May 15, 1951 J. L. CABLE 2,552,883

FOLDING CHAIR HAVING A METALLIC FRAME

Filed Feb. 13, 1946

Fig. 2

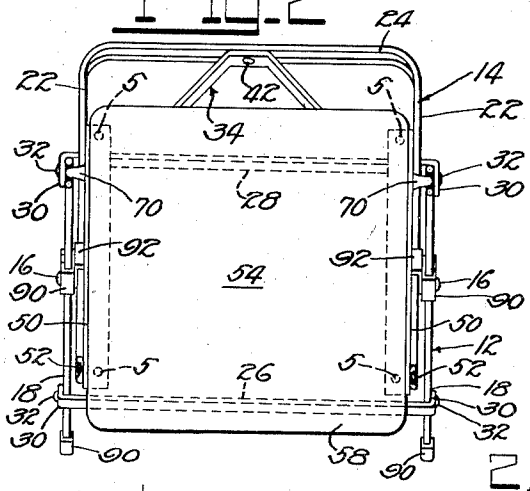


Fig. 1

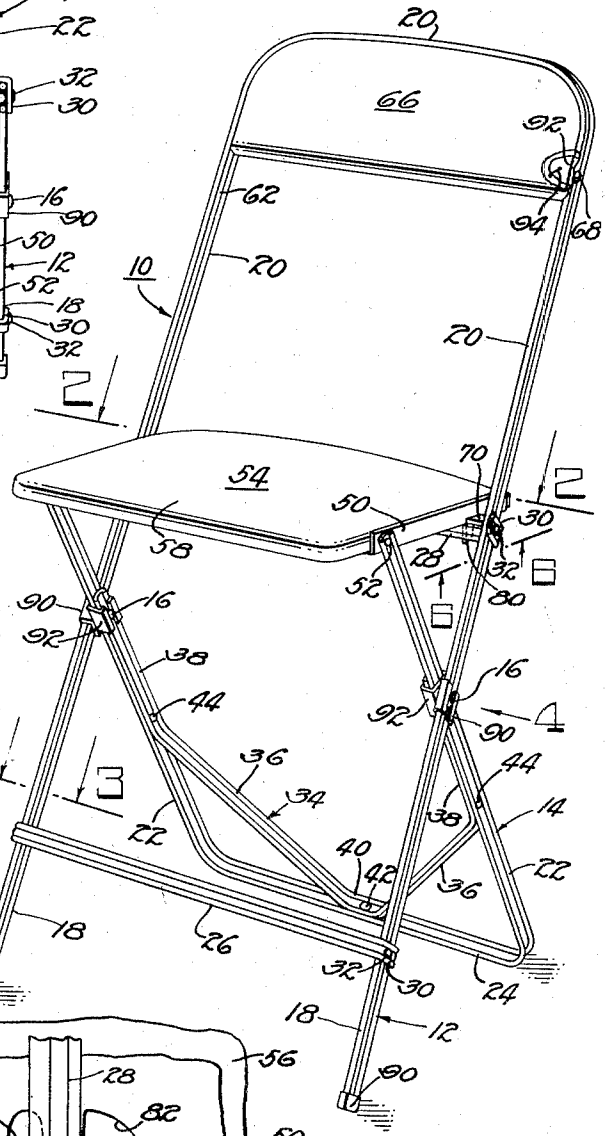


Fig. 4

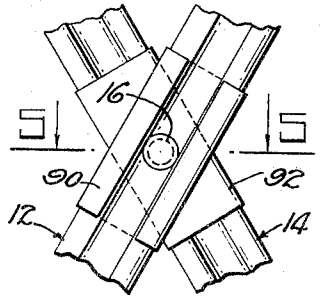


Fig. 5

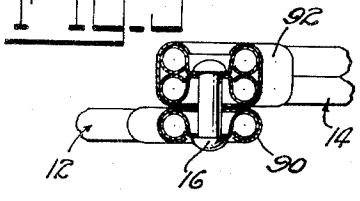


Fig. 3

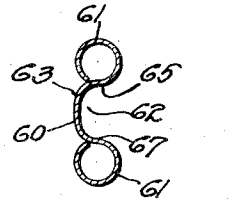
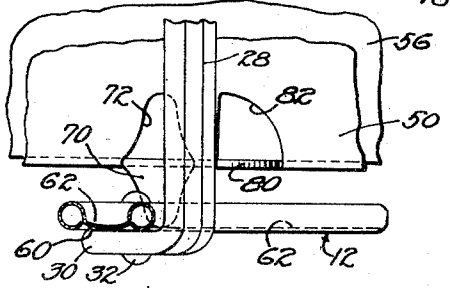


Fig. 6



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FOLDING CHAIR HAVING A METALLIC FRAME

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Application February 13, 1946, Serial No. 647,227

3 Claims. (Cl. 155—143)

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This invention relates to chairs and more particularly, though not exclusively, to chairs which may be folded.

It is the primary object of the present invention to provide a chair which is very light in weight, yet extremely strong, and which lends itself to efficient mass production from inexpensive materials.

It is another object of the present invention to construct the framework of the chair from a minimum number of steel bars which are cut from flat strip stock, and finished by simple bending operations.

It is a more specific object of the present invention to use thin gauge strip stock of light weight for making the bars of the framework of the chair, and to configurate the strip stock cross-sectionally into a shape designed to lend it maximum rigidity, by uninterruptedly feeding the stock lengthwise through cooperating forming rolls.

The foregoing and other objects of the invention, together with means whereby the latter may be carried into effect, will best be understood from the following description of an illustrative embodiment shown in the accompanying drawing: in which,

Fig. 1 is a perspective view of the chair embodying the present invention,

Fig. 2 is a horizontal section through the chair, taken on the line 2—2 of Fig. 1,

Fig. 3 is an enlarged section taken on the line 3—3 of Fig. 1,

Fig. 4 is an enlarged, fragmentary side elevation of a certain part of the chair, as viewed in the direction of the arrow 4 in Fig. 1,

Fig. 5 is a section taken on the line 5—5 of Fig. 4, and

Fig. 6 is an enlarged, fragmentary section through the chair, taken on the line 6—6 of Fig. 1.

Referring to the drawing, and particularly to Fig. 1, the reference numeral 10 designates a chair which, in the present instance, is of the folding type. The framework of the chair consists of sections 12 and 14, which intersect each other when the chair is unfolded as shown in Fig. 1. The frame sections 12 and 14 are pivotally connected at 16 at their intersections in a manner to be described in detail hereinafter. The frame sections 12 and 14 are formed by U-shaped steel bars which are inverted to each other, as shown in Fig. 1. The frame section 12 is longer than the other frame section 14, and comprises the front legs 18 and the back rest support 20 of the chair, while the frame section 14 comprises the rear legs 22 of the chair. The rear legs 22 of the chair are joined at the bottom by the integral yoke 24 of the U-shaped section 14. The frame section 12 is reinforced by spaced cross ties 26 and 28, the ends 30 of which are bent

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and riveted or otherwise secured at 32 to the frame section 12. The frame section 14 is reinforced by a tie bar 34 which is generally V-shaped and has its diverging legs 36 terminating in parallel ends 38. The apex 40 of the tie bar 34 is riveted at 42 to the yoke 24 of the frame section 14, while the parallel ends 38 are secured to the legs 22 by rivets 44 and also by the previously mentioned pivot connections 16 between the frame sections 12 and 14.

The legs 22 of the frame section 14 are pivotally connected at the top with seat-mounting angle irons 50 as by rivets 52. The seat 54 may consist of a wooden board 56 (Fig. 6), screwed or otherwise secured to the angle irons 50 as at 5 (Fig. 2), and preferably having a cover 58 of any suitable material, such as leather or a textile fabric, for instance. For comfort, the seat may also be somewhat upholstered. When the chair is unfolded as shown in Fig. 1, the seat 54 rests on the cross tie 28.

The steel bars of which the frame sections 12 and 14 are composed, are made from strip stock 60 which has been formed into the cross-sectional shape shown in Fig. 3. The strip stock thus formed provides a longitudinal channel 62. The strip stock for the frame section 12 has been bent into U-shape so that the portions of the channel 62 in the parallel legs of said frame section face each other (Fig. 1). A back rest 66 is placed into the channel 62 in the yoke portion of the frame section 12, and secured therein by suitable fastening means, such as wood screws 68. Since the present chair is of the folding type, the opposite portions of the channel 62 in the parallel legs of the frame section 12 are also used as guide channels for lateral tongues 70 on the seat-mounting angles 50. The tongues 70 are preferably punched from the angles 50 as at 72 (Fig. 6) and bent outwardly so as to project into the adjacent portions of the channel 62 in the frame section 12. To fold the chair, the seat 54 is lifted off the cross tie 28 and the frame sections 12 and 14 folded together, whereby the lateral tongues 70 on the seat ride upwardly in the adjacent portions of the channel 62. When the chair is unfolded, the tongues 70 ride downwardly in the adjacent portions of the channel 62. Hence, the tongues 70 and the channel 62 serve to guide the seat 54 into folded and unfolded position, as will be readily understood.

The seat-mounting angles 50 are provided with downwardly extending lugs 80 which bear against the cross tie 28 when the seat is unfolded (Fig. 1), thereby preventing the unfolded frame sections 12 and 14 from collapsing. The lugs 80 are preferably punched from the angles 50 as at 82 (Fig. 6), and bent downwardly in the fashion illustrated in Fig. 1.

The pivots 16 on the framework of the chair

are preferably formed by rivets which connect the intersecting portions of the frame sections 12 and 14 and the adjacent ends 38 of the V-shaped tie 34. Since the pivoted portions of the frame sections 12 and 14, and also the adjacent ends 38 of the V-shaped tie 34, have been weakened by drilling holes through them for the reception of the rivets 16, they are reinforced by split steel sleeves 90 and 92. The sleeves 90 are pressed over the drilled portions of the frame section 12, while the sleeves 92 are pressed over the drilled portions of the frame section 14 and tie 34, as shown in Fig. 5. The sleeves 90 and 92 not only reinforce the drilled, and, hence, weakened, portions of the frame sections 12, 14 and tie 34, but also afford additional layers of steel through which the rivets 16 extend, thus preventing the rivets 16 from tearing or excessively wearing the drilled portions of the frame sections 11, 12 and tie 34, even when an exceptionally heavy person sits on the chair.

The tie 34, by its V-shape and attachment to the legs 22 and yoke 24 of the frame section 14 in the manner shown in Fig. 1, greatly reinforces the frame section 14. Thus, by securing the parallel ends 38 of the tie 34 to a length of the chair legs 22, the latter are separately reinforced against longitudinal collapse, while the additional attachment of the apex 40 of the V-shaped tie 34 to the yoke 24 of the frame section 14 reinforces the latter against collapse in any direction. Hence, the provision of the V-shaped tie 34 on the frame section 14 renders the latter exceptionally rigid. This is of decided advantage since the frame section 14 of the present chair carries the greater portion of the weight of a person sitting on the chair, particularly when the person leans against the backrest.

The strip stock from which the frame sections 12 and 14 and preferably also the ties 26, 28 and 34, are made, is preferably thin gauge steel of light weight, so as to reduce the weight of the chair to a minimum. However, in order that strip stock of very thin gauge may safely be used for the intended purpose, the same is configurated cross-sectionally into the shape shown best in Fig. 3. More particularly, the strip stock is configurated cross-sectionally so as to provide opposite, round beads 61 and a web or bridge 63 joining said beads. The stock is thus continuously curved cross-sectionally with repeated reversals in the curve at 65 and 67 (Fig. 3) making for maximum rigidity of the configurated stock. Stock of this cross-sectional shape may be obtained economically and efficiently by feeding strip stock uninterruptedly through appropriate forming rolls (not shown). The various lengths for the frame sections 12, 14, the cross ties 26, 28 and the V-shaped tie 34 may then be cut from the formed stock, and simply bent into the shapes shown in Fig. 1. The ties 26 and 28 may then be riveted to the frame section 12 to form a sub-assembly, and the V-shaped tie 34 may be riveted to the frame section 14 at 42 and 44 to form another sub-assembly. The reinforcement sleeves 90 and 92 may also be applied to these sub-assemblies. The seat 54 may be assembled and mounted on the angles 50 to form an additional sub-assembly. Thereafter, the several sub-assemblies may readily be assembled into the complete chair.

Press-fitted over, or otherwise secured to, the lower ends of the front legs 18 of the chair are caps 96 which lend to these legs a more finished

appearance and reinforce them where they would be liable to collapse cross-sectionally if directly standing on the floor. The back rest 66 may be made from a board of inexpensive ply-wood, and suitably covered with the same material as the seat 54. In order to prevent the holding screws 68 from splitting the plywood, or working loose therein, within a short time, a piece 92 of thin sheet metal is wrapped around each side of the board in the manner shown in Fig. 1, and a screw 68 is forced therethrough and into the board. Each sheet metal piece 92 may be attached to the wooden board of the back rest 66 by an ordinary nail of which the end is hammered over against the board as at 94.

I claim:

1. A folding chair having a seat, a supporting frame therefor, said frame being formed by joined bars, each made from a steel strip configurated cross-sectionally so that its side edges form round beads and its intermediate portion forms a continuously curved web joining each bead in a reversing, continuous curve, said supporting frame comprising two U-shaped bars each having a yoke and parallel legs spaced apart to receive said seat therebetween, pivots connecting the legs of said bars intermediate their ends so that said bars may be folded substantially into a common plane, a straight rigid tie across the legs of one of said bars, a rigid V-shaped tie having two legs diverging from the apex of the V and continuing as parallel ends, means including said pivots for attaching said apex and ends to the yoke and legs, respectively, of the other bar, said seat being pivotally connected with the free ends of the legs of said other bar and resting on said straight tie when the chair is unfolded, and means to limit the unfolding of said bars.

2. A folding chair as set forth in claim 1, having a reinforcing sleeve over the pivoted portion of each leg of said other bar and the adjacent end of said V-shaped tie, and each of said pivots extending through the adjacent sleeve.

3. A folding chair as set forth in claim 1, having a reinforcing sleeve over the pivoted portion of each leg of said one bar, and a reinforcing sleeve over the pivoted portion of each leg of said other bar and the adjacent end of said V-shaped tie, and each of said pivots extending through the adjacent sleeves.

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