Nov. 30, 1943. E. C. GREMPLER 2,335,754

METAL CORNER STRUCTURE AND METHOD OF MAKING SAME

Filed Feb. 2, 1942

Fig. 1.

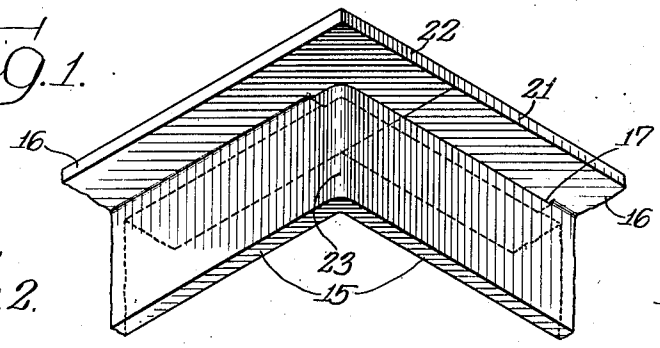


Fig. 2.

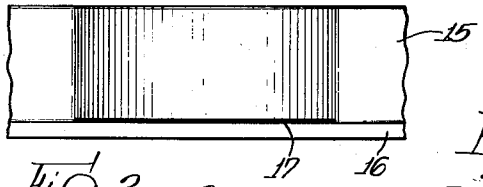


Fig. 3.

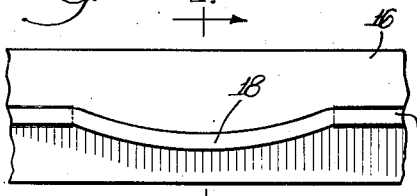


Fig. 4.

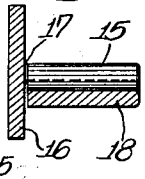


Fig. 5.

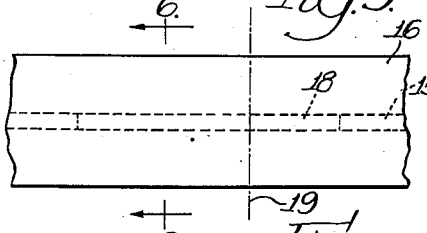


Fig. 6.

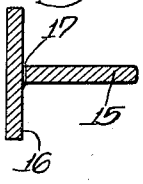


Fig. 7.

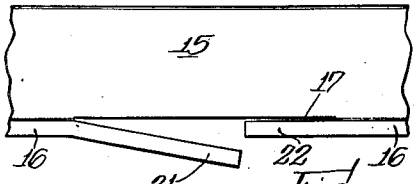


Fig. 8.

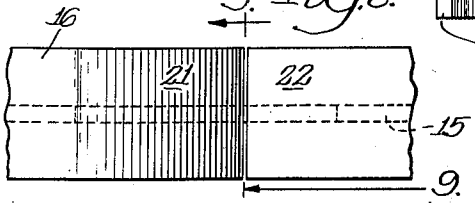


Fig. 9.

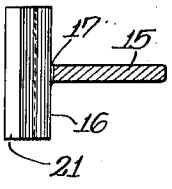


Fig. 10.

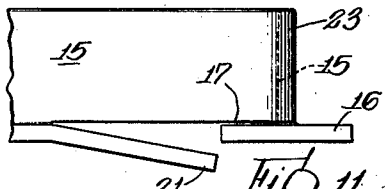


Fig. 11.

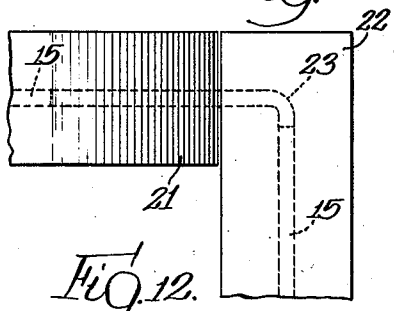


Fig. 12.

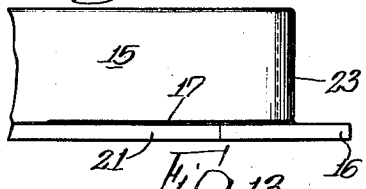
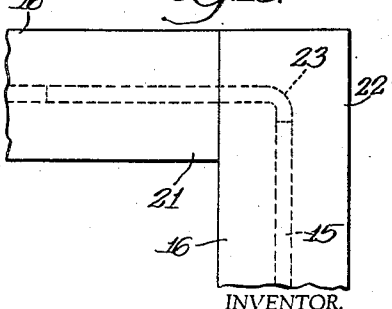


Fig. 13.



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UNITED STATES PATENT OFFICE

2,335,754

METAL CORNER STRUCTURE AND METHOD OF MAKING SAME

Edward C. Grempler, Oak Park, Ill., assignor to Ceco Steel Products Corporation, Omaha, Nebr., a corporation of Nebraska

Application February 2, 1942, Serial No. 429,222

4 Claims. (Cl. 29—150)

This invention relates to metal corner structures adapted to be embodied in various metal constructions, such as steel window sashes, frames, and other constructions in which square corners are desirable.

In the formation of metal constructions of this general character, it has heretofore been customary to form the corners by merely bending the metal bar (usually a T-bar) into the desired shape to form the frame. In the bending operation the T-bar web was bent transversely, but the flange was bent edgewise or, in other words, in the plane of the flange, with the result that the metal at the outer edge was stretched and produced a round, instead of a square exterior corner, while the metal at the inner edge was compressed and crimped so that it was thicker at this point than elsewhere and was also projected inwardly, thus forming a round, instead of a square, interior corner. Window frames and sashes having rounded corners and thickened corners resulting from their method of manufacture have been unsatisfactory, because the sashes would not tightly fit the frames, particularly at the corners, thereby resulting in a considerable leakage of air between the frames and the sashes.

The primary purpose of my present invention is to provide a metal corner structure which will present square instead of rounded corners, both exteriorly and interiorly, and in which the metal will be of uniform thickness and lie in a common plane, instead of being crimped and thickened at the inside corner and stretched and thinned at the outside corner.

Another purpose of my invention is to provide a novel method for producing a square corner structure of the character indicated.

A typical corner structure embodying my invention and a method by which the same may be produced are disclosed as illustrative of the principles of my invention on the accompanying drawing.

Referring to the drawing,

Fig. 1 is a perspective view of the corner structure;

Fig. 2 is a fragmentary elevation of the T-bar with the web and flange disunited for a limited distance;

Fig. 3 is a plan view of the structure shown in Fig. 2;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a view looking at the face of the flange of the bar;

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

Fig. 7 is an elevation showing the displacement of one of the flange portions;

Fig. 8 is a view looking at the bottom of Fig. 7;

Fig. 9 is a section on the line 9—9 of Fig. 8;

Fig. 10 is an elevation after the web has been bent;

Fig. 11 is a bottom view of Fig. 10;

Fig. 12 is a view similar to Fig. 10, but showing the displaced flange portion in restored position; and

Fig. 13 is a bottom face view of Fig. 12.

In producing a corner structure in accordance with my invention, a metal bar is employed comprising a web and a flange. While bars differing in structure and dimensions from that herein illustrated may be utilized, I have shown herein for illustrative purposes a T-bar comprising a web 15 and a flange 16. The first step is to disunite the flange and web for a limited distance, as illustrated for instance in Figs. 2, 3 and 4. The disuniting operation may be accomplished by the employment of a suitable tool adapted to either sever the web at its base from the flange or to rupture it by displacement along the line 17 of Fig. 2.

In disuniting the web and flange by rupturing, a blunt arcuate tool is employed which displaces a portion 18 of the web laterally, as indicated in Figs. 3 and 4.

The displaced and disunited web portion 18 is then returned to its original position with respect to the flange, as indicated in Fig. 5, by suitable flat-faced dies. The dies serve to align the displaced portion with the remainder of the web.

The disunited flange portion of the bar is then divided transversely along the line 19 (Fig. 5) approximately the same distance from the adjacent end of the severance 17 as that end is from the point at which the web is to be subsequently bent. The flange portion is thus divided into two sections 21 and 22, respectively, whereupon one of said sections, preferably the longer one 21, is displaced away from the web, as shown in Figs. 7, 8 and 9. The division of the flange and the displacement of one section thereof may be performed in two operations, as, for instance, by sawing and then bending one section away from the web, or, preferably, the two operations may be performed simultaneously by means of suitably shaped severing and displacing dies.

The purpose of displacing one section of the disunited portion of the flange from the plane

of the other section is to permit rotative movement of one section relatively to the other in the subsequent bending operation. Referring to Figs. 10 and 11, it will be observed that the web 15 has been bent at the point 23, so as to provide two legs of the corner structure projecting at right angles from each other. During the bending of the bar from a straight to a right-angled position, the flange section 22 is swung from the position shown in Figs. 7 and 8 to that shown in Figs. 10 and 11, so that its projecting end where the division between sections 21 and 22 occurred is disposed parallel with the outer edge of flange section 21, and the free end of flange section 21 is disposed parallel with the inner edge of section 22.

The final step is to restore the displaced flange section 21 to its original position in alignment with the remainder of the flange. The flange in restored position is illustrated in Figs. 12 and 13. When thus restored, the end of flange section 21 abuts against the inner edge of flange 16 and its extending section 22, thus providing a rigid abutment which renders the corner structure strong and inflexible.

The final structure is best illustrated in Figs. 12, 13 and 1, from which it will be apparent that the flange of the corner structure presents straight-line, non-rounded corners both exteriorly and interiorly, and that the flange is of original and uniform thickness throughout, since it has not been subjected to either tension or compression strains tending to distort the metal during the formation of the corners.

While I have disclosed a preferred structure and method of producing the same, it should be manifest that the character of the bar from which the structure is formed and the order of procedure may vary to meet specific requirements in the ultimate structure without departing from the essence of my invention, as defined in the following claims.

I claim:

1. The method of forming a corner from a flanged metal bar having a flange and web, which comprises, severing the web from the flange of the bar for a limited distance in proximity to the prospective corner, dividing the severed portion of the flange along a line into two sections, displacing the free end of one of said sections from the plane of the other section, thereafter bending the severed portion of the web along a line spaced from the line of division of said two sections to position the side edge of one of said flange sections for substantial engagement with the end of the other flange section when said displaced flange section is restored to the plane of the other flange section, and restoring said displaced flange section to the plane of the other flange section.

2. The method of working a metal T-bar having a flange and web to produce a right-angled corner structure presenting square external and internal corners, which comprises, severing the flange from the web for a limited distance, dividing the separated flange portion transversely along a line to provide two abutting flange sections, displacing a first of said sections away from the web and from the plane of the second section, thereafter bending the web at right angles along a line spaced from the line of division of said two sections to position a side edge of one of said flange sections for substantial engagement with the end of the other section and a side edge of the other section in substantial alignment with the end of said one section when said displaced section is returned to the plane of said second flange section, and restoring the displaced flange section to the plane of said second section in abutting relation with said second flange section.

3. A corner structure formed from an integral metal bar, comprising a flat flange and a continuous web projecting from one face thereof, said web being bent to form two connected corner legs, the flange of one leg extending longitudinally thereof beyond the web corner and having its end terminating in alignment with the outer edge of the other leg flange, and said other leg flange having its end terminating in abutting relation with the inner edge of said first leg flange, said web being severed from said flange at the region of the corner.

4. A corner structure consisting of an integral metal T-bar, the continuous web of which is bent to form a right angle corner, the flange of said bar being severed transversely in proximity to the web corner, said web being bent at a point spaced from the point of severance of said flange, the severed end of one portion of the flange being disposed against the side edge of the other flange portion, and the severed end of said other flange portion being disposed in alignment with an edge of said first flange portion to provide square interior and exterior flange corners, said web being severed from said flange at the region of said corner.

EDWARD C. GREMPLER.