

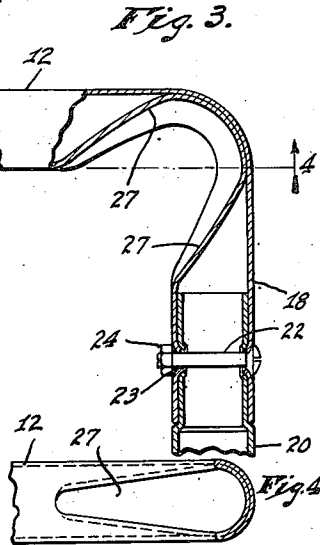
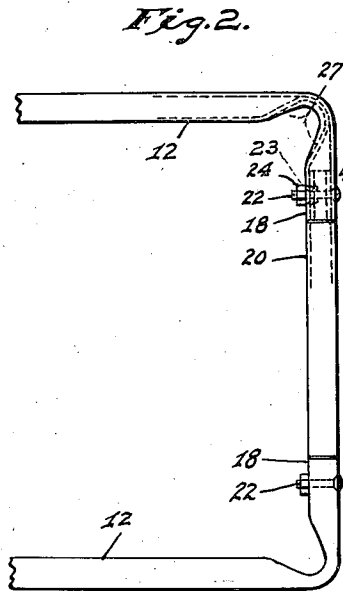
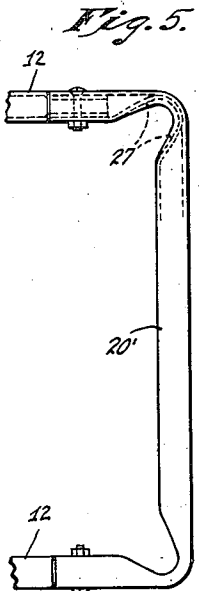
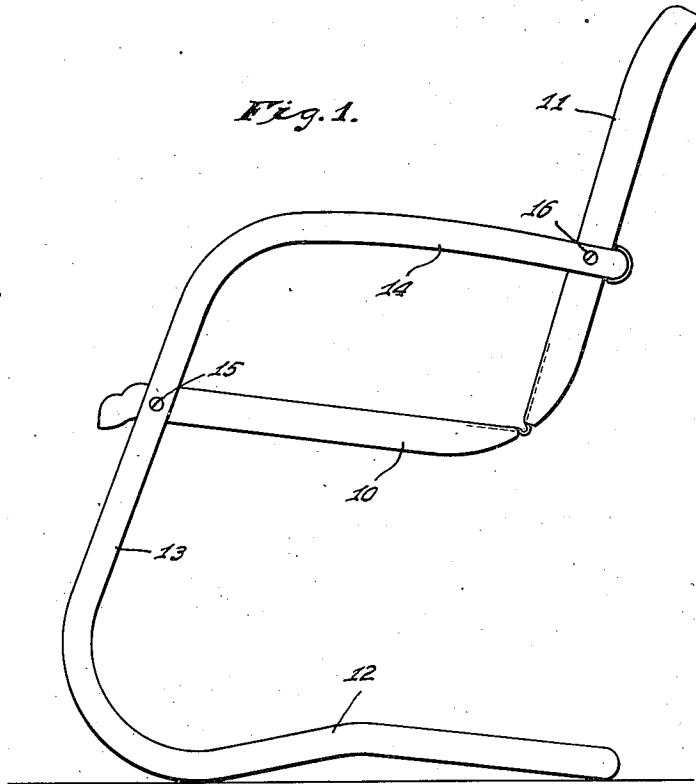
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2,417,733

CHAIR SUPPORTING STRUCTURE

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CHAIR SUPPORTING STRUCTURE

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My invention relates to a metal chair, and more particularly to that form of chair embodying a pair of U-shaped members each of which is formed of metal tubing and has a lower horizontal stretch adapted to rest on the floor or other supported surface, an intermediate stretch extending generally vertically and secured to a front corner of the seat, and an upper horizontal stretch which is secured at its rear end to the chair-back and which provides a chair-arm. My invention is particularly concerned with a means for interconnecting the rear ends of the lower horizontal stretches of the respective side members.

It is the object of my invention to provide a means for interconnecting the rear ends of the respective lower side-member stretches which will be attractive in appearance, which will provide firm joints, and which will not unduly reduce the stability of the chair.

In carrying out my invention in its preferred form I provide a tubular cross member or stretcher the ends of which are telescopically connected respectively to the rear ends of the lower side-member stretches. Because the stretcher will be disposed generally perpendicularly with respect to the lower side-member stretches, it will be necessary, in order to effect the telescopic interconnection, to bend either the ends of the stretcher at right angles to the body thereof or to bend similarly the rear end of each lower side-member stretch. For a purpose to be hereinafter made apparent, it is desirable to make such bends about as small a radius as possible; and to effect this result, I first collapse the tube for a distance and then confine the bend substantially to such collapsed portion.

The accompanying drawing illustrates my invention: Fig. 1 is a side elevation of an erected chair; Fig. 2 is a fragmental plan view of the rear end of the chair-base; Fig. 3 is a fragmental view similar to Fig. 2 with portions of the tubing being shown in section; Fig. 4 is a vertical section on the line 4—4 of Fig. 3; and Fig. 5 is a view similar to Fig. 2 illustrating a modified construction in which the bends are provided in the ends of the stretcher rather than in the ends of the lower stretches of the side member.

The chair illustrated in Fig. 1 comprises a seat 10 and a back 11, here shown as formed of a single piece of sheet metal in accordance with the disclosure of my prior Patent No. 2,581,718, granted July 31, 1945. At each side of the chair there is provided a U-shaped side member formed

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of metal tubing bent to provide a lower horizontal stretch 12, a generally vertical intermediate stretch 13, and an upper horizontal stretch 14. The intermediate stretch 13 is secured to the front corner of the seat 10, as by means of a bolt or screw 15, while the rear end of the upper horizontal stretch 14 is secured to the back 11, as by means of a screw or bolt 16. If desired, the lower horizontal stretch 12 of each side member may be arched slightly as indicated in Fig. 1.

In the construction illustrated in Figs. 2, 3 and 4, the rear ends of the horizontal stretches 12 of the two side members are bent through 90° into substantial alignment with each other and telescopically receive the ends of a cross-member or stretcher 20. As shown, the stretcher 20 is formed of tubing having a diameter equal to that of the side members, and its ends are reduced in diameter to permit its reception within the ends of the side members. The particular form of joint employed between each end of the stretcher and the adjacent end 18 of the associated side member is immaterial, but I prefer the type of joint illustrated because of its relatively attractive appearance.

To prevent separation of the stretcher 20 from the side members when the chair is erected, a bolt 22 is passed through the telescopically associated ends. Desirably, the metal surrounding the holes in the tube walls through which the bolt 22 passes is displaced inwardly of the tube to form nesting frusto-conical flanges. Desirably also, the underside of the bolt-head is frusto-conical, and a frusto-conical washer 23 is disposed beneath the nut 24 at the opposite end of the bolt. As a result of this construction, when the bolt is tightened, the conical flanges on the inner and outer tubes are forced tightly together, thus preventing relative rotation of the tubes.

It will be obvious that the stability of the chair, especially when the person sitting in it tends to lean backward, will depend upon the radius of the bends at the ends of the horizontal stretches 12. The greater this radius, the less will be the width of the base at its rear end, and the less will be the stability of the chair against lateral tipping. It is therefore desirable to bend the rear ends of the side-member stretches 12 about as small a radius as possible. However, the bending of metal tubing about a small radius is difficult because of the tendency of the tube to collapse and wrinkle.

To produce a bend of satisfactorily small radius, while still maintaining an attractive appearance, I employ the expedient best illustrated in Figs. 3

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and 4. As will be clear from those figures, and especially from the dotted-line showing of Fig. 3, we first collapse the tubing for a distance equivalent to that over which it is to be bent, forcing that wall of the tube which will be on the inside of the bend in contact with the opposite wall. To avoid abrupt bends in the tube-collapsing operation the tube is formed beyond each end of the completely collapsed portion with a concave groove 27 of gradually decreasing depth. After the tube is collapsed in the manner indicated, the collapsed portion is bent through an angle of 90°, as will be clear from Figs. 2 and 3. In this bending operation, the collapsed portion of the tube is desirably formed transversely so that its exterior curvature will correspond in radius to the uncollapsed portion of the tube, as is shown in Fig. 4.

By first collapsing the tube and then bending it, I am able to avoid any unsightly wrinkling of metal, and thus I produce a bend which is of attractive appearance and still possesses the desirable small radius. The radius of horizontal curvature of the outer tube-wall over the extent of the bend can be as small as or even smaller than the diameter of the tube and preferably is no more than twice such diameter.

In the modified construction illustrated in Fig. 5, the 90° bends are provided in the ends of the stretcher 23', instead of in the ends of the horizontal side-member stretches 12. Otherwise, the construction is substantially the same as that previously described.

While I prefer to make the tubular side members as separate pieces interconnected at their rear ends by the stretcher 23 or 23', the advantages in respect to stability obtained through the practice of my invention exist irrespective of the separate character of the side members and stretcher.

I claim as my invention:

1. In a chair, a supporting structure having a base portion including two horizontal tubular members disposed in generally parallel relationship at the sides of the chair and a transverse stretcher, said members and stretcher being of circular cross-section, said tubular members being provided with bends which bring their ends into alinement with each other and said stretcher being telescopically associated with and secured to said alined member-ends, the wall of each tubular member on the inside of the bend therein being displaced outwardly into contact with the tube-wall on the outside of the bend, the two contacting tube walls being curved in cross-section with the radius of curvature of the outer surface of the outer tube-wall conforming substantially to the radius of the undistorted outer surface of the tube-wall.

2. The invention set forth in claim 1 with the addition that the inner wall of the tubular member for a distance in each direction from said bend is displaced inwardly of the tube to form a groove of gradually decreasing depth.

3. The invention set forth in claim 1 with the addition that the radius of horizontal curvature of the outer surface of the bent portion of said tubular member is no greater than approximately twice the diameter of the tubular member.

4. In a chair, a supporting structure having a base portion including two horizontal members disposed in generally parallel relationship at the sides of the chair and a transverse stretcher, said members and stretcher being of circular cross-section, said two members being joined re-

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spectively to the ends of said stretcher at points adjacent the rear corners of said base portion, one of the two elements joined at each rear corner of the base portion being tubular and being provided with a horizontal bend to bring its end into alinement with the other of such elements, the tube-wall on the inside of said bend being displaced outwardly into contact with the tube-wall on the outside of the bend, the two contacting tube walls being curved in cross-section with the radius of curvature of the outer surface of the outer tube-wall conforming substantially to the radius of the undistorted outer surface of the tube-wall.

5. The invention set forth in claim 4 with the addition that the inner tube-wall for a distance in each direction from said bend is displaced inwardly of the tube to form a groove of gradually decreasing depth.

6. The invention set forth in claim 4 with the addition that the external radius of said bend is no greater than approximately twice the diameter of the tube.

7. In a chair, a supporting structure having a base portion including two horizontal members disposed in generally parallel relationship at the sides of the chair and a transverse stretcher, said members and stretcher being of circular cross-section, said stretcher being tubular and bent adjacent its ends to bring such ends into alinement respectively with the rear ends of said horizontal members, each end of said stretcher being telescopically associated with and secured to the rear end of such adjacent horizontal member, the wall of said stretcher on the inside of each bend being displaced outwardly into contact with the tube-wall on the outside of the bend, the two contacting tube walls being curved in cross-section with the radius of curvature of the outer surface of the outer tube-wall conforming substantially to the radius of the undistorted outer surface of the tube-wall.

8. The invention set forth in claim 7 with the addition that the inner tube-wall for a distance in each direction from said bend is displaced inwardly of the tube to form a groove of gradually decreasing depth.

9. The invention set forth in claim 7 with the addition that the external radius of said bend is no greater than approximately twice the diameter of the tube.

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