Sept. 14, 1965 J. E. McCORMICK 3,205,632

WALL-PANEL STRUCTURE

Filed Nov. 13, 1962

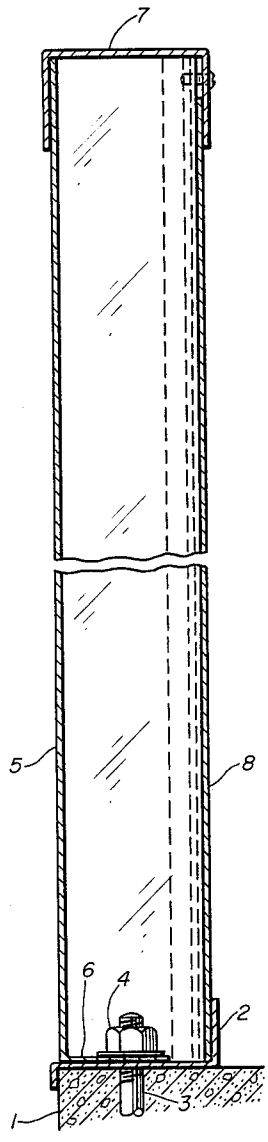


Fig. 1.

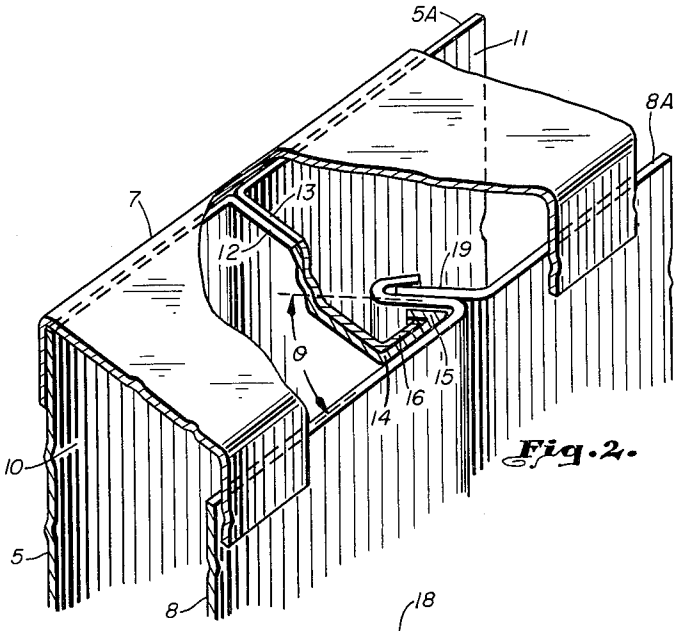


Fig. 2.

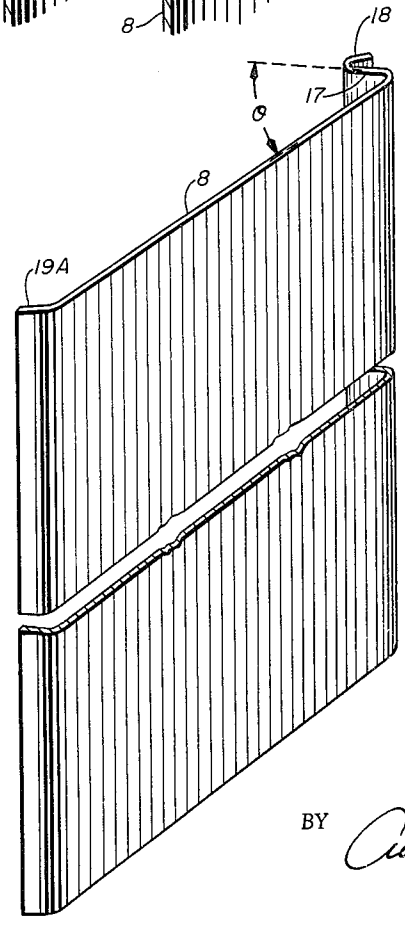


Fig. 3.

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United States Patent Office 3,205,632 Patented Sept. 14, 1965

3,205,632

WALL-PANEL STRUCTURE

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Filed Nov. 13, 1962, Ser. No. 237,276
1 Claim. (Cl. 52—588)

The present invention relates to the construction of building walls. More particularly, the invention relates to a form of junction structure between wall panels of buildings.

Many items of buildings are now prefabricated. Prefabrication has the advantage of closely controlled factory conditions which will assure economy in construction of units, combination of units and inspection of workmanship. However, the designs of buildings of prefabricated units tend to develop complex junction structures in providing assembly and stability to the assembly.

Traditionally, the erection of load-bearing walls has required the provision of load-bearing frame members mounted on a foundation. The frame members are required to sustain roof loads and anchor the complete walls to the foundation. The exterior wall surface is provided by attaching various materials, in planar form, to the frame members to provide the wall surface in the vertical plane. There is a standing problem in bringing this material together in a simple form which will provide both strength and the surface required.

Installation of interior walls, using non-load-bearing units, offers still another problem. Generally, it is desirable to mount the interior walls on the load-bearing walls with structure which is simple, yet effective and strong.

A primary object of the present invention is to provide the required mounting structure as flanges with which non-load-bearing wall panels are mounted on a load-bearing wall, the flanges having an extremely simple configuration.

Another object of the invention is to provide non-load-bearing panels with a juncture between them which effectively conceals the flanges between the non-load-bearing panels and the load-bearing panels.

The present invention contemplates a load-bearing panel, flanged to provide a simple retaining edge for non-load-bearing panels. With the retaining flange on one vertical edge of each load-bearing panel, a series of contiguous load-bearing panels will have the retaining edge configuration at each junction between load-bearing panels.

The present invention further contemplates that a non-load-bearing panel be provided with a female flange on one vertical edge which will hook over the retaining edge at each junction between load-bearing panels for support by the load-bearing panels while receiving the male flange of a contiguous non-load-bearing panel. With the non-load-bearing panels horizontally extended between, and supported by, the retaining edges of the load-bearing panels, there is produced an interior wall made up of units which are simply interlocked with each other and the retaining edges of the load-bearing wall.

Other objects, advantages and features of this invention will become apparent to one skilled in the art upon consideration of the written specification, appended claims, and attached drawings, wherein;

FIG. 1 is a sectioned elevation of a complete wall of load-bearing and non-load-bearing panels embodying the present invention;

FIG. 2 is a sectioned perspective of a junction of the wall of FIG. 1; and

FIG. 3 is a perspective of a complete non-load-bearing panel.

FIG. 1 is established to show all the components of a building wall embodying the present invention. FIG. 1 is actually a section taken normal to the plane of the wall which is represented. None of the drawings show a full length of the complete wall. It is not necessary to show a full wall panel to illustrate the invention embodied in the junction between the panels of the wall.

FIG. 1 shows concrete block 1 as a base, providing a level surface upon which the load-bearing wall panels are erected and to which these panels are directly anchored. A flashing member 2 has an S-shaped cross section, one lip of the S extending down the outside of the base 1 while the other lip extends up from the base and lies against the inside of the wall panels.

Anchor bolt 3 is extended down into base 1 and nut 4 is threaded down on this bolt, capturing the assembly of wall panels and the flashing plate 2 as a unit. Load-bearing panel 5 has flange 6 on its bottom, the element of the wall specifically captured by the nut 4.

Anchored solidly to base 1 by bolt 3, panel 5 extends vertically as high as desired. The height is not signicant to the invention, but depends upon the strength of the material used for the panel and the dimensions of the panel. The top of the wall is crowned by a cap 7 in the form of a channel. This channel cap at the top and flashing member at the bottom of the wall capture all of the panels of the wall between them to form a unit. Non-load-bearing panel 8 is supported by load-bearing panel 5; both panels extend parallel to each other between the cap 7 and flashing 2.

Channel cap 7 is secured to the load-bearing panels at their tops. All the panels are held together at their tops by the channel configuration, but cap 7 does not rest on and impose a load upon non-load-bearing panel 8.

FIG. 2 shows all the details of the junction structure formed between two load-bearing panels and two non-load-bearing panels. The load-bearing panel 5 is shown joined at one vertical edge with a vertical edge of a second load-bearing panel 5A. Non-load-bearing panel 8 is also joined at one vertical edge, with a vertical edge of a second non-load-bearing panel 8A. Channel cap 7 extends over the junction of the pairs of panels and is shown broken away to disclose the junction structure more clearly.

The junction structure for the panels is a combination of a unique form of flanging at the vertical edges of the panels. Flanged under the teachings of the present invention, the panels can be joined together easily. Additionally, the resulting junction is both effective and strong. Further, the flanges are not visible from either external side of the complete wall, being completely contained between the load-bearing panels and non-load-bearing panels.

Load-bearing panel junction

Panel 5 has a main portion 10 in a single plane. Panel 5A has a main portion 11 in a single plane. These main portions are placed contiguous to form a continuous flat wall surface which normally functions as the outside of the wall unit.

Prior to being placed contiguous to each other, the panels are provided with vertical edge portions at right angles to the common plane of the panels. Vertical edge portion 12 is formed on panel 5 while vertical edge portion 13 is formed on the adjacent edge of panel 5A. These edge portions are parallel to each other and abut while extending away from the common plane of main portions 10 and 11 in a direction normal to their common plane.

The first vertical edge portion 12 of panel 5 is then

provided with a particular form of flange. The portion **12** has a flange **14** formed thereon. Flange **14** is bent at right angles to edge portion **12**. This working of the edge brings flange **14** into parallel with the plane of main portion **10**. It is the outwardly facing surface of this flange **14** against which a non-load-bearing panel bears in its supported position.

Finally, the flange **14** on portion **12** is given a lip. The flange **14** has a lip portion **15** formed thereon. However, rather than stopping at the right angle of the first and second flanging, lip **15** is carried around until it extends at the acute angle θ from the plane of flange **14** to form a pocket. The thickness and other dimensions of the panel may be found to make angle θ somewhat greater or less than 60 degrees. In a relatively narrow range which includes 60 degrees will be found the precise acute angle which will provide the retention and support function desired for the non-load-bearing panel.

If the description of forming the first vertical edge of panel **5** has been followed on the drawing, the result of the flanging uniformly along the vertical length of the panel **5** can be defined as "wrapping" the first vertical edge of the panel around the adjacent vertical edge of panel **5A** to form the pocket.

The adjacent vertical edge of panel **5A** will be designated the second vertical edge of any similar panel. Therefore, panel **5** has this same second vertical edge, flanged as shown in FIG. 2 and wrapped by a flanging as disclosed at **12**, **14**, **15** into the pocket so formed. A flange **16** is formed on vertical edge portion **13**, to extend into the "pocket" of flange **14** and lip **15** which are formed at the angle θ to each other.

Vertical edge portions **12** and **13** may be fastened together in any of a number of suitable ways. They could be spot-welded, bolted or screwed together. Fasteners of various forms can be extended through both portions **12** and **13** to supplement the rigidity given the combination by the second vertical edge of panel **5A** nesting within the flanging of the first vertical edge of panel **5**.

This junction between load-bearing panels **5** and **5A** may be given various specific forms within the scope of this invention. However, to give the support and retention basically desired for non-load-bearing panels of the present invention, a solid, flat surface equivalent to the outside of flange **14** must be provided. Further, retention structure formed by bending lip **15** to the angle θ with the plane of flange **14** must have an equivalent in order to give a retaining edge for a flange on a non-load-bearing panel to "hook" to. If these simple structures are provided by the load-bearing wall at suitable intervals along its length, the non-load-bearing panels will complete the wall with need for few, if any, additional fastening structures to bind the panels together.

Non-load-bearing panels

As with the load-bearing panels, first and second vertical edges of two non-load-bearing panels are shown in FIG. 2. The first vertical edge portion of panel **8** is hooked over the edge formed by the flange **14** and lip **15** of the first vertical edge of panel **5**. The second vertical edge of panel **8A** is received in the flanging of panel **8** and retained thereby. In general, all the flanged edges of panels **5**, **5A** and **8**, **8A** are folded in on each other to form the wall.

Non-load-bearing panel **8** is shown in FIG. 3. The flanged edges of both vertical edges can be studied to better advantage from this FIG. 3. The junction of two such panels can be considered with the guidance of FIG. 2.

Panel **8** first has an edge portion formed on its first vertical edge to the angle θ lip **15** was bent from flange **14**. Therefore, this hook can be fitted over the corner provided by flange **14** and lip **15** and be retained thereby. The angle is made small enough that panel **8** will not

fall away from the outside surface of flange **14**; even without fasteners additionally placed through both panels. Lip **15** gives support to this first edge portion **17** of panel **8** and this solidarity extends along the complete length of the position.

On the end of first edge portion **17** is formed a hook flange **18** to receive the second vertical edge of the adjacent non-load-bearing panel **8A**. This hook is formed by simply bending the last portion of first edge portion **17** back away from lip **15**. The result is to form this first vertical edge of panel **8** into an S-shape; one hook of the S receives the support of the load-bearing panels, the other hook of the S receives the second vertical edge of an adjacent non-load-bearing panel to hold the two panels in the same plane, parallel to the plane of the load-bearing panels.

To join the first vertical edge portion of panel **8** with the second edge portion of panel **8A**, panel **8A** is given a very simple bend which fits into the hooked end of the first edge portion of panel **8**. This bend, on panel **8**, is shown at **19A**, bent to the supplemental angle which the first edge portion **17** makes with the plane of panel **8**. This brings lip **15**, edge portion **17** and edge portion **19** into parallel, the end of **19** nested within the hooked end or the first edge portion of panel **8**; lip **15** and flange **14** are nested within the angle of the first edge portion.

Contiguous panels **5** and **5A** and **8** and **8A** are maintained parallel to each other and bound together into a unit by the junction structure. Cap **7** fits over all the panel units at their tops without imposing a load on the non-load-bearing panel. The basic assembly, therefore, requires little or no fastening means in addition to the flange system at the first and second vertical edges of the panels.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The present invention having been described, what is claimed is:

A load-bearing wall comprised of;

a series of load-bearing panels with each panel having a first vertical edge portion extending perpendicular to the plane of the panel,

a flange extending outward from the end of the edge portion and lying parallel to the plane of the panel, the flange terminating in a lip portion bent inwardly at an acute angle with the flange to form a pocket;

each of the panels also having a second vertical edge portion extending perpendicular to the plane of the panel and being bent in the same direction as the first vertical edge portion,

a flange extending inward from the end of the second edge portion and lying parallel to the plane of the panel;

the second vertical edge portion of one panel abutting the first vertical edge portion of an adjacent panel with the flange of the second edge portion of one panel received in the pocket formed on the first vertical edge portion of an adjacent panel;

a series of non-load-bearing panels mounted on the load-bearing panels with each panel having a main portion arranged in a single plane which is parallel to the plane of the load-bearing panels,

a first edge portion bent toward the load-bearing panels and forming, in relation to the main portion, the same acute angle as the lip of the first vertical edge portion of the load-bearing panel and abutting the lip, the first edge portion of the non-load-bearing panel having a hooked end portion directed away from the lip, the main portion of the non-load-bearing panel abutting the flange of the first edge portion of the load-bearing panel;

and a second edge portion on each non-load-bearing panel bent at an angle to the main portion of the panel, the angle being the supplement of aforesaid acute angle, the second edge portion of one-load-bearing panel abutting the first vertical edge portion of an adjacent non-load-bearing panel and being seated within the hooked portion of the first edge portion,

and a cap having downwardly extending flanges embracing the upper edges of the parallel load-bearing and non-load-bearing panels and bearing only on the upper edges of the load-bearing panels.

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