Dec. 27, 1966 W. S. SMITH 3,293,820

PREFABRICATED HOLLOW PANEL BUILDING

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FIG. 1.

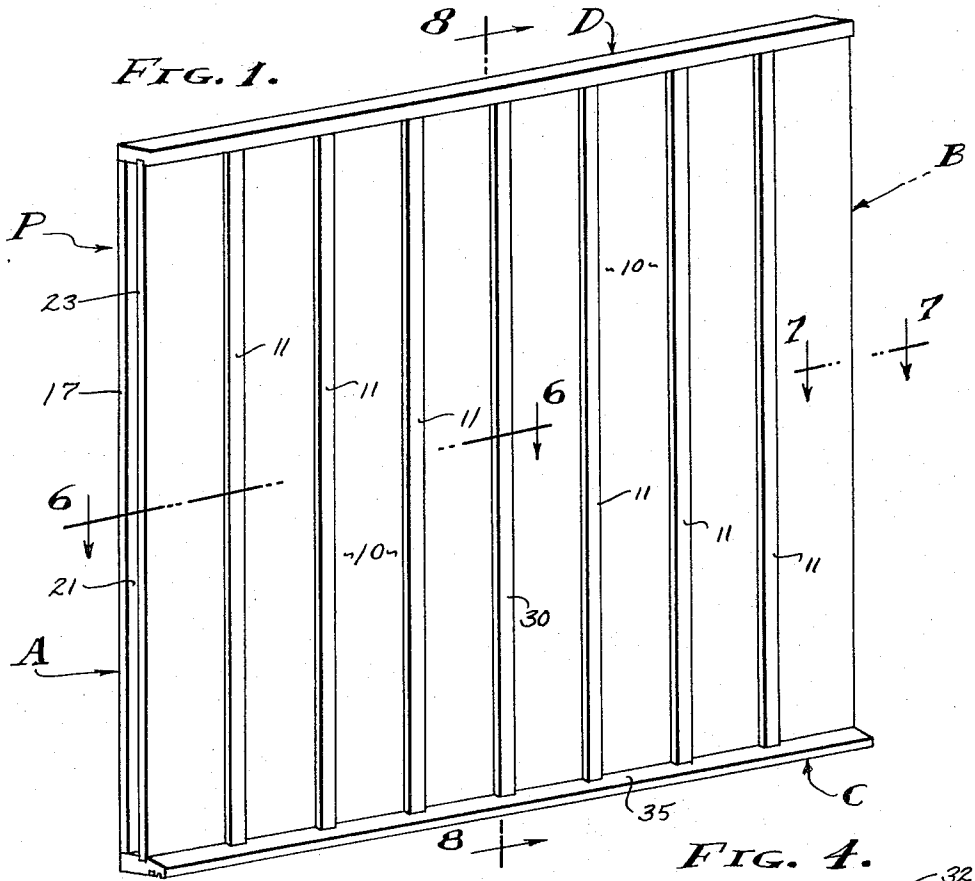


FIG. 3.

FIG. 4.

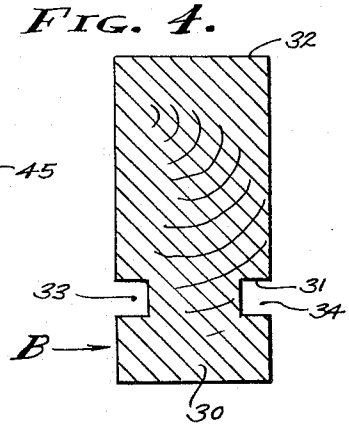


FIG. 2.

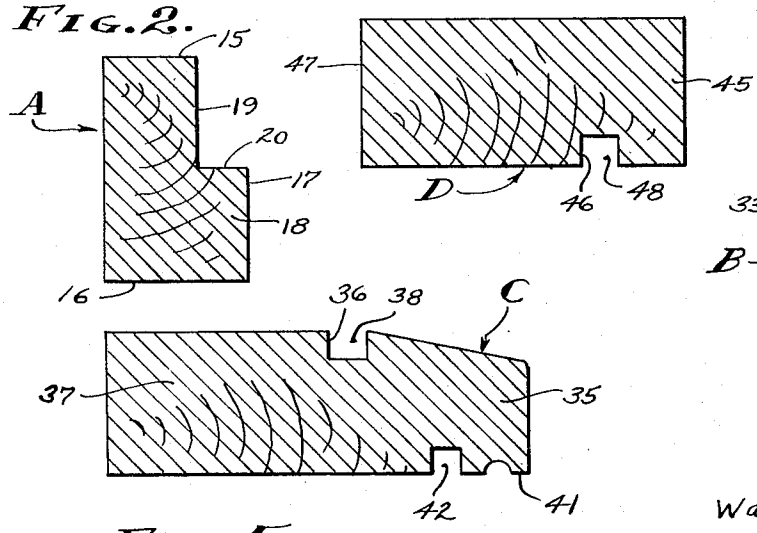


FIG. 5.

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PREFABRICATED HOLLOW PANEL BUILDING

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FIG. 6.

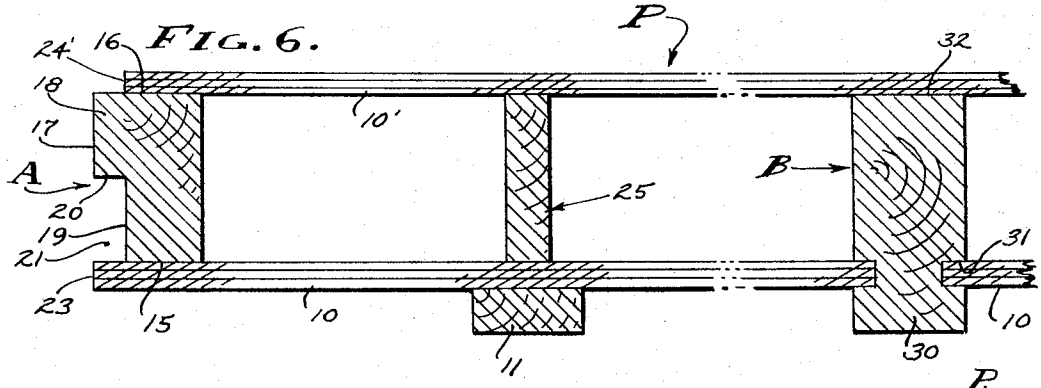


FIG. 7.

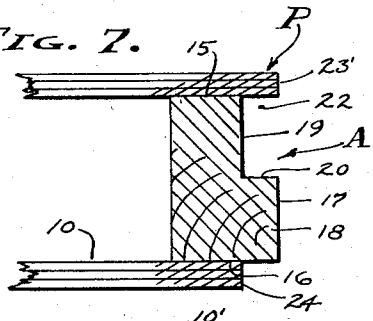


FIG. 8.

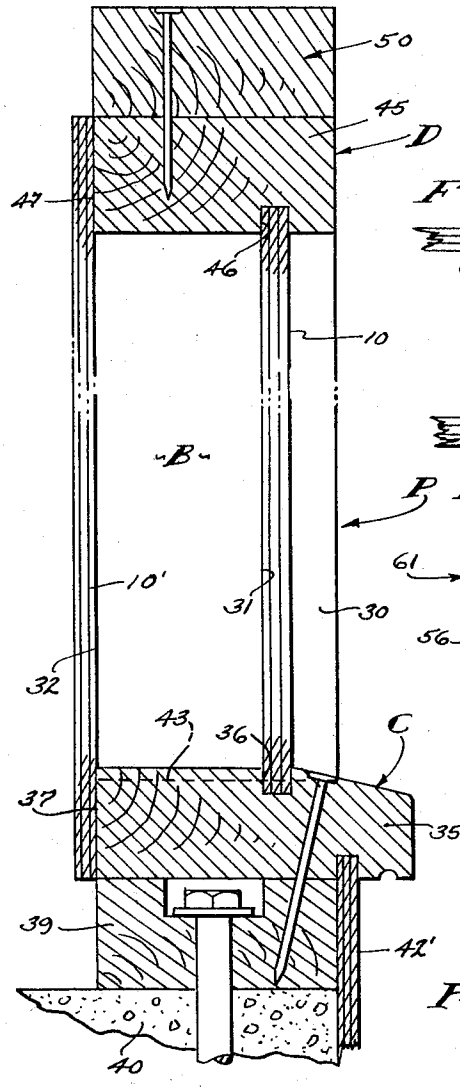
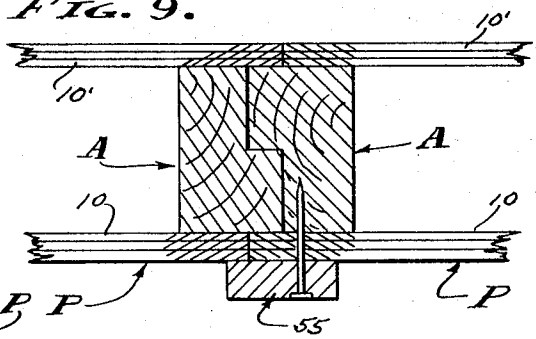


FIG. 9.



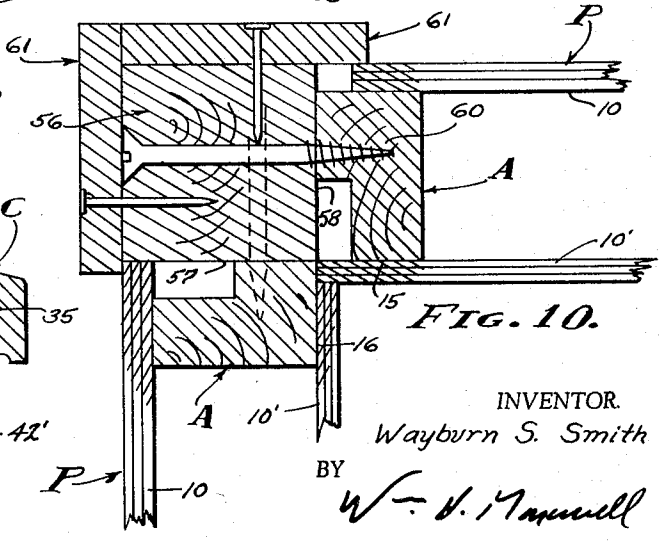


FIG. 10.

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PREFABRICATED HOLLOW BUILDING PANEL

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4 Claims. (Cl. 52—589)

This invention relates to prefabricated building construction and is particularly concerned with wall construction adapted to be completed at a factory and then transported to and erected on a site as a permanent installation, it being a general object of this invention to provide prefabricated structural bearing walls for frame type buildings and which are easily fabricated and easily erected without modification upon assembly or erection.

Wood frame type buildings are widely used and are usually erected on their site from raw lumber. Thus, a crew of carpenters is usually employed in the erection of each building according to a plan which is peculiar to that particular building. Prefabrication of such buildings has been tried in various ways, and most often the various walls are factory made to certain dimensions and which in reality is about the same as constructing said walls on the site. Furthermore, prefabrication usually involves the erection of a frame, and siding is then cut as circumstances require and is applied. All in all, each building becomes peculiar to itself in respects which require fabrication on the final assembly.

An object of this invention is to provide a frame building made of prefabricated components without modification upon assembly. By the manufacture of preselected key sized modular components it is feasible to erect a building of almost any configuration. For example, the module increment may be one foot or even a fraction thereof, by fabricating certain component widths that can be combined as circumstances require.

Another object of this invention is to provide components for a prefabricated building and which are composed of the fewest number of easily made parts. The parts involved in the components are essentially identical throughout the various components regardless of component size, and the component parts involved are identifiable with the corresponding parts used in ordinary building structures. However, and in accordance with the invention, each of said component parts of the present invention is formed to prescribed configuration whereby said components remain intact and fit one with another without any modification upon assembly. For instance, the said corresponding parts involved are, generally, studs, sills and plates, and each of which is unique in the combination of other parts which are fashioned together into each individual component.

The various objects and features of this invention will be fully understood from the following detailed description of the typical preferred form and application thereof, throughout which description reference is made to the accompanying drawings, in which:

FIG. 1 is a perspective view of one typical component of the building structure as provided.

FIGS. 2, 3, 4 and 5 are enlarged cross-sectional views of the component parts involved, FIG. 2 being a view of the end studs, FIG. 3 being a view of the plate, FIG. 4 being a view of the intermediate studs, and FIG. 5 being a view of the sill.

FIGS. 6, 7 and 8 are enlarged detailed sectional views taken substantially as indicated by lines **6—6**, **7—7**, and **8—8** on FIG. 1.

FIGS. 9 and 10 are detailed cross-sectional assembly view, FIG. 9 illustrating the manner in which adjacently related components are interrelated, and FIG. 10 illustrating the manner in which right-angularly related components are interrelated.

The modular component shown in FIG. 1 of the drawings is a typical panel P comprising the structure of the present invention. It is preferred that the panel P simulate "board and batten" construction, or the like, and which is characterized by flat vertically disposed panel boards separated by projecting vertically disposed rib-like battens. As shown in the illustration FIG. 1 the battens are alike in appearance and they are evenly spaced, and said battens would normally cover the abutted joints of adjoining panel boards. However, it is advantageous to build such a wall of large rectangular sheets **10** of material, for example, of pressed board or plywood, in which case suitable battens **11** are superimposed thereon for appearance only. Thus, the large sheets **10** are decorated so that they have an appearance identical to the accepted "board and batten" construction, reference thus far being made to the exterior of the panel P.

With a construction which simulates "board and batten" siding it is possible to readily hide vertical seams, including seams within modular panels P, and also including seams where the panels P abut. Therefore, it is practical to have panels P made up of a plurality of sheets **10** joined integrally together at seams hidden by battens. However, and in accordance with the invention battens as such are not employed at these seams between sheets **10** and in lieu thereof a novel stud is provided and which includes features which simulate a batten.

Each panel P is a rectangular structure comprising generally one or a plurality of sheets **10**, end studs A, intermediate studs B when there is a plurality of sheets **10**, a sill C and a plate D. These various parts are formed as clearly shown in FIGS. 2 to 5 and remain the same in cross-sectional configuration regardless of the size of the component panel P. Thus, uniform cross-sectional configurations are employed and only the lengths of parts A, B, C, and D need be tailored upon fabrication in order to manufacture components of various size.

The end studs A characterize the present invention, being disposed vertically at the opposite ends of the panel P. The end studs A are identical and are simply faced oppositely so that the end edges of adjacently related panels P mate with overlapped and preferably grooved engagement. Basically, the end stud A is rectangular in cross-section, having opposite faces **15** and **16** to receive the sheets **10** and **10'**, and having a face **17** extending between the first mentioned faces and exposed laterally to establish the end edge. In order to make all end studs A interchangeable, the face **17** is stepped centrally so as to have a raised portion **18** and a depressed portion **19**. As a result, the end stud A is characterized by a face **17** stepped into two parallel planes with a central shoulder **20** extending normally therebetween.

In accordance with the invention, at one end of the panel P the face **15** is secured flat against the back of sheet **10** that establishes the outside wall and face **16** is secured flat against sheet **10'** that establishes the inside wall, and at the other end of the panel P the face **16** is secured flat against the back of sheet **10** and face **15** is secured flat against sheet **10'**. The sheets **10** and **10'** extend beyond the depressed portions **19** at opposite ends of the panel P, thereby cooperating with the end studs A so as to provide vertical channels **21** and **22**, each adapted to snugly receive the raised portion **18** of the next adjacent panel P. These oppositely faced and matable channels **21** and **22** are best illustrated in FIGS. 6 and 7, and the normal engagement for the interconnection of adjacent panels P is illustrated in FIG. 9. Note

that the vertical end edges 23 and 23' of the sheets 10 and 10' are coincidental with the flat end face of the raised portion 18, and that the opposite edges 24 and 24' of the sheets 10 and 10' are coincidental with the flat end face of the depressed portion 19. Thus, the opposed end edges of the panel P mate in every respect, as shown in FIG. 9, with no discrepancies and no voids, the sheets 10 and 10' being tightly abutted as shown.

With the sheets 10 and 10' related to the end studs A as hereinabove described it will be seen that a hollow panel P is formed, having spaced parallel outer and inner walls. It will be apparent that the sheets 10 and 10' can be secured on the studs by suitable means comprising fasteners and/or adhesives. Insulation intermediate the sheets 10 and 10' is optional, and by using wood parts and suitable insulation a wall having a high resistance to heat transfer is produced.

The panel P is advantageously made of sheets 10 and 10' having large expansive areas, in which case there is considerable distance between end studs A. Therefore, auxiliary studs 25 are disposed on suitable centers for stiffening and as may be required by building codes. It is preferred that the studs 25 be of minimized cross-section and proportioned so as to fully occupy the space between sheets 10 and 10', thereby establishing a plurality of cores disposed vertically. Additionally, and according to building code requirements, suitable fire stops (not shown) can extend between the various studs at appropriate heights.

The intermediate studs B characterize the present invention, being disposed vertically at the points of joinder between outer sheets 10. The stud B differs from the stud A in that it permanently couples together and locks adjacently related sheets 10 in coplanar alignment. This permanent joinder of sheets 10 is accomplished by stud B while simultaneously forming and establishing a batten which covers the said joinder. Thus, the stud B and batten portion 30 thereof is advantageously formed as an integral part, preferably of rectangular cross-section, having opposite faces 31 and 32 to receive the sheets 10 and 10'. However, the portion 30, being integral with the stud, projects forwardly to simulate a batten, there being oppositely aligned grooves 33 and 34 coextensive with the stud B and each adapted to snugly receive the marginal edge of a sheet 10. The said face 31 is common to the inside wall of the two grooves as shown.

In accordance with the invention the face 31, or faces, at grooves 33 and 34, is secured flat against the back of sheet 10, and face 32 is secured flat against the back of sheet 10'. The spacing of faces 31 and 32 is the same as that of faces 15 and 16, whereby parallelism of sheets 10 and 10' is assured.

The sill C characterizes the present invention, being disposed horizontally at the lowermost edge of the panel P. The sill C is provided for supporting engagement with a suitable foundation such as is shown in FIG. 8 and provides for flashing designed to exclude water. The sill C is similar to the intermediate stud B in that it has a portion 35 that projects forwardly from the plane of the sheet 10 and has opposite faces 36 and 37 to receive the sheets 10 and 10'. The said forwardly projecting portion 35 is preferably integral with the sill and has an upwardly disposed groove 38 that snugly receives the lower marginal edge of sheet 10 .

In accordance with the invention the sill C is adapted, for example, to rest upon a plate or mud-sill 39 supported on a foundation 40 with the projecting portion 35 extending substantially beyond the outer edge of the said foundation. As shown, the portion 35 is pitched to shed moisture away from the sheet 10 and is provided with a drip 41 at its outermost lower extremity. Further, a flash groove 42 is provided so as to receive suitable flash or boards 42' which overlie the otherwise exposed mud-sill and foundation. A feature of the invention is that the projecting portion 35 presents an exposed part of substantial size suitable for the reception of usual fasteners 44 adapted to secure the panel P in position on a plate or sill 39. The inside sheet 10' can be trimmed as circumstances require, and the sill is notched at 43 to fully receive the lower end of the intermediate stud B (see FIG. 8).

The plate D characterizes the present invention, being disposed horizontally at the uppermost edge of the panel P. The plate D is provided for carrying the ceiling and/or roof structure and is adapted to tie the upper level of the panels together. The plate D is similar to the intermediate studs B and sill C in that it has a portion 45 that projects forwardly from the plane of the sheet 10 and has opposite faces 46 and 47 to receive the sheets 10 and 10'. The said forwardly projecting portion 45 is preferably integral with the plate and has a downwardly disposed groove 48 that snugly receives the upper marginal edge of sheet 10.

In accordance with the invention, the plate D is provided as the lowermost of a pair of plates and is adapted to support an overlapping plate 50 that ties the panels P together in a longitudinal chain.

A feature of the invention is the adaptability of the panels P, as hereinabove described, to have both aligned joinder (FIG. 9) and to have corner joinder (FIG. 10). In the case of aligned joinder the sheets 10 and 10' abut tightly and a batten 55 is fastened in place to cover the said joinder. In the case of corner joinder the opposed ends of two panels P are abutted against a post 56 having angularly or normally related faces 57 and 58 disposed coincidentally with the planes of faces 15 and 16 of the respectively opposed end studs A. Thus, and it is uniquely significant, the inside sheets of material 10' have angular abutted engagement without voids. Suitable fasteners 60 can be employed as shown, to secure the panels P to the post 56, and the corner is then covered, preferably, by widened battens 61 that overlie the joinder between the outside sheets 10 and post 56.

From the foregoing, it should be clear that modularly dimensioned panels P of the specified character herein set forth can be permanently fabricated in complete form at a factory and then erected and assembled in accord with a variety of different plans, all without cutting or engineering at the site of erection. Suitable methods of fastening can be employed as is indicated in the drawings. That is, the modular panels P need not be modified upon erection, and are simply fastened together, it being understood that windows and/or door openings are to be inserted therein as and when circumstances may require. Upon completion, the building that is erected will have the simulated "board and batten" appearance with upper and lower frame margins of finished detail established by the parts C and D.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any modifications or variations that may appear to those skilled in the art and fall within the scope of the following claims:

Having described my invention, I claim:

1. A prefabricated panel for erection, without modification, into a bearing wall of a building, and including:

(a) identical oppositely faced end studs vertically disposed at opposite ends of the panel and each having opposite faces spaced to receive outside and inside sheets of material and each having raised and depressed portions separated by the central shoulder and disposed normally between the said faces,

(b) outside and inside sheets of material engaged with said opposite faces respectively and extending between the two studs,

(c) the outer sheet having a marginal portion of material extending beyond the depressed portion of one stud and terminating in an edge substantially coincidental with the raised portion at said one stud, and

the inner sheet having an opposite marginal portion of material extending beyond the depressed portion at the other stud and terminating in an edge substantially coincidental with the raised portion at said other stud, with channels formed at the opposite end studs of one panel for the reception of raised portions of the next adjacent panels and with both outer and inner sheets of material in edge abutment with each other.

2. A prefabricated panel for erection, without modification, into a bearing wall of a building, and including:

(a) identical oppositely faced end studs vertically disposed at opposite ends of the panel and each having opposite faces spaced to receive outside and inside sheets of material and each having raised and depressed portions separated by a central shoulder and disposed normally between the said faces,

(b) outside and inside sheets of material engaged with said opposite faces respectively and extending between the two studs,

(c) the inner sheet having a marginal portion of material extending beyond the depressed portion at one end stud and terminating in an edge substantially coincidental with the raised portion at said one end stud, and the inner sheet having an opposite marginal portion of material extending beyond the depressed portion at the other end stud and terminating in an edge substantially coincidental with the raised portion at said other end stud, with two of such panels right angularly related and abutted against a corner post with the said inner sheets of the two panels overlapped.

3. A prefabricated panel for erection, without modification, upon a foundation to form a bearing wall of a building, and including:

(a) a vertically disposed outer sheet of material of rectangular configuration and having parallel upper and lower marginal edges and parallel end marginal edges, and a vertically disposed inner sheet of material,

(b) identical oppositely faced end studs vertically disposed at opposite ends of and between the said outer and inner sheets of material to join the same; and each having raised and depressed portions separated by a central shoulder, and each having opposite faces spaced to receive the outer and inner sheets of material and each stud having said raised and depressed portions separated by a central shoulder and disposed in planes normal to the plane of said sheets of material,

(c) the outer sheet having a marginal portion of material extending beyond the depressed portion of one stud and terminating in an edge substantiallyy coincidental with the raised portion at said one stud, and the inner sheet having an opposite marginal portion of material extending beyond the depressed portion at the other stud and terminating in an edge substantially coincidental with the raised portion at said other stud, with channels formed at the opposite end studs of one panel for the reception of raised portions of the next adjacent panels and with both outer and inner sheets of material in edge abutment with each other,

(d) a sill horizontally disposed at the lower marginal edge of the panel and having a projecting portion extending from the front face of said outer sheet of material to overlie the foundation,

(e) a plate horizontally disposed at the upper marginal edge of the panel and having a projecting portion extending from the front face of said outer sheet of material,

(f) there being opposed and aligned grooves in the plate and sill receiving the upper and lower marginal edges of the outer sheet of material, respectively,

(g) whereby the plate and sill are coupled to the sheet of material in alignment and provision is made for driving fasteners through said projecting portion and into overlying and underlying structures, all without disturbing either sheet of material.

4. A prefabricated panel for erection, without modification, upon a foundation to form a bearing wall of a building, and including:

(a) a vertically disposed outer sheet of material of rectangular configuration and having parallel upper and lower marginal edges and parallel end marginal edges, and a vertically disposed inner sheet of material,

(b) identical oppositely faced end studs vertically disposed at opposite ends of and between the said outer and inner sheets of material to join the same and each having raised and depressed portions separated by a central shoulder, and each having opposite faces spaced to receive the outer and inner sheets of material and each stud having said raised and depressed portions separated by a central shoulder and disposed in planes normal to the plane of said sheets of material,

(c) the inner sheet having a marginal portion of material extending beyond the depressed portion of one end stud and terminating in an edge substantially coincidental with the raised portion at said one end stud, and the inner sheet having an opposite marginal portion of material extending beyond the depressed portion at the other end stud and terminating in an edge substantially coincidental with the raised portion at said other end stud, with two of such panels right angularly related and abutted against a corner post with said inner sheets of the two panels overlapped.

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