Jan. 1, 1957 W. W. BUSH 2,776,030

INTERLOCKING JOINT FOR ANGLE IRONS

Filed Dec. 23, 1953

Fig. 1.

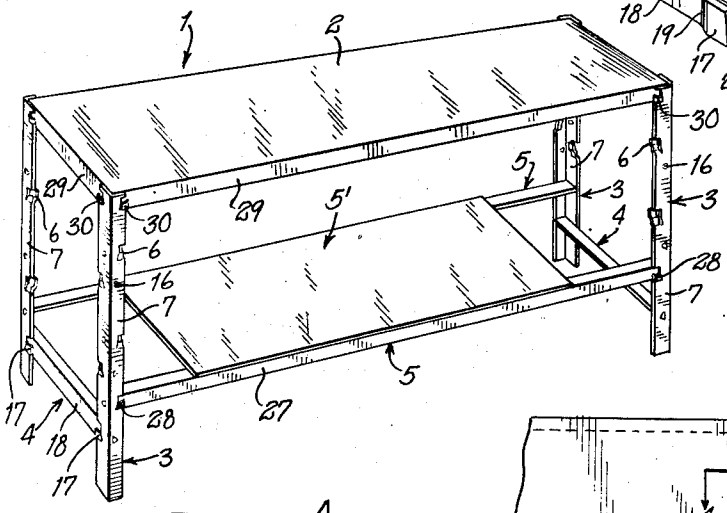


Fig. 2.

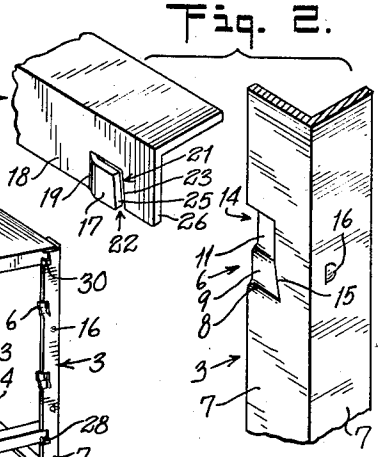


Fig. 3.

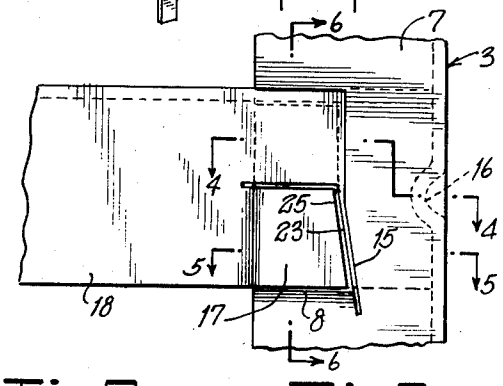


Fig. 4.

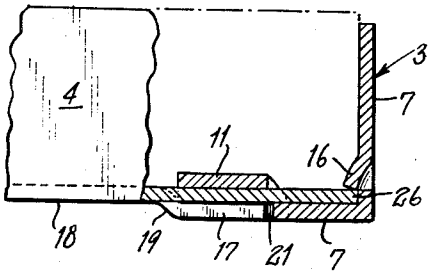


Fig. 5.

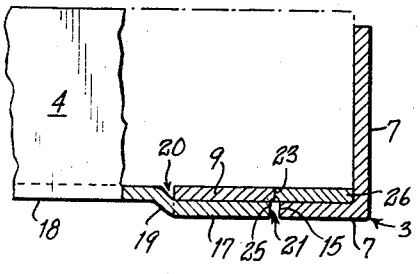


Fig. 6.

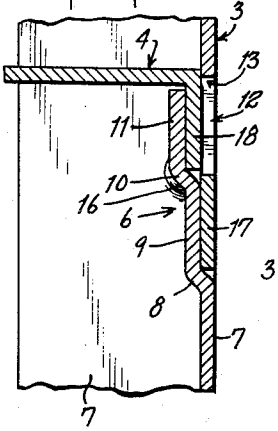
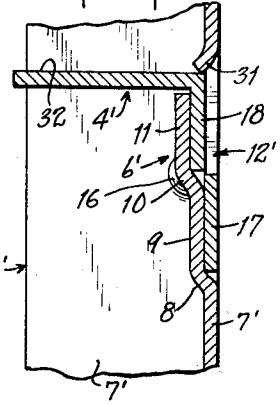


Fig. 7.



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INTERLOCKING JOINT FOR ANGLE IRONS

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6 Claims. (Cl. 189—36)

This invention relates to metal collapsible or knockdown structures and more particularly to new and useful improvements in angle iron joints for such structures.

A prime object of the present invention is to provide a collapsible or knockdown structure with joints whereby the meeting or intersecting elements thereof may be readily assembled and disassembled without the aid of extraneous fasteners and with the aid of simple tools by the user.

Another object of the invention is to provide an angle iron joint construction wherein one structural element is easily and quickly threaded through a cooperative adjacent structural element in order to interlock the two elements detachably together.

A further object of the invention is to provide an angle iron joint construction formed of interlocking lugs having shoulders and tapered edges whereby the interlocking lugs assume a shoulder to edge and an edge to edge relationship.

For further comprehension of the invention and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

On the drawings forming a material part of this disclosure:

Figure 1 is a perspective view of a work bench embodying my invention.

Figure 2 is an enlarged spread perspective showing a portion of a leg and an end portion of an adjacent angle bar bracing member.

Figure 3 is an enlarged front elevational view of the parts of Figure 2 in joined relation.

Figure 4 is a sectional view taken on the plane of the line 4—4 of Figure 3.

Figure 5 is a sectional view taken on the plane of the line 5—5 of Figure 3.

Figure 6 is a sectional view taken on the plane of the line 6—6 of Figure 3.

Figure 7 is a view similar to Figure 6 but showing a modification of the invention.

In the accompanying drawing, my invention is shown embodied in a rectangular-shaped work bench indicated generally at 1. The frame of the work bench is preferably constructed in accordance with present day standards of bench making wherein the frame members meet face to face in overlapping relation whereby the greatest structural strength can be obtained from the material comprising the frame members. Such an arrangement of frame members is illustrated in Figure 1 wherein it will be seen that each frame member meets another frame member so that the two will engage in face to face and face to edge relation.

The work bench 1 comprises a bench top 2 supported on corner legs 3, the top being of suitable length and width and the legs being of sufficient height for

the purposes desired. The legs are braced adjacent their lower ends by transverse end pieces 4 and by longitudinal struts 5. The struts 5 also serve as supports for a floor or platform 5'. The bench top 2 and floor or platform 5' are formed of sheet metal and the legs 3, end pieces 4 and struts 5 comprise angle bars having their sides or flanges in right-angled or perpendicular relation to each other. Also, the inner surfaces 3*a* of the flanges of the legs meet at a true right angle without a fillet.

In accordance with the present invention, the legs, end pieces, struts and bench top are detachably joined together in a novel and improved manner to permit a ready assembly and disassembly of the parts without fastening elements and without the use of tools.

Each angled leg 3 is formed with a series of elongated instruck lugs 6 cut at spaced intervals along the edge of each side 7 thereof. Each instruck lug projects inwardly providing a shoulder portion 8 which continues into a portion 9 extending on a plane offset inwardly from the plane of the side 7 of the leg but parallel thereto. The portion 9 continues into a shoulder portion 10 which extends inwardly continuing into a portion 11 extending on a plane offset inwardly from the plane of the portion 9 but parallel to the plane of the side of the leg as shown in Figure 6. A recess 12 is thus formed in front of the elongated instruck lug 6 having a top end entrance 13 and an outer side entrance 14. It will be noted from Figure 3 that the inner edge of the cut formed by the lug 6 along the portion 9 thereof is tapered or inclined upwardly and away from the other side of the leg as indicated at 15 so that the inner edge of said portion 9 is correspondingly tapered. The edge along the portion 11 of the lug 6 of each side of the leg, however, is cut parallel to the other side. Each side 7 of each leg 3 is also indented so as to provide a protuberance 16 on the inner surface of said side a distance from the other side slightly greater than the thickness of said sides.

The angled cross-pieces 4, each has an outstruck lug 17 cut in the edge of one side 18 of each end thereof adapted to cooperate with an instruck lug 6 on the adjacent leg 3. Each outstruck lug 17 projects outwardly of the side 18 of the cross-piece 4 providing a shoulder 19 and is disposed in a plane offset outwardly of the plane of the side 18 of the cross-piece, leaving a recess 20 behind the lug. The recess has an end entrance 21 and a bottom entrance 22. The outer edge of the cut forming the lug 17 is tapered as indicated at 23 correspondingly to the taper of the portions 9 of the lugs 6.

In order to join a leg 3 and a cross-piece 4, the lug 17 on the cross-piece is disposed over the lug 6 on one side of the leg 3 with the end of the cross-piece abutting the other side of the leg, and the cross-piece is moved downwardly whereby the lug 17 on the cross-piece will slide through the top entrance 13 of the recess 12 in front of the lug 6 on the leg 3 and into said recess. In the final position of the parts, the portion 9 of the lug 6 is disposed in the recess 20 behind the lug 17 in the plane of the side 18 of the cross-piece 4, with the tapered edges of the lug on the leg in edge to edge relation with the tapered edge 23 of the cutout in the cross-piece 4. The portion 11 of the lug 6 is disposed behind the cross-piece 4 above the cutout formed therein and in face to face relation with said cross-piece. The outer edge 25 of the lug 17 is in engagement with the face of the shoulder portion 8 of the lug 6. The end portion 26 of the cross-piece 4 is clamped between one side of the leg and the protuberance 16 on the other side of the leg 3 with its extremity abutting the side of the leg bearing the protuberance whereby

lateral displacement of the parts is prevented. It will thus be seen that there is a firm interlocked relation between the leg and the cross-piece thereby providing a rigid joint. The parts can be separated by simply forcing the cross-piece upwardly.

In a similar fashion, the ends of the struts **5** are joined to the legs **3**. The end edge of one side **27** of each strut **5** is cut to form an outstruck lug **28** similar in construction to the lugs **17** on the cross-pieces **4**. The lugs **28** are interlocked with the lugs **6** on the legs **6** the same as the lugs **17** are interlocked with said lugs, and the end edges of the struts are clamped between the protuberances **16** and the side walls **7** of the legs, whereby rigid joints are effected between the struts and the legs.

The bench top **2** is formed with a downwardly extending marginal, horizontally disposed flange **29** on all sides thereof forming a right angle. On each side of the top, adjacent each corner, the edge of the flange is formed with an outstruck lug **30** projecting outwardly from the plane of the flange. Each lug **30** is similar in construction to the lug **17** of the cross-piece **4** and is similarly interlocked with the adjacent uppermost lug **6** on the adjacent leg **3**. In order to join the bench top **2** to the legs **3**, the bench top is positioned over the legs with the lugs **30** thereof in substantial alignment with the lugs **6** on the legs **3**. Downward movement of the bench top will cause the lugs **30** thereof to slide through the top entrances **13** of the recesses **12** in front of the lugs **6** on the legs and into said recesses, to become interlocked with the lugs **6** in the same manner as the lugs **17** of the cross-pieces are interlocked with the lugs **6**. Rigid joints are thus effected between the corners of the bench top and the legs.

It will be understood that owing to the spacing of the lugs **6** along the legs **3**, the cross-pieces **4** and the struts may be mounted at any of several points along the legs.

In the modification of the invention shown in Figure 7, the top edge wall of the recess **12'** formed by cutting out the lug **6'** in the side wall **7'** of the leg **3'** is depressed and curved inwardly at one point along its edge providing a tab **31** which is adapted to engage the top side **32** of the cross-piece **4'** to provide additional interlocking means for the joint whereby vibration of the parts is prevented and the cross-piece is locked against upward movement relative to the leg.

While the invention is shown and described as embodied in a metal work bench, it will be understood that the invention is also applicable to other frame structures, such for example, as panel frames, racks, sign supports, shelving and the like. The invention may also be embodied in constructions formed of material other than metal, such as constructions formed of plastic or fibre.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

What I claim is:

1. Interlocking joint for structural elements, comprising upright post and horizontal beam members having flanges overlapping in angled relation, the flange on the post having an upwardly extending tongue connected at the bottom with the flange but cut from the flange across the top and down along an inner side edge, the lower portion of said tongue being offset from the flange approximately the thickness of the flange material and the upper portion of said tongue being offset in the same direction approximately twice the thickness of the flange material, the flange of the beam member having a horizontally extending tongue cut from the lower edge portion of said flange and offset therefrom substantially the thickness of that flange material and in the opposite direction from the offset of said first mentioned post tongue, said second mentioned beam tongue being substantially the height of said lower, less offset portion of the first tongue and disposed in front of said first tongue over the part connecting the bottom of that tongue to the post flange, and that part of the beam flange above said second tongue being disposed in front of the upper, greater offset portion of said first tongue and thereby held in underlying relation in back of the flange of the post member with said second tongue retained and supported by said less offset lower portion of the first tongue.

2. The invention according to claim 1, with said cut inner side edge of the upwardly extending first tongue and the flange of the beam member from which the second tongue is cut having opposed edges in abutting relation holding the beam member against longitudinal separation from the post member.

3. The invention according to claim 2 and including the further features of an abutment on the post member positioned to be engaged by the end of the beam member and said abutting edges of the first tongue and flange of the beam member being inclined downwardly toward the post member to thereby effect approach of the beam member into endwise engagement with said abutment.

4. The invention according to claim 1 and including further a shoulder on the post member spaced from the flange of that member and positioned to abut the rear face of the flange of the beam member, thereby to hold the beam flange against the post flange.

5. The invention according to claim 1, in which the post member has a second flange at an angle to the first flange with which the end of the flange of the beam member is in abutting engagement and in which the flange of the beam member has a cut edge opposed to and in abutting engagement with said inner side edge of the lower portion of said first tongue and whereby said beam member is held in abutting engagement with said second flange of the post member.

6. The invention according to claim 1, in which the post member has a second flange at an angle to the first flange positioned to form an abutment for the end of the flange of the beam member and including the further feature of an integral projection on said second flange positioned to abut the rear face of the flange of the beam member thereby to retain the beam flange against the post flange.

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