March 13, 1962 F. BURMEISTER 3,024,880

TRANSLUCENT BUILDING PANELS

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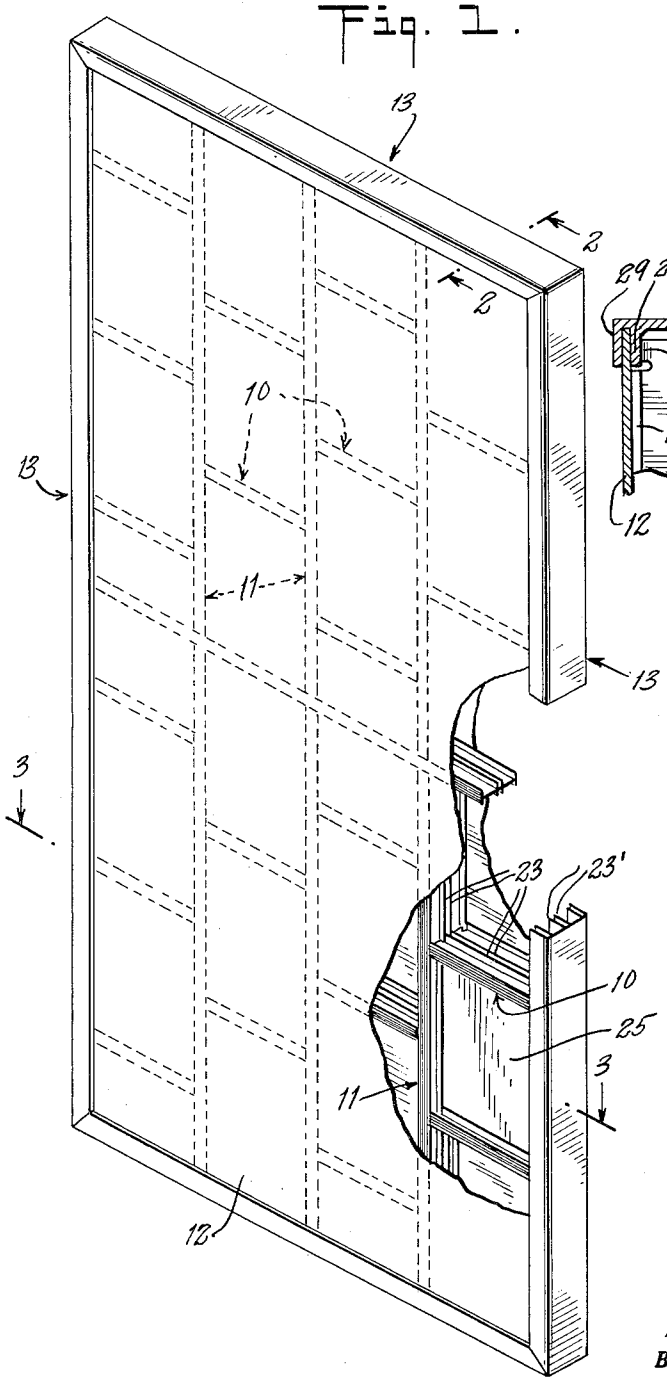
Fig. 1.



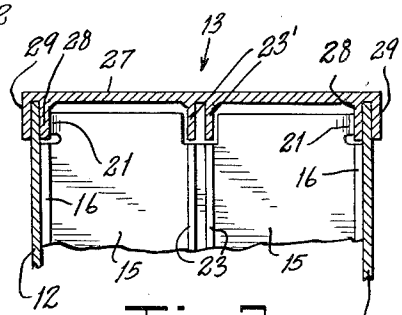


Fig. 2.

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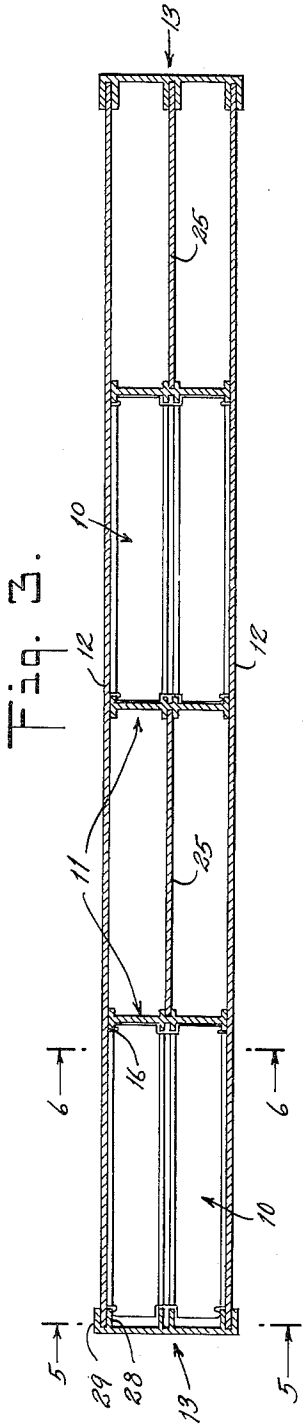

Fig. 3.

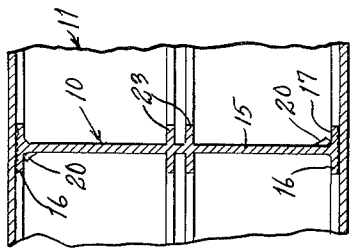

Fig. 6.

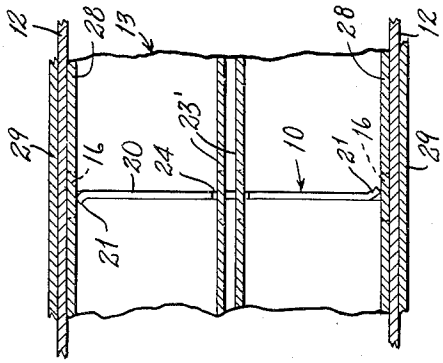

Fig. 5.

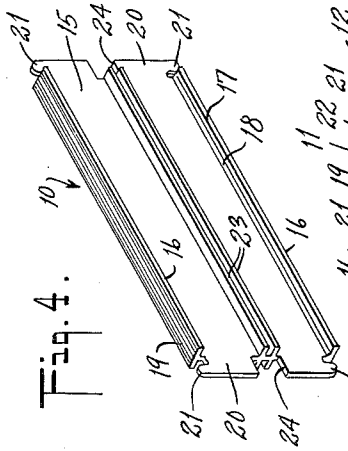

Fig. 4.

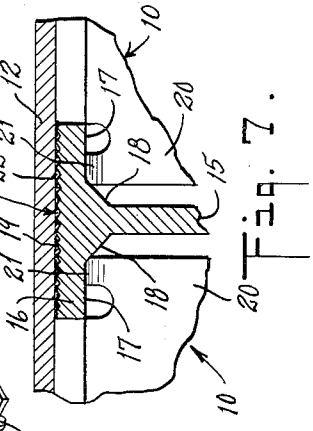

Fig. 7.

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TRANSLUCENT BUILDING PANELS

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4 Claims. (Cl. 189—64)

This invention relates to building panels and more particularly to the type of building panel which is fabricated of two layers of translucent plastic material laminated to the sides of an interior open gridwork core.

Panels of the indicated type are of sandwich design and usually comprise an interior gridwork composed of extruded aluminum beams locked to each other and to a frame or perimeter made of aluminum extruded beams, and a one piece layer of Fiberglas reinforced acrylic-polyester plastic bonded to each side of the gridwork by means of an adhesive which is activated by heat and pressure.

Translucent building panels of the indicated type have found favor in building constructions because of their light transmitting and insulating qualities, their light weight and their attractive appearance. Another important factor in their favor is the low cost of installation of such panels. They are hindered however, in their acceptance for many other uses in which they can be employed with equal success because of the cost of their construction. While the structure of these panels is relatively simple and it is principally constituted of sheets of plastic and extruded aluminum beams that readily lend themselves to mass production methods, the assembly of such parts is accomplished by a hand operation that raises the cost of these panels above that which would enable them to favorably compete with other customary, though probably less satisfactory, constructions. In the assembly of these panels, the most time consuming operation, so far as labor is concerned, is probably the joining of the aluminum beams together to form the open framework. Recognizing this, the art has tried various expedients to reduce the assembly time of such beams without affecting the strength of the structure, which it will be readily understood, is of great importance in a structure as light in weight as these panels and employed for the purposes for which they have been designed.

The primary purpose of the present invention is to provide an improved translucent building panel of the indicated type which is structurally strong for the purposes intended and yet which is of a construction that readily adapts itself to rapid, low cost assemblage.

Another object of the invention is to provide a translucent building panel of the indicated type in which the gridwork beams are joined by an improved extremely simple yet rugged connection that enables the beams to be readily assembled into gridwork form.

Other objects of the invention, as well as the advantages thereof, will become apparent from the following description when read in connection with the accompanying drawings, in which

FIG. 1 is a perspective view of a building panel embodying the invention and partially broken away to show its interior construction;

FIG. 2 is an enlarged detailed sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is an enlarged horizontal sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is a perspective view of one of the core beams;

FIG. 5 is a vertical sectional view on an enlarged scale taken along the line 5—5 of FIG. 3;

FIG. 6 is a view similar to FIG. 5, but taken along the line 6—6 of FIG. 3; and

FIG. 7 is an enlarged detailed sectional view of the upper end of a longitudinal core beam and associated portions of transverse core beams.

In the drawings, the reference numerals 10, 11 indicate the transverse and longitudinal beam elements, respectively, which make up the interior gridwork core of the panel. Laminated to the sides of the gridwork are two sheets 12, 12 of translucent material such as the plastic above indicated. The edges of the gridwork and the sheets are enclosed by side frame beam elements 13.

It will be noted that the frame elements 10 and 11 are in the nature of I-beams and are preferably made of extruded aluminum, though they may be made of other suitable materials and formed by other methods of construction well known to the art. Each of the elements 10, 11 has a web portion 15 extending from end to end thereof and having provided along its longitudinal edges flanges 16, 16 which project outwardly from each side of the web portion 15. The inner side of each flange is formed by a substantially flat, plane longitudinal surface 17 which extends throughout the length of the flange, and a coextensive inclined surface 18 joined along one longitudinal edge with plane surface 17 and along its other longitudinal edge with a surface of web portion 15. The outer surfaces of the flanges 16 preferably are minutely grooved longitudinally at 19 to provide a means for holding the adhesive by which such outer surfaces are adhered to the inner surfaces of the plastic sheets 12.

The aforesaid grooved flanges 16 on each of the beam elements 10 and 11, terminate at points short of the ends of such elements so that the ends 20 of the web portion project beyond the ends of such flanges. The length of such projecting ends 20 is at least as great as the width of the plane surfaces 17 on the flanges 16 and preferably slightly greater, but less than the distance between the outer edge of a flange 16 and the associated surface of the web portion 15 on which such flange is provided. The upper and lower extremities of each web end 20 are formed to provide oppositely extending, deformable, friction locking members 21, 21, the outer ends of which are normally spaced apart a distance greater than the distance between opposed plane surfaces 17 on the flanges 16 associated with such web. The locking members 21, which preferably are constituted of relatively soft metal aluminum, are constructed so that their outer ends may be readily bent in the assembly of the beams. Thus a web end 20 of one beam can be frictionally wedged between the opposed plane surfaces 17 on one side of another beam, and the two beams will be frictionally locked together by such members 21.

The beam elements 10 and 11 differ in the respect that they are of different lengths. The lengths of the longitudinal beams 11 are substantially uniform and extend the length of the building panel in substantial parallelism. The shorter beam elements 10 are disposed at right angles to the beams 11 and their lengths depend upon the widths of the spacing between the beams 11 in which they are

located. As is customary, the transverse beam elements **10** may be variably arranged in the spacings between the beams **11** to obtain any desired pattern or architectural effect.

In assembling the elements which are to constitute the interior gridwork of a panel, the longitudinal beams **11** are arranged in substantially parallel relation and then the transverse beams **10** are assembled in interlocked relation on the longitudinal beams. In interlocking a beam **10** with a beam **11**, an end **20** of the former is inserted at right angles into the space between the flanges **16** on one side of the latter, with beam **10** slightly tilted to permit the unbent locking members **21** on such end **20** to enter between the opposed plane surfaces **17** of such flanges. Beam **10** is inserted until the adjacent ends of the flanges **16** thereof come into engagement with the outer side edges of the flanges on the beam **11**. The workman then turns the transverse beam **10** about its longitudinal axis to bring it to a vertical position. In this turning movement the outer ends of the locking members **21** on beam **10** wipe along the opposed plane surfaces **17** of beam **11** and are bent in opposite directions (note FIG. 6) so that by the time such turning wiping action is completed the transverse beam **10** will be frictionally interlocked with the associated beam **11**. As has been indicated and as is shown more clearly in FIG. 7 of the drawings, the length of the tongues **20** on the transverse beams **10** may be greater than the widths of the plane surfaces **17** on the inner sides of the flanges **16** so that such tongues will come into wedging relation with the inclined surfaces **18** thereby enhancing the frictional grip between the beams.

It will be apparent that the assembly of the interior gridwork in the manner indicated can be accomplished in a relatively short period by workmen of relatively little skill. Even though this operation is relatively rapid, it has been found that the friction lock between the beams will provide a rigid structure that may be handled without danger of displacement of the beams and which is capable of sustaining substantial stresses without becoming disassembled. Thus it is likely that this manner of connecting the beams together may make it possible for the first time in this art to enable the production of these panels to be accomplished in an assembly line operation.

After the interior gridwork elements **10** and **11** have been assembled in the desired relation, the translucent facing members or sheets **12** are applied to opposite sides of the gridwork with the aid of a suitable adhesive **22** in FIG. 7. The adhesive is preliminarily spread over and along the grooved edge surfaces **19** of all of the gridwork beam elements **10, 11** and adheres the inner surface portions of the sheets **12** overlying such surfaces **19** to the latter. The adhesive bond between the beam elements **10, 11** and the sheets **12** fixes such parts in their desired relationship and coacts with the friction lock between the beam elements to provide a rigid panel of great strength.

It will be noted that the beams **10** and **11** of the gridwork are each provided centrally of the web portion **15** thereof with a pair of spaced longitudinally extending flanges **23, 23** projecting outwardly from each side of the web portion **15**. As is shown more clearly in FIG. 4 of the drawings, the flanges **23, 23** in the transverse beams **10** are approximately coextensive with the edge flanges **16** thereof and extend up to the inner ends of notches **24, 24** provided in the end portions **20, 20** of the web **15**. The notches **24, 24** are of a depth approximately equal to the length of the end portions **20, 20** and are wide enough to readily receive the flanges **23, 23** of the associated longitudinal beams **11** of the gridwork and the corresponding flanges **23', 23'** provided on the side frame beams **13** (note FIG. 5). It will be understood that as a result of this construction the opposing pairs of flanges **23, 23** on two adjacent transverse beams **10** will form with the portions therebetween of the flanges **23, 23** on one longitudinal member **11** and on either another longitudinal member **11**, or of the flanges **23', 23'** on a side frame beam member **13**, a frame adapted to receive a sheet **25** of suitable size. Thus those sheets **25** which are mounted in the frames so formed in the gridwork, will be located centrally of the gridwork and approximately midway between the outer side sheets **12, 12**. The sheets **25** preferably are made of translucent plastic material of a suitable color or a variety of colors and may be located in any suitable arrangement in said frames in the gridwork to obtain desired color and design effects. It will be apparent that the aforesaid construction enables the resultant color effect to be displayed to equal advantage on both sides of the panel.

The building panel is finished at its edges by the side frame beams **13**. Preferably the side beams **13** each include a web portion **27** having inwardly extending flanges **28, 28** which are spaced apart a distance equal to the length of the space between the edge flanges **16, 16** in the beam elements **10** and **11** and which are aligned with such flanges **16, 16** (note FIGS. 2, 3 and 5). The locking members **21** of the associated transverse beams **10** are frictionally locked with the inner surfaces of such flanges **28, 28** in the manner previously explained with respect to flanges **16**. The flanges **28, 28** also form with outer inwardly extending flanges **29, 29** arranged in spaced parallel relation thereto, a pair of longitudinally extending recesses to receive the associated edge portions of the two facing sheets **12, 12**. The said edge portions of the facing sheets may be permanently locked in such longitudinal recesses with the aid of a suitable adhesive, the bond of which may be enhanced by roughening or grooving either one or both opposing surfaces of each pair of flanges **28, 29**. The ends of the side frame beams **13** are beveled so that the several flanges thereof will properly enclose the facing sheets **12, 12** and also the colored sheets **25** which may be associated with the ends of such side beams. This construction has the advantage that the outer enclosing flanges **29** of the side frame beams form an integral protecting lip for the facing sheets. It is to be understood however, that the panel may be constructed without the protective flanges **29**, so that the side edge portions of the facing sheets are secured to the flanges **28** of such side frame beams in the same manner that the inner portions of such sheets are secured to the flanges **16** of the gridwork beams **10** and **11**.

Having illustrated and described a preferred embodiment of my invention, what I claim as my invention is:

1. A structural panel comprising a multiplicity of rigid beams extending approximately the length of the panel in one direction and disposed in spaced parallelism, a plurality of rigid beams of shorter length disposed at right angles to said longer beams, each of said beams having a web portion of substantial depth extending from end-to-end thereof and flanges extending along opposite edges of said web portion, the flanges in each of said shorter beams on at least one end thereof, abutting against intermediate portions of the flanges on at least one of said longer beams, the flanges on said longer beams presenting oppositely directed plane surfaces of a width substantially greater than the thickness of the web portion, said abutting ends of said shorter beams having locking projections provided adjacently beyond the associated flange ends and located between said opposed surfaces, said locking projections extending outwardly from the associated web in opposite directions, being made of readily deformable material, and being bent in opposite directions and frictionally engaging such opposed edges in such tight relation, that said projections and opposed surfaces frictionally lock the associated short and long beams together, and a pair of facing sheets of translucent material secured to the outer surfaces of all of said flanges and enclosing the gridwork formed by said beams.

2. A structural panel as defined in claim 1 in which said locking projections and said opposed surfaces are constituted of aluminum, the aluminum material of such

projections and surfaces being deformed under force so that such elements are formed into a permanent interlocking relation.

3. A structural panel as defined in claim 1 in which the flanges on said longer panels are provided with inclined surfaces located adjacently inwardly of said opposed surfaces, and in which said locking projections are deformed against and are interlocked in wedging relation with said inclined surfaces.

4. A structural panel as defined in claim 1, in which said short and long beams are provided on the longitudinal central sections of the web portions thereof with a pair of spaced flanges extending in the same direction as said edge flanges, the central spaced flanges on associated short and long beams forming a plurality of sheet frames intermediate said facing sheets, and colored sheets mounted in said sheet frames.

References Cited in the file of this patent

FOREIGN PATENTS

1,069,848 Germany ---------- Nov. 26, 1959