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A. A. LAHTI
BUILDING CONSTRUCTION

2,300,937

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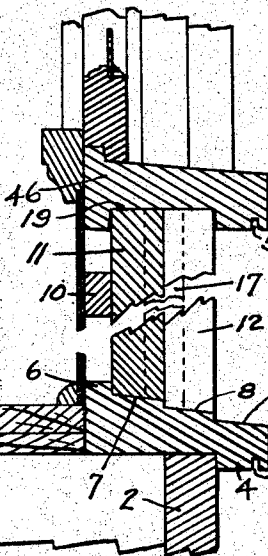
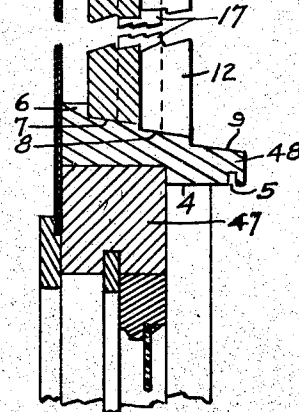
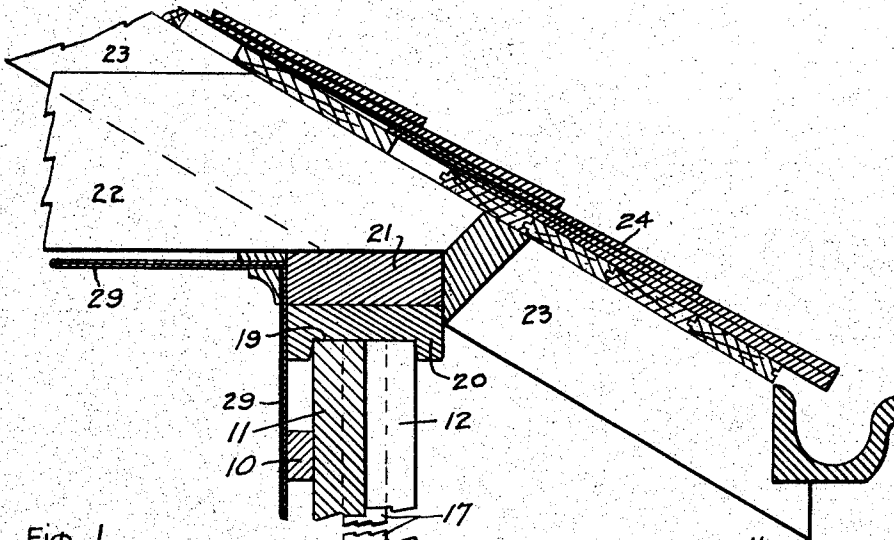
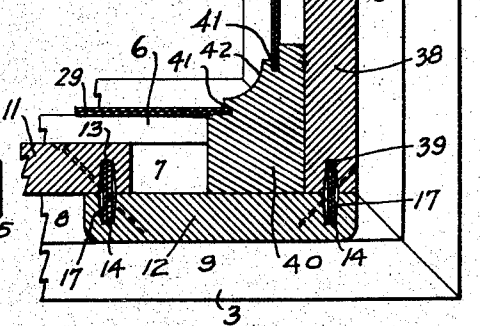


Fig. 2



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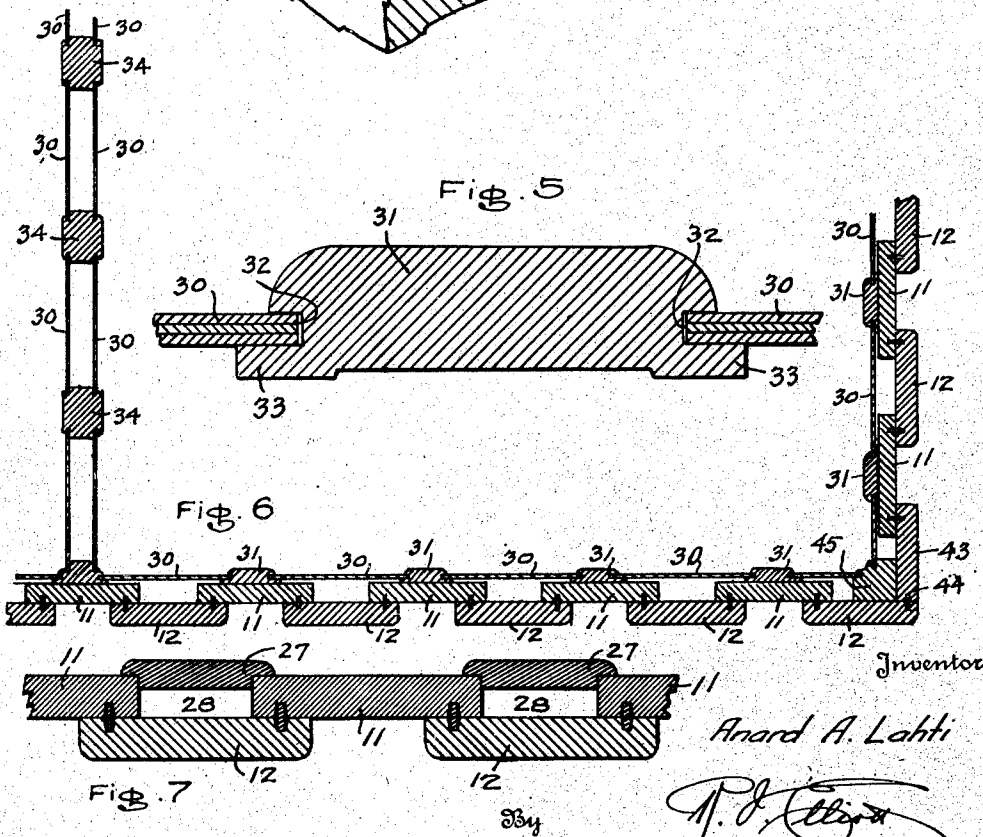
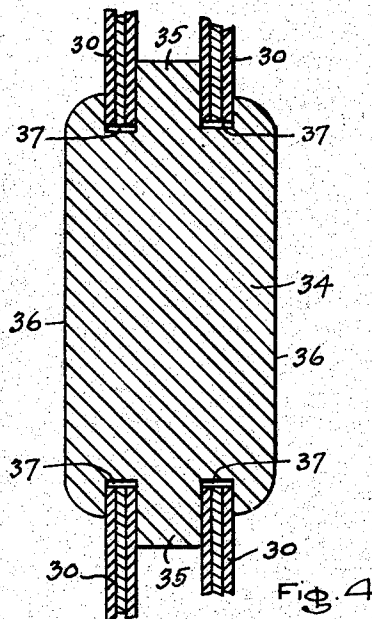
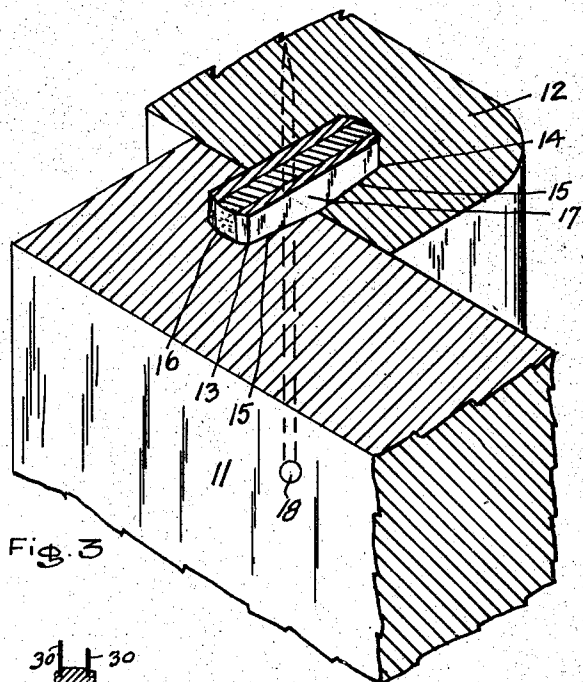
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,300,937

BUILDING CONSTRUCTION

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three-tenths to H. B. Welch, Tacoma, Wash.,
and three-tenths to A. J. Weberg, Tacoma,
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3 Claims. (Cl. 20-4)

This invention relates primarily to residence and small building construction, and especially to such a building which may be sold and delivered in packages, but I do not wish to limit it to buildings of any particular size, plan, or type.

The main object of my invention is to reduce the labor cost in erecting a building. Other objects are to provide a cheap, strong and attractive structure which is adaptable to practically any form of house plan and to which any form of interior finish may be applied; to provide a wall structure which, while simple in construction, is very strong and substantially wind-proof, and which permits a limited expansion or contraction of the walls without loosening any of the parts thereof. Another object of my invention is to provide means for holding the sheets of inner plywood paneling to the building and to form dividing walls or partitions thereof. Further, it is an object of my invention to construct the building substantially entirely of precut and pre-shaped parts, and to reduce the number of such parts to a minimum.

I attain these and other objects by the devices and arrangements illustrated in the accompanying drawings, in which—

Fig. 1 is a vertical section of a side wall of a building, taken through a window; Fig. 2 is a horizontal section of one form of a corner of such a building and showing particularly the construction of the walls; Fig. 3 is a perspective section drawn to a larger scale, showing the jointure between two of the main wall planks; Fig. 4 is a horizontal section of one of the dividing posts or stiles forming a partition wall; Fig. 5 is a horizontal section of one of the stiles used in fastening the plywood finish to the outer walls; Fig. 6 is a horizontal section of a part of a building wall showing a different form of corner and showing a partition wall; and Fig. 7 is a horizontal section of a portion of the outer wall and showing another form of interior finish for the said outer wall.

Similar numerals of reference refer to similar parts throughout the several views.

The construction of houses, as usually practised, has made little advance in the past two hundred years, comprising essentially of erecting a framework or skeleton of studding, securing on the outer side of this framework a sheathing or rough boards, usually laid at a vertical angle of about 45°, covering said sheathing with paper, and then covering the outside with horizontal weather boards, shingles, or other suitable finish. The inner surface of the wall thus constructed

is usually lathed and plastered, or may have plywood or other prepared sheet finish applied thereto, which said finish is often covered with a decorative paper as the final interior finish of the wall. The partition walls usually comprise a similar framework of vertical studding to both sides of which a finish corresponding with that applied to the outer walls is secured. It is obvious that in building the framework as above outlined, as well as in the erecting of the other portions of the walls, each piece has to be carefully measured and cut before it is secured in place and this part of the process of erection is responsible for a large portion of the labor cost of the structure. It is the elimination of this skeleton structure which is one of the principal economies responsible for the great saving in labor in my building construction, as shown in the drawings and described below.

Referring to the drawings it will be seen that no studding, in the ordinary sense of the word, is found. After the foundations of the structure have been completed and the base structure comprising the joists 1 and headers 2 have been laid thereon and properly secured, a special sill plate or water table 3 is carefully fitted and secured in place. The under side of this sill plate 3 is cut away to provide an integral flange or drip bead 4 at its lower outer corner. This flange 4 is placed tightly against the header 2, whereby the said water table or sill 3 is quickly and accurately aligned, thereby saving the laborers time in fitting it in place. Also this flange 4 forms a drip part overhanging the header 2, and is provided with a groove or kerf 5 on its under side to prevent the drip water from passing towards the header 2 or the under side of the plate 3.

The upper side of this sill plate 3 is cut downward from the inner corner in four steps 6, 7, 8 and 9. The top inner step 6 comprises a bead or flange extending its entire length and positioned at the upper inner corner of the sill plate 3, the inner surface of said flange 6 being coplanar with the furring 10 against which the inner finishing material is secured. The horizontal thickness of said flange 6 corresponds with the thickness of the furring 10 on the inside of the wall.

The outer surface of the said flange 6 forms a stop against which the inner wall planks are pressed and secured, as hereinafter described.

The second step 7 is of the same width as the thickness of the inner planks of the wall, and may be flat or slightly inclined downward and outward. The outer vertical surface of this step

7 forms the stop against which the outer wall planks are pressed and secured, as hereinafter described.

The third step 8 is of the same width as the thickness of the outer planks of the wall, and may be flat or slightly inclined downward and outward.

The fourth step 9 forms the water table and is inclined downward and outward. The vertical surface between this step 9 and the above described step 8 may be very shallow or may be eliminated so as to make its surface continuous with that on which the outer wall planks rest.

The outer walls of the building are constructed in the following manner: A series of inner vertical planks 11 are placed with their lower ends resting upon the upper surface of the step 7 of the plate 3 and are alined by being pressed into tight contact with the vertical face of the flange or stop 6. The planks 11 are spaced between their adjacent edges, as hereinafter described.

A second or outer series of vertical planks 12 are placed with their lower ends resting upon the upper surface of the third step 8 of the sill 3, alternating with the inner planks 11 so as to close the spaces between the said planks 11 and so that they lap over the edges of the said planks 11, and are alined by being forced into tight contact with the vertical face between the steps 7 and 8 and with the outer sides of the inner planks 11, and are secured in place thereon. As clearly shown in the drawings the two sets of planks 11 and 12 overlap each other at each joint. About the center of each such overlapping area I provide a pair of coordinated grooves 13 and 14. The grooves 13 are made in the outer side of the inner planks 11, parallel with their edges and extending from end to end. Similarly the grooves 14 are made in the inner side of the outer planks 12, parallel with their edges and extending from end to end. The grooves 14 are coordinated with the grooves 13. Both of these sets of grooves 13 and 14 are formed with slightly splayed sides 15 and with rounded inner ends 16, as clearly shown in Fig. 3.

A spline 17 fits in both of the coordinated grooves 13 and 14, tightly engaging the rounded ends 16 thereof, said spline being slightly rounded on its two edges to fit in the said rounded ends of the grooves. The splines 17 do not fit tightly, laterally, since the sides 15 of the grooves are slightly splayed, but permit a limited relative motion of the planks 11 and 12 without engaging the said sides 15 and without disengaging the ends 16, thus forming a continuous baffle against the entrance of wind through the joint between the planks 11 and 12, and yet maintaining a certain amount of flexibility to permit the expansion or contraction of the planks. The splines 17 are made of wood and extend the entire lengths of the planks 11 and 12. Since these splines 17 would readily split if made of a single length of wood, when the two planks 11 and 12 moved sufficiently to pinch the spline between their contacting edges, thus producing a shearing stress therein, I make the splines 17 of three-ply plywood in which the grain of the two face layers runs vertically, parallel with their edges, while the grain of the center ply runs at right-angles thereto or across the jointure of the planks, as shown particularly in Fig. 3. In practice I prefer to make the face plies of the spline 17 about one-half the thickness of the core ply.

The planks 11 and 12 may be secured together by spaced nails 18 driven from the inside outward at a horizontal angle of about 45° and pass-

ing through the spline 17 substantially at its horizontal center.

The upper ends of the two planks 11 and 12 are confined within a rabbet 19 formed in the lower side of the lower cap plate 20, the sides of the said rabbet groove 19 being slightly splayed and the ends of said planks fitting tightly against the inner end or surface of the groove. The cap plate 20 is in turn covered by an upper cap plate 21.

Thus it will be seen that the main structural members comprising the wall are formed by the double row of lapped vertical planks, and that these planks are tightly held in place by the cap 20, and that the splines 17 prevent any wind leakage between the said planks, and that the bottom ends of these planks are alined by means of the steps in the water table. It will also be observed that the cap 20 extends inward from the inner plane of the planks 11 a distance corresponding with the flange 6 of the sill plate 3 and with the thickness of the furring 10.

Suitable ceiling joists 22, resting upon the upper cap 21, may now be erected, and then the roof rafters 23 may be erected and the roof 24 constructed thereon. The subfloor 25 and the finish floor 26 may be laid at any convenient time after the sill plate 3 has been laid.

One of the advantages of this form of construction is that, though normally the interior of the building would not be erected or finished until the exterior walls and roof had been completely erected yet, if it is so desired, the interior finish of the walls and the interior partitions may be constructed along with the erection of the exterior walls, as will be readily understood. It may be observed as demonstrating the economy in time and labor that two carpenters of ordinary skill can erect twenty lineal feet of wall as above described, including window and door casings, per hour.

A cheap but effective interior finish is illustrated in Fig. 7, wherein the interstices between the inner planks 11 are filled by vertical rabbeted boards 27, secured to the inner surfaces of the planks 11, the corners of the said planks 11 entering the grooves or rabbets in the edges of the said boards 27. It will be observed that this construction provides a series of air spaces 28 at the rear of each of the outer planks 12, thereby increasing the heat insulation and providing spaces adapted to receive electric wires, water or other pipes, and other service equipment. The interior partitions will naturally be made with a corresponding series of boards to harmonize with the inner finish of the exterior walls.

The preferred interior finish, however, is illustrated particularly in Figs. 1 and 2 in which the inner surface of the exterior walls and the partitions is formed either of single panels of plywood, or of several panels of plywood which appear as single panels by means of side edge joints made in accordance with my invention for which U. S. patent has been applied under Serial Number 222,415 and for which a patent has been issued in Canada under date of Nov. 28, 1939, and numbered 385,283. In this case the plywood panels 29 are secured to horizontal furring 10 as well as to the flange 6 of the sill plate 3 at the bottom (Fig. 1) and to the cap plates 20 and 21, it being understood that the furring 10, the flange 6, and the caps 20 and 21 all lie in the same vertical plane.

However, if it is desired that the interior walls shall have a vertical panel effect, such as is il-

illustrated in Fig. 6, I prefer to separate the panels 30 of plywood by means of stiles 31, each of which is formed as shown in Fig. 5. In this case the stile 31 is provided with a groove 32 in each edge, adapted to receive the edge of the plywood panel 30, and the under side of this stile 31 is extended by a lip 33 which extends beyond the width of the front or face side of the stile 31. The purpose of this construction is that in erecting the panels and stiles, two stiles may be first erected then the panel is inserted in the groove of one stile and then forced into the groove of the other stile by bending the panel and springing it into the groove, and when the panel is so forced it cannot shoot past the groove in the second stile because it is stopped by the projecting lip 33 of the said second stile otherwise, if there were no such lip provided and if it should happen to pass the groove of the second stile, it would be jammed against the back edge of the second stile and could not be drawn forward to enter the groove of the said second stile.

When the above construction is used for a partition wall the stiles 34 form the studding of the partition and are formed as shown in Figs. 4 and 6. In this case they are made the same on both sides as the stile 31 shown in Fig. 5, being provided with two edge lips 35 extending beyond the edges of the faces 36, and with four grooves 37 bordering each side of each of the lips 35.

In Fig. 2 is shown one form of corner post for this building, in which the outer plank 12 of one side is connected to a special form of inner plank 38, having its connecting groove 39 in its edge, as clearly shown, said groove 39 being coordinated with the groove 14 in the said outer plank 12. Both of these planks 12 and 38 are fastened against the corner post 40. This post 40 has its inner corner cut away to provide two grooves 41 corresponding in alignment with the grooves 32 in the stiles 31 (Fig. 6) and may be joined by a concave molding groove 42. The edges of the panels 30 fit in the grooves 41.

In Fig. 6 this construction is slightly varied in that the corner planks are both in the outer row. In this case a special outer plank 43 is provided with a groove 44 in its edge, coordinated with the groove 14 in the other outer plank 12. The corner post 45 in this case is slightly smaller in cross-section, being made from a square post, but is provided with grooves and molding groove corresponding with those of the post 40.

In erecting a window it will be seen (Fig. 1) that the window sill 46 corresponds on its under side with the under side of the lower cap plate 20, being rabbeted to receive the upper ends of the shortened planks 11 and 12, except that it is as wide as the water table 3 and is provided with a drip kerf 5 in its under side. The window frame is provided with a header 47, which is aligned on its inner side with the head 6, the furring 10, and the caps 20 and 21, and on its outer side with the header 2 of the main floor. An upper water table 48, exactly corresponding with the water table 3, is secured above this window header 47, and the shortened upper planks 11 and 12 extend upward therefrom as in the rest of

the wall. This same construction, except for the lower part, is followed in making the door opening.

Thus it will be seen that the building produced in accordance with my invention is adapted for substantially any desired floor plan; that it can be completely erected of precut parts; that these parts may be shipped in packages direct from the factory; that there will be substantially no trash left around the building after it is finished; and that the method of erection involves merely placing the parts in their proper positions and nailing them together. Also, it will be seen that, due to the few operations necessary, the walls may be erected with great speed and with low labor cost, and that the building so erected will be free from wind leakage and of low heat conduction, especially in the case of hollow wall construction shown in Figs. 1, 2 and 6. Further, it will be seen that the sill 3 and the water table 48 above the window are cut in the same machine, and that other parts are duplicated throughout the building, thereby reducing the number of distinct parts and reducing the cost of manufacture of the parts and the cost of the structure.

Having described my invention, what I claim is:

1. In a building wall construction, the combination with a base structure; of a sill secured thereto, said sill having its upper surface progressively stepped upwards and inclined to form a water table, the inner and higher of said steps forming a furring strip for the inner wall surface and a guide stop for aligning the outer wall; and an outer wall formed of two series of vertical planks in contact with each other, the inner of said vertical planks supported by the next step downward and the outer of said vertical planks supported by the third step downward.

2. In a building wall, the combination with a supporting base structure; of an inner series of vertical planks mounted thereon and spaced laterally from each other; two grooves in the outer surface of each of said planks and positioned adjacent to and parallel with their vertical edges, the sides of said grooves being splayed outward; a second or outer series of vertical planks mounted on said base structure and closing the spaces between the planks of the first series; two grooves in the inner surface of each of said second series of planks and positioned adjacent to and parallel with their vertical edges, said second series of planks being positioned to bring each groove therein in coordinated alignment with the corresponding groove of the first series of planks, the sides of said grooves being splayed outward to permit slight relative lateral movement of the coordinated grooves; and splines mounted in each such pair of coordinated grooves and crossing the jointure thus formed.

3. In a building wall as set forth in claim 2, wherein the bottoms of said grooves are curved, thereby permitting a slight relative lateral movement of the coordinated grooves without pinching said splines and without freeing said splines from contact with the bottom of the grooves.

ANARD A. LAHTI.