

Jan. 22, 1957

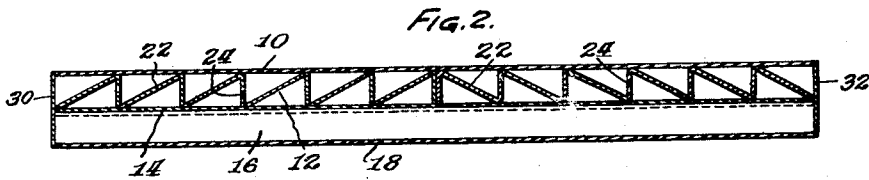
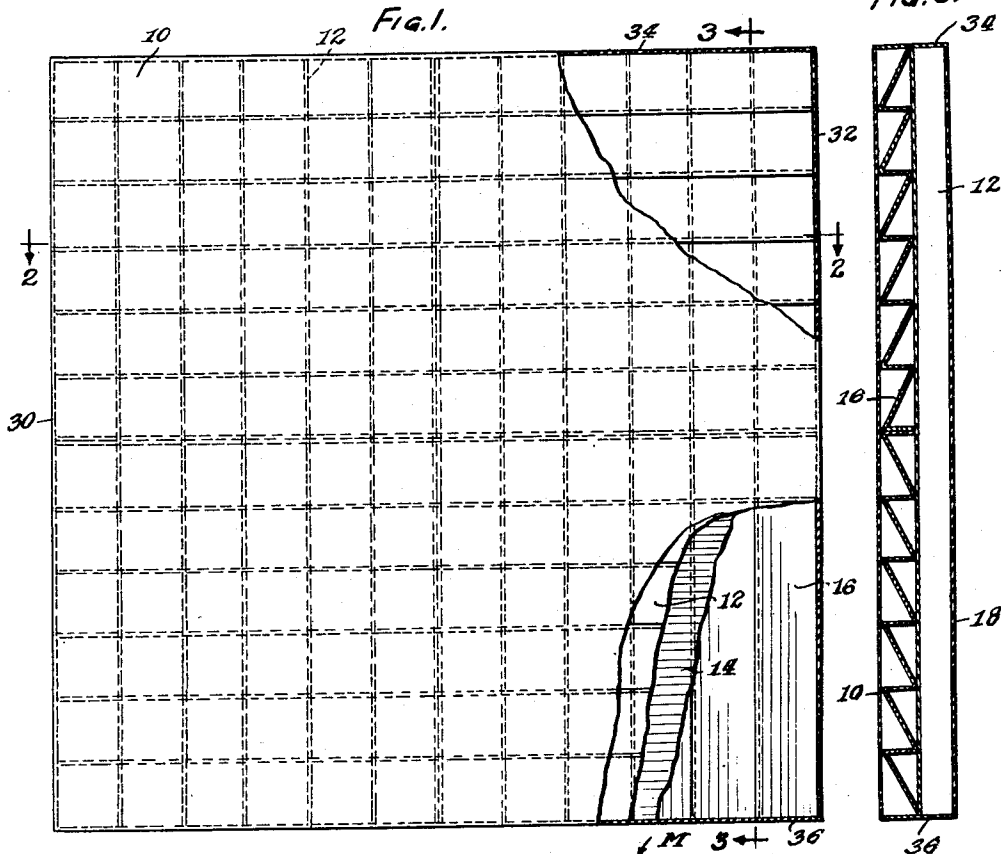
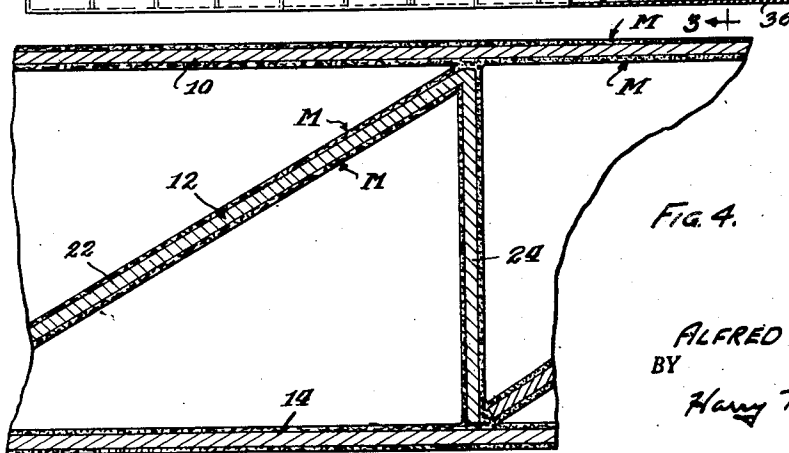
A. BRIGGS

2,778,458

MULTI-STRUT OR MULTI-CELL PANELS

Filed Sept. 5, 1951

2 Sheets-Sheet 1



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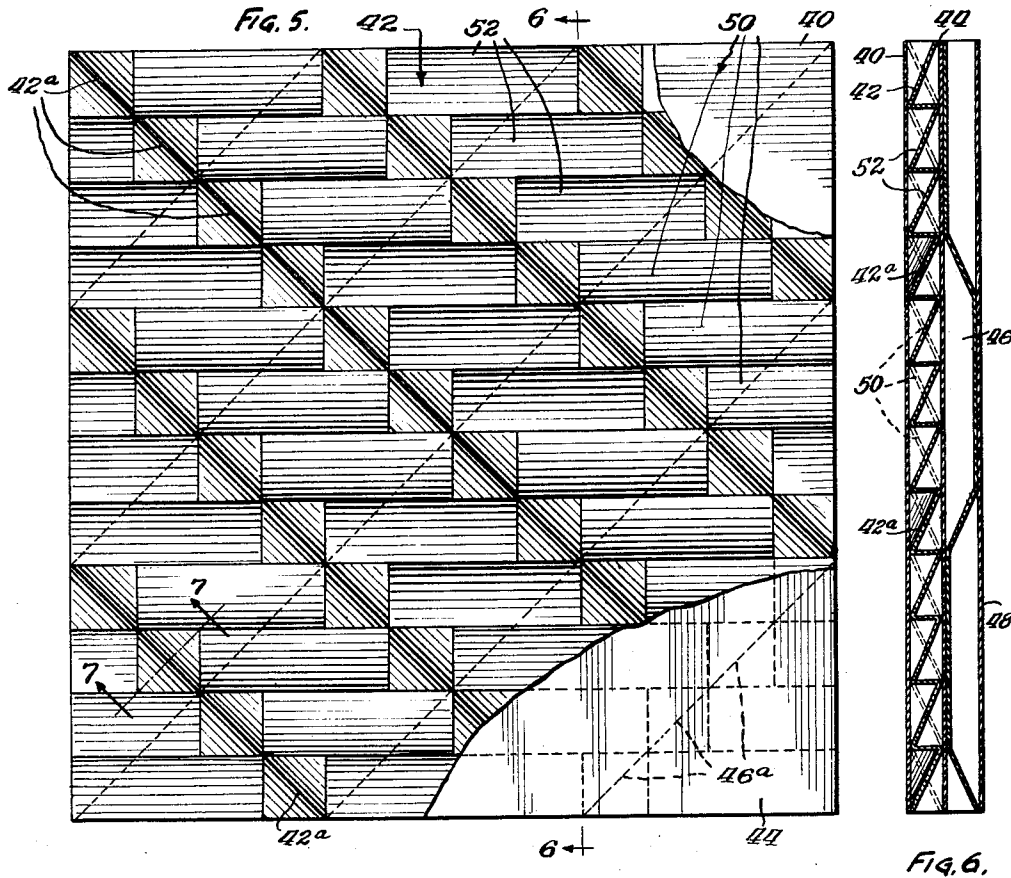
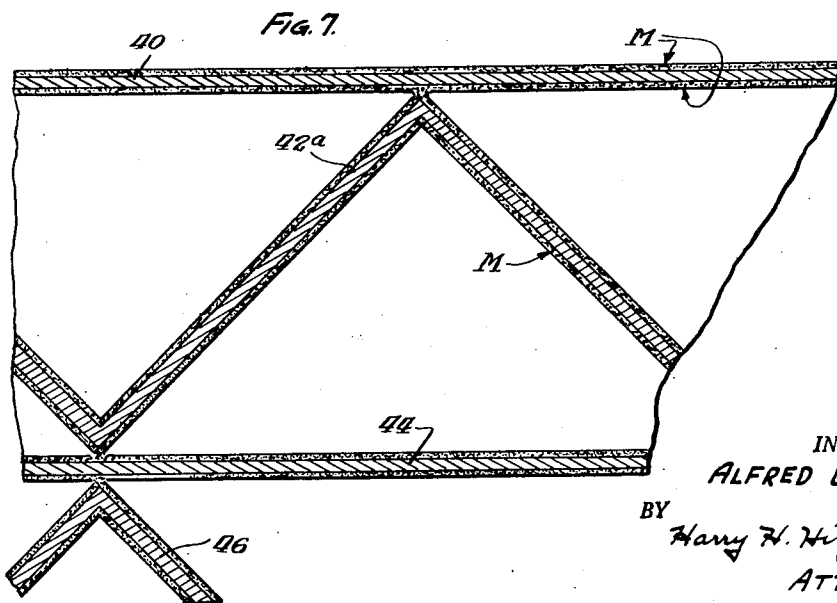
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MULTI-STRUT OR MULTI-CELL PANELS

Alfred Briggs, Chicago, Ill.

Application September 5, 1951, Serial No. 245,159

1 Claim. (Cl. 189—34)

My invention relates to an improved method of making multi-strut or multi-cell panels and the improved panel produced thereby.

My invention relates more particularly to a method of making panel structures which employ one or more flat sheets of metal and one or more embossed or deformed sheets, all secured together as a unitary structure to impart greatly increased rigidity and structural strength to the panel, without adding undue weight to the same.

Panels of this character can be put to many uses. For example, they can be used as part of wall or ceiling structures in buildings, in which case the surface of the panel may be utilized to provide ornamental effects in addition to the load-bearing qualities of the panel. Another typical use of such panels is in the walls, ceilings or floors of vehicles such as airplanes, trailers, freight trucks and the like, where a strong, light-weight member is desired. Under such conditions, the panels may be called upon to withstand a considerable variety of loads, so that a panel which is designed to be loaded in a single direction only is not satisfactory. Of course various substances may be used for the panel, but in general metal is the most satisfactory from all standpoints, and particularly so in structures, because of its high strength and great durability. The handicap of weight resulting from its relatively high density, can be overcome to a large extent by so disposing the metal as to obtain maximum strength for the quantity of metal used.

For uses of these kinds, many different types of panels have been devised previously; but usually these have been adapted to some particular use and so find only a limited commercial application. Another shortcoming of many known types of panels is that they have not always achieved the most efficient distribution of the metal used, so that they have not been as lightweight as possible for a given strength.

In view of these considerations, it is a general object of my invention to provide a panel structure made from thin sheet material in which a maximum of strength is obtained in proportion to the weight of the panel.

It is a further object of the invention to provide a panel construction of the above general character in which cross-bracing in opposite directions is effected, as well as diagonal cross-bracing.

It is a further object of the invention to provide an improved panel construction whereby a plurality of dead air cells are created in the panel, the cells being obtained by the sealing of the edges of the struts or bends in the "corrugated" sheets against the surfaces of the flat sheets between which they are placed.

A further object of the invention is to provide an improved panel of the type described constructed of sheet metal coated with zinc or other low fusing metal so that abutting edges and surfaces of the sheets which comprise the panel can be fused together by electric induction or externally applied heat to effect a seal between the metals of the sheets throughout the entire surface contact area

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of juxtapositioned sheets whereby multiple strutting is obtained and multiple air cells are created.

For a more comprehensive understanding of the invention and its method of procedure, reference may be had to the accompanying drawings, upon which

Fig. 1 is a plan view of a composite panel made of a plurality of sheets with multiple strutting in opposite directions, the panel being broken away in section to more clearly show other parts of the construction;

Fig. 2 is a cross-sectional view thereof taken on line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary cross-sectional view showing the manner in which the metal coating of the sheet members is fused together;

Fig. 5 is a front elevational view of a modified form of construction which includes diagonal bracing in opposite directions as well as paneling bracing in opposite directions;

Fig. 6 is a sectional view taken generally on the line 6—6 of Fig. 5;

Fig. 7 is an enlarged fragmentary sectional view showing the manner in which the cross-bracing is fused together and is taken on the line 7—7 of Fig. 5.

In the embodiment of the invention which I have chosen to illustrate and describe the same, I have shown a plurality of alternate constructions of the multi-strut or multi-cell unit, it being apparent from this showing that other similar constructions may be accomplished without departing from the spirit of the invention.

Thus, as shown in Fig. 1, I provide a panel which may be of any suitable or desirable shape, but which I have shown as square and consisting of a top sheet metal member 10, a multi-strut member 12, a second panel member 14, a similar multi-strut member 16 with the bracing in the opposite direction, and a lower sheet metal member 18. The multi-strut panel 12 may be either in separate angle-shaped pieces or it may consist of a continuous strip having the diagonal legs 22 and the short legs 24 which are so directed that when the multi-strut sheet is placed between two of the outer sheets the short panels 24 will provide effective cross-bracing between the two sheet metal members throughout their length.

Each of the panels 10, 12, 14, 16 and 18 are preferably coated with zinc or other low fusing metal as shown in exaggerated thickness in Fig. 4, so that when the panel is assembled and pressed together and placed in a field of an electric circuit whereby heat is transmitted electronically in the area in which the panel is located the heat will be sufficient so that the surface coating on each of the panels will melt to a sufficient degree so that all of the contact surfaces throughout the panel will be fused together and a unitary structure will result. In the event that it is desired to make the structure of the panel completely air-tight, the four side edges 30, 32, 34 and 36 may be folded up to close the side walls of the panel, and the edges also would be coated with zinc or other fusible material, pressure is applied to bring all of the possible contact surfaces of the panel together and heat is applied as herein before described, a panel will be produced with cross-bracing both longitudinally and horizontally, as well as rigid cross-struts throughout its thickness.

In Figs. 5 to 7 inclusive, I have shown a modified form of the invention wherein I employ the top sheet metal member 40, a multi-strut panel 42, a medial flat panel 44, a second multi-strut panel 46, and a third flat sheet metal panel 48.

The multi-strut panels 42 and 46 may be similar in surface configuration, but are adapted to be placed at right angles to each other in the panel so that the diag-

onally disposed ridges 42a will be at right angles to the diagonally disposed ridges 46a of the panel 46.

Each of these panels may be formed with a plurality of sloping wall portions 50 and 52 which converge at a peak to form the diagonal ridge 42a. As best seen in Fig. 5, the rows of ridges 42a provide spaced diagonal peaks running across the panel, the peaks being spaced by the length of the sloping wall portions 50 and 52. When this sheet is turned at 90 degrees as is the panel 46, it will provide the rows of diagonal walls 46a as shown in dotted lines on Fig. 5 to produce the checkerboard design that can be seen, with two of the diagonal ridges 42a forming one side of the checkerboard effect that is thereby created.

With this construction I prefer to have a surface coating of zinc or other fusible metal so that the abutting edges of the sheets which comprise the panels will be fused together as previously described either by electric induction welding or externally applied heat, such as in a furnace or by other similar methods. To effect a metal seal between the metals of the various sheets in the panel throughout the entire area of the juxtapositioned sheets whereby multiple strutting is obtained and multiple air seals are created throughout the length and breadth of the structure.

From the foregoing description it can be seen that I have provided a new method of making a composite panel from comparatively thin sheet metal members, the same including when assembled cross-bracing both through the thickness of the panels as well as longitudinally and horizontally and diagonally in both directions. By the use of a panel such as the panel 42 or 46, which is adapted to be bent to the shape shown upon a suitable press, it can be seen that great rigidity and bracing is provided due to the right and left bends in the surface, as well as the diagonal bends across the same. Since panels 42 and 46 are similar, by turning one at 90° to the other, as shown in Figs. 5 and 6, a composite panel is provided which is effectively braced in all directions.

I contemplate that changes and modifications may be made in the exact details shown, and I do not wish to be limited thereby, but rather what I desire to secure and protect by Letters Patent of the United States is set forth in the appended claim.

I claim:

An integral structural unit consisting of three flat parallel metal sheets equally spaced apart, a pair of preformed metal brace members, one disposed between the middle sheet and each of the two outside sheets, each of said brace members being similar, said brace members formed with parallel ridge members transverse to the plane of said member and parallel diagonal ridge members connecting said transverse ridge members, alternate rows of said diagonal ridge members sloping in opposite directions, aligned diagonal ridge members converging to a peak at spaced intervals, said peaks arranged in diagonal rows in the plane of said structural unit, said brace members between successive parallel sheets arranged at right angles to each other so that the ridge members in each member form a checker-board of struts throughout the area of said unit, all of said elements coated with fusible metal and heat-sealed together.

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