

Dec. 11, 1951

W. N. BROWN
FURNITURE CONSTRUCTION

2,578,397

Filed Feb. 10, 1948

3 Sheets-Sheet 1

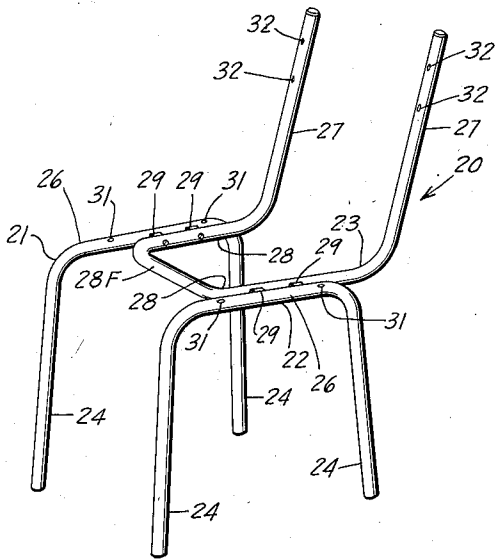


FIG. 1

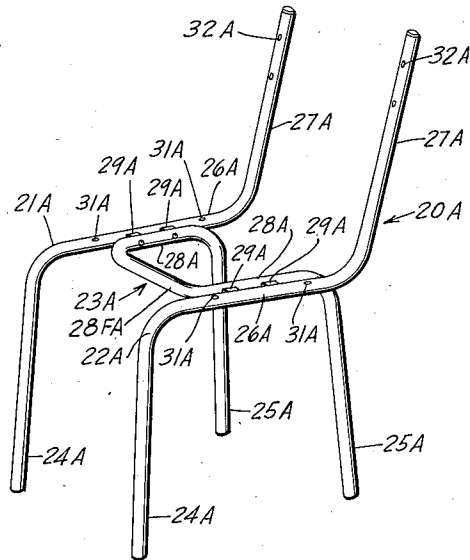


FIG. 2

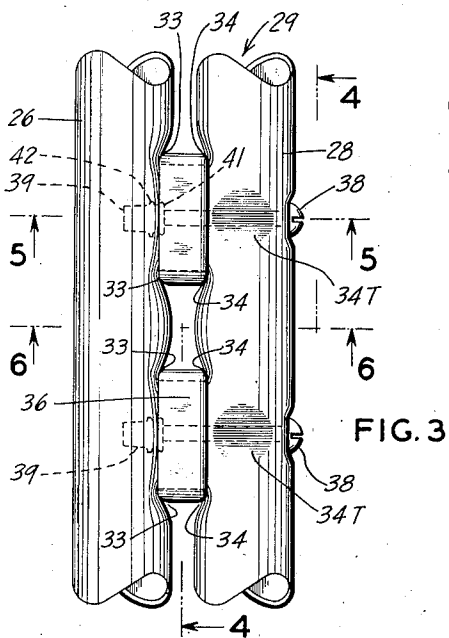


FIG. 3

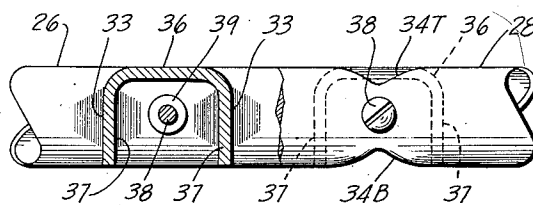


FIG. 4

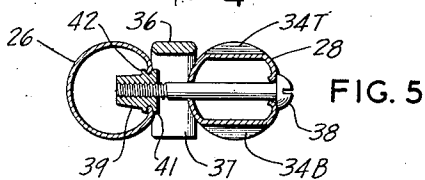


FIG. 5

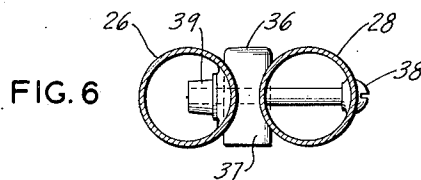


FIG. 6

INVENTOR.
WILLIAM N. BROWN
BY *John Bing*
ATTORNEY

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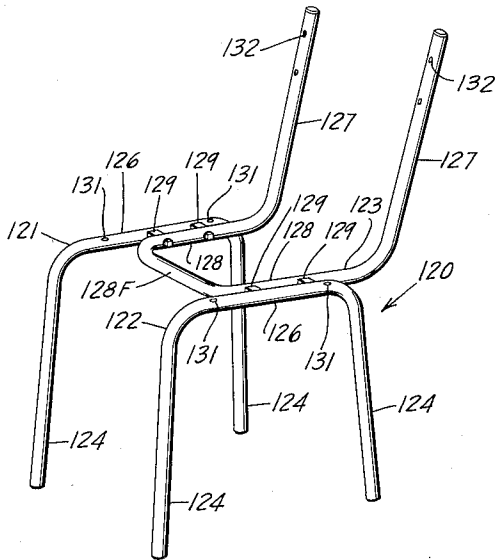


FIG. 7

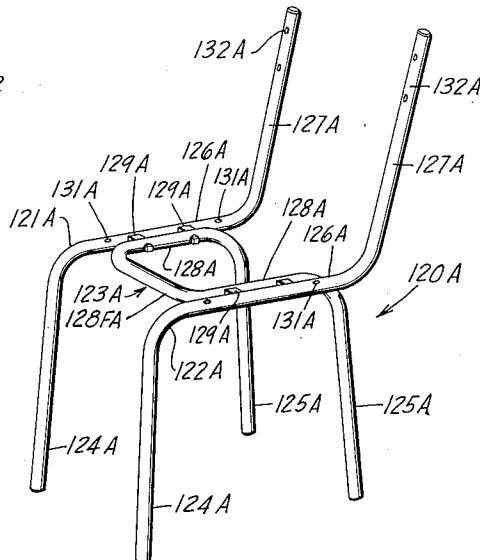


FIG. 8

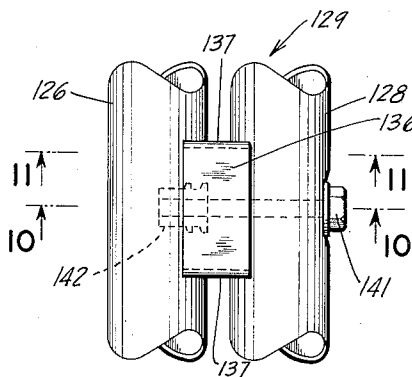


FIG. 9

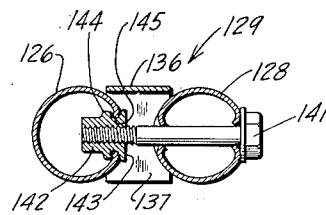


FIG. 10

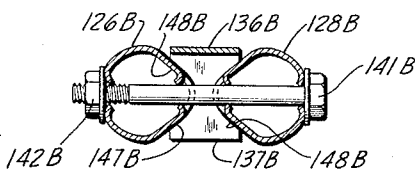


FIG. 12

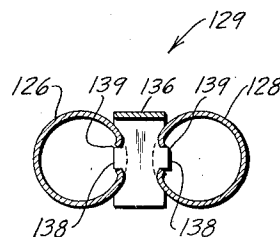


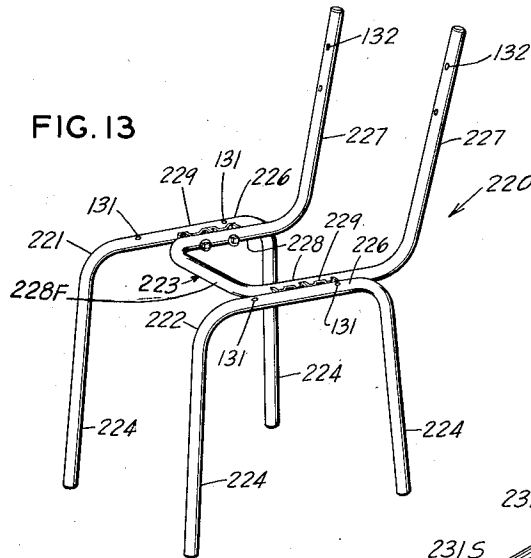
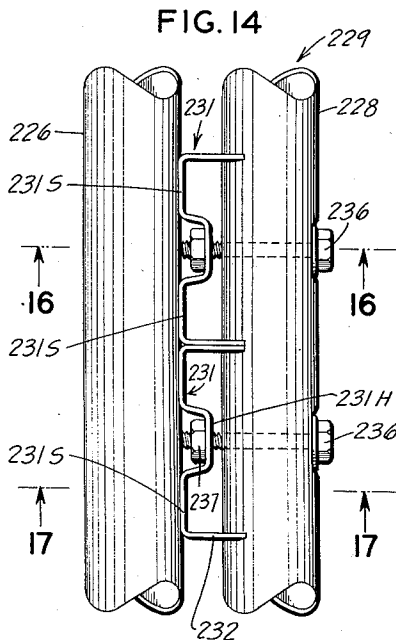
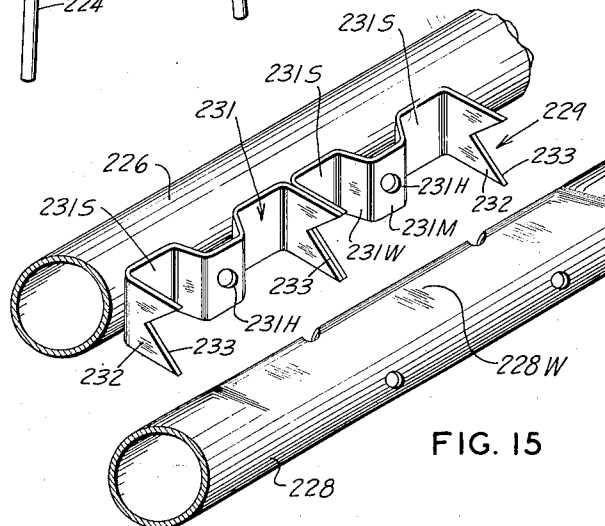
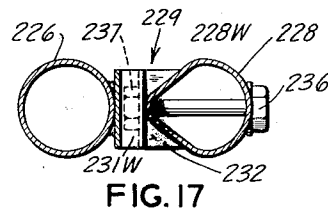
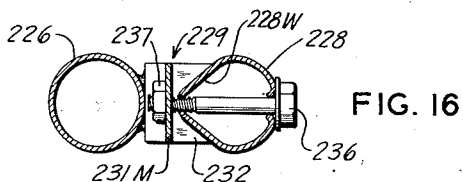
FIG. 11

INVENTOR.
WILLIAM N. BROWN
BY *John Bing*
ATTORNEY

W. N. BROWN

FURNITURE CONSTRUCTION

3 Sheet's-Sheet 3



INVENTOR.
WILLIAM N. BROWN
BY *Fred Bing*
ATTORNEY

UNITED STATES PATENT OFFICE

2,578,397

FURNITURE CONSTRUCTION

William N. Brown, Winona Lake, Ind., assignor to
Arnolt Corporation, Warsaw, Ind., a corporation
of Indiana

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5 Claims. (Cl. 155—194)

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This invention relates generally to the art of making furniture and has particular reference to furniture structures made of metal tubing.

Tubular metal framed furniture has long been shipped and sold in assembled condition to the ultimate retail outlet, and it has been recognized that it would be a great deal more advantageous and economical to ship and sell such furniture in knocked down or KD form to the retail outlet where it could be assembled prior to display for sale. However, such knocked down components for making up such furniture have ordinarily been difficult to assemble, particularly by workmen not possessed of special tools nor of special skills.

It is, therefore, an important object of this invention to enable tubular metal framed furniture to be shipped in knocked down form so that it may be assembled by the user or the retail outlet, such assembly being characterized by the absence of any requirement for special tools or skilled workmen.

Another object is to form the members comprising a tubular frame structure in such a fashion that the members may be readily assembled by unskilled workmen using only the simplest tools.

Still another object is to form the members of a tubular frame structure in such a fashion that they may readily be fastened together to form a structure which will be unusually rigid and able to withstand loads or forces tending to disrupt the connection between such members.

Yet another object is to form the members making up a tubular frame chair structure with certain configurations in cross-section of the tubing employed therein to the end that these configurations may be employed with clips or separating members and connecting bolts to connect the members in a rigid and firm assembly.

Still another object is to enable a tubular metal frame furniture to be assembled in such a fashion that the means for such assembly will not be discernible to the user.

Other and further objects and important features of the invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments and the principles thereof and what I now consider to be the best modes in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and struc-

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tural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

5 In the drawings:

Fig. 1 is a perspective view of a chair frame embodying the invention;

Fig. 2 is a perspective view of a chair frame embodying the invention but employing frame members of a different shape from that of Fig. 1;

Fig. 3 is a fragmentary plan view of a portion of the frame members of Figs. 1 and 2 which lie in a substantially horizontal plane to provide a support for a seat and showing details of the manner in which the frame members are secured together;

Fig. 4 is a side view of Fig. 3 looking in the direction of the arrows 4—4 of Fig. 3;

Fig. 5 is a transverse section taken on the line 5—5 of Fig. 3;

Fig. 6 is a transverse section taken on the line 6—6 of Fig. 5;

Fig. 7 is a perspective view of a chair frame embodying the invention similar to that shown in Fig. 1 but employing a different arrangement for fastening the frame members together;

Fig. 8 is a perspective view similar to Fig. 7 but employing frame members of a different shape from the embodiment shown in Fig. 7;

Fig. 9 is a fragmentary plan view of a portion of the frame members of Figs. 7 and 8 and showing the mode of securing the frame members together;

Fig. 10 is a transverse section taken on the line 10—10 of Fig. 9;

Fig. 11 is a transverse section taken on the line 11—11 of Fig. 9;

Fig. 12 is a transverse section taken through a pair of frame members similar to those shown in Figs. 1, 2, 7 or 8 and showing another way in which the frame members may be deformed to cooperate with fastening and separating members which together prevent the contiguous frame members from rotating with respect to each other;

Fig. 13 is a perspective view of a chair frame embodying the invention and incorporating still another manner of securing the frame members together;

Fig. 14 is a fragmentary plan view of contiguous portions of the frame members lying in the plane of the seat support and showing the manner in which the frame portions are secured together;

Fig. 15 is a perspective partly exploded view of the frame members shown in Fig. 14;

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Fig. 16 is a transverse section taken on the line 16—16 of Fig. 14; and

Fig. 17 is a transverse section taken on the line 17—17 of Fig. 14.

Referring now to Fig. 1 of the drawings, the invention is shown as embodied in a chair frame 20 comprised of three tubular metal frame members 21, 22 and 23, members 21 and 22 being spaced from each other and alike in proportions, and each being provided with leg portions 24 and a connecting portion 26 lying in a substantially horizontal plane. The frame member 23 is substantially U-shaped and includes a pair of upstanding portions 27 and spaced portions 28 which lie in the same substantially horizontal plane as the portions 26 of the members 22 and from corresponding ends of which the portions 27 are extended. The other ends of the portions 28 are connected by an integral cross bar 28F. The portions 26 of the members 21 and the portions 28 of the members 23 provide spaced contiguous pairs of said portions disposed in said substantially horizontal plane, the paired portions so formed being connected at a plurality of points as at 29, by means as will be presently described. The frame members 22 are also provided with a plurality of holes 31 whereby a seat or cushion may be fastened to the members 22, and the upstanding back frame portions 27 of the frame member 23 are similarly provided with holes 32 for securing a back or rest, the seat and the back or rest not being shown.

Referring now to Fig. 2, there is shown an alternate form of a chair frame indicated at 20A which employs frame members of a different shape from that shown in Fig. 1. As shown, the chair frame 20A consists of spaced frame members 21A, each of which comprises a leg portion 24A, a portion 26A lying in a substantially horizontal plane and an upstanding portion 27A adapted to form a back for the chair structure 20A. The chair frame structure 20A also includes a substantially U-shaped member 23A consisting of leg portions 25A and spaced portions 28A which lie in a substantially horizontal plane including the portions 26A of frame members 21A and 22A, and the forward ends of the portions 28A are joined by an integral front bar 28FA. As shown, the frame members 21A and 22A are connected to the frame member 23A at a plurality of points indicated at 29A in a manner similar to that shown with respect to Fig. 1 and which will presently be described in detail. As with the chair frame structure shown in Fig. 1, the chair frame structure 20A may be provided in the portion 26A with a plurality of holes 31A for fastening a seat thereto, and with holes 32A in the portions 27A for securing a back support.

Referring now to Figs. 3 to 6 inclusive, there is shown in plan view one of the spaced contiguous pairs of portions 26 and 28 which lie in the substantially horizontal common plane. For purposes of convenience reference will be made only to the portions of the frame members shown in Fig. 1, but the description obtaining with reference to Fig. 1 will obtain also with reference to Fig. 2. As shown in Fig. 3, the contiguous portions 26 and 28 are formed on their proximate faces with transverse or vertically disposed grooves 33 and 34 which are in register with each other and which are engaged by a substantially U-shaped spacer element 36 having vertical limbs 37 engaging the opposed grooves 33 and 34. Means are provided for holding the portions 26

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and 28 together with the separator or spacer element 36 therebetween, and to this end the portion 28 has passing therethrough a bolt 38 which is adapted to engage a nut 39 that is fixed in position in the inner wall of the portion 26 in a known manner. As shown, the nut 39 has a shoulder 41 bearing against the outside surface of the portion 26 and a shoulder 42 formed and bearing against the inside surface of the portion 26. This nut 39 is of the construction made and sold by Goodrich Tire and Rubber Co.

By the arrangement thus far described it will be seen that the members comprising a tubular metal chair structure may be shipped in knocked down condition and easily and conveniently assembled by the means described with particular reference to Figs. 3 to 6 inclusive and without the requirement of skilled labor. With the arrangement thus far described the members making up a tubular metal chair frame are held against movement with respect to each other, particularly any rotative or longitudinal movement of the portions 26 and 28 with respect to each other, and this is accomplished by the clamping of the complementary surfaces of the elements 33 and 34 against the elements 37 by the screw 38 and nut 39. Such clamping exerts considerable crushing force on the securing portion 28, and to prevent crushing, the portion 28 has reinforcing grooves 34T and 34B formed in the upper and lower surfaces thereof parallel to and in the plane of the screw or bolt 38. It will also be apparent that the assembly means described particularly with reference to Figs. 3 to 6 will not interfere with or disfigure the outer faces of the frame portions 26 and 28A, the assembly means described being further concealed by the seat, not shown, that is adapted to be secured to the chair structure 20 and 20A at the holes 31 and 31A.

Referring now to Figs. 7 and 8 there is shown a tubular chair frame structure similar to that shown in Figs. 1 and 2. The chair frame structure is indicated at 120 and is provided with frame members 121 and 122 which are fastened to a substantially U-shaped frame member 123 to form a tubular frame structure. The members 121 and 122 have leg portions 124 and portions 126 which lie in a substantially horizontal common plane. The substantially U-shaped frame member 123 has upstanding portions 127 and substantially horizontal spaced portions 128 which lie in the plane common to the portions 126 of the frame members 121, the spaced contiguous pairs of frame portions 126 and 128 being connected as indicated generally at 129, and as will be described presently more fully. The forward ends of the portions 128 are joined by an integral front bar 128F. In order to provide for the attachment of a seat the frame portions 126 are provided with holes 131, and in order to provide for the attachment of a back the upstanding portions 127 are provided with mounting holes 132.

The tubular frame chair structure 120A of Fig. 8 is like the chair structure described with reference to Fig. 2 and consists of spaced frame members 121A and 122A and a substantially U-shaped member 123A. The members 121A and 122A have leg portions 124A and substantially horizontal portions 126A which lie in a common plane, the portions 126A being continuous with substantially vertical portions 127A. These substantially U-shaped members 123A have spaced portions 128A which are joined at their forward

ends by an integral front bar 128FA. In the assembled chair the portions 128A are contiguous to the portions 126A of the frame members 121A and 122A and lie in the common substantially horizontal plane, the spaced portions 128A being continuous with leg portions 125A. Means are provided for joining the portions 128A which are contiguous to the portions 126A shown generally at 129A and which will be described more fully hereinafter. Holes 131A are provided in the portions 126A of the members 121A and 122A to the end that a chair seat, not shown, may be secured to the frame structure 128, and similar holes 132A are provided in portions 127A to enable a chair back to be secured thereto.

Referring now to Figs. 9 to 11, the fastening means 129 of Fig. 7, which is similar to the fastening means 129A shown with reference to Fig. 8 (the description of the fastening means of Fig. 7 therefore, will suffice for Fig. 8 as well) comprises U-shaped spacer elements 136 having vertical limbs 137 adapted to follow the surface of the contiguous frame portions 126 and 128, and which are provided with lugs 138 adapted to extend into and interlock with openings 139 formed in the proximate faces of the contiguous portions 126 and 128. The frame portions 126 and 128 are adapted to be held in such interlocked relation with the spacer elements 136 by means of a bolt 141 which passes through the frame portion 128 and which cooperates with nut 142 which is of the same kind as the nut 39 so as to have a shoulder 143 on the exterior of the contiguous portion 123 and a shoulder 144 on the interior of the frame portion 126.

Alternately the proximate faces of the contiguous frame portions 126 and 128 of Fig. 7 (and similarly the contiguous frame portions 126A and 128A of Fig. 8) may be deformed to provide contiguous frame portions 126B and 128B which are spaced by spacer elements 136B having limbs 137B formed to match the contour of the proximate faces of the portions 126B and 128B, the assembly shown in Fig. 12 being joined by means of a bolt 141B passing through the frame portions 126B and 128B and secured by a nut 142B. The rotative locking action in this form of the invention is attained by forming notches 147B in the opposite sides of the limbs 137B, and forming the adjacent side walls of the members 126B and 128B in an angular shape 148B that is complementary in part with the notches 147B. The bolt 141B serves of course to draw the elements 147B and 148B into a firmly interlocked relation.

The tubular frame chair or furniture structure described with reference to Figs. 7 to 12 inclusive is conveniently and readily assembled by persons requiring no particular degree of skill, and the resultant structure is able to resist all the usual kind of loads placed thereon. With the arrangement of the fastening means shown with particular reference to Figs. 9 to 11 inclusive the contiguous frame portions 126 and 128 are held against rotation on their axes with respect to each other, as well as against longitudinal displacement, thus insuring that the frame members making up the chair frame structure will not become misaligned. The embodiment of the invention described with reference to Figs. 9 to 11 is further characterized by the advantage that the means for fastening the frame members together is not visible to the user, all exterior surfaces being unbroken or unmarred by the fastening means described.

Referring now to Fig. 13, there is shown

another embodiment which the invention may assume in practice, the chair frame structure being illustrated as being similar to that shown in Figs. 1 and 7 and being characterized by the provision by another form of fastening means for holding the frame members in assembled relationship. Thus, the structure 220 consists of frame members 221 and 222 which are joined with a substantially U-shaped frame member 123, the members 221 and 222 being formed with leg portions 224, and the U-shaped member 123 being formed with upstanding portions 227 to provide support for a chair back. As with the embodiment shown in Figs. 1 and 7, the frame members 221 and 222 have substantially horizontal portions 226 which lie in a common plane, the U-shaped frame member 123 having spaced portions 228 which also lie in the same plane, the spaced contiguous pairs of said frame portions being connected as indicated generally at 229. The substantially horizontal portions 226 are provided with holes 131 to enable a seat or cushion to be secured thereto, and the upright portions 227 are provided with holes 132 whereby a chair back may be secured thereto.

Referring now to Figs. 14 to 17 inclusive, the fastening means indicated generally at 229 for securing the frame portion 226 and the frame portion 228 together consists of a stamping 231 secured to the frame portion 226 by welding or any other convenient manner. The stamping 231 is formed with a pair of spaced securing portions 231S which are the portions that are welded or otherwise fastened to the face of the tube portion 226, and between these portions 231S the stamping has an outwardly projecting U-shaped anchoring portion that is afforded by walls 231W and a cross member 231M that extends generally parallel to the axis of the tube portion 226 and in such spaced relation thereto that a nut 237 may be disposed between the tube and the cross member 231M. An opening 231H is formed in the cross member 231M so that a bolt 236 which is extended through the tube portion 228 may be engaged with the nut 237 to draw the tube portions 226 and 228 together. To fix the tube portions 226 and 228 in a rigid relation when the bolt 236 is thus tightened, the tube 228 has its inner side, that is the side that is adjacent the tube portion 226, formed in an angular or wedge shape as indicated at 228W, and at the opposite end portions of the brackets or stampings 231, arms 232 are formed having complementary notches 233 to receive the wedge surfaces 228W. Thus, upon tightening of the bolts 236, the notches 233 and the wedge surfaces 228W are engaged in a rigid relation.

The form of the invention described with reference to Figs. 13 to 17 inclusive is characterized, as are the other embodiments of the invention, by the feature that the fastening means for holding the frame members together will be completely concealed from the casual observer, and being further characterized by complete rigidity of the connected elements even though these elements are of such a character as to be readily secured together by unskilled workers.

From the foregoing description, which has been had with reference to a number of preferred embodiments which the invention may assume in practice, it will be evident that the present invention enables frames for furniture such as chairs to be shipped in a convenient knocked down form, the members comprising such a chair frame or

the like being capable of being readily assembled by the workers in the usual retail furniture store to afford such a rigid frame.

It will be evident of course that in all of the embodiments of the invention, the connected parts are held securely against relative longitudinal displacement as well as against relative rocking of the tubular members about the axes of the connected parts. Moreover, in all of the embodiments, the parts are so formed and related as to effectually resist the crushing forces incident to the tightening of the clamping or securing bolts.

Thus, while I have illustrated and described the preferred embodiments of my invention, it is to be understood that these are capable of variation and modification, and that I, therefore, do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as shall fall within the purview of the following claims.

I claim:

1. In a furniture frame structure, a pair of separately formed tubular frame members respectively affording elongated securing portions disposed in parallel spaced relation, a substantially U-shaped member having spaced limb portions between said spaced securing portions, at least one of said securing portions being deformed on the side adjacent the other securing portion, and said U-shaped member being formed complementary to said deformations, and means securing said securing portions to said U-shaped member with said deformations operatively engaged with complementary surfaces of said U-shaped member to prevent the rotation of said members along the axes of said securing portions.

2. In a furniture frame structure, a pair of separately formed tubular frame members respectively affording elongated securing portions disposed in parallel spaced relation, a substantially U-shaped member having spaced limb portions lying between said securing portions, said securing portions being deformed on the proximate faces thereof, and means connecting said securing portions and cooperating with said deformations to prevent the rotation of said securing portions about their axes.

3. In a furniture frame structure, a pair of separately formed tubular frame members respectively affording elongated securing portions disposed in spaced parallel relation, said securing portions being transversely grooved on proximate faces thereof and said grooves being in register and in opposed relation, spacer elements engaging said opposed grooves, and means for securing said securing portions and said spacer elements

together whereby said securing portions are prevented from rotation along their axes with respect to each other.

4. In a furniture frame structure, a pair of separately formed tubular frame members respectively affording elongated securing portions disposed in spaced parallel relation, said securing portions being transversely grooved on proximate faces thereof and said grooves being in register and in opposed relation, spacer elements engaging said opposed grooves, means including a clamping bolt extended through one of said portions and a nut fixed to the other of said portions for securing said securing portions and said spacer elements together whereby said securing portions are prevented from rotation along their axes with respect to each other, and transverse grooves formed in the upper and lower faces of said other one of said portions opposite said bolt to prevent crushing of said other portion when clamping forces are applied by said bolt.

5. In a furniture frame structure, a pair of separately formed tubular frame members respectively affording elongated securing portions disposed in spaced parallel relation a substantially U-shaped member having limb portions lying between said securing portions, said securing portions being transversely grooved on proximate faces thereof and said grooves being in register, spacer elements engaging said grooves in a complementary relation and means comprising a nut fixed to one of said portions and a bolt passing through the other of said portions to secure said portions together with the spacer therebetween.

WILLIAM N. BROWN.

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