

Nov. 18, 1969

H. W. COLLINS

3,479,073

BUILDING PANEL SYSTEM

Filed Feb. 16, 1966

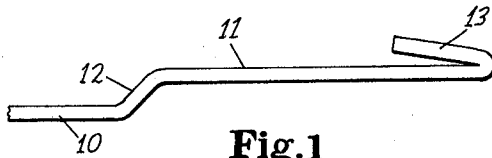


Fig. 1

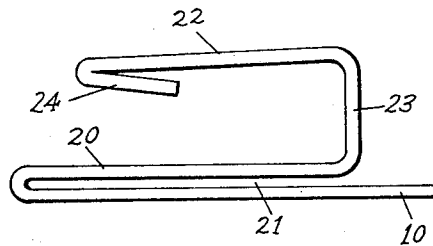


Fig. 2

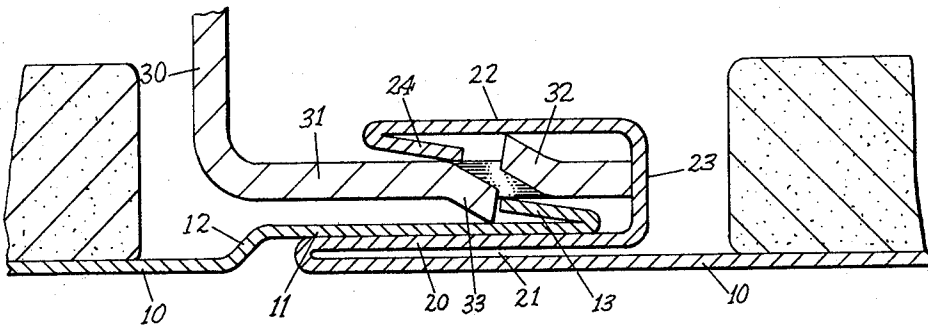


Fig. 4

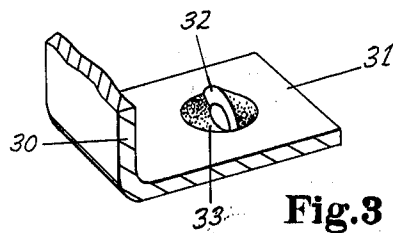


Fig. 3

INVENTOR

HOWARD W. COLLINS,

BY *Yungblut, Melville, Shasser, and Foster*
ATTORNEYS

1

2

3,479,073

BUILDING PANEL SYSTEM

Howard W. Collins, % Armco Steel Corporation,
Middletown, Ohio 45042

Filed Feb. 16, 1966, Ser. No. 527,881
Int. Cl. F16b 1/00, 5/00, 7/00

U.S. Cl. 287—189.36

2 Claims

ABSTRACT OF THE DISCLOSURE

Building panel system including panel members having adjacent edges configured to fit together in interdigitating relationship, with a support member extending between interdigitated portions of adjacent panels and locking them together against forces acting in any of three directions.

This invention relates to a building panel system, and more particularly to such a system including metal panel members which coact with formed metal structural members to form interior or exterior wall systems, ceilings, etc.

Metal buildings and panel systems are of course old per se. According to conventional practice, a metal panel system will include a plurality of relatively thin panel members joined in edge to edge relationship. The panels as joined will then be secured to a suitable supporting structure as by bolting or the like. This of course means that at least semi-skilled workers are necessary for the erection of such a panel system.

Accordingly, it is a primary object of this invention to provide a metal building panel system wherein adjacent edges of a pair of panel members fit together as described in more detail hereinafter and wherein a structural member will "snap" into place, coacting with the joined edges of the panel members to provide a secure joint.

Specifically, it is an object of this invention to provide a panel system wherein the adjacent panel members are provided with complementary interdigitating configurations whereby assembly requires no rivets, bolts, welding, or special tools.

A further object of the invention is the provision of a panel system wherein the various elements may be quickly assembled without the use of special tools, and which, when assembled provide a tight, rigid, joint.

It is an object of this invention to provide a panel system in which the assembled joint is secure against disjoining due to loads applied from any of three directions; specifically, the joint will remain secure against differential pressure applied normal to two adjacent panel faces, against pulling forces parallel to the face of the panel and perpendicular to the seam, and against racking loads—the slipping of adjacent panels longitudinally along the seam.

Still another object of this invention is to provide a building panel system in which all components are easily prefabricated by the manufacturer.

Still another object of the invention is the provision of a panel system in which the handling and shipping costs of the manufacturer are reduced, in that the panel members and coacting structural elements are the only components which must be shipped, since no special fastenings or fittings are required.

While the metal panel system and buildings have many advantages, it is generally believed that an all metal construction necessarily involves an unusually high noise transmission factor. It is therefore still another object of this invention to provide a panel system which has remarkably low acoustical transmission properties.

Numerous other objects and advantages of this invention will become apparent during the following description. Reference will be made from time to time to the

accompanying drawings which illustrate a specific embodiment of the invention, and in which:

FIGURE 1 is a cross sectional view showing the configuration of one panel edge;

5 FIGURE 2 is a cross sectional view showing the complementary panel edge;

FIGURE 3 is a partial perspective view showing a portion of one of the structural members of this invention; and

10 FIGURE 4 is a cross sectional view showing a pair of panel members and a structural member in their assembled position.

Briefly considered, this invention contemplates a panel system wherein adjacent panels are provided with complementary male and female edges, adapted to be placed in an interdigitating relationship. The preformed structural member for the panel system of this invention is then "snapped" into place between interdigitated portions of the adjacent panels, and serves to securely lock the adjacent panels in the assembled position.

20 FIGURES 1 and 2 show in cross section, and on an enlarged scale, the complementary male and female edge portions respectively of a pair of adjacent panels. It will be understood that the method or procedure for forming the edges disclosed does not form a part of this invention; the respective male and female edges may be formed by any known expedient.

Referring to FIGURE 1, the wall portion of a panel member is indicated at 10. One edge of the panel member is formed to include a tongue 11 parallel to and offset from the wall portion 10 of the panel member. The offset portion is indicated in the FIGURE at 12. The outermost end of the tongue is folded back upon itself to provide the locking tab 13.

30 As seen in FIGURE 2, the opposite end of a wall or panel 10 will be formed to provide a generally U shaped channel opening toward this edge of the panel member. The generally U shaped channel includes a first channel wall 20 which is parallel and spaced apart from the wall portion 10. It is believed that the separation 21 formed between the wall portion 10 and the first channel wall 20 at least in part accounts for the remarkably low vibration transmission through the wall. The generally U shaped channel includes a second channel wall 22 which is generally parallel to and spaced from the first channel wall, and is secured thereto by means of the bottom channel portion 23. It will also be apparent that the free end of the second channel wall 22 is folded back on itself to form the locking tab 24.

50 Preferably the panels will have gypsum board adhered to their inside surface. This helps to keep the panel faces flat and stiff making them weighted or dampened diaphragms which do not tend to vibrate. The stiffened centers sprung at the edges by the separation 21 provide extremely low noise transmission. It has been found that a system made up of parallel panel walls with thermal insulation between will show a sound transmission loss averaging 46 decibels for a frequency range of 125 to 4000 cycles per second. The gypsum board should be covered with metal foil or some other vapor barrier to prevent warpage or deterioration due to moisture absorption by the gypsum.

60 Referring now to FIGURES 3 and 4, the formed structural member of this invention is indicated generally at 30. This structural member may take on a wide variety of forms, depending upon the specific usage contemplated. In any event, the structural member must be provided with the flange 31 which is adapted to be inserted between interdigitated portions of the male and female edges shown in FIGURES 1 and 2 respectively. The flange portion 31 of the structural member is provided with the oppositely extending projections 32 and 33. In the embodi-

ment shown in the drawings, these projections are in the form of the D dents. It will of course be understood that other configurations of perforations, dimples, or projections could be used.

FIGURE 4 shows the completed panel joint. The preferred sequence of assembly is as follows. A suitable sealant or adhesive, if required, is placed in the U shaped channel of the female edge, and the flange 31 of the structural member is inserted therein. Then the tongue 11 of the male edge of the next panel is inserted between the flange 31 of the structural member and the channel wall 20.

It will be seen that the outer surfaces of the adjacent panels are substantially flush. This slight groove occurring at the offset 12 can be filled with a filling compound or the like if desired.

The sealant or adhesive used in the U shaped channel of the female edge may serve several purposes. It can be used to seal the joint, making it air and water tight; it can act as an adhesive to increase the resistance to racking forces; and it can insure that the joint is "full" and will not rattle when vibrated.

It will be seen in FIGURE 4 that when the male and female edges are placed in the proper interdigitating relationship, the locking tabs 13 and 24 will be directed toward the center of the resulting channel. The flange portion 31 of the structural member is then snapped into the position shown in FIGURE 4, at which time the projection 33 will contact the locking tab 13, preventing withdrawal of the male edge, while the projection 32 will contact the locking tab 24, preventing withdrawal of the female edge. As indicated earlier, this joint will remain secure against differential pressure applied normal to two adjacent panel faces, against pulling forces parallel to the face of the panel and perpendicular to the seam, and against racking loads—the slipping of adjacent panels longitudinally along the seam.

Various modifications may be made in the panel system of this invention, without departing from its scope and spirit.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A building panel system comprising:

- two adjacent panels having interdigitating male and female edges,
- said female edge being formed as a channel for receiving said male edge and including, serially connected,
- a first channel wall secured to the edge of said panel,
- a bottom channel portion,
- a second channel wall, disposed generally parallel to said first channel wall,
- a first locking tab projecting into said channel from said second channel wall,
- said male edge including a tongue projecting into said channel and a second locking tab projecting outwardly from said tongue, and
- a support member having a planar portion disposed in said channel between said tongue and said second channel wall, said planar portion including projections extending out of the plane of said planar portion in opposite directions and engaging respectively said first and second locking tabs.

2. A building panel system according to claim 1 further comprising:

- an adhesive disposed in said channel to resist racking forces.

References Cited

UNITED STATES PATENTS

2,258,911	10/1941	Skoko	285—424 X
2,703,110	3/1955	Curtis	285—424 X
1,399,088	12/1921	Seymour	52—582
2,189,159	2/1940	Anschilds	52—470
2,822,898	2/1958	Richards	52—497
3,187,389	6/1965	Anderson.	

FOREIGN PATENTS

1,391,568	1/1965	France.
-----------	--------	---------

RAMON S. BRITTS, Primary Examiner

U.S. Cl. X.R.

52—582, 588; 285—424