

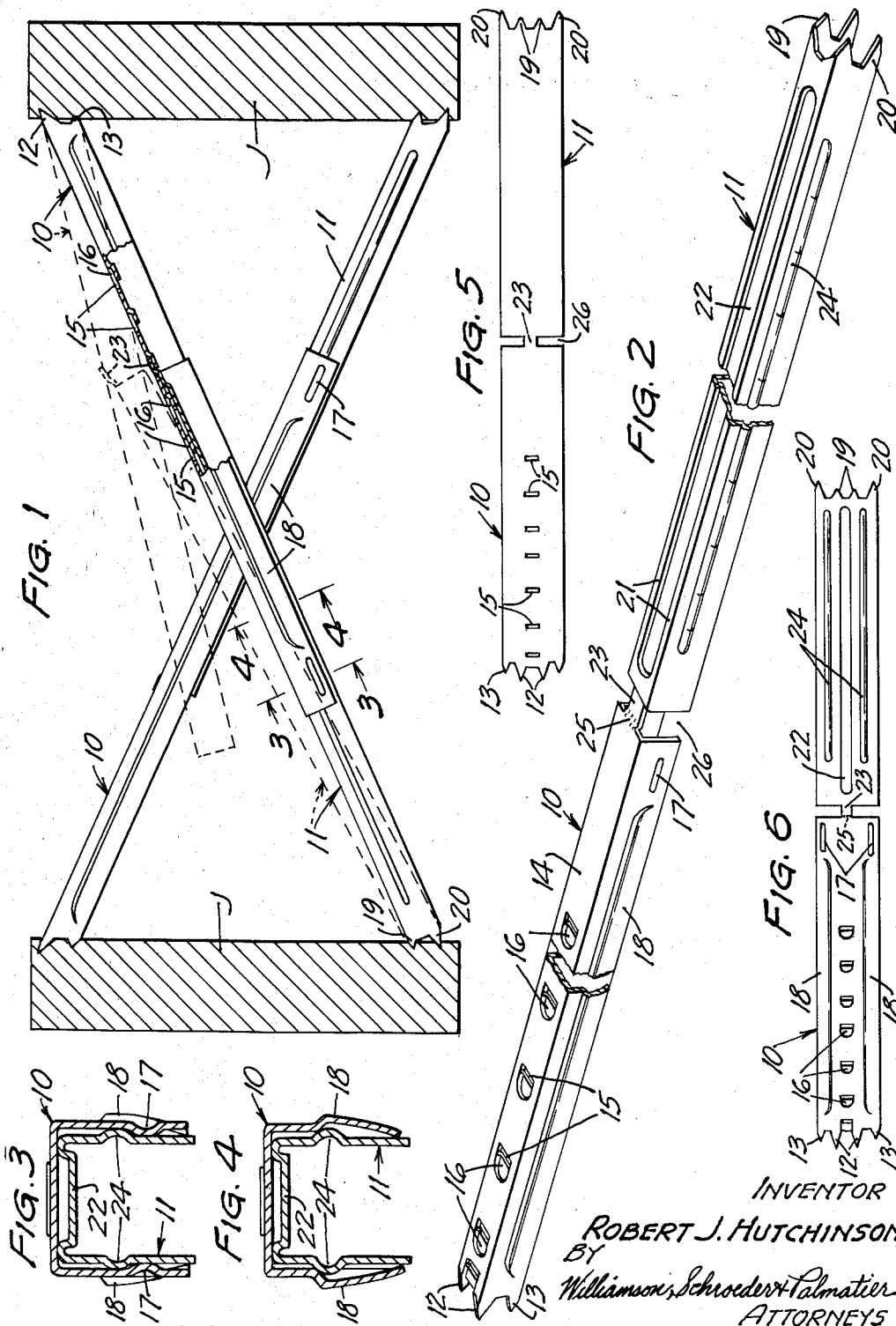
Sept. 3, 1963

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3,102,306

METHOD OF MANUFACTURING BRACING

Filed Aug. 27, 1959



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3,102,306

METHOD OF MANUFACTURING BRACING
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Filed Aug. 27, 1959, Ser. No. 836,356
3 Claims. (Cl. 20—9)

This invention relates to adjustable cross bracing or bridging such as that employed in bracing floor joists and the like, and particularly to telescoping toggle type bracing in which a pair of separable bracing members adjustably cooperate to span the distance between a pair of joists to provide a rigid bracing unit therebetween.

Although this invention is general applicable to all types of cross bracing employing separable cooperating bracing members, it constitutes primarily an improvement in the cross bracing as an article of manufacture and the method of making same as set forth in my joint co-pending application, Serial Number 558,047, filed January 9, 1956, now Patent No. 3,077,009, issued February 12, 1963.

The cross bracing of the aforementioned application and of which this invention constitutes an improvement briefly consists of a pair of separable male and female members having wood penetrating and gripping means provided at the ends thereof, said male member being provided at one end thereof with an outwardly extending tang or tab, said female member having a plurality of recesses or apertures intermediate the ends thereof for adjustably receiving said tang or tab, and said members having cooperating means for locking said members in telescoped condition to provide a single rigid bracing unit.

In the course of the manufacture, distribution and use of said bracing units a serious problem has arisen insofar as the packaging of the separable bracing members is concerned as well as a problem of maintaining equal numbers of male and female members available and at hand when the braces are to be installed. Thus, in the previous practice of packaging these male and female members, since the male and female members have in the past been formed as separate ununited members, it frequently occurs that in the packaging and shipment of these separate male and female members dissimilar or unequal numbers of one or the other are packaged and shipped which results in the user being supplied with too many male and female members. Even where equal numbers of the male and female members are shipped to the user, it frequently happens that the parties installing the bracing will inadvertently take too many of one of the members and not enough of the others so that when he reaches the job and begins installation he finds that he is unable to complete the same because he has a disproportionate number of male or female members.

Therefore, an object of my invention is an article of manufacture comprising the male and female bracing members of the class described which are disconnectably united as an article of manufacture.

Still another object is a bracing unit of the class described in which the male and female members are formed as a single integral unit for ease in packaging and location thereof, which unit is readily disconnected at the point of installation to enable the separate members to function and cooperate in the manner for which they were designed.

A more specific object is a bracing unit of the class described wherein the tang or tab carried by the male member is disconnectably united to the female member and is suitably scored at the point of connection therewith to permit ready disconnection therefrom by simple relative movement therebetween.

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Still another object is an improved method for making the cross bracing units of the class described which effects a substantial saving and reduction in the cost thereof.

These and other objects and advantages of my invention will more readily appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is an elevational view of the bracing of the instant invention utilized for the cross bracing of two adjacent joists, the joists being shown in vertical section, with portions of the bracing broken away for clarity of understanding;

FIG. 2 is a perspective view of the article of manufacture of my invention illustrating the male and female members in disconnectable integrally united condition;

FIG. 3 is a cross sectional view taken on the line 3—3 of FIG. 1;

FIG. 4 is a cross sectional view taken on the line 4—4 of FIG. 1; and

FIGS. 5 and 6 illustrate the article of manufacture of this invention at intermediate stages in the formation thereof.

Referring to the drawings for a detailed description of the preferred embodiment of my invention illustrated therein, each bracing unit comprises an elongate female member 10 which cooperatively receives and engages an elongate male member 11, both members 10 and 11 having a generally channel shaped cross-section.

The female member is provided at its outer end with a pair of outwardly extending spurs or prongs 12 extending outwardly from the upper corner portions thereof and a pair of spurs or prongs 13 extending outwardly from the lower corners thereof. It will be noted that in the preferred form shown the upper spurs 12 are of greater length and extend outwardly a greater distance than the bottom spurs 13 to permit both of said spurs 12 and 13 to engage and grip the joists J when the cross bracing of this invention is angularly disposed with respect thereto as shown in FIG. 1, which is the preferred manner of installation of this type of cross-bracing. The top or center portion of the female member 10 is provided with a plurality or series of longitudinally preferably equi-spaced transversely extending apertures or slots 15 the outermost slot being disposed adjacent the outer end thereof. Semi-circular depressions 16 are formed in the top surface 14 adjacent to and contiguous with each of the slots 15 on the side thereof facing the outer end carrying the spurs 12 and 13, said depressions 16 providing a seat or ledge disposed slightly below the top surface 14 of the female member 10 and providing a ledge or seating surface and a leading abutment edge for engaging the tab or tang of the male member hereinafter to be described.

On each of the sides of the female member 10 adjacent the inner end thereof and disposed slightly above the lower marginal edge thereof is an elongate inwardly extending detent 17 which forms a part of the locking mechanism for retaining the male and female members in telescoped bracing condition. Each side of the female member is also provided with an elongate embossed or relief portion 18 which extends substantially the full length of said female member adjacent the lower marginal edge thereof and terminates just short of the detents 17, said embossed portions 18 tapering downwardly and inwardly as best seen in FIG. 4.

The elongate male member 11 has a cross-section generally similar to that of the female member 10 but slightly smaller in size to permit said male member 11

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to be received by and snugly fitted within the female member 10. The outer end of the male member 11 is provided with a pair of outwardly extending spurs 19 which extend outwardly from the top or upper corners thereof and is also provided with a pair of spurs 20 extending outwardly from the bottom corners thereof, the lower spurs 20 in this case being longer than the top spurs 19 to permit engagement of both spurs 19 and 20 with the joists J when disposed at an angle thereto as in FIG. 1. The top surface or center portion 21 of the male member 11 is provided with an elongate depressed portion 22 which extends substantially the full length thereof and is sufficiently deep to receive the depressed portion 16 of the female member 10 when the members 10 and 11 are in locked telescoped relationship.

The inner end of the male member 11 is provided with an outwardly extending offset tang or tab member 23 which tab or tang 23 is integrally united to the top surface 21. The tang 23 is offset upwardly from the top surface 21 by an amount substantially equal to the extent of depression of the semi-circular depressions 16 provided in the female member 10.

Each side of the male member is provided with a narrow elongate rod-like embossed portion 24 which extends substantially the full length of the member and provides a portion of the locking mechanism for maintaining the male and female members in telescoped locked condition, said embossed portion 24 being adapted to co-act and cooperate with the detents 17 provided on the female member 10. The detents 17 and embossed portions 24 are so disposed with respect to the top and bottom edges of their respective members that when the members are in locked telescoped condition as in FIG. 1 the embossed portion 24 will be disposed above the detents 17 and in cooperative engagement therewith to prevent relative vertical movement between the members 10 and 11 and are preferably so arranged with respect to each other that substantially no play between the members 10 and 11 can occur.

In operation and use, the male and female members are disposed as indicated by the dotted positions of FIG. 1, the outer spurred end of the female member engaging one of the joists and the outer end of the male member engaging the adjacent opposite joist. As shown in the initial relative positions of the members 10 and 11 they are disposed angularly to one another, the tang 23 being inserted in one of the slots 15 from the inside thereof with the female member generally overlying and disposed outwardly of the male member. Thus, the engagement of the tang 23 with the depressed portion 16 adjacent the slot 15 provides a pivot point or fulcrum for the relative toggle like bracing locking movement of the members 10 and 11. After the members have been positioned as shown by the dotted lines of FIG. 1 and the tang 23 is inserted in the slot 15 to engage the depression 16, a slight downward pressure is applied to the female member which causes the lower marginal edges thereof defined by the embossed portions 18 to yield slightly and extend outwardly slightly to pass over the inner end of the rod-like embossed portion 24 of the male member in contiguous relation therewith to assume a nearly aligned position with the detent 17 of the female member assuming a position immediately above and adjacent to the rod-like embossed portion 24. Upon further application of downward pressure against the female member against the inner end thereof preferably as by grasping of the two members in the hand a further compressive pressure of somewhat greater degree than that initially required to pass the relief portions 18 over the rod-like portion 24 is applied which causes the detents 17 to pass over the rod-like embossed portion 24 and to be disposed immediately therebelow and in cooperative engagement therewith to positively lock the two members together and prevent relative movement there-

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between. Thus, the drawing of the male and female members together to form a single bracing unit in locked condition corresponds to a toggle-like locking action with the movement of the two members being pivotal about the fulcrum provided by the engagement of the tang 23 with the semi-circular depressed portions 16. Thus, any inwardly directed force on the joists will tend to more positively retain the members 10 and 11 in locked position, the bracing unit preventing any actual movement of the joists inwardly, the arrangement being such that it is impossible to effect an unlocking or breaking of the locked condition of the male and female members by the application of an inward force against the joists.

It should also be noted at this point that the length of the members 10 and 11 and the disposition and spacing of the slots 15 is such that the bracing unit is adjustable and adaptable to the conventional spacing between the joists, said joists normally being installed on what is termed even numbered centers such as 12, 14, 16, 18 inch centers, etc.

As previously noted, it is highly desirable to have the male and female members comprising each bracing unit to be integrally united as an article of manufacture yet readily disconnectible at the point of installation for convenience in packaging and shipping and to insure that a complete unit is always available. To accomplish this, I have devised a new method of manufacture of said bracing unit and therewith a new article of manufacture which is best illustrated in FIG. 2. In the new article of manufacture as illustrated in FIG. 2 the male and female members are individually constructed as previously described and as set forth in my co-pending application and are adapted to function in the same manner and to cooperate with one another in the same manner as previously above described. However, in the new article of manufacture the male and female members comprising each bracing unit are integrally united by means of tang or tab member 23. The integrally united male and female members as shown in FIG. 2 are preferably made from a single sheet of flat steel and are formed in a manner hereinafter to be described. The point of connection between the outer end of the tang 23 and the inner end of the female member 10 is suitably scored or perforated as at 25 to permit ready disconnection therebetween by simply bending or twisting the members relative to one another, which bending or twisting quickly and readily effects such a disconnection by breaking the join therebetween along the scored portion in a manner well known.

The intermediate steps of the method of forming the article of manufacture which comprises this invention is sequentially illustrated in FIGS. 5 and 6, it being understood that each article or bracing unit is initially formed from a simple flat sheet of metal such as steel. In the first stage of operation the strip of metal is subjected to a suitable punch and die operation in which the ends thereof are suitably notched to provide the spurs for the male and female members, the slots 15 are punched out and suitable portions 26 intermediate the ends are cut out along and inwardly of each marginal side thereof to define the tang 23 therebetween. After the metal has been suitably punched and notched as previously indicated, the strip or unit assumes the intermediate form shown in FIG. 5. The strip of FIG. 5 is then sent to a second operation or stamping operation in which the embossed and depressed portions including the depressions 16, the embossed portions 18, detents 17 and the rod-like rib portions 24 are provided, and the scoring of the tang and the offsetting thereof are accomplished providing the form shown in FIG. 6. After the stamping operation has been completed, the strip then moves to a final finishing operation in which the individual male and female members are shaped or formed to the gen-

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eral channel-type cross-section configuration previously described and best seen in FIG. 2.

Since in use the male member 11 is adapted to be telescopically received within and by the female member 10, the dies employed in the final forming operation are so constituted as to shape the male member 11 to a slightly smaller cross-sectional size than the female member 10 to permit a snug interfitting therebetween, the center portion 21 of the male member being slightly narrower than the center portion 14 of the female member, and the sides of the male member being correspondingly deeper than the sides of the female member.

This new method of manufacture and the resulting disconnectibly united article of manufacture or cross-bracing unit effects a substantial saving in the cost of manufacture over similar types of cross-bracing wherein the members are formed separately, and the unit or article of manufacture, because of the integrally united nature of its components, is less expensive to wrap, package and ship. In addition, the finished article presents a more convenient product to both the manufacturer, distributor, and user, each of the units comprising a complete working unit, eliminating the inconvenience of seeking out, finding, unwrapping and counting out equal number of cooperating mating members to assure a sufficient number of working units. It, therefore, can be seen that by means of my simple but ingenious invention herein disclosed I have effected a considerably less expensive product than has previously been available.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What I claim is:

1. A method of forming a pair of separably connected cooperating bracing members comprising cutting out a pair of transverse diametrically opposed slots from a long flat strip of metal intermediate the ends thereof and leaving a narrow tongue separating said slots, said slots communicating with the sides of said strip, said slots dividing said strip into first and second end portions which are connected by said tongue, forming at least one opening in said first end portion substantially midway between the sides thereof capable of receiving said tongue, forming the outer end of said strip into wood penetrating elements, forming a longitudinally extending rib adjacent one side of said first end portion, forming a longitudinally extending rib on said second end portion adjacent the same side of said strip as said first mentioned rib, said ribs being in parallel relationship and lying on opposite sides of and immediately adjacent to a common longitudinally extending line, said ribs protruding from opposite faces of said strip for subsequent engagement with each other, transversely scoring said strip along the line of juncture between said tongue and first end portion whereby said tongue can be severed from said first end portion by pivotally moving said end portions relative to one another about the weak joint, forming said first end portion into a first channel whereby its rib is located on the side wall of said channel and forming said second end portion into a second channel which is slightly narrower than said first named channel whereby said second channel can be telescopically seated in said first channel and enclosed thereby, and whereby said second named rib is located on the side wall of said second channel corresponding to the side wall of the first channel upon which its rib is located, said first named rib being closer to the side edge of said strip than said second named rib whereby said first named rib lies below and engages said second named rib when said channels are in said telescoped relationship.

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2. A method of forming a pair of separably connected cooperating bracing members comprising subjecting a continuous long flat metal strip to a punching operation in which both ends of said strip are notched to provide wood penetrating spurs, and a pair of transversely extending diametrically opposed slots are cut out intermediate the ends of said strip leaving a narrow longitudinally extending tongue therebetween whereby said strip is divided by said slots into first and second end portions connected by said tongue, said punching operation also including the formation of at least one opening capable of receiving said tongue in said first end portion substantially midway between the sides thereof, subjecting the strip to a stamping operation which includes embossing said strip to provide longitudinally extending locking ribs on each end portion adjacent the same side of said strip, the rib on said first end portion being closer to said side of said strip than the rib on said second end portion and facing in opposite direction therefrom, said ribs being parallel and lying on opposite sides of and adjacent to a common longitudinally extending line, said stamping operation also including scoring said strip transversely along a line corresponding to the joint between said tongue and first end portion, whereby said joint may be severed by relative pivotal movement between said end portions about said weak joint, and subjecting the punched and stamped strip to a forming operation which includes bending the side portions of said end portions in the same direction and substantially normal to the center portions of said end portions to thereby form first and second channel members from said first and second end portions respectively, said channels having said ribs located on the side walls thereof, said second member being formed to a narrower width than said first member whereby it is capable of being telescopically seated in and enclosed by said first channel with said tongue installed in said opening and said ribs in side by side locking engagement.

3. A method of forming a pair of separably connected cooperating bracing members comprising forming a pair of transverse diametrically opposed slots of substantially equal size in an elongate flat strip of metal intermediate the ends thereof, said slots extending inwardly from the sides of said strip dividing the strip into first and second end portions and defining therebetween a narrow elongate tongue which connects said end portions together, transversely weakening the strip along the line of juncture between said tongue and first end portion whereby the joint therebetween can be severed by relative pivotal movement between said end portions about said weakened joint, forming an opening in said first end portion substantially midway between the sides thereof capable of receiving said tongue, and shaping said first and second end portions into first and second channel members respectively, said second channel member being formed to a narrower width than said first channel member whereby said second member can be telescopically seated in said first member with said tongue installed in said opening.

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