April 18, 1939. L. I. BECKWITH 2,154,599

BRACE AND BRACED FRAME

Filed June 16, 1937

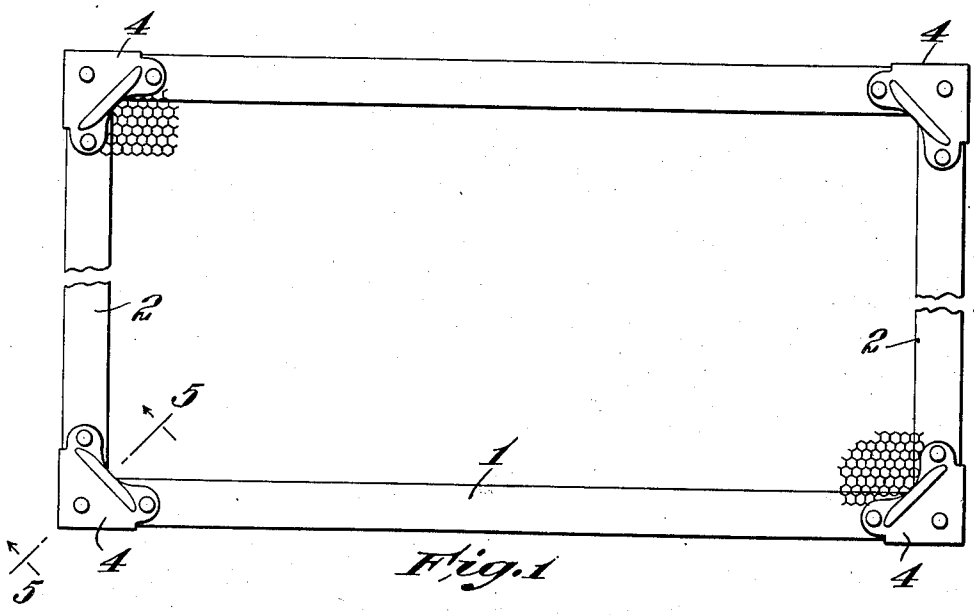


Fig. 1

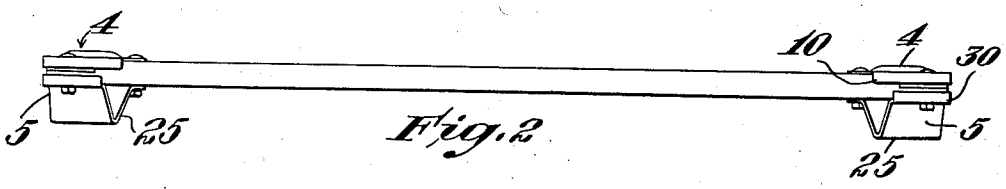


Fig. 2

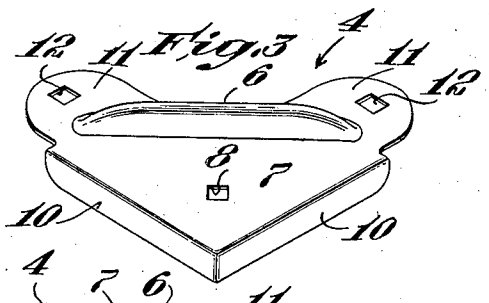


Fig. 3

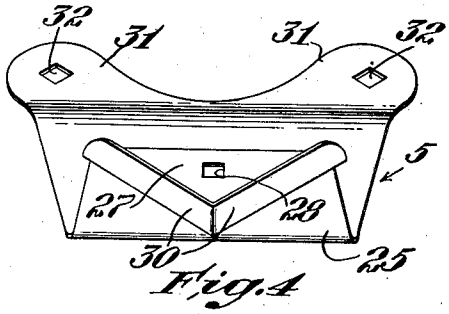


Fig. 4

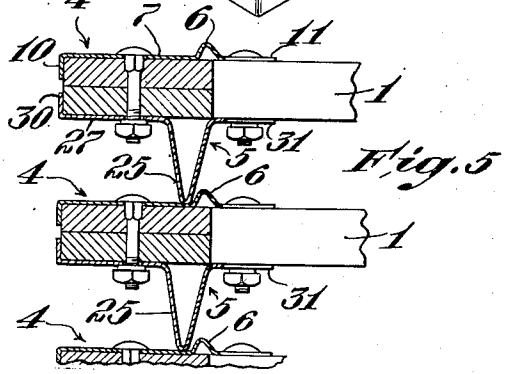


Fig. 5

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Patented Apr. 18, 1939

2,154,599

UNITED STATES PATENT OFFICE

2,154,599

BRACE AND BRACED FRAME

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Application June 16, 1937, Serial No. 148,541

3 Claims. (Cl. 34—17)

This invention relates to corner braces for frames and to frames which are provided with such braces.

In accordance with this invention, corner braces are provided for application to the opposite faces, for example, of rectangular frames, these corner braces being arranged to afford stiff, rigid reinforcements connecting the end and side rails of the frame. The braces secured to one face of a frame may have relatively shallow diagonal ribs, while the braces secured on the opposite face of the frame may have relatively deep diagonally disposed ribs, one set of ribs being located slightly nearer the center of the frame than the other set so that, when such frames are stacked in superposed relation, the first set of ribs of one frame may engage the second set of ribs of another frame, thus guiding the frames into properly centered relation to each other with their respective edges in vertical alignment. Preferably one of the ribs may be relatively deep so that the body portions of the frames are held in spaced relation when the frames are stacked.

Frames and braces of this character may be employed in a wide variety of environments; for example, such frames may be employed to support suitable sheets of webbing or wire mesh on which material is disposed for drying.

More specifically, the present invention affords corner braces of the character described which are formed of sheet metal. Each of these braces preferably has a triangular corner portion with reinforcing flanges extending along two sides to engage edge faces of the frame. Ordinarily these sides of the triangular corner section are disposed at right angles to each other. Each brace may be provided with a diagonal rib defining the third side of its triangular section, while at the opposite side of the rib there may be ears located in the same plane as the triangular section and adapted to be secured to the respective rails of the frame which meet at the corner.

The braces preferably are provided in pairs and the brace which is to be secured to one face of the frame may have a relatively shallow rib formed by indenting the sheet metal, the ends of this rib merging into planar connecting portions which extend between the triangular corner section of the brace and its ears, so that this rib does not extend entirely across the brace. The other brace of each pair, on the other hand, may have a relatively deep ridge-like rib formed by bending the metal up so that adjoining sections are disposed at an acute angle to each other and so that the rib or ridge extends entirely across the brace.

In the accompanying drawing:

Fig. 1 is a plan view of a frame provided with reinforcing braces at its corners in accordance with this invention;

Fig. 2 is an edge view of such a frame;

Fig. 3 is an isometric view of one of a pair of corner braces which is employed at each corner of the frame shown in Figs. 1 and 2;

Fig. 4 is an isometric view of the other brace of the pair; and

Fig. 5 is a sectional view indicated by line 5—5 of Fig. 6, but showing the corners of three frames in stacked relation with the respective upper and lower ribs of the same in mutual juxtaposition.

The present invention affords corner braces which may be provided for a variety of frames, but which are particularly adapted to be employed with frames of rectangular form having parallel side rails and parallel end rails. Such a frame is shown in Fig. 1 and includes the side rails 1 and the end rails 2. These rails meet at right angular corners and are reinforced and interconnected by metal braces 4 secured, for example, to the upper face of the frame and by metal braces 5 secured to the lower faces thereof.

The brace 4 is shown more particularly in Fig. 3 and comprises a single piece of sheet metal which is formed to provide a generally triangular member with two of its sides extending substantially at right angles to each other and with a shallow elongate indentation or rib 6 extending diagonally between these sides and at equal angles thereto. Accordingly the brace 4 is provided with a triangular, planar corner section 7 which may be provided with an opening 8 to receive a fastening bolt or the like. The outer sides of this triangular section 7 preferably are provided with downturned flanges 10, it being evident that in practice the region of juncture of the flanges and of the corresponding sides of the triangular corner sections 7 may be slightly rounded, if desired. At the opposite side of the rib 5 there are ears 11 which are coplanar with the triangular sections 7 and which are provided with openings 12 to receive fastening means. Portions of the sheet metal between the ears and the outer parts of the triangular sections 7 may lie in the same plane, since the ends of the elongate indent 6 preferably are spaced from the edges of these portions of the brace.

The cooperating brace 5 is shown in Fig. 4, it being understood that in practice of course one brace may be uppermost and the other brace low-

ermost, depending upon which side of the frame is uppermost. The brace 5 is also of generally triangular form and has the same general arrangement of parts as has been described with reference to Figs. 3 and 4. Thus this brace includes a rib 25 extending diagonally along the longer side of a triangular corner section 27 provided with an opening 28 to receive a fastening and having its two shorter sides extending at right angles to each other and provided with reinforcing flanges 30. The corner of this triangular section may be slightly rounded and the brace is provided with ears 31 having openings 32 therein to receive fastening means, these ears being coplanar with the triangular section 27.

The brace 5, however, differs from the brace 4 in the arrangement and shape of the rib 25. The rib 25 is much deeper than the rib 6 and extends the entire distance between the sides of the brace 5 which extend at right angles to each other. This rib 25 may be formed by bending the sheet metal so that portions thereof lie at acute angles to each other at opposite sides of the peak of the rib (Fig. 5), and the rib preferably has a uniform height throughout its length. This height, for example, may be of the general order of one-half its length and may be substantially greater than the depth of flanges 30.

The braces 4 and 5 are so dimensioned that the openings in the same are spaced at corresponding distances from each other and from the outer sides of the respective braces which are disposed at right angles to each other. Accordingly, when these braces are disposed at opposite sides of the frame, as shown in Figs. 2 and 5, suitable fastening bolts may extend through openings in the rails of the frame and through the aligned openings in the braces 4 and 5.

The rib 25 may be spaced slightly nearer the right angular corner of the brace 5 than is the rib 6 of the brace 4. Both of these ribs, however, are provided with rounded portions so that when the ribs are bolted to a frame in the manner which has been described, the frame may be stacked in superposed engagement with other frames in such a manner that, for example, the inner portions of the ribs 25 engage or are juxtaposed to the outer portions of the ribs 5 as illustrated in Fig. 5. Since similar ribs are provided at the four corners of each of the frames and the frames preferably are stacked with corresponding ribs uppermost, the ribs themselves act to center the frames accurately so that their vertical edges are substantially aligned with each other. It will be evident that the initial contact of the rounded portions of the ribs aid this self-aligning arrangement.

It is furthermore evident that the relatively deep ribs 25 permit the spacing of the frames so that air may circulate therebetween, as for drying, while the relatively deep ribs thus provided also form strong and rigid reinforcements for the corners of the frames, even if sheet metal of relatively light gauge is employed in making the braces.

While as a matter of convenience the frames have been shown with the deep ribs 25 projecting downwardly and with the ribs 6 disposed uppermost, it is of course evident that the frames can be turned over and that the self-aligning function provided by the reinforcing ribs is still retained.

It is evident that the present invention affords simple, sturdy corner braces for reinforcing frames and for permitting the frames to be stacked in spaced superposed relation and in accurate vertical alignment.

I claim:

1. A sheet metal corner brace member comprising a body portion of generally right-triangular contour and having an elongate ridge consisting of an integral portion of the sheet metal of the brace extending between opposite sides of the brace and defining the hypotenuse of the body portion, integral extensions of the metal, at the opposite side of the ridge from the body portion, constituting ears coplanar with said body portion, said body portion and said ears each having an opening for attaching means whereby to secure the brace to the corner portion of a frame or the like, the body portion having integral marginal flanges at those edges which define the right angle, said flanges being perpendicular to the plane of the body portion, the ridge being of substantially V-shape in transverse section with its side walls intersecting at an acute angle.

2. A sheet metal corner brace for rectangular frames or the like, said brace comprising a substantially planar body portion of generally triangular contour having two edges which meet to form a right angle, integral marginal flanges at said edges, the flanges being substantially perpendicular to the plane of the body portion, that edge of the body portion which forms the hypotenuse of the triangle being defined by an integral elongate stiffener ridge substantially V-shape in transverse section and extending substantially from one corner to another of the body portion, the brace having steeply inclined walls and being of such height as to constitute in effect a leg operative to space the frame a substantial distance above a support upon which it may be placed, the brace having ears integral with the body portion adjacent to each of said last-named corners and substantially coplanar with the body portion, said ears being at the opposite side of the ridge from the body portion of the brace and having openings for the reception of attaching fasteners whereby the brace may be secured to the corner portion of a frame with its marginal flanges disposed respectively against intersecting outer surfaces of the frame at the corner and with the ridge disposed substantially perpendicular to the bisector of the corner angle of the frame.

3. A brace for a rectangular frame or the like, said brace comprising in combination a pair of complemental sheet metal members designed to clasp the corner portion of the frame between them and having body portions which contact the upper and under surfaces respectively of said corner portion of the frame, the body portion of each of said brace members being generally triangular in contour and having two edges which meet to form a right angle, integral marginal flanges at said respective edges, the flanges being substantially perpendicular to the plane of the body portion, that edge of the body portion which forms the hypotenuse of the triangle being defined by an integral elongate ridge substantially V-shape in transverse section and extending substantially from one corner to another of the body portion, the ridge having steeply inclined walls, the ridge of the lower member of the pair being of substantial height and constituting a leg operative to space the frame a substantial distance from a support upon which it may be placed,

the ridge of the upper member of the pair being of a lesser height and being disposed at such a distance from the right-angled corner of the brace member of which it forms a part that when two frames provided with such corner braces are stacked with their corners in vertical registry, the free edge of the lower or foot-forming ridge of the upper frame closely engages the lower part of the side wall of the positioning or top ridge of the frame below it, the sloping sides of said ridges constituting guides operative to facilitate such registry of the frames, each brace member of the pair having attaching parts whereby it may be secured to the frame.

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