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 [21] Appl. No. **835,106**
 [22] Filed **June 20, 1969**
 [45] Patented **June 29, 1971**

[56]

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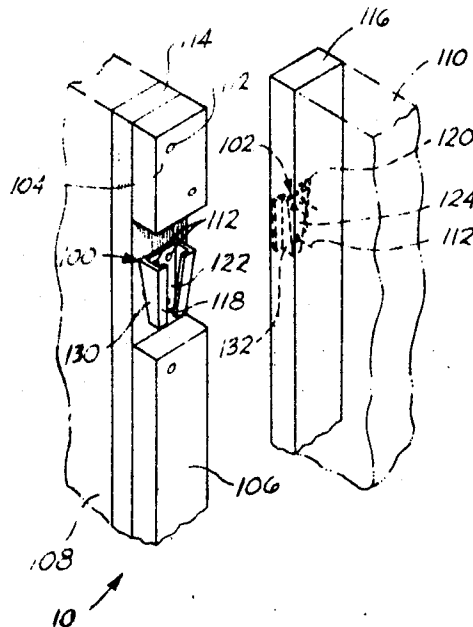
[54] **PREFABRICATED-WALL ATTACHMENT SYSTEM**
9 Claims, 8 Drawing Figs.

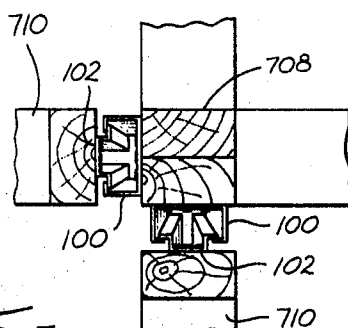
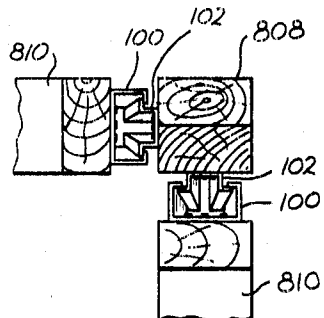
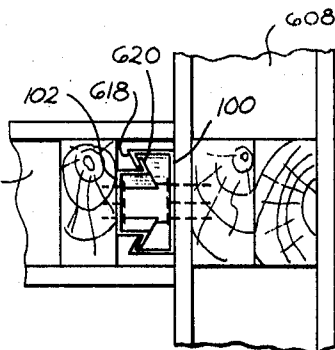
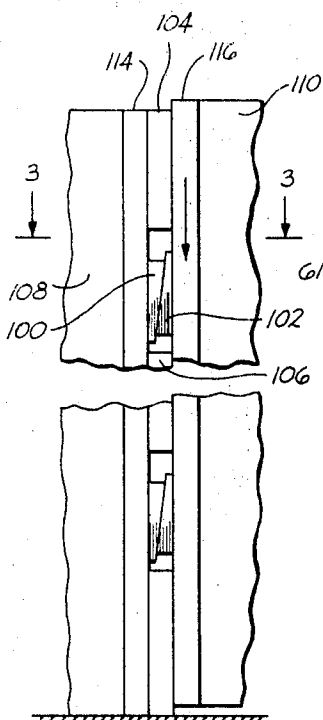
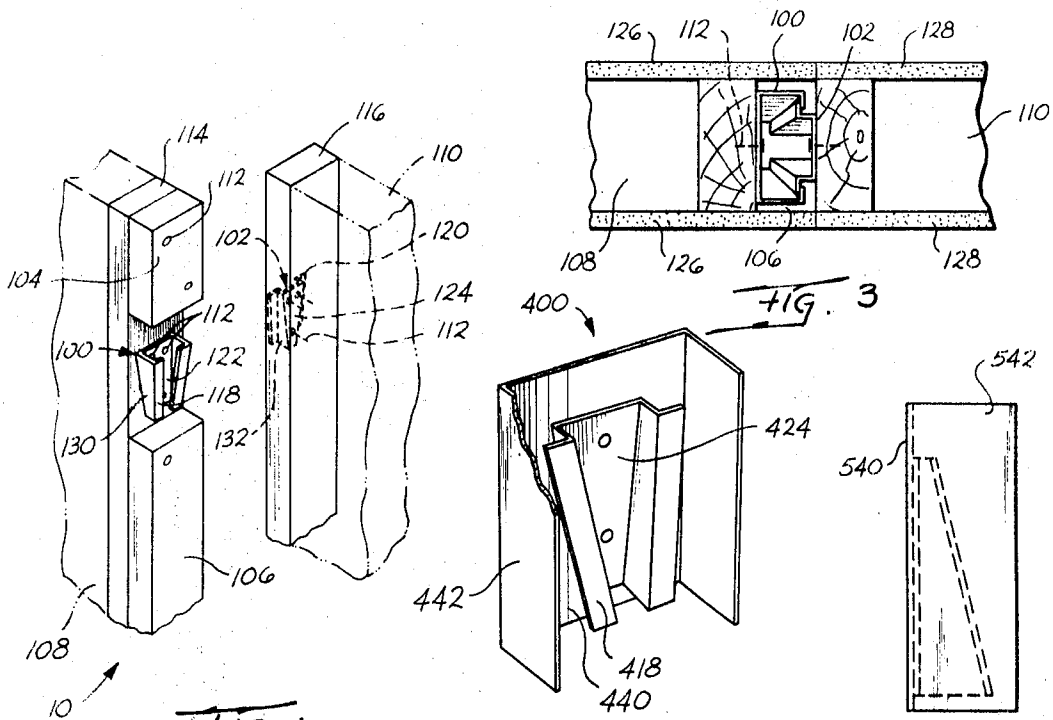
[52] U.S. Cl. **287/20.924,**
52/582, 248/224

[51] Int. Cl. **F16b 3/00**

[50] Field of Search..... **287/20.92**
G, 20.924, 20.925, 20.926, 20.92 R, 20.92 C,
20.92 D, 189.35, 189.36 C, 189.36 D; 52/122,
582, 584, 489, 495, 498, 580, 593, 594, 595;
220/4, 7; 248/224, 300; 217/43, 45, 12, 13

ABSTRACT: A vertical-wall attachment system for building construction of the prefabricated type, including double tapered interconnective clips for installation on the end of the wall and on the structure to which the wall is to be secured, and modular spacers coacting to position the wall in relation to said structure, thereby coacting to provide tight attachment on vertical sliding interconnection of the clips.





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PREFABRICATED-WALL ATTACHMENT SYSTEM

This invention relates to building construction generally, and to prefabricated wall installation specifically.

It has become evident that increasing percentages of future housing in this country will be of prefabricated construction, for reasons of economy and speed. Unsatisfactory methods of joining building elements, including methods of fastening prefabricated walls, which have retarded use of prefabrication in the past, must be replaced.

A principal object of this invention, therefore, is to provide a novel wall-attachment system for prefabricated buildings which overcomes objections found in prior methods and provides advantages not previously available.

Briefly, the novel wall-attachment system consists of one or more sets of vertically interlocking double-tapered spring clips and spacers for installation on the end of a prefabricated wall and on the part of the building to which the wall is to be attached. The sets of tapered clips are fixed in vertical alternation with the spacers, and, when interconnected in tension on attachment of the wall to the building, are in the thickness range of common 2x4 studding, thus providing for lengths of studding to be used as spacers.

To install a prefabricated wall in a building using the system of this invention, the wall is raised slightly, brought next to a standing member in the building so that the clips on the wall and the standing member are vertically nested, and lowered into self-tightening, clip-aligned studding-spaced final position.

Another object of this invention is to provide a wall-attachment system which is compatible with wood-frame construction and accommodative of variations ordinarily encountered in such construction, while preserving precise alignment and rigid positioning on installation of prefabricated walls.

And another object of this invention is to provide a wall-attachment system which is easy to align and attach to the walls, and which is secure on installation.

And still another object of this invention is to provide a wall-attachment system having clips adapted to draw the wall into place before final engagement of the clips.

Yet another object of this invention is to provide a wall-attachment system which is effectively resilient to an extent in the vertical direction, but which is effectively rigid in directions lateral and longitudinal of the walls.

A further object of this invention is to provide a wall-attachment system which is equally well adapted for use at wall junctions of the T type, the corner type, and the butt type.

And a further object of this invention is to provide a wall-attachment system having clips adapted to support cantilevered drywall sheathing edges adjacent the clips.

Yet a further object is to provide a system of the type described which is adapted to minimize corrosive effects of water leakage, through free draining design.

Still a further object is to provide a system of the type described which is adaptable in the same pattern to light gauge and heavy gauge construction, and to construction employing a variety of materials.

And still a further object of this invention is to provide a system as described in which clips of different gauge construction can be used together, and as replacements in the same application.

And further objects of this invention are to provide a system of the type described which requires no expensive materials, is easy to manufacture, is accommodative of loose tolerances in manufacture, is difficult to damage, and is easy to repair.

These and other objects of this invention will become more easily understood on examination of the details of the disclosure, including the drawings in which:

FIG. 1 is a perspective of the system of this invention installed to walls for attachment of the walls;

FIG. 2 is an elevation, partly in section, of walls joined by this invention;

FIG. 3 is a section along 3-3 of FIG. 2;

FIG. 4 is a plan of an embodiment of a clip of this invention; FIG. 5 is a side elevation of another clip embodiment; and FIGS. 6, 7 and 8 are plan views of wall attachments according to this invention in various embodiments.

FIG. 1 shows clips 100 and 102 of one embodiment of this system attached to studding 114 and 116 of wall sections 108 and 110 by fastening means such as nails 112. Holes are provided in the bases 122 and 124 of the clips for the fastening means, but appropriate types of fastening means may be driven directly through the bases.

Spacers 104 and 106 are nailed to the studding of the respective walls. The clips and spacers are preferably used in plural sets, one above the other, as shown. The vertical arrangement allows easy inspection on installation and generous space for clip-flexure.

Clip 100 is a vertically directed, symmetrical U-section channel with a tapered flat base having tapered arms 130 normal to the base with inwardly turned right-angle flanges 118 at the open side. Both tapered dimensions increase upwardly.

Clip 102 is of complementary shape and taper to clip 100, comprising a vertically directed symmetrical U-section channel with a tapered flat base 124 having tapered arms 132. The base taper of clip 102 widens upwardly and the arm tapers widen downwardly. Flanges 120 of clip 102 are outwardly turned and proportioned to engage flanges 118 of clip 100.

The clips are made of sheet metal, such as, for example, 16- to 28-gauge galvanized iron, cut and bent to modular dimension. In the FIG. 1 embodiment, the module chosen is the section of the common 2x4 used in studding. Spacers 104 and 106 are lengths of 2x4.

FIG. 2 shows the relation of the spacer and clip dimensions. In FIG. 2, wall section 110 of FIG. 1 has been butted against wall section 108 in the approximate vertical relation of FIG. 1, and wall section 110 is being lowered, engaging and tightening the clips and the wall sections. Note that the clip assembly when substantially engaged and tensioned has the same dimension across the joint as the 2x4 spacer, the module chosen.

To engage the clips, it is not necessary to raise one wall section the full height of the clip. The double tapered design allows the clip flanges to be "nested" at appreciably less difference in height than the height of a clip, the exact engaging height depending on flange width and taper.

In the embodiment shown, with a flange width of three-sixteenths inch and a vertical taper of 1 to 6 on each side of each clip, less than 1-inch height difference frees the clips for engagement.

The clips draw the walls together, align the walls laterally, and fix the walls in place, on engagement, as noted, but the clips can also be used to draw the walls closer when the clips are partially engaged. When one wall is at an angle such that only one flange of the clips is engaged, lowering the wall draws it closer to the proper installation position. After this, with the walls closer together, wall alignment is corrected, the clips are fully engaged, and the walls are properly attached.

The gaps between the tops of the clips and the spacers is so designed to provide clearance for engagement of the clips. A smaller gap below the clips is provided to allow room for some vertical misalignment, as through uneven floor heights, or imprecise manufacture, or improper installation of the clips.

The design of the clips of this invention is especially well adapted for wood-frame house construction, in which it is usually not practical to demand extremely close tolerances because of normal variations in materials, workmanship, and lack of time. The double tapered configuration of the matched clips produces the necessary constructional rigidity and strength in both plan dimensions—that is, transverse to the wall, and horizontally in the plane of the wall. However, in spite of the lateral rigidity and self-tightening feature of this invention, sufficient vertical adjustment to accommodate wide variations in installation tolerances is automatically provided through symmetrical flexing of the clips under the great mechanical advantage of the double tapers as the weight of the wall is applied. The mechanical advantage and vertical

tolerance can be varied as desired by changing the taper angles to which the parts are fabricated.

FIG. 3, a section at 3-3 of FIG. 2, shows a plan view of a pair of the clips engaged. In this joint, dry wall panels 126 are tightly butted to dry wall panels 128 as the clips draw the walls together, during lowering of wall 110 into place. The limiting dimension as the walls are drawn together is the thickness of the spacer 106, which is below the clips (between studs 114 and 116 in this view), and which is of equal thickness with the studs. In FIGS. 1, 2 and 3 it is readily apparent that insulation such as fiberglass batting can be inserted around the clips. If granular material such as rock wool is used, it can simply be poured into the top of the funnel formed by the clips if the gap below the clips is small. Otherwise, a small piece of insulative sheathing, drywall, or the like, can be inserted below the clips before pouring. A similar piece can be inserted above the clips after pouring.

It will be noted that the clips are self-draining there is no pocket in the metal or horizontal surface which would retain leakage and promote corrosion.

Edges of the wall panels 126 and 128, at the butt joint shown in FIG. 3, are supported above and below the clips by the spacer 106 and spacer 104 (not shown), but are not supported by the clips. In ordinary installations this construction is sufficient. For applications such as children's playrooms, public passages, and the like, in which the walls may be subject to unusual abuse, panel-supporting embodiments of this invention are provided.

FIGS. 4 and 5 show two such panel-supporting embodiments and FIG. 6 shows one of these embodiments installed in a wall. In FIG. 4, rectangular base-extensions 440 turned at right angles into sides 442 provide support for wall sheathing at the clips. Width of the base extension is approximately equal to width of the spacers used. Width of the sides is slightly less than the thickness of the spacers. Length of the sides, and of the base also, may be greater than the length of the tapered body, if desired. The base extensions are preferably integral with the clips, but may be separate U-shaped pieces, preferably provided with matching attachment holes, and may in either case be used with either type clip.

FIG. 5 shows a clip similar to that of FIG. 4, but having both elongated sides 542 and base 540. This clip affords full support of the wall sheathing, and additionally functions as a clearance template for itself on installation, automatically providing proper clearance above and below between the spacers and the tapered body at the clip.

Simple templates may be used to assure uniform vertical spacing of the clips along the walls to be fastened. These templates may be marked lengths of wood or metal, laid along the studding for indicating the desired locations of the clips and spacers. The spacers and clips are adapted for easy positioning by the square ends and the symmetrically proportioned widths of the clips.

FIGS. 6, 7 and 8 show clips of this invention in use in three further types of installations. In FIG. 6, wall 610 has been attached at a T-joint to wall 608. In FIG. 7, walls 710 have been brought individually to fixed cornerpost 708 and attached to

it. In FIG. 8, cornerpost 808 has been brought to walls 810 and has been used to attach the walls together.

FIG. 6 is also illustrative of another embodiment of the clips of this invention. Note that at 618 and 620 the respective flanges return acutely to provide additional holding advantage.

In conclusion, it will be seen that many construction problems requiring skill in nail-, bolt-, and screw-attachment are entirely avoided by the use of this invention. It will be seen further that the invention is well suited for applications involving wood-frame construction modular elements other than that noted, as for example 2x3 modules.

Although the various embodiments have been described specifically and in detail, it is to be understood that this invention may be practiced otherwise than in the precise detail given without departure from the spirit of the invention.

I claim:

1. A system for joining of first and second walls comprising: first and second interconnective clips of resilient material for respective attachment to the first wall and the second wall, interconnective portions of the clips being tapered, each clip comprising a substantially U-section channel consisting of flanged arms upturned from a flat base, the base tapered in width between the arms and the arms tapered in width normal to the base; the flanges on the arms of the first clip spaced to engage the flanges on the arms of the second clip; thereby providing a dimension across said joint variable through said tapered interconnection; and a spacer adapted for affixation between said walls to be joined affixed to a said wall in spaced vertical relation with said clips the dimension of said spacer across said joint being intermediate said interconnected clip variable dimension, thereby providing for said respective wall means to be loosely joinable in one relative vertical position and tightly joinable and in a selected position through varying said relative vertical position of the respective wall means.
2. A system as recited in claim 1, said first clip having inwardly flanged arms, all said tapers widening upwardly.
3. A system as recited in claim 2, said second clip having outwardly flanged arms, said base width taper widening upwardly and said arms width taper widening downwardly.
4. A system as recited in claim 1, all said flanges being respectively normal to said arms and parallel to said bases.
5. A system as recited in claim 1, all said flanges being respectively at acute angles to said arms and returned toward said bases.
6. A system as recited in claim 3, said spacer comprising a wood-frame construction modular element.
7. A system as recited in claim 6, and a second set of said clips vertically positioned adjacent said spacer.
8. A system as recited in claim 3, and a panel support on one clip comprising a rectangular base extension with vertical sides at right angles to said base extension, a said vertical side extending upwardly in the vertical plane beyond said base, thereby providing assembly clearance for said spacer.
9. A system as recited in claim 8, said panel support comprising a U-shaped channel adapted for attachment to a said clip.