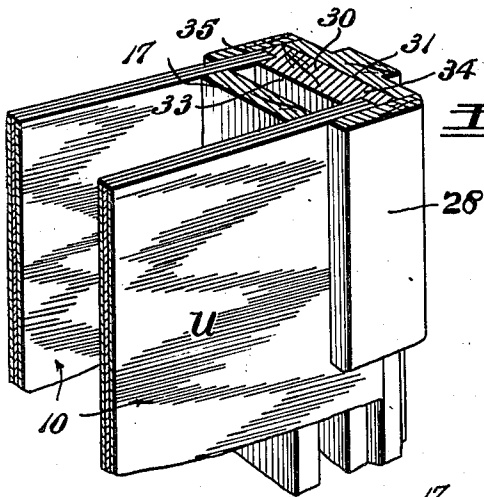
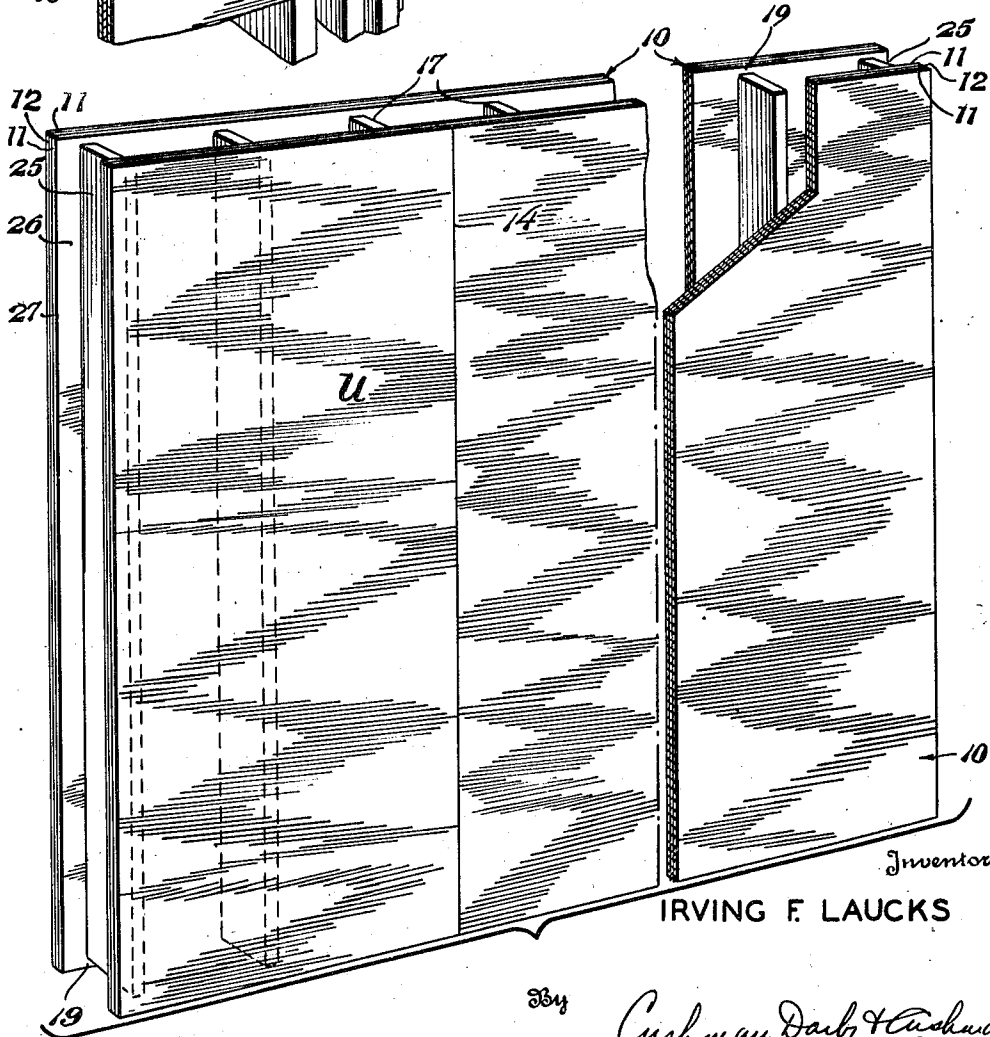


FIG. 15



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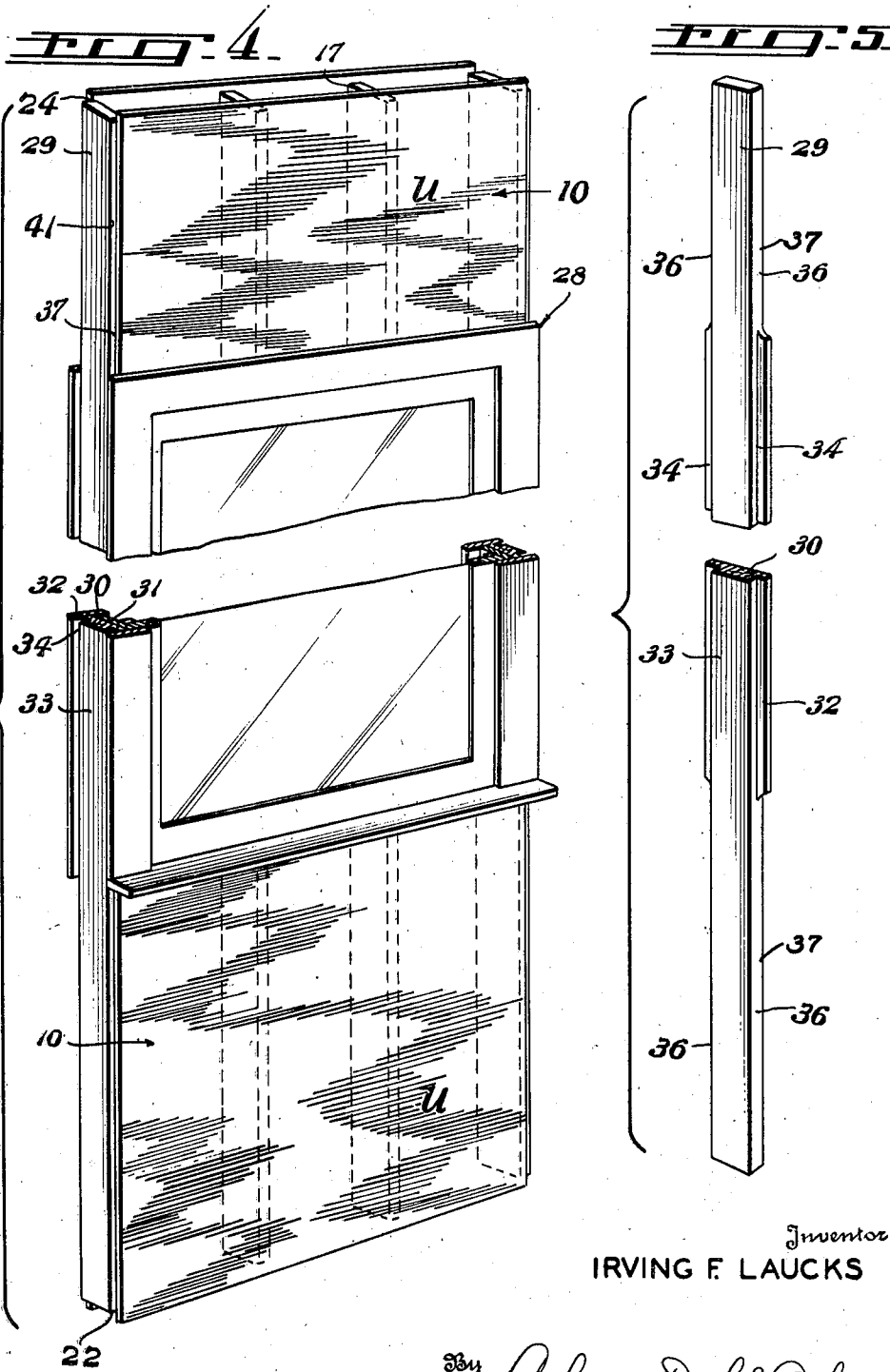
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STRESSED PANEL DOUBLE WALL CONSTRUCTION

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6 Sheets-Sheet 3



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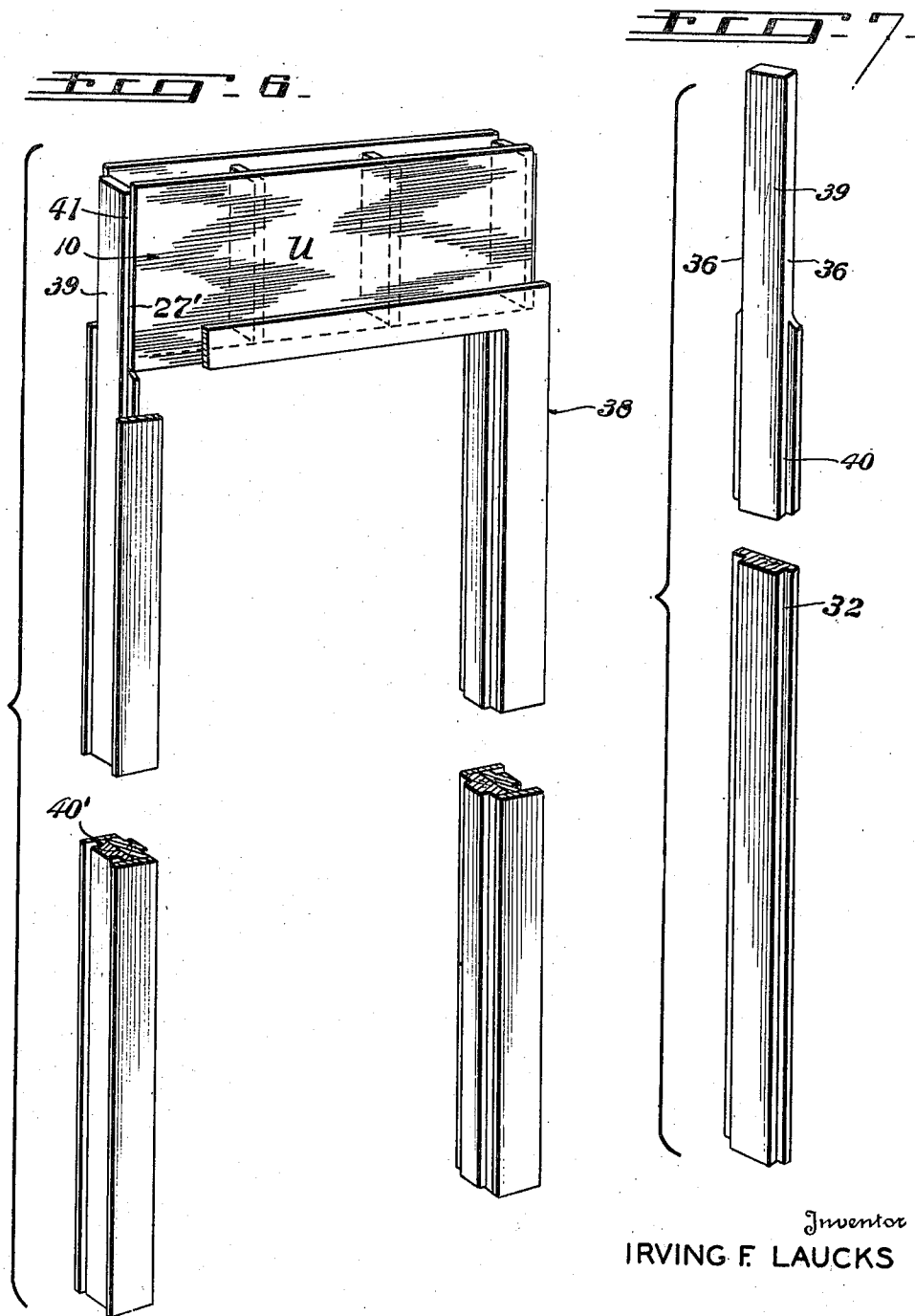
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STRESSED PANEL DOUBLE WALL CONSTRUCTION

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6 Sheets-Sheet 4



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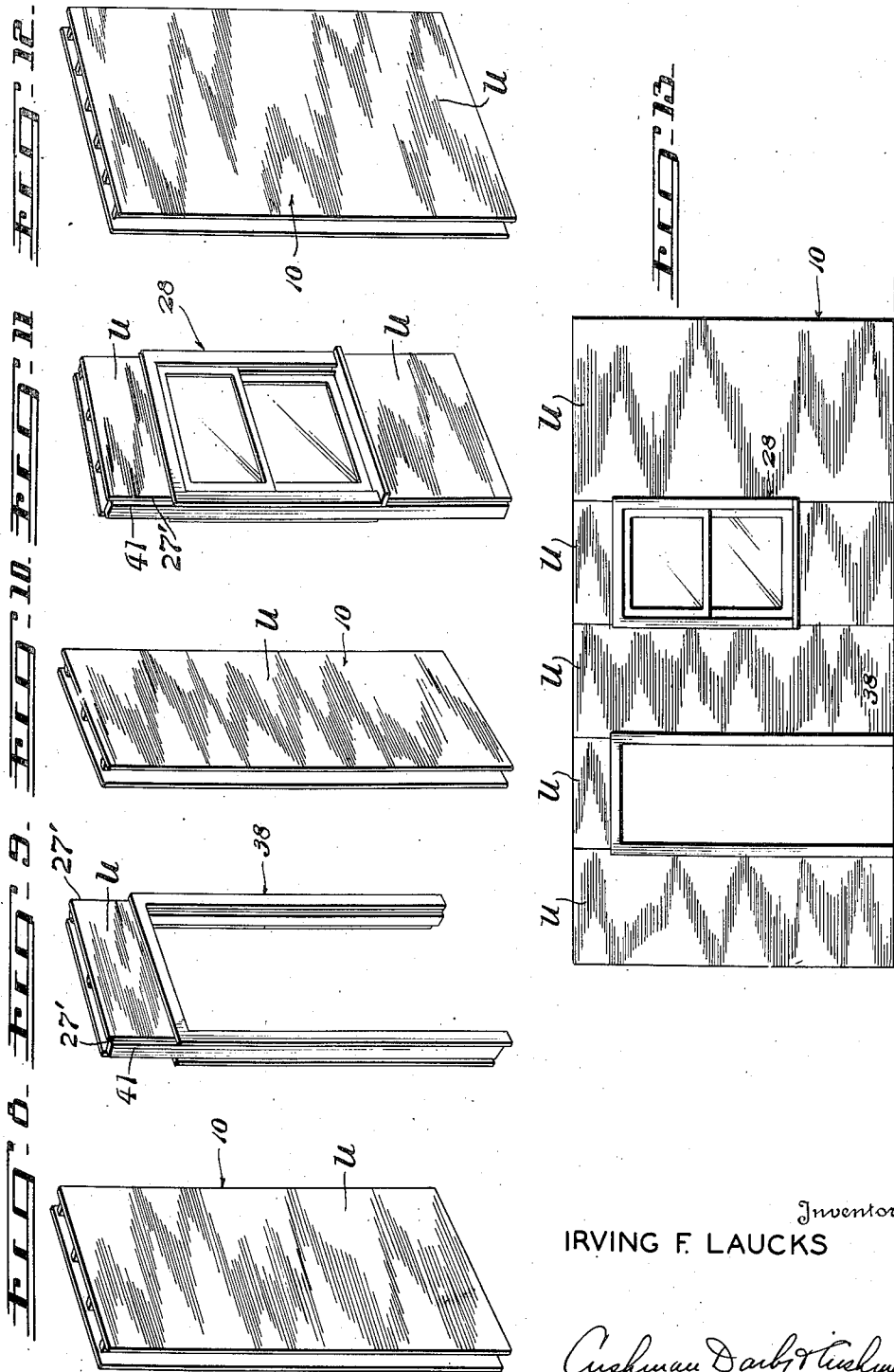
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STRESSED PANEL DOUBLE WALL CONSTRUCTION

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6 Sheets-Sheet 5



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STRESSED PANEL DOUBLE WALL CONSTRUCTION

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FIG. 16.

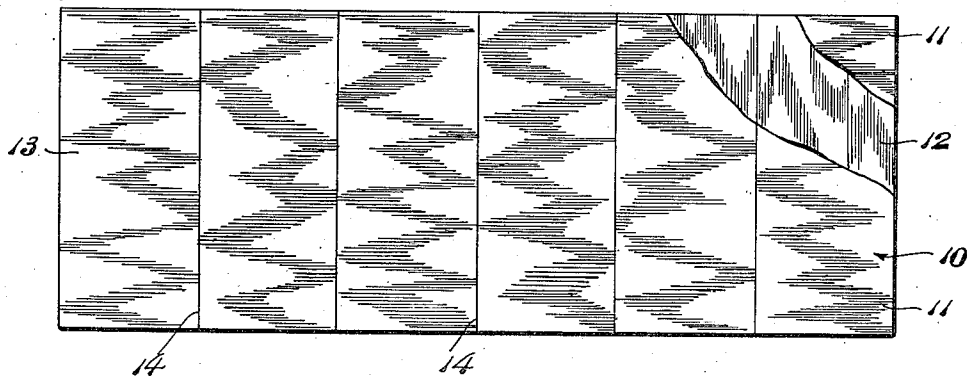


FIG. 17.

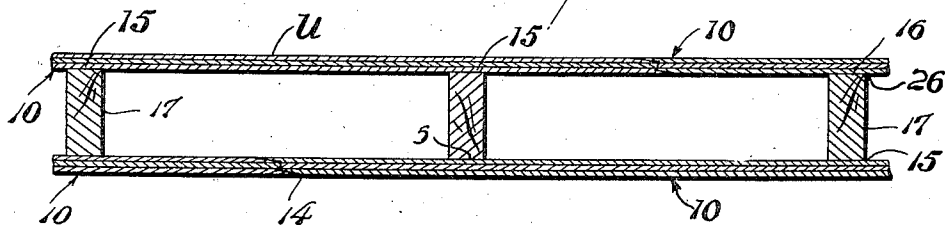
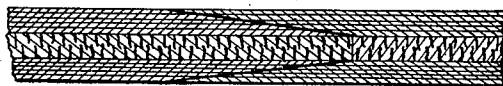


FIG. 18.



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UNITED STATES PATENT OFFICE

2,332,732

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Washington

Application October 24, 1942, Serial No. 463,239

6 Claims. (Cl. 20—4)

The present invention especially relates to improvements in stressed panel construction of prefabricated walls and similar building elements. More specifically, it includes disclosure of three types of new stressed panel double wall units having cooperative features, a new method of assembling walls using these units, and the resulting new type of wall.

The term "stressed panel double wall construction" is used to describe building walls consisting of two surface sheathings of panel material spaced apart by attached studding to form double walls and so constructed as to provide a large area of attachment of the studding to the panels effective to transfer a substantial proportion of the stresses from the studding to the panels while simultaneously supporting the studding against deflection, thus forming a stiff structure similar in function to a box girder or built-up column. While the invention is not limited as to the kind of paneling material, as will be subsequently described, plywood and particularly a novel kind of plywood is considered preferable as the surfacing for the walls as shown and described in copending application, Serial No. 352,014 of Laucks et al., filed August 9, 1940.

In recent years, numerous attempts to develop improvements in house construction have demonstrated the feasibility of replacing lath and plaster with panel or plywood wall sheathing. Success with the panel or plywood construction has also emphasized its adaptability for extending the use of shop prefabrication, thus affording further savings. Many proposals have been directed towards these ends, but, as is usual in a rapidly developing field, some of the proposals have proved disappointing in practice and none has gone so far as seems possible and desirable. The present invention discloses a further advance along these lines which has successfully met the test of extensive practical experience.

In general terms, it makes use of panel or plywood wall sheathing in the place of lath and plaster and particularly permits extensive shop prefabrication with elimination of waste while providing great simplicity in erecting the house walls. The resulting walls are also stiffer, lighter, stronger and more easily decorated than previous constructions and these results are obtained with an important over-all economy. Furthermore, another advantage is obtained not hitherto available in prefabrication, namely, the elimination of hampering restrictions as to the freedom and flexibility of individual design.

Hitherto, freedom in house design as to such

matters as the length of the room walls or the location and dimension of service openings (such as windows and doors) has only been obtainable where wall prefabrication was eliminated and the house completely constructed on the job in the usual way. This restriction is believed to have been a serious obstacle standing in the way of the adoption of prefabricating methods and its elimination is an important advance. Other objects and advantages of the invention will be apparent from the subsequent description.

The invention provides double-faced, stud-supported room walls having service openings as required for windows, doors and the like and formed of the novel wall units, the wall being characterized by the feature that the blank wall portions defined in the space extending from floor to ceiling laterally adjacent the service openings are smoothly continuous without joints or interruptions of surface, while the wall portions defined in the spaces vertically above and below the service openings are preferably of the same construction as the rest of the blank walls and of a width dimension which permits their inclusion in a common frame along with a service opening of any reasonable size. The new method thus includes installing continuous, panel faced, blank wall units from floor to ceiling in the areas between or laterally adjacent to the service openings along with opening units which includes similar panels in the wall areas defined vertically between floor and ceiling above or below the openings. In the case of walls which require no service openings, smoothly continuous walls are also provided. This is all accomplished with shop prefabricated units, either blank wall units or opening units containing any desired service opening. As will be disclosed in the subsequent description, this can be done by the method of the present invention without any hampering limitations as to the location or dimensions of the service openings or as to the length of room walls and this much desired flexibility is obtained without any penalty of wasted material.

Referring now to the accompanying drawings:

Figure 1 shows a plywood wall surfacing panel commonly known by the trade name of "Big Board" and as produced in accordance with the aforementioned application Serial No. 352,014;

Figure 2 shows a "Big Board" panel, the same as shown in Figure 1 except that one surface is covered with a glued-on textile covering;

Figure 3 shows a typical blank wall unit constructed with plywood "Big Board" facing panels

glued or otherwise secured to interposed supporting studs;

Figure 4 shows a typical opening unit including a window.

Figure 5 shows a jamb stud used in making up a window unit;

Figure 6 shows a typical opening unit including a door;

Figure 7 shows a jamb stud used in making up a door unit;

Figures 8, 9, 10, 11 and 12 show respectively adjacent views of a blank wall unit, a door unit, another blank wall unit, a window unit, and another blank wall unit, all the units being dimensioned for successive assembly to make up a typical room wall;

Figure 13 shows the room wall after assembly is completed;

Figure 14 shows details of stud and panel arrangement for floor and ceiling plates;

Figure 15 shows details for tongue and groove interlocking of units at their lateral edges;

Figure 16 is a side elevation of a "Big Board" assembly with parts broken away to show the direction of the grain of the three plies, the "Big Board" being constructed as shown and described in the aforesaid application of Laucks et al., Serial No. 352,014;

Figure 17 is a sectional view of a wall unit showing "Big Board" panels secured to the studding on opposite sides as shown in Figure 3; and

Figure 18 is an enlarged detail sectional view taken along one of the joints for uniting the panels of the "Big Board" as illustrated in the aforesaid pending application.

Referring now to the drawings in detail, and particularly to Figures 1 and 16, the "Big Board" panel is identified as a whole by the reference numeral 10. The width dimension is usually about eight feet to accommodate the ordinary height of room walls and the length dimension as employed in the present invention may be variable but is usually about sixteen feet or more. In the drawings, as best shown in Figure 16, the numeral 11 indicates the face plies and 12 the intermediate ply. The panel is of the customary odd number of plies, usually three ply, and is of indeterminate length when speaking of the panel considered as a whole but has the unique feature that the direction of the grain of the face plies 11 runs in the direction of the long dimension of the large panel as shown in Figures 1 and 16. This long dimension is indeterminate so that individual panels are readily provided cut off to a length dimension equal to the greatest length of any room wall in an ordinary house. The width dimension, again referring to the panel as a whole, is as stated, preferably about eight feet to accommodate the usual height of room walls and it is noted that the direction of the face grain runs transverse the eight foot or height dimension. As described in Serial No. 352,014, these "Big Board" panels are made up from a series of individual panels 13 of normal commercial size as produced by plywood plants having a long dimension of about eight feet and a short dimension of about four feet but are specially made in the plywood mills with the grain of the outer face plies parallel with the short dimension as contrasted with the usual practice in the plywood plants of having the grain of the face plies extend parallel with the long dimension. From these individual panels, the "Big Board" panels are constructed by joining them

together as at 14 along their longest marginal edges with a joint shown best in Figure 18 which unites the terminal fibers of the face plies of one panel to the corresponding fibers of the adjacent panel, the object of this procedure being to produce a "Big Board" which has approximately the strength that it would have if the face plies ran continuously along the face of the board without any breaks. A preferred form of scarfed joint is shown in Figure 18. The lines 14 are imaginary since in the actual panel or facing there is no clear line of demarcation, the grain of the several panels merging into each other at the joint with the only suggestion of a line denoted by the change in the direction of the annular rings.

In the subsequent description, it will be noted that these "Big Board" panels are preferred as the surface facing material of the double wall units shown in Figures 3 and 17. Two boards 10 are securely glued at 15 to the opposite edges 16 of a series of interposed vertical studs 17 as shown in Figures 3 and 17 and in all such instances the exposed grain of the plywood runs parallel with the floor and ceiling and transverse the direction of the studs.

Referring to Figure 2, a similar "Eg Board" 10 produced by the same method described above is shown wherein the outer face ply 11 is covered by a glued-on sheet 18 of textile material. In constructing the double wall units of the invention, either the "bare board" of Figures 1 and 16 without fabric covering or the "cloth board" of Figure 2 with the fabric covering 18 may be used as desired. The fabric-covered board is preferred in many instances for the interior walls of houses because of its ease of decoration, while the bare board may be used for either exterior or interior wall unit facings. In the same way, in constructing the double wall unit, plywood of exterior grade glued with a highly weather-resistant adhesive may be used for the exterior face of the double wall units while plywood glued with a water-resistant glue may be used for the internal face of walls since these faces are not exposed to weather.

Referring to Figure 3, there is shown a double wall unit faced with plywood facing layers 10 spaced apart by interposed studs 17 as used in prefabricating the blank wall unit portions of the house walls constructed according to the present invention. The "Big Board" facing panels 10 are preferably glued to the interposed studs 17 although other suitable securing means may be used. These facing panels are usually three-ply, commonly $\frac{3}{4}$ " in thickness, and a common dimension for the cross section of the studs is $\frac{7}{8}$ " x $2\frac{1}{2}$ ". The facing panels are glued to the opposed narrow edges of the studs so that the studding space is $2\frac{1}{2}$ " thick and the over-all thickness of the double wall unit is approximately $3\frac{1}{4}$ ". The studs are located vertically conveniently on about twelve inch centers and are desirably glued over their entire contacting edge surfaces to the facing panels, preferably with a water-resistant adhesive. It is preferably provided that the studs 17 are somewhat shorter than the dimension of the facing panel which corresponds to the height of the room walls and are glued on to the facing panels in such a manner that the stud ends are recessed back a short distance, usually about one inch, from the top and bottom edges or extremities of the facing panels as shown at 19. The object of this arrangement as shown in Figure 14 is to permit

the projecting edges 20 of the facing panels to straddle a floor plate 21 placed horizontally on the floor but without having the panel edges reach the floor as shown at 22. This arrangement insures that the ends of the studs carry the full weight of the unit since the studs rest on the floor plate 21 as shown in Figure 14. A similar arrangement is preferably used along the ceiling as shown in Figure 14, provision being made by means of a ceiling plate 23 so that the weight of the structure above the studs is also carried on the upper ends of the studs since the ceiling plate rests on the studs, while the upper edges of the facing panels are kept free of any structure above and hence do not carry any direct load on their edges. As shown in Figure 14, the panel has its edge 20 below the top surface of the ceiling plate as shown at 24.

It is to be noted by reference to Figures 3, 14 and 17 that the lateral faces 25 of the outermost studs are also recessed back as shown at 26, a short distance from the lateral extreme edges 27 of the facing panels. This is to provide blank wall units having protruding lateral panel edges 27 adapted to enter corresponding recesses in service units as will be explained subsequently.

From the foregoing it will be noted that integral blank wall units generally designated by the letter U are produced of indeterminate length consisting of the facing layers 10 connected to the studding 17, the facing layers being formed of panels as described with the grain of the external plies 11 extending in the length direction of the unit and transverse to the length direction of the wall height panels. The facings 10 are secured to the studding preferably by gluing and the studs extend parallel to the length direction of the panels with the grain of the outer plies 11 extending transverse the vertical studding. While any suitable joint may be used to unite the panels into a board 10, that shown in Figure 18 is preferred and it is unnecessary for the vertical studding to register with the vertical joints between the panels making up the board 10.

In Figure 4 there is illustrated a typical double wall window unit made according to the present invention to cooperate with adjacent blank wall units as illustrated in Figures 3 and 13. Referring to the drawings, a conventional window frame assembly 28 which may be any desired type of window, such as for example the ordinary double hung window, is secured between two special marginal jamb studs 29 shown in detail in Figure 5 which run from floor to ceiling. These jamb studs may be conveniently run out of ordinary fir stock to a width the same as the total thickness of the double wall units (in this instance, $3\frac{1}{4}$ "'). One of the flat faces 30 of the jamb studs is secured to the outer edges 31 of the styles of the window frame as shown in Figure 4 as by gluing or in any suitable manner. The opposite edge is conveniently rabbeted at 32 to form a protruding face or tongue 33 equal in width to the studding spaces (in this case, $2\frac{5}{8}$ "') and to leave at the extremities two rabbeted grooves 34 having a length coextensive with the window frame. These grooves are each dimensioned to form with the window frame recesses for receiving projecting portions 27 of the facing panels 10 of adjacent wall units as best shown at 35 in Figure 15. The grooves 34 extend along those portions of the two jamb studs which laterally abut the window frame, but in the remaining portions of the studs extending

above and below the window frame, both edges of the stud 29 are cut away entirely as at 36 so that the jamb stud width above and below the window frame is the same as the depth of the wall opening and tongue 33 (in this instance, $2\frac{5}{8}$ "') and the edge faces 37 of the jamb stud provide a flat surfaced support for the projecting edges 27 of the wall panels to which they may be glued.

Further, referring to Figure 4, above and below the window frame 28 proper are located portions of double wall units U equal to the desired blank wall space between the floor and the bottom of the window and between the top of the window and the ceiling. These comprise the usual facing panels 10 and studs 17 as shown in Figure 3 and are placed with their studs in the vertical position. Thus, all the elements of the window unit, including the window assembly 28 and the blank wall sections, are secured into a common frame by means of the two marginal jamb studs 29 enclosing the frame to which the window and blank wall units are secured. It is to be noted also that, as with the blank wall unit shown in Figure 3, the ends of the studs 17 and jamb studs 29 are provided recessed back about one inch from the top extremities of the facing panels 10 as shown at 22-24 so as to free the facing panels 10 from carrying any load on their edges.

Referring to Figures 6 and 13 there is illustrated a typical door unit made according to the present invention. It will be noted that this is very similar in its design to the window unit illustrated in Figures 4 and 5. A door frame 38 which may be of any suitable design as to width and height, is enclosed between two jamb studs 39 which run from floor to ceiling. These are identical in section with the jamb studs 29 illustrated in Figure 5 and perform the same functions of enclosing the frame 38, of providing grooves 40 for engagement of the projecting panel edges 27, of adjacent cooperating double wall units U, and of securing to the assembly a blank wall unit section U dimensioned to fill the space between the top of the door and the ceiling as shown in Figure 6. Also, as in the window units, the jamb studs 39 and the studs 17 of the blank wall unit are arranged to be recessed back about one inch at the floor and ceiling lines respectively to engage the horizontal floor and ceiling plates 21 and 23 so that the weight of the unit is carried on the studs. The upper portions of the jamb studs 39 are also cut away to the full depth of the rabbeted grooves 40 as in Figure 5 so as to provide supports for the margins of the panels of the top blank wall section U above the door and also the margins 27 of the facing panels of blank wall units adjacent the door.

Referring to Figures 8 to 13, there is illustrated respectively and successively a blank wall unit, a door unit, another blank wall unit, a window unit and a third blank wall unit. These are shown in successive location in the drawings to illustrate their cooperation in constructing a typical room wall as shown in Figure 13. As previously described, rabbeted grooves 34-40 provided on the jamb studs 39 of the door unit shown in Figure 6 and the window unit shown in Figure 4 provide engagement for the laterally projecting edges 27 of the wall panels 10 on the blank wall units U. In Figure 13, the same units are shown assembled in place to provide a complete room wall having one window and one door.

The wall illustrated in Figure 13 and comprising two openings, namely, the window 28 and door 38 is smooth and continuous since the projecting margins 27 of the panels have a registering fit within the recesses 35 and 40' provided by the respective jamb studs, and the wall units above and below the window 28 and above the door 38 are so constructed that the facing layers 10 terminate short of the thickness of the jamb studs as illustrated at 41 in Figures 4, 6, 9 and 11 whereby the projecting edges 27 of the wall units engage over the exposed edge portions of the jamb studs and abut the terminal edges 27' of the units above and below the wall openings.

In Figure 14 there is illustrated the preferred arrangement of the ends of the normal studs 17 and, in Figures 4 and 6, i. e., in the case of an opening unit, of the jamb studs 29 and 39 whereby the top and bottom extremities of the facing panels 10 are permitted to straddle the floor plate 21 at the bottom of the wall and the ceiling plate 23 at the top of the wall. It is noted that the floor plate 21 and the ceiling plate 23 are thicker than the amount which the ends of the studs 17 or, if they are present, jamb studs 29—39 are recessed back from the top and bottom extremities of the facing panels while the width of the floor plate 21 and the ceiling plate 23 is equal to the width of the stud space in the double wall unit. It is thus seen that it is impossible for the extremities of facing panels 10 to contact either the floor or ceiling and consequently none of the weight of the building structure is carried directly on the edges of the facing panels of the units. What weight is carried by the facing panels is directly supported by the studs and since each unit consists of facing panels 10 securely glued to the studs 17 or the studs 29—39, the stresses applied are transmitted through the studs which act as stress distributors. This arrangement frees the facing panels from any concentration of stress such as would be likely to cause them to warp or buckle.

In Figure 15, there is illustrated the operation of the tongue and groove arrangement for interlocking blank wall units U illustrated by Figures 14 and 17 in cooperation with adjacent opening units as illustrated in Figure 4 or 6. The interlocking action shown in Figure 15 is a view of a section taken horizontally parallel to the floor line through contacting sections of a blank wall unit and adjacent window or door frame. The numeral 10 indicates the facing panels of the blank wall unit and the numeral 17 indicates one of its lateral supporting studs. It is noted that the stud 17 is recessed back from the projecting ends of the facing panels and these projecting ends 27 enter rabbeted grooves 34—40 in the face of either the jamb stud 29 which is attached to the adjacent parts of the window frame 28 or jamb stud 39 associated with the door frame 38 as the case may be. This arrangement permits a convenient method of assembly with an interlocking engagement between the adjacent units. If desired in assembling the units, the engaged portions may be supplied with glue, or they may be nailed together, or in some instances they may be left unattached to each other if it is desired to make the wall demountable at some subsequent date.

Important advantages of the invention are found in connection with the prefabrication of the walls of dwelling houses and similar structures. The method of operation may be exemplified as follows: Materials are assembled in the

prefabricating shop. The material for the two external face surfaces of the wall is preferably provided in the form of large sheets of suitable paneling having one dimension equivalent to the height dimension of ordinary house walls (usually about eight feet) and another dimension equivalent to the greatest wall length of a fairly long room (for example, sixteen feet). The paneling material may be of the usual thickness for wall covering, conveniently about $\frac{1}{8}$ inch. Preferably, one piece plywood panels of these dimensions are obtained, although other materials, such as various types of composition wall boards, may also be used in some instances. In the case of plywood, the usual three-ply material of wall board grade may be used and this material may be provided with the direction of the wood grain in the faces running either approximately parallel with the eight foot dimension of the large panels or transverse the eight foot dimension of the component panels. However, for best results, it is highly desirable to use plywood wall board having face grain running transverse the eight foot dimension so that when the panels, after attachment to their supporting studding, are erect as covers for walls of eight foot height, the face grain of the outer plies will run parallel to the direction of the floor and ceiling lines and transverse the direction of the vertical supporting studs. Large panels of this type, now known in the trade as "Big Board," are commercially available, their method of manufacture and properties being described in detail in the aforementioned copending application, Serial No. 352,014.

Having provided, for example, a supply of "Big Board" panels which may be conveniently 8' x 16' x $\frac{1}{8}$ ", a supply of special studding is also prepared. This stock may be run from ordinary fir lumber and is desirably cut to a rectangular cross section of $\frac{7}{8}$ " x 2 $\frac{5}{8}$ " and is conveniently supplied in one standard length cut about two inches shorter than eight feet. From these materials, a large supply of integral blank wall units, as illustrated in Figure 3, are fabricated, using the "Big Board" faces 10 in the full sixteen foot length and supplying interposed vertical studding 17 which may be conveniently located on about twelve inch centers. For best results, it is desirable to use a water-resistant glue and glue the entire $\frac{7}{8}$ " edge of the studs to the face panels.

A convenient method of fabricating these assemblies is to glue them up in a hot press. As indicated in Figure 3, the studs are about two inches short of the eight foot dimension of the panels and they are located symmetrically between the panel faces so that their ends are recessed back from the top and bottom edges of the panels about one inch. The resulting prefabricated panel faced double wall units U according to the method of the present invention, constitute the raw material or stock units from which all the blank wall portions of the house walls are constructed.

For specific house jobs, as they come in, these large stock blank wall units are cut up into longitudinal sections of the same area as the vertical portions of walls, or entire room walls, which are free from service openings. In the case of the portions of walls which have service openings, the sections of these blank wall units are cut to fit the spaces from the corners of the room to the nearest lateral edge of any service opening and also to fit the spaces between the lateral

edges of two service openings. Smaller portions of these blank wall units may also be cut to fill the areas of blank walls vertically above doors and vertically above and below windows. Thus wall height sections of blank wall units are provided for all the blank wall areas of the house.

The wall opening units are made up as follows: the small blank wall sections required to fill out the blank wall spaces above doors and above and below windows are fabricated into a frame along with the window or door, as the case may be, by means of special marginal jamb studs as illustrated in Figure 4 for a window unit and Figure 6 for a door unit.

As previously described, it will be noted that all of the wall height blank wall units are cut from the stock units in such a manner that a lateral i. e., an edge stud is not allowed to come out flush with the lateral panel edges. This merely calls for the exercise of a little care in cutting so that all blank wall units are cut out with the lateral edges of their facing panels projecting at least one inch beyond the lateral face of the nearest stud. These projecting edges in the blank wall units consequently become available to function as tongues adapted to cooperate with corresponding grooves cut in the lateral faces of the jamb studs of the window and door units as above described. It is noted that the marginal jamb studs along the side edges of the window or door, as the case may be, are provided with rabbeted grooves dimensioned to receive the projecting panel edges of the adjacent blank wall units. It will be noted also, however, that this groove only extends along the vertical height of the actual door or window frame while the portion of the jamb stud which projects above a door (or in the case of a window, which projects above and below the window) is machined off across the whole face to the full depth of the groove. In constructing the opening units, the previously mentioned small sections of blank wall units which are preferably cut to fill the area of the opening are fitted in their proper positions with their included supporting studs in vertical position and secured in place with their panel edges overlapping about half-way on the edge of each of the two marginal jamb studs.

The lateral edges of the blank wall units and opening units are thus arranged cooperatively so that when a blank wall unit is brought up into position adjacent to an opening unit, its panel edges fit into the rabbeted grooves along the sides of the window or door casing and abut the corresponding lateral edges of the small blank wall sections above the door and above and below the window, this abutment coming on the face of the routed-off portion of the jamb studs.

With these arrangements, it will be seen that it is a very simple matter upon receiving an order for house walls to prepare from the stock blank wall units and from conventional door and window frames a series of blank wall units and a cooperating series of opening units so that complete walls with the desired openings are provided and the openings are located exactly according to the preference of the builder or architect. The locations and dimensions of the openings present no problems and it is equally convenient and economical to make up the necessary units regardless of the chosen location. Extensive experience with this new method of prefabrication has shown that it is remarkably economical as to both labor and material. The

cutting waste, for example, is readily held below two per cent.

It will be noted that the principles of this invention, so far as the fabrication of desired walls is concerned, will work well with any preferred form of surface paneling regardless of whether it is, for example, artificial composition board of any type that can be readily cut and glued to studding or whether it is plywood with the face grain running either vertically or horizontally. In any case, the glued-up double wall units have many of the desirable characteristics of a box girder since an adhesive union is provided between the paneling and the entire exposed surface of the stud edges so that the panels constitute a diagonal bracing effect to the stud-ding and absorb stresses received therefrom. As has previously been recognized, this provides a wall of considerably greater stiffness than if the panels were merely nailed to the studs. This additional stiffness is largely due to the glued construction which enormously increases the area of attachment as compared to the relatively very small cross-sectional area of attachment obtained with nailed construction.

By controlling the grain direction of the fibers of the outer plies of the plywood further advantages can be gained. If plywood is used for the wall surfacing and the grain of the face plies runs parallel to the eight foot dimension (i. e., vertically up and down the face of the wall as has been the practice hitherto in the use of plywood wall board in house construction) a fairly strong wall is produced, but it is noted that the wall is not particularly stiff against pressure in the unsupported spaces between two studs. The panels are easily deflected inward by pressure so that adequate stiffness in that case is either not obtained or else requires thicker plywood or greater area of stud support than is required when the preferred method of the present invention is employed. Thus, if the "Big Board" described in S. N. 352,014, is used for the wall surfacing, the direction of the face grain is reversed so that the grain of all the face plies runs transverse the studs. In this instance, a great gain in strength and stiffness is obtained without the provision of any added material. With this construction, the tensile strength of the face grain fibers running transverse the studs offers a strong resistance to inward or outward deflection of the walls between the stud locations. The stiffness and strength of such a wall becomes fully adequate to give equal satisfaction in that respect as compared to lath and plaster walls. Due to this important gain, it is of course very desirable in practicing the present invention to surface the wall units with the "Big Boards" described in S. N. 352,014.

The present invention is a radically new departure in the field of prefabrication. Comparison with existing methods reveals important advantages. Hitherto, most prefabrication has been done by one of two methods. In one method, which may be defined as the "modulus system," the walls are made up out of a series of interchangeable units of standard width, usually about four feet. Blank wall units of this width are provided and also door units and window units of exactly the same width. These four foot units can then be used interchangeably as required, and of course they can be uniformly prefabricated in a shop and kept in stock, and can also be erected fairly quickly. However, in the modulus system, numerous field joints involving consider-

able expense become necessary since a single unit only covers for example four feet of wall. Also, field joints occurring every four feet require some sort of covering or concealment, and, with the joints so numerous, it is impractical to provide unbroken wall surfaces free from battens or other conspicuous joint coverings. To obtain economy in prefabrication, the modulus chosen must be rigidly adhered to so that the total length of walls and the location and width of all openings must conform exactly to the modulus dimension. Thus, the modulus system requires an excessive number of field joints and imposes rigid dimensional restrictions on house design. The numerous joints between the units also tend to weaken the wall and the complete supporting frame needed for each unit adds objectionable weight and consumes unnecessary material.

Another system of prefabrication, which may be called the "cut-out system," consists of providing either on the job or in the shop the framing for an entire wall, including framing around the desired openings, and then covering the framing with single large surfacing panels from which the areas of any service openings are cut out either before or after erecting. This system, of course, involves serious waste of surfacing board lost by cutting out the openings, and it fails to provide the desirable extensive use of prefabrication available in the system of the present invention.

Thus, it will be noted that the method of the present invention has outstanding advantages over both of these other systems. As compared to the modulus system, the present invention greatly reduces the number of field joints. Many walls have no joints at all, and where there are windows or doors, fewer joints are required than if a rigid modulus had to be adhered to, and for, example, a field joint made every four feet.

I claim:

1. A prefabricated wall unit comprising a pair of substantially parallel panels of wall height secured to and spaced apart by at least two studs, the studs terminating short of the top and bottom edges of the panels, the panels being thin facings of structurally strong material of substantially similar properties with respect to contraction and expansion and the spaces between the studs being open at both ends and from end to end, all of said studs being disposed inwardly with respect to the lateral edges of the panels so as to provide longitudinal recesses between said lateral edges.

2. A prefabricated wall unit comprising a pair of substantially parallel panels at least one of which is made of plywood, said panels being of wall height secured to and spaced apart by at least two wooden studs, the studs terminating short of the top and bottom edges of the panels, the panels being thin facings of structurally strong material of substantially similar properties with respect to contraction and expansion and the spaces between the studs being open at both ends and from end to end, all of said studs being disposed inwardly with respect to the lateral edges of the panels so as to provide longitudinal recesses between said lateral edges.

3. A prefabricated wall unit comprising a frame for a door or window and comprehending the vertical distance between a floor and ceiling and a lateral distance substantially equal to the width of the door or window frame, said unit being laterally enclosed between two marginal jamb

studs extending from floor to ceiling and having its blank wall area above a door or above and below a window and defined by said jamb studs filled by prefabricated units each comprising a pair of substantially parallel panels secured to and spaced apart by at least two studs, the studs terminating short of the top and bottom edges of the panels, the panels being thin facings of structurally strong material of substantially similar properties with respect to contraction and expansion and the spaces between the studs being open at both ends and from end to end, all of said studs being disposed inwardly with respect to the lateral edges of the panels so as to provide longitudinal recesses between said lateral edges, the adjacent edges of the marginal jamb studs being received in said recesses and the adjacent lateral edges of the facing panels being attached to the said adjacent edges of the jamb studs.

4. A prefabricated room wall comprising at least one opening containing wall unit as described in claim 3 and at least one blank wall unit comprising a pair of substantially parallel panels of wall height secured to and spaced apart by at least two studs, the studs terminating short of the top and bottom edges of the panels, the panels being thin facings of structurally strong material of substantially similar properties with respect to contraction and expansion and the spaces between the studs being open at both ends and from end to end, all of said studs being disposed inwardly with respect to the lateral edges of the panels so as to provide longitudinal recesses between said lateral edges, the jamb studs of the opening containing unit being each provided with an outwardly projecting tongue portion running from floor to ceiling, said tongue portions having a width equal to that of the longitudinal recesses between the lateral edges of the blank wall units, at least one of said tongue portions being received in the longitudinal recess of an adjacent blank wall unit with the said lateral edges of the blank wall unit defining said recess attached to the adjacent edges of the jamb stud.

5. The method of constructing a room wall from prefabricated units comprising constructing at least one opening containing wall unit as described in claim 3 and at least one blank wall unit comprising a pair of substantially parallel panels of wall height secured to and spaced apart by at least two studs, the studs terminating short of the top and bottom edges of the panels, the panels being thin facings of structurally strong material of substantially similar properties with respect to contraction and expansion and the spaces between the studs being open at both ends and from end to end, all of said studs being disposed inwardly with respect to the lateral edges of the panels so as to provide longitudinal recesses between said lateral edges, forming the jamb studs of the opening containing wall unit with outwardly projecting tongue portions running from floor to ceiling, and connecting said units into a wall by inserting at least one tongue portion into the longitudinal recess between the lateral edges of an adjacent blank wall unit and attaching said lateral edges to the adjacent edges of the tongue portion.

6. The method of constructing a room wall from prefabricated units comprising constructing at least one opening containing wall unit as described in claim 3 and at least one blank wall unit comprising a pair of substantially parallel

panels of wall height secured to and spaced apart by at least two studs, the studs terminating short of the top and bottom edges of the panels, the panels being thin facings of structurally strong material of substantially similar properties with respect to contraction and expansion and the spaces between the studs being open at both ends and from end to end, all of said studs being disposed inwardly with respect to the lateral edges of the panels so as to provide longitudinal recesses between said lateral edges, forming the jamb studs of the opening containing wall unit with outwardly projecting tongue portions run-

ning from floor to ceiling, connecting said units into a wall by inserting at least one tongue portion into the longitudinal recess between the lateral edges of an adjacent blank wall unit and attaching said lateral edges to the adjacent edges of the tongue portion, and inserting floor and ceiling plates in the recesses of the top and bottom edges of the units so that the plates engage the studs for supporting the units, said last mentioned recesses being formed by having the studs terminate short of the top and bottom edges of the panels of the units.

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