Aug. 26, 1952 E. C. BOOTH 2,608,240

FOLDING CHAIR

Filed July 14, 1949 2 SHEETS—SHEET 1

Fig. 1.

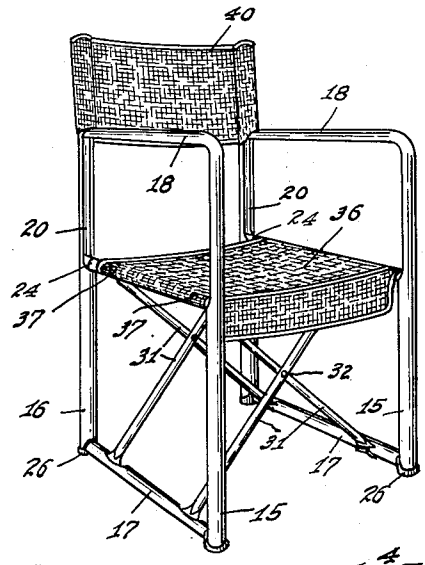


Fig. 2.

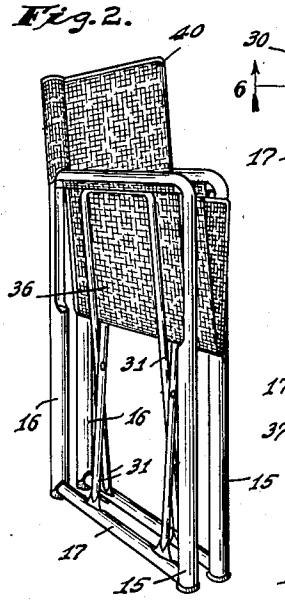


Fig. 5.

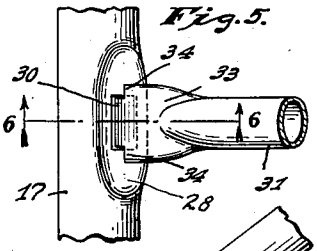


Fig. 6.

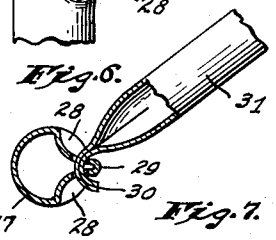


Fig. 7.

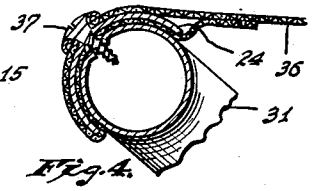
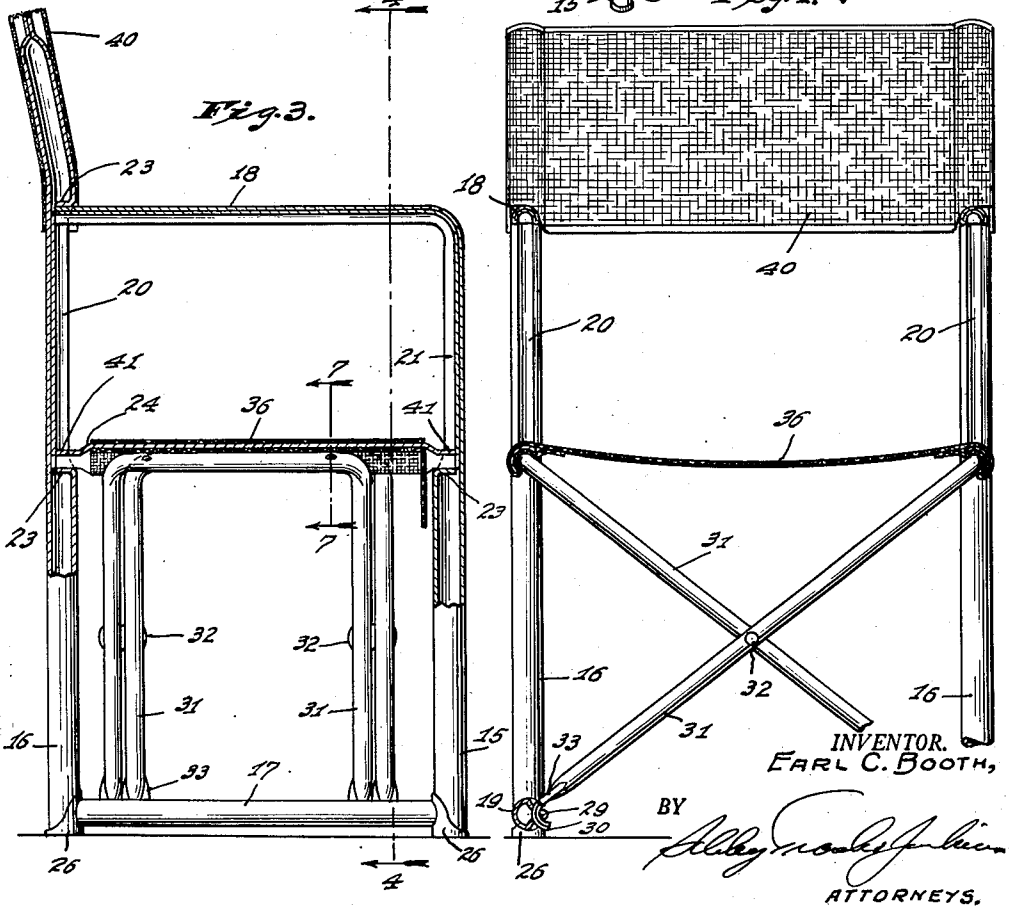


Fig. 4.

Fig. 3.



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Fig. 8.

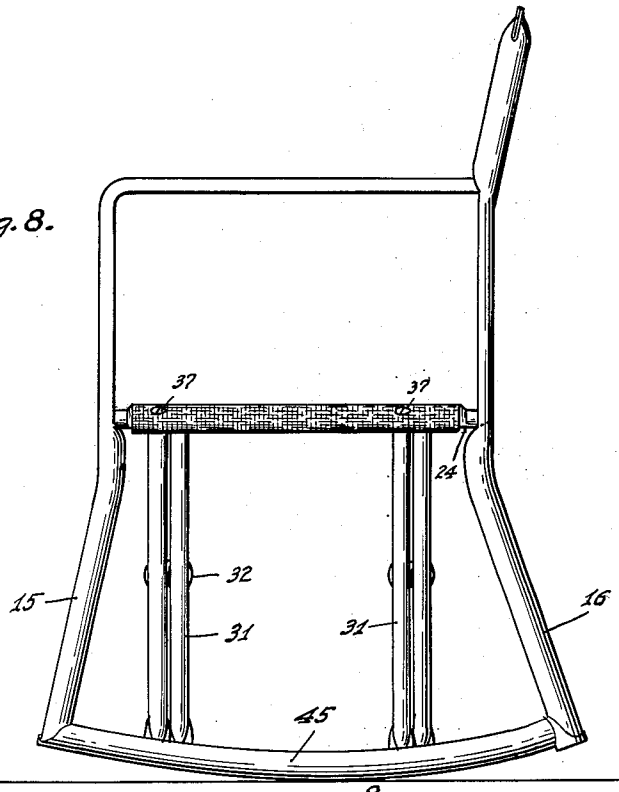


Fig. 9.

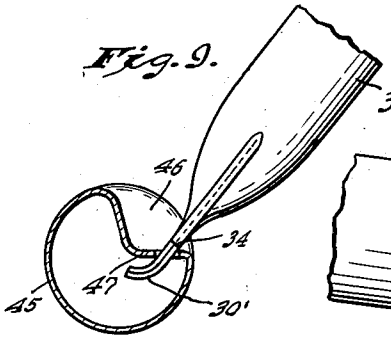


Fig. 10.

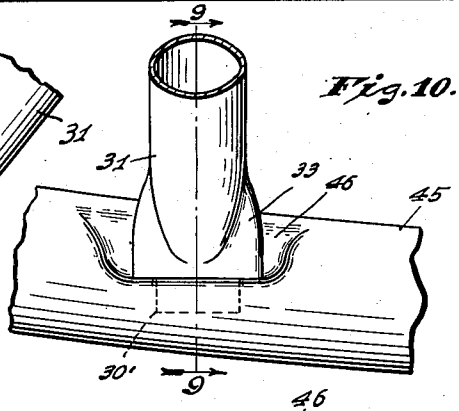
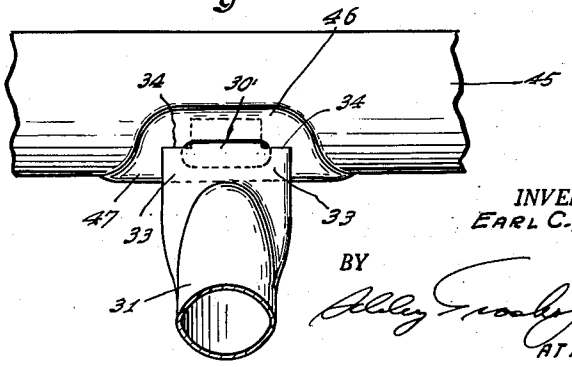


Fig. 11.



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FOLDING CHAIR

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Application July 14, 1949, Serial No. 104,641

8 Claims. (Cl. 155—140)

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This invention relates to a chair and more particularly to a chair of the type embodying a pair of side frames interconnected by a collapsible brace structure and by flexible back-forming and seat-forming elements, the arrangement being such that the two side frames may be moved toward each other to collapse the chair. The invention is primarily concerned with a collapsible chair having side frames and other rigid elements formed of metal tubing.

It is an object of the invention to produce a collapsible chair which can be simply and economically constructed, and which will prove sturdy and durable in use.

In carrying out the invention I provide a pair of side frames each formed of three lengths of metal tubing. One length of such tubing forms a rear leg and back support, another length forms a front leg and arm, and the third length forms a stretcher rigidly interconnecting the lower ends of the front and rear legs. For a distance above the level of the seat when the chair is extended, the front and rear tubular legs are collapsed and given a channel shape in cross-section, the channels thus formed opening toward each other to receive for vertical sliding movement the ends of a seat-supporting member. The seat-supporting member associated with each side frame is connected through a U-shaped brace with the stretcher of the other side frame, the parallel arms of the two U-shaped braces crossing each other and being pivotally secured together. The interconnection between the braces and the stretchers is pivotal in character; and as a result, the two side frames can be moved toward or away from each other while the braces swing relatively about their axis of pivotal interconnection and the seat-supporting members slide up and down in the channel-forming portions of the front and rear legs.

A seat, comprising a strip of canvas or similar flexible material, is secured to the two seat-supporting members. In addition, the rear legs desirably project upwardly beyond the rear ends of the arms to be received in hems at the ends of a back formed of canvas or similar flexible material. The U-shaped braces are desirably formed of tubing and have their ends flattened and bent to cooperate with slots in the stretchers in a manner to be more fully described hereinafter.

The accompanying drawings illustrate the invention:

Figs. 1 and 2 are perspective views respectively showing a chair embodying my invention in extended and collapsed conditions; Fig. 3 is a side

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elevation of the chair with portions broken away and shown in section; Fig. 4 is a vertical section on the line 4—4 of the Fig. 3; Fig. 5 is a fragmental plan view and Fig. 6 a section on the line 6—6 of Fig. 5 illustrating details of the manner in which the braces are connected to the stretchers; Fig. 7 is a fragmental section on the line 7—7 of Fig. 3 illustrating a connection between the seat, a seat-supporting member, and a brace; Fig. 8 is a side elevation or a modified form of chair; Fig. 9 is a fragmental section on the line 9—9 of Fig. 10 showing a modified method of interconnecting the braces and stretchers; Fig. 10 is a side elevation of the construction shown in Fig. 9; and Fig. 11 is a fragmental plan view of the same construction.

The chair illustrated in Figs. 1 to 7 comprises a pair of side frames each including a front leg 15, rear leg 16, and a stretcher 17, all formed of metal tubing. The upper portion of each front leg 15 is bent at right angles to extend horizontally and to form an arm 18 which joins and is secured to the rear leg 16 at a point below the upper end thereof.

Beginning at the point where it meets the rear end of the arm 18 and continuing downwardly for a distance, the metal tubing of which the rear leg 16 is formed is collapsed, as indicated at 20, and given an arcuate form in cross-section to provide a forwardly presented, vertically extending channel. Beginning at the elevation of the lower end of the channel 20, and continuing upwardly, the metal tubing of which the front leg 15 is formed is similarly collapsed and shaped in cross-section to provide rearwardly presented channel 21. If desired, the channel 21 may continue throughout the extent of the arm 18. At the lower end of the channel 20 and at the lower end of the channel 21, the metal wall constituting the inner thickness of the channel is transversely slit, and the metal outwardly beyond such slit is bent, as indicated at 23, to provide an abutment or stop. The upper abutment 23 serves to locate the rear end of the arm 18, while the lower abutment 23 limits downward movement of a seat-supporting member 24 the ends of which are slidably received in the channels 20 and 21.

The ends of each stretcher 17, which are desirably formed in the manner set forth in my copending application Serial No. 113,550, filed September 1, 1949, to form feet 26, are rigidly secured respectively to the lower ends of the front and rear legs 15 and 16. Near each end and in its inner face, each stretcher 17 is provided with a pair of co-extensive depressions 28

to form a double-thickness rib 29. The two walls of each rib 29 are provided with aligned slots which receive the arcuate curved end 30 of a brace member 31. Each of the brace members 31 is desirably formed of the length of metal tubing bent into a U-shape to provide two parallel legs and an intermediate leg, as will be clear from Fig. 3. The intermediate legs of the brace members 31 are secured respectively to the two seat-supporting members 24; and from such seat-supporting members, the braces extend in crossed relation into association with the stretchers 17. Where the parallel legs of the brace 31 cross each other, they are pivotally secured together as by means of aligned bolts or rivets 32. At its ends, each tubular brace member is flattened, as indicated at 33 in Fig. 5, and the double-thickness flattened portion is notched at its corners to provide shoulders 34 separated by a central tongue which constitutes the curved end 30 previously referred to.

A seat for the chair is provided by a strip 36 of canvas or some similar flexible material the opposite ends of which are respectively secured to the seat-supporting members 24. Conveniently, the ends of the seat 36 are hemmed, the seat-supporting members are placed within the hems, and each seat-supporting member is secured to its associated brace member by screws 37 which pass through the seat-supporting member 24 and into the intermediate leg of the brace 31, as will be clear from Fig. 7. Preferably, the seat-supporting member is arcuate in cross-section to conform to the exterior surface of the brace 31.

The upper ends of the rear legs 16 conveniently continue upwardly beyond the arm 18 and are given a slight rearward inclination. A back 40 of canvas or other suitable flexible material is provided at its ends with hems which can be slipped over the upper ends of the rear legs 16, as will be clear from the drawing. At its ends, each of the seat-supporting members 24 may be formed to provide generally cylindrical trunnions 41 slidably received in the channels 20 and 21.

It will be clear from Fig. 6 that the curved tongues 30 cooperate with the aligned slots in the ribs 29 to provide a pivotal interconnection between each brace 31 and its associated stretcher 17. This pivotal interconnection permits the two side frames of the chair to be moved toward and away from each other, the braces swinging about their points of pivotal connection with the stretchers 17 and the seat-supporting members 24 sliding up and down in the channels 20 and 21. Separation of the two side frames is limited by engagement of the trunnions 41 with the lips or stops 23 in the lower ends of the channels 20 and 21. The seat 36 and back 40 are made of such length that they will be reasonably straight when the side frames reach the limits of their separation.

The modified chair illustrated in Figs. 8 to 10 is generally similar to that above described except that the lower portions of the front legs 15 and 16 are bent to diverge downwardly while a rocker 45 is substituted for each of the stretchers 17. An additional difference between the chair of Figs. 8 to 11 and the chair of Figs. 1 to 7 lies in the manner in which the ends of the braces 31 are connected to the rocker-like stretchers 45. As will be clear from Figs. 9 to 11, the metal of each rocker 45 adjacent each end of the associated brace 31 is displaced inwardly of the rocker to form a depression 46 having a generally horizontal lower wall 47. Each lower wall 47 is provided with a slot loosely receiving a tongue 30' on the adjacent lower end of the associated brace 31. The tongue 30' is much the same as the tongue 30 shown in Figs. 5 and 6, but it is curved in the opposite direction; and since it extends through only one slot in the wall of the tubing its end lies within the tubing, where it is concealed.

If the tubes forming the front and rear legs are bent in only one plane, as is the case in the chair shown in the drawing, corresponding legs on both sides of the chair may be identical. The U-shaped braces 31 may also be identical, both the parallel legs of one brace lying in rear of the parallel legs of the other brace. In addition, if the center-line of the brace-assembly is disposed midway between the front and rear legs, the two stretchers 17 may also be identical in form although reversed in position. All this identity in form of elements on the opposite sides of the chair reduces die expense and manufacturing cost.

The curved form of the tongues 30 or 30' prevents their removal from the slots which receive them when the chair is assembled; because, in the assembled chair, swinging movement of the braces 31 is limited to an extent which prevents withdrawal of the tongues from the slots. At the same time, the tongues permit such swinging movement of the braces as is necessary in the collapse and extension of the chair. It will be noted that the affective pivotal connection between the braces 31 and the stretchers 17 or rockers 45 involves no pivot pins, bolts, or rivets and no projecting ears or brackets for the support of such pivot members; and the appearance of the chair is thus improved and its manufacture simplified.

I claim as my invention:

1. In a chair, a pair of relatively movable side frames each including rigidly interconnected front and rear legs, a horizontal seat support mounted for vertical sliding movement in each side frame, means for moving each seat support vertically in its associated side frame as the side frames are moved toward and away from each other, and a flexible seat secured to and extending between said side supports, the front and rear legs of each side frame being formed of metal tubing collapsed over portions of the lengths of the legs and formed into channels which open toward each other and slidably receive the ends of the associated seat support.

2. In a chair, a pair of relatively movable side frames each including rigidly interconnected front and rear legs, a horizontal seat support mounted for vertical sliding movement in each side frame, means for moving each seat support vertically in its associated side frame as the side frames are moved toward and away from each other, and a flexible seat secured to and extending between said side supports, the front and rear legs of each side frame being formed of metal tubing collapsed over portions of the lengths of the legs and formed into channels which slidably receive the ends of the associated seat support.

3. A chair as set forth in claim 2 with the addition that the inner thickness of each collapsed portion is slit transversely at the lower end of the collapsed portion, the metal below such slit being bent to extend horizontally and form a shoulder engageable by the adjacent end of the seat support to limit downward movement thereof.

4. In a chair, a pair of relatively movable side frames each including front and rear legs and a stretcher secured to and rigidly interconnecting the lower ends of the legs, a horizontal seat support vertically slidable in each side frame, and links attached respectively to said seat supports and extending downwardly and inwardly therefrom in crossed relation into association with the opposite stretchers, said stretchers being formed of metal tubing and provided with slots, said links having at their lower ends curved tongues received in said slots and providing pivotal interconnection between the stretchers and links, each of said links extending in a direction tangential to the curved tongue at its end.

5. In an articulated structure, a member formed of metal tubing, a swingable link, a portion of the metal of said tubing being displaced inwardly to form a depression having a wall extending generally radially of the tubing, said wall being provided with a slot, said link being provided at one end with a curved tongue extending through said slot and into the interior of the tube, said link extending in a direction tangential to said curved tongue.

6. In an articulated structure, a member formed of metal tubing, a swingable link, a portion of the metal of said tubing being displaced inwardly to form a depression having a wall extending generally radially of the tubing, said wall being provided with a slot, said link being provided at one end with a curved tongue extending through said slot, said link extending in a direction tangential to said curved tongue.

7. In an articulated structure, a member formed of metal tubing, a swingable link, portions of the metal of said tubing being displaced inwardly of

the tubing to form depressions each having a side wall extending generally radially of the tubing, said two side walls forming a double-thickness rib, said two side walls being provided with aligned slots, said link being provided at one end with a curved tongue extending through both said slots.

8. In a chair, a pair of relatively movable side frames each including front and rear legs and a stretcher secured to and rigidly interconnecting the lower ends of the legs, a horizontal seat support vertically slidable in each side frame, and links attached respectively to said seat supports and extending downwardly and inwardly therefrom in crossed relation into association with the opposite stretchers, said stretchers being formed of metal tubing and having in the upper inner quadrants of their cross-section inwardly offset portions providing substantially horizontal walls, each of said horizontal walls being provided with a slot extending longitudinally of the associated stretcher, said links having at their lower ends curved tongues extending respectively through said slots into the interior of the stretchers and providing pivotal interconnection between the stretchers and links.

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