Nov. 24, 1953 W. H. CROWTHER 2,659,938

BUILDING PANEL AND CONSTRUCTION

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Fig. 1

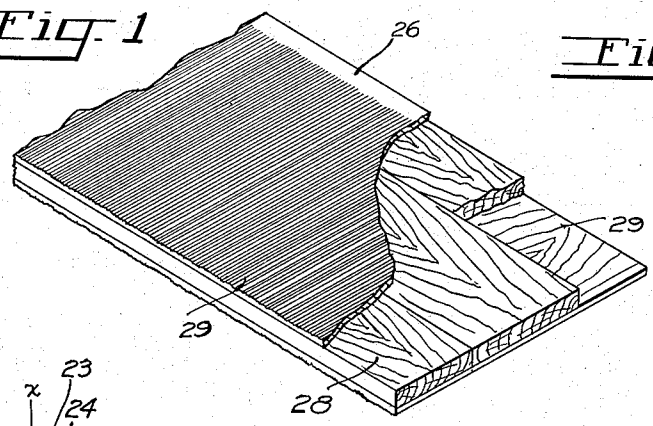


Fig. 4

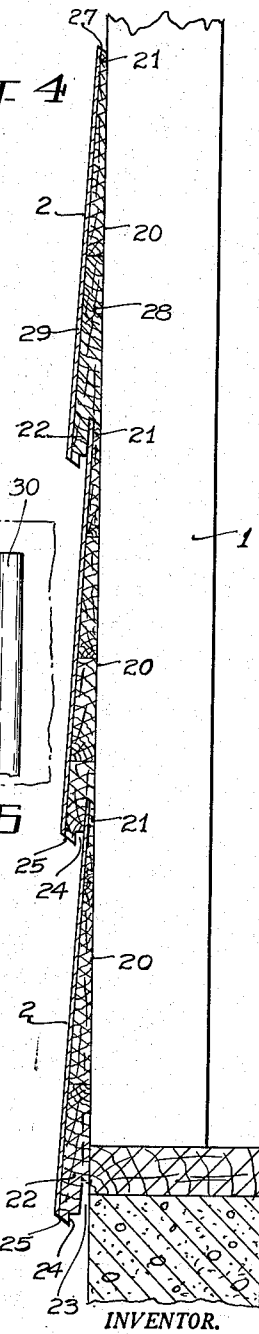
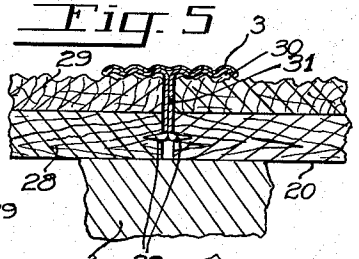


Fig. 5



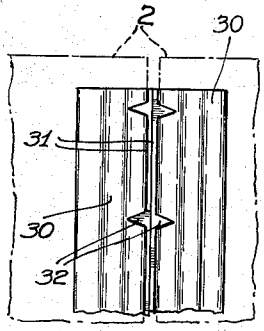


Fig. 6

Fig. 3

Fig. 2

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BUILDING PANEL AND CONSTRUCTION

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1 Claim. (Cl. 20—5)

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This invention relates to panels to be utilized in building construction, and which are particularly adapted for sidewall and roof construction.

A primary object of my panel construction is to utilize a minimum of clear lumber, which is becoming progressively more scarce and valuable, and to combine such lumber with low-grade or scrap material or lumber. In fabricating such a panel generally conventional manufacturing processes may be employed.

Despite the saving in cost of material required for my panel it nevertheless is very durable and rugged, while at the same time it is of attractive appearance.

A further important object of my invention is to construct the panel so that such panels alone may be used in place of the conventional sheathing and surfacing construction usually employed in wall and roof construction. Further economy results from application of the panels to a wall or roof with a minimum of overlap, while producing a firm wall with tight joints, and having a weather-tight exterior surface and a smooth interior surface.

Not only is it an object of my invention to effect economy in the construction of the panels themselves and in the wall or roof structure which they form, but it is a further object to make the panels of a size and structure such that they can be handled and applied to a wall or roof with a minimum of effort even by a single workman, although each panel is large enough to enable a given wall area to be covered quickly.

A further advantage of my wall and roof construction is that in case of necessity a single panel may be cut out or removed and replaced by a new panel with no or negligible disturbance of the adjacent panels.

An incidental object of the invention is the provision of a panel end joint cover strip which, while not absolutely necessary, is beneficial, particularly for roof construction. Such strips may be applied quickly and easily, and, when in place, will harmonize with the panels.

The advantages of my panel and wall construction will be pointed out in detail in the following description of the preferred embodiment of my invention shown in the accompanying drawings.

Figure 1 is a top perspective view of a portion of partially fabricated panel stock, parts being broken away to show internal structure. Figure 2 is an end elevation view of panel stock ready to be divided finally into panels.

Figure 3 is a perspective view of a portion of a house incorporating wall and roof structures constructed with my panels.

Figure 4 is a transverse sectional view of a portion of a wall taken on line 4—4 of Figure 3.

Figure 5 is a fragmentary sectional view on

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line 5—5 of Figure 3, showing a panel end joint, and Figure 6 is a fragmentary bottom plan view of the joining strip shown in Figure 5, portions of adjacent panels being illustrated in phantom.

As shown in Figure 3, the studs 1 in conventional house construction are usually spaced apart 16 inches on centers, although for lighter construction, such as in gables, the studs may be spaced 24 inches on centers. Rafters 10 for roofs not required to carry heavy covering structure, and used in roofs not having an excessive span, also are frequently spaced 24 inches on centers, although they may be arranged on 16 inch centers if desired. My panel 2, as will be described in greater detail hereafter, is designed for application directly to studs or rafters on 16 or 24 inch centers, although such panels may be used as the weather covering over sheathing in conventional fashion in the same manner that drop siding, bevel siding, shakes, or shingles are applied. Consequently it is preferred that the length of each panel 2 be a common multiple of 16 and 24 inches.

The vertical dimension or width of the panels may be any which is desired, but for the best appearance, easy handling, and economy of material, a width of 12 to 24 inches is preferable. Because of the lightness of my panel construction, a convenient length for panels of such width is 8 feet, as illustrated in Figure 3, although the panels may be made shorter or longer than this if desired, but preferably a common multiple of 16 and 24 inches, as stated above. Conventional equipment for manufacturing my panels usually is best adapted to handle panels of approximately 8 feet in length.

The finished panel 2 has a flat inner face 20 adapted to fit contiguously against the outer faces of the studs 1, or the outer surface of sheathing, if sheathing is used to cover the studs in conventional fashion. Since the lengths of the panels extend horizontally, the joints between them will be horizontal, and in order to make the latter weatherproof, a lap of each panel over the next lower panel is desirable. To provide such a lap and still to enable the inner surfaces of the panels to fit flat against the studding or sheathing, the panels are of the bevel type so that they taper from their lower to their upper edges and the lower edge of each is recessed to receive beneath it the upper edge of the next lower panel.

Referring particularly to Figure 4 which shows the panels secured in any suitable fashion, such as by nailing, gluing, or the like, directly to the studs, the edges 21 of the panels are shown to be in thickness approximately one-third of the distance between the outer surface of the panels' thicker lower edge 22 and the adjacent face of the backing. Thus the rabbet or recess 23 will be of a depth equal to the thickness of the thinner

panel edge 21, and the remaining material of the thicker edge 22 may be approximately twice as thick as the thinner panel edge. For purposes of illustration the thinner edge of the panel may taper to one-quarter inch, so that the maximum thickness of the edge received in a rabbet 23 will approach $\frac{5}{16}$ of an inch. The nominal thickness of the thicker edge of the panel may be one inch, making the net thickness of the rabbeted thicker edge somewhat less than three-quarters of an inch.

In addition to the panel edge-receiving rabbet or recess 23 the thicker edge of each panel may have a step 24 and a bevel or chamfer 25 extending between such step and the outer face of the panel's thicker edge. Such bevel and step form a definite interruption between the lower edge of each panel and the upper edge of the next lower panel, so that the usual butt surface from which drops of water can hang is eliminated, and, particularly in a roof structure, capillary attraction between the panels will not cause moisture to be drawn upward between the rabbet and the panel edge received by it. In addition such a bevel and step produce a more pronounced horizontal shadow line in sharp contrast to the striations, which is attractive.

The purpose of using panels of a length corresponding to a multiple of the stud spacing is to locate all the joints between adjacent panel ends overlying a stud, particularly if sheathing is not employed beneath the panels. Such a joint location affords firmer anchorage for the panel ends and also aids in sealing the joint. It is preferred, however, in addition, that a weather or sealing strip be applied to the exterior of each panel end joint to seal such joint positively. Such a strip 3 is shown covering each joint in the wall of Fig. 3, and details of a suitable sealing strip for this purpose are shown in Figs. 5 and 6.

As indicated in Fig. 3, it is preferred that the outer surface of each panel be grooved or striated transversely of the length of the panel to simulate naturally split wood, which has a rustic appearance. This treatment of the panel exterior is optional, but normally it will be used. Consequently it is preferred that the sealing strip 3 be corrugated to conform generally to the contour of the striations on the adjacent panel edges. Conveniently such sealing strips may be made of metal, preferably of copper alloy, and may include edge portions 30 bent first into face to face relationship with the central exposed portion of the strip, and then perpendicular to the central portion of the strip to form a web 31. The flanges of such strip formed by its central portion and by the underlying portions 30 may be corrugated or crimped to conform generally to the striations of the panel edges which the strip overlies, as discussed above. To retain the sealing strips 3 in place, points 32 may be formed on the web 31 and bent oppositely from it for embedment in the panel ends, as shown in Fig. 5.

Even though the sealing strips 3 be made of thin metal, it is not desirable to extend them endwise upward within the rabbet 23 of the next higher panel. The step 24 may, however, serve the further purpose of projecting down over and shielding the upper ends of the sealing strips.

To improve the fit of the horizontal joints where the outer face of each panel is striated, the striating may be stopped short of the upper edge of the panel, to leave a smooth margin 26, shown in Fig. 1, which will abut the rabbet 23 of the next higher panel in contiguous fashion. A better lock between abutting panel edges is afforded by beveling the thinner edge downwardly toward its inner surface to form the edge 27, and the edge of the rabbet 23 will be correspondingly undercut or formed with an acute angle. Engagement of the thinner panel edge in such rabbet holds the thinner edge of the lower panel from displacement inwardly and the thicker edge of the upper panel from displacement outwardly in case either such panel edge should tend to warp between studs 1.

The various characteristics and dimensions of the panel mentioned so far require that the panel be of special fabrication for best results, compatible with durability, rigidity, and efficiency. Moreover these characteristics of a panel can be achieved by the use of very economical material fabricated by efficient production methods. Since the panels are intended for exterior construction, their faces should be of high grade weather-resistant material. Western red cedar, for example, is recognized as being such a material that is commonly used for shingles and siding. In bevel siding, however, the grain runs lengthwise of the board, that is, generally horizontally when the siding is in place, whereas water would run off siding more effectively, instead of soaking into the wall, if the grain were to run vertically. A long relatively narrow panel in which the grain runs transversely or crosswise of the panel cannot be cut from a tree, however, and if it could be, the expense would be very great. Moreover, such a panel would have comparatively little rigidity lengthwise of the panel to resist bending stresses, and would be inclined to warp excessively, and to split.

In a panel intended for use in the manner described the required characteristics can be attained by utilizing a backing of boards having their grain extending lengthwise of the panel, and covering such backing with an outer layer in the form of a veneer sheet in which the grain runs transversely or cross wise of the panel length. Such a construction is illustrated in the drawings, in which the backing 28 is formed of stiff material, for example boards of any variety of wood having their grain extending lengthwise of the panel. Any number of boards of random or equal widths may be joined in edge to edge relationship to form a backing of sufficient width for each panel.

The face 29 of the panel may be formed of a sheet of western red cedar veneer. The thickness of this veneer sheet may be an eighth of an inch uniformly over the whole panel, the entire bevel of the panel resulting from the backing being tapered from edge to edge. In such a panel the backing alone is sufficiently rigid so that a panel of even as little as twelve inches in width may be handled readily without damage. Moreover its lengthwise stiffness will prevent endwise bending of the panel by any tendency of the surface veneer 29 to warp, and such backing will prevent splitting of the veneer face lengthwise of its grain.

Since the backing 28 is continuous from end to end of the panel the face may be formed of several sheets of veneer joined in edge relationship, to utilize less valuable material. Such construction will also reduce the tendency of the panel to warp endwise. Potential warping stresses created by the veneer face are further relieved if the surface veneer is striated lengthwise of its grain in the manner shown in the drawings. While the boards of the backing extending

lengthwise of the panel enable a number of veneer facing sheets to be employed, likewise the veneer sheets extending transversely of the backing boards will supplement the edge joints between them in holding the boards of the backing together to form a single panel, and will strengthen the backing materially, particularly at the thinner edge of the panel.

The method of fabricating my panels may largely conform to conventional plywood manufacturing technique. Thus the face veneer may be cut from a log in rotary fashion, or it may be sliced to form thin sheets or strips of uniform thickness. The backing may be made from boards of random widths jointed along the edges and edge glued into panels of convenient size. These panels may be planed after being fabricated and before application of the veneer to them. The veneer sheets are now bonded to both faces of the backing, after which the resulting panel stock may be cut approximately to the desired width and length, depending upon the size of the finished panel to be constructed.

If the surface of the panel is to be striated, which is an optional treatment, this operation is next accomplished on both sides of the panel stock in a direction lengthwise of the veneer grain and transversely of the panel length, and in a fashion to leave a plain marginal strip along one edge of each face, as shown in Fig. 1. Both longer edges of the panel stock or blank are next cut to the desired profile shown in Fig. 2 to form grooves for the rabbet **23** and the step **24**, as well as the beveled surfaces **25** and **27**. Two finished panels are then formed from each of these blanks merely by resawing them along the line X—X of Fig. 2 at an angle to the veneered surfaces. The panels are completed by trimming their ends, if the blank or stock has not been cut to length prior to the resawing operation.

The panels are applied to a wall or roof structure much like bevel siding, except that, as previously pointed out, no sheathing layer is required. Preferably laying of the panels is begun at the lower edge of the wall or roof structure, although this order is not essential. Such order is desirable so that the upper edges of the panels may be nailed in the marginal portion **26**, enabling the nail heads to be covered by the lower edge of the next higher panel. Alternatively a single nail may be driven through both overlapping panel edges forming each horizontal joint.

Another reason for starting to lay the panels from the bottom up is the reduction in holding effect required on the part of the workman. Thus when the first panel is secured in place the next panel may be set on such lower panel, in which case the rabbet **23** will lock in engagement with the beveled thinner edge **27** of the lower panel, and the upper panel will thus be held from tilting even on a vertical wall until it can be nailed, without requiring to be held at all by the workman. He therefore may merely set the panel in place and then move to any location along its length to nail it without being concerned about another portion lengthwise of the panel slipping out of place.

In placing the several panels in each row after one panel is secured in place, a joining or sealing strip **3** may be applied to an exposed end of such panel. The end of the next panel may then be inserted beneath one flange of the sealing strip, and the panel driven endwise until the points **32** are embedded securely in the adjacent panel

ends. The next panel may then be secured in place.

The facility with which a damaged or deteriorated panel may be replaced in such a construction is extraordinary. First the sealing strips **3** at opposite ends of the panel to be removed are pried off, and then the defective panel may be cut out or its thicker edge pried out. It may be desirable to pry outward the overlapping thicker edge of the next higher panel to some extent to relieve the thinner edge of the panel to be removed. The rabbet of the panel to be inserted is now cut, if necessary, to remove its undercut portion. If the panel to be installed has been cut to the proper length, its thinner edge may merely be inserted into the rabbet **23** of the next higher panel, and the rabbet of the inserted panel pressed inward against the thinner edge of the next lower panel.

In order to simplify replacement of seal strips at each end of the inserted panel its ends may be beveled slightly, so that the joint crevices will be somewhat wider at the face of the panel than at the inner surface of the wall. The points **32** of the sealing strips may now be bent slightly toward each other, and the strips then driven into place. As the points **32** catch on the wood they will be spread and forced endwise into the adjacent panel ends as the strips are driven inward. When the insertion of the new panel is completed, therefore, the repaired wall in every respect will conform to the structure of the original wall.

I claim as my invention:

A building panel comprising a backing of low grade lumber having its grain extending lengthwise of the panel and tapered transversely of the panel, said backing being of a thickness to give lengthwise rigidity to the panel, and a relatively thin face of high grade veneer of uniform thickness bonded to said backing with its grain extending transversely of the panel, and striated transversely of the panel to leave an unstriated marginal portion along its thinner edge and the thicker edge of the panel having a rabbet therealong of a shape and size complemental to the marginal unstriated thinner edge portion of the panel for receiving snugly therein the thinner edge of a like panel to dispose corresponding surfaces of said panels in coplanar relationship, and said thicker panel edge further having a step therein alongside said rabbet and a chamfer extending from such step across the edge of said veneer face.

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