April 11, 1944. Q. G. NOBLITT ET AL 2,346,449

METAL FURNITURE

Filed Feb. 8, 1941

Fig. 1.

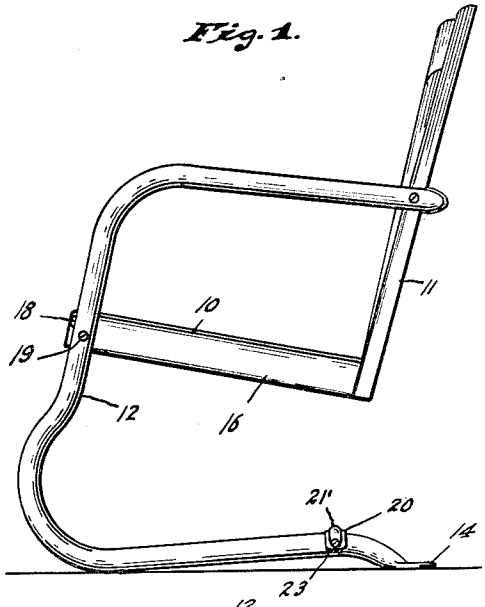


Fig. 2.

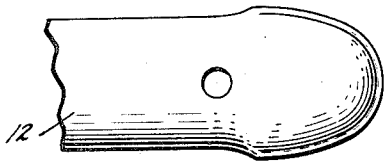


Fig. 3.

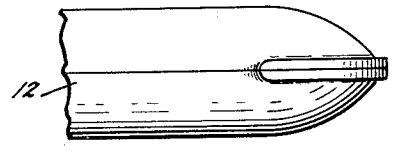


Fig. 4.

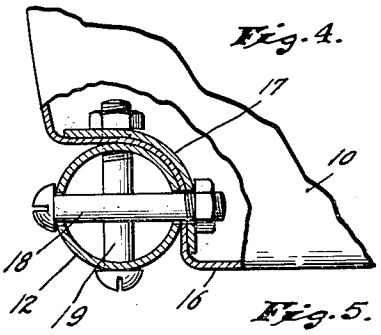


Fig. 5.

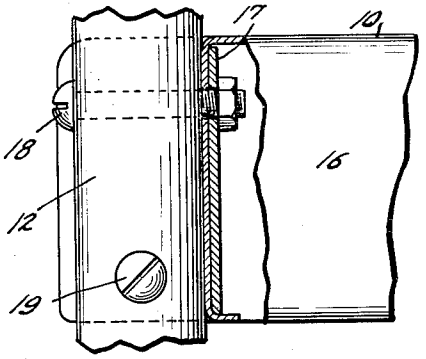


Fig. 6.

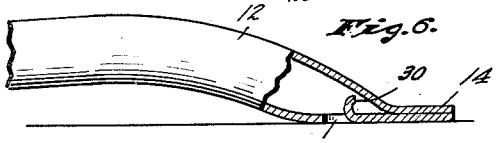


Fig. 7.

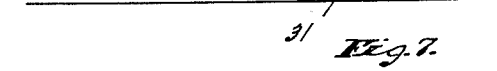


Fig. 8.

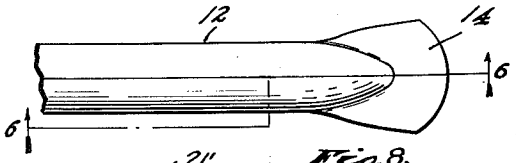


Fig. 9.

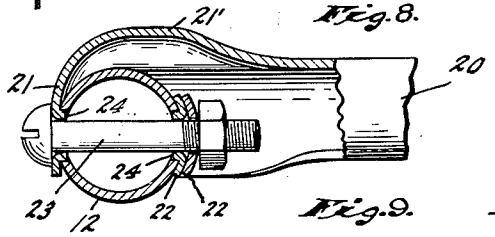


Fig. 11.

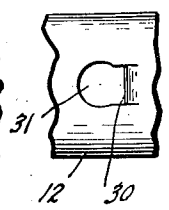
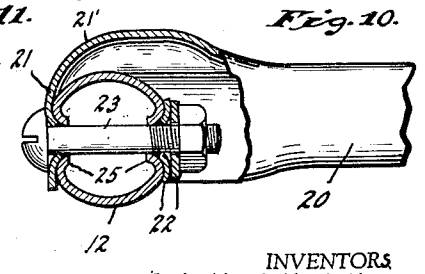
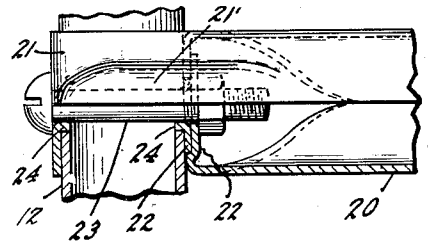


Fig. 10.





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UNITED STATES PATENT OFFICE

2,346,449

METAL FURNITURE

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Application February 8, 1941, Serial No. 377,950

10 Claims. (Cl. 155—194)

Our invention relates to metal furniture of the type in which tubular members of metal are employed to support chair-seats, chair-backs, table-tops, etc. It is the primary object of our invention to improve the rigidity of such articles of furniture and to simplify and cheapen the manufacture thereof. More specifically, it is our object to provide a simple and economical construction which will prevent any relative rotation of the tubular supporting members and the other elements of the structure which are secured to them. A further object of our invention is to reduce the cost of finishing the ends of the tubular supporting members, where those ends are exposed.

In carrying out our invention, we contemplate that the tubular supporting members will be secured to other elements of the structure by means of bolts or screws; and, at points where rigidity of connection is desired, the holes through each tubular supporting member are made considerably larger than the bolt or screw which is to pass through them, and the element secured to the tubular member is provided with an integral annular flange closely fitting the hole or holes in the tubular member. To finish the ends of the tubular members, we first flatten the ends in forming dies, and then trim the flattened portions to any desired conformation.

The accompanying drawing illustrates our invention: Fig. 1 is a side elevation of a chair embodying sheet-metal seat and back portions and tubular supporting members; Fig. 2 is a side elevation and Fig. 3 is a plan view of the upper end of one of the tubular supports; Fig. 4 is a fragmental plan view and Fig. 5 a fragmental side elevation of one front corner of the seat, portions of the construction being broken away and shown in section; Fig. 6 is a fragmental side elevation of the lower end of one of the tubular supports, broken away in partial section on the line 6—6 of Fig. 7; Fig. 7 is a plan view of the lower end of a tubular support; Fig. 8 is a fragmental section illustrating the arrangement employed for securing the lower portions of each of the tubular supports to a stretcher which extends between them; Fig. 9 is a top plan view of the construction illustrated in Fig. 8 with portions thereof broken away and shown in section; Fig. 10 is a view similar to Fig. 8 illustrating a modified construction; and Fig. 11 is a fragmental elevation of one of the tubular supporting members.

The chair illustrated in Fig. 1 is of the general type more fully shown and described in our co-pending patent application Serial No. 369,940, filed Dec. 13, 1940. It comprises a sheet-metal seat 10 secured at its rear edge to the bottom of a sheet-metal back 11, the seat and back being supported by a pair of similar U-shaped tubular supporting members 12. Each of the tubular supporting members has a generally horizontal lower portion adapted to rest upon the ground or other supporting surface, a generally vertical intermediate portion secured to a front corner of a seat 10, and a generally horizontal upper portion disposed above the seat, forming an arm, and secured at its rear end to the chair-back 11.

Heretofore, in order to finish the ends of each of the tubular supports 12, it has been the general custom to provide them with caps which not only serve to impart a finished appearance but also to prevent the entrance of water into the interior of the tubular supports. To eliminate the necessity for such extra elements as the caps just referred to, and at the same time to close the ends of the tubes in a manner which will enhance their appearance and exclude water, we flatten the tubes to close them and then trim the flattened portions to any desired form. The shape of each flattened tube-end, and the manner in which it is trimmed may vary as desired. At the upper ends of the tubular supports 12, which are secured to the chair-back 11, we prefer to flatten the tubes symmetrically into a vertical plane as indicated in Fig. 3 and to trim the flattened portion close to the tube-body, as shown in Figs. 1 and 2. At the opposite, or lower end, of each tube the tube is flattened asymmetrically into a horizontal plane offset from the tube-axis; and the trimming is performed in a manner which leaves the flattened portion projecting beyond the body of the tube, as indicated at 14 in Figs. 6 and 7, to form a foot. If desired, tubular stock may be flattened intermediately to form two tube-ends simultaneously, and the trimming tools arranged to trim and sever both tube-ends simultaneously.

As in our co-pending application above referred to, the seat 10 of the chair is provided with a downwardly extending peripheral flange 16 which, at each of the front corners of the seat, is formed to provide a vertically extending channel of arcuate cross-section receiving the intermediate vertical portion of the adjacent supporting member 12 and desirably provided with a reinforcement 17; and in each of such channels the intermediate portion of the associated tubular support 12 is secured. In our co-pending application each support was secured in the vertical channel at the adjacent front corner of the seat

by one or more screws which extended through holes in the supporting member and the flange 16 in a direction which was oblique with reference to the seat. Because of the oblique disposition of the screw-receiving holes in the supporting members, the two members differed from each other even if they were otherwise identical, and the difference between them increased the cost of manufacture of the chair.

To overcome this disadvantage in the chair of this application, the two supporting members 12 are made identical throughout. In forming the supports from straight tubing all bends are made in a single plane, and the axis of the tubing, throughout its entire extent, lies in this plane in the finished supporting member. The two bolts 18 and 19 which secure each supporting member to the seat, instead of being disposed obliquely, are arranged so that one (shown as 18) is disposed with its axis in the plane of the support 12 while the other (19) is perpendicular to that plane. This arrangement not only makes possible absolute identity of the two supporting members, but also provides a very firm attachment of the supporting members to the seat and thereby increases the rigidity of the chair.

In a chair of the type described the rigidity of the support and the tendency of the chair to resist side sway is materially enhanced if the lower horizontally extending portions of the two tubular members 12 are prevented from rotating about their respective axis. To secure this result, the lower horizontal portions of the two tubular members 12 are interconnected by a stretcher 20, and the means employed to attach each end of the stretcher to the associated tubular member is such as will tend to prevent the latter from rotating. One such means is illustrated in Figs. 8 and 9. In the construction there illustrated, the stretcher 20 is tubular and each of its ends is split and formed as shown to provide a downwardly opening seat for the tubular member 12. Preferably each such seat includes a top-wall portion 21, desirably reinforced by an integral intermediate rib or bead 21', which extends outwardly over and downwardly adjacent the supporting member 12 and side-wall portions trimmed to fit the supporting member 12 and to provide two tongues 22 which are bent inwardly of the stretcher into overlapping relationship with each other and into opposed relationship with the down-bent end of the top-wall portion 21. As will be clear from Fig. 8, the tongues 22 are desirably arched in cross-section to conform to the curvature of the exterior surface of the tubing of which the supports 12 are formed. The down-bent end of the top-wall portion, the two tongues 22, and the tube 12, are pierced for the reception of a clamp bolt 23. The holes in the tube 12 are made considerably larger than the clamp bolt 23, and the material at the edges of the holes in the seat-portion 21 and in the inner one of the overlapping tongues 22 is turned inwardly to form annular flanges 24 which fit closely within the holes in the tube 12 and which prevent the tube from rotating about its axis. The flanges 24 are relatively short so that the seat-portion 21 can be sprung to the extent sufficient to permit disposing the tube 12 within it.

In the construction illustrated in Figs. 8 and 9, the holes in the tube 12 are drilled or formed in some other manner which does not cause the tube 12 to depart materially from its uniform circular cross-sectional shape. To eliminate the expense of drilling, the holes in the tube 12 may be punched. Even if the tubes are supported exteriorally in dies, the punching of holes through them will result in some inward distortion of the tube, as indicated at 25 in Fig. 10, such inward distortion resulting in the formation of frusto-conical depressions in the outer surfaces of the tubes. If the holes in the tube 12 are punched to create such frusto-conical depressions, the opposed walls of the tube-receiving seat may be provided with flanges which, instead of being cylindrical like the flanges 24, are frusto-conical to conform to the depressions which are to receive them.

In punching holes in the tubular members, we find that it is advantageous to use a punch the end of which is struck off obliquely so that the slug removed to form the hole is not severed from the body of the tube. Such an expedient is illustrated in Figs. 6 and 11 where the slug 30, removed to form a hole in the side wall of the tube, is left joined to the tube along one edge. Forming the holes in this manner not only reduces the punching effort, which tends to collapse and distort the tube, but also eliminates the necessity of removing from the tube one or more slugs which, if loose within the tube, would be objectionable. The opening 31 left by the inward deflection of the slug 30 in Fig. 6 is provided, desirably adjacent the foot 14 as illustrated, for the purpose of draining paint, water, or other liquid from the tube.

We claim as our invention:

1. In an article of metal furniture, a supporting member formed of metal tubing and having an exposed end, the exposed end of said supporting member being collapsed to form a flattened portion joining the body of the support along an outwardly convex curve the inner ends of which are approximately tangent to the exterior surface of the undistorted portion of the supporting member, said flattened portion being trimmed close to the unflattened portion of the supporting member.

2. In an article of metal furniture, a supporting member formed of metal tubing and having an exposed end, the exposed end of said supporting member being collapsed to form a flattened portion, said flattened portion being trimmed close to the unflattened portion of the supporting member.

3. In a chair having a seat and back, a pair of supporting members disposed at the sides of the chair, each of said members being formed of metal tubing and having a generally horizontal lower stretch adapted to engage a supporting surface, a generally vertical stretch secured to the seat near a front corner thereof, and a generally horizontal upper arm-forming stretch extending rearwardly above the seat and secured near its end to the chair-back, the rear end of each arm-forming stretch being flattened into a vertical plane and trimmed close to the unflattened portion, and the rear end of each lower stretch being flattened into a horizontal plane and offset from the unflattened portion to form a foot.

4. In a chair having a seat and back, a pair of supporting members disposed at the sides of the chair, each of said members being formed of metal tubing and having a generally horizontal lower stretch adapted to engage a supporting surface, a generally vertical stretch secured to the seat near a front corner thereof, and a generally horizontal upper arm-forming stretch extending rearwardly above the seat and secured near

its end to the chair-back, the rear end of each arm-forming stretch being flattened into a vertical plane and trimmed close to the unflattened portion.

5. In a chair having a seat and back, a pair of supporting members disposed at the sides of the chair, each of said members being formed of metal tubing and having a generally horizontal lower stretch adapted to engage a supporting surface, and a generally vertical stretch secured to the seat near a front corner thereof, and a stretcher extending between and interconnecting the lower stretches of said supporting members, said stretcher having at its ends seats respectively receiving the lower stretches of said supporting members, each of said stretcher-seats being provided on opposite sides of the associated supporting member with a pair of alined openings and with annular flanges respectively surrounding said openings and extending inwardly of the stretcher seat, each of said supporting members being provided with diametrically opposite holes respectively receiving said flanges, and a clamping member extending through the holes in each seat and in the associated supporting member.

6. The invention set forth in claim 5 with the addition that said flanges are frusto-conical.

7. The invention set forth in claim 5 with the addition that said flanges are substantially cylindrical.

8. In a chair having a seat and back, a pair of supporting members disposed at the sides of the chair, each of said members being formed of metal tubing and having a generally horizontal lower stretch adapted to engage a supporting surface, and a generally vertical stretch secured to the seat near a front corner thereof, and a stretcher extending between and interconnecting the lower stretches of said supporting members, said stretcher having at its ends seats respectively receiving the lower stretches of said supporting members, each of said stretcher seats and its associated supporting member having co-operating provisions preventing rotation of the supporting member in the seat, and means in addition to said provisions for clamping said seat and supporting member together.

9. In an article of metal furniture, a tubular supporting member, an intersecting sheet-metal member provided with a seat for the reception of said tubular member, said seat being provided on opposite sides of said supporting member with a pair of openings and with annular flanges respectively surrounding said openings and extending inwardly of said seat, said supporting member being provided with openings respectively receiving said flanges, and a clamping member extending through the holes in said seat and supporting member for clamping them together.

10. In an article of metal furniture, a tubular supporting member, an intersecting sheet-metal member provided with a seat for the reception of said tubular member, said seat and supporting member being provided with co-operating provisions preventing rotation of said supporting member about its axis in said seat, and means in addition to said provisions for clamping said seat and supporting member together.

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