April 2, 1957 E. L. MOORE ET AL 2,787,316

FOLDING CHAIR

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Fig. 1.

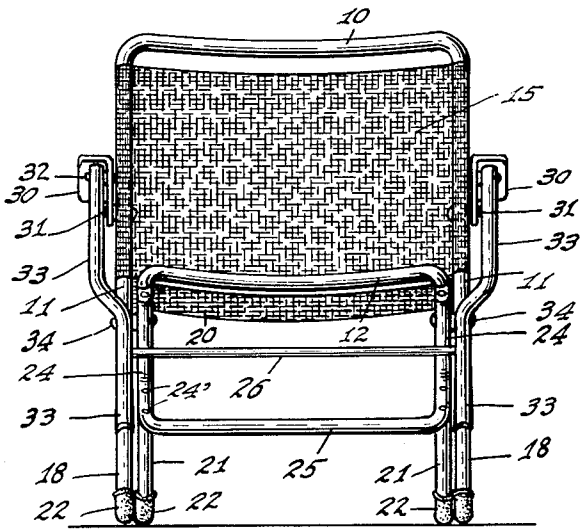


Fig. 4



Fig. 3.

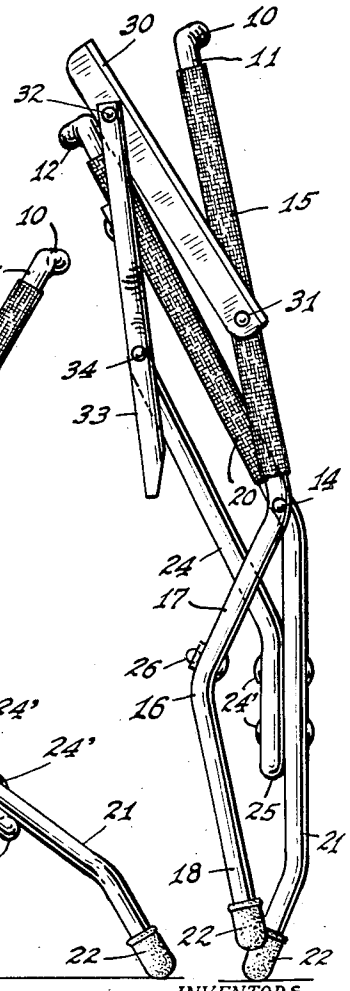
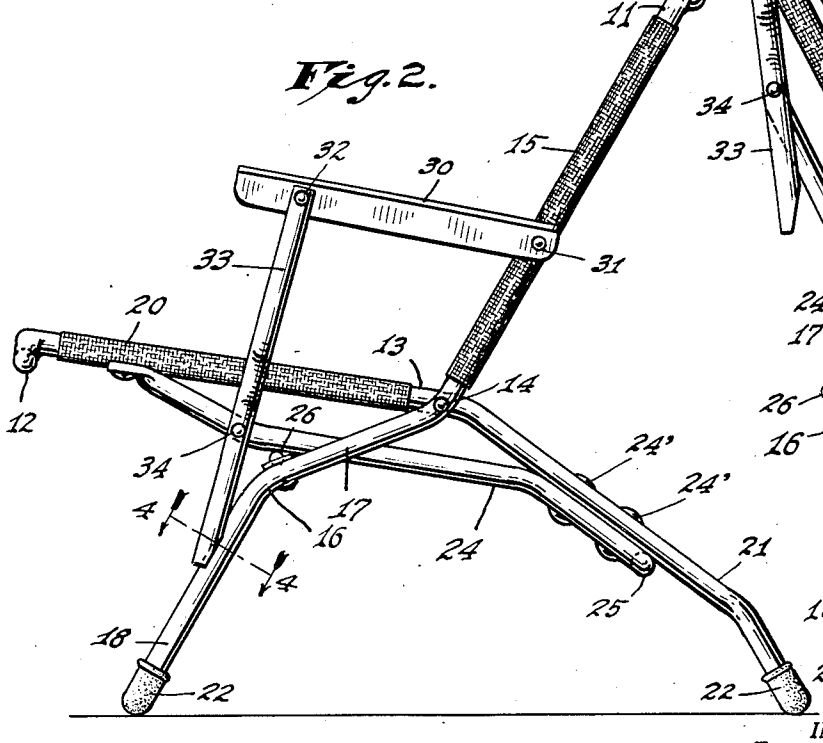


Fig. 2.



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FOLDING CHAIR

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5 Claims. (Cl. 155—143)

This invention relates to collapsible chairs, and more particularly to collapsible chairs adapted for manufacture from light-weight metal tubing. Objects of the invention include improved construction and an enhanced strength and rigidity in chairs of the type indicated.

A preferred form of chair embodying my invention includes two crossed, pivotally interconnected structures each formed from a single length of metal tubing bent into a U-shape. In the first of these structures, the sides of the U-shaped tubing extend upwardly, desirably at a slightly rearward inclination, from the pivotal axis to provide a back-support, and downwardly and forwardly from the axis to provide front legs, the intermediate stretch of the U-shaped tubing being located at the top of the structure. In the second structure, the sides extend forwardly from the axis to provide support for a seat and rearwardly and downwardly from the axis to provide rear legs, and the intermediate stretch of the U-shaped tubing is located adjacent the front of the seat. The seat-supporting, and leg-forming portions of each side of the second structure are rigidly interconnected by a brace secured to them at points spaced from the pivotal axis, the two braces conveniently being the sides of a third U-shaped tubular member the intermediate portions of which serves as a stretcher extending between the rear legs. A second stretcher extends between the front legs in a position to be engaged by the braces to limit extension or opening movement of the chair. If the chair is to have arms, such arms may be pivotally connected at their rear ends to the sides of the first tubular structure, and at their front ends to supports which extend downwardly and are pivotally connected to the respective braces. The arm supports may project below their axis of pivotal connection with the braces and engage the front legs, desirably being formed at their lower ends to partially embrace the front legs whereby to restrict any relative lateral movement.

A preferred form of chair is illustrated in the accompanying drawing, in which:

Fig. 1 is a front elevation of the chair in extended condition;

Fig. 2 is a side elevation of the chair, likewise in extended condition;

Fig. 3 is a side elevation of the chair in collapsed condition; and

Fig. 4 is a transverse section on the line 4 of Fig. 2.

The chair illustrated in the drawing comprises a first length of metal tubing bent into an inverted U-shape to provide an intermediate portion **10** and sides **11**. A second length of tubing is bent into a U-shape to provide an intermediate portion **12** and parallel sides **13**. The width of the structure formed by the second tube is less than that of the structure formed by the first tube so that the sides **13** can be received between the sides **11** and pivotally interconnected therewith as by bolts or rivets **14**. A chair-back **15**, conveniently of fabric, woven plastic, or similar flexible material, is stretched between and secured to the upper portions of the sides **11**, such

upper side-portions extending upwardly, preferably with a rearward inclination, from the axis of the pivot bolts **14**. At or adjacent the pivot bolts **14**, the sides **11** are bent forwardly to provide front legs for the chair. Desirably, the leg-forming portions of each side has an intermediate bend **16**, defining an upper leg-portion **17** of relatively slight inclination to the horizontal and a lower portion **18** of greater inclination.

A chair-seat **20**, which may be of material similar to that of the back **15**, extends between and is secured to the front portions of the sides **13** of the second tubular member. At or adjacent the pivot bolts **14**, the sides **13** are bent to extend downwardly and rearwardly to form rear legs **21**. The lower ends of the legs **18** and **21** may be tipped with feet **22** of rubber or other appropriate material.

To stiffen and strengthen the sides **13**, each of them is provided with a brace **24** which is secured to the rear leg **21** at a point in rear of the pivotal axis of the bolts **14** and which extends forwardly below such axis to have its front end secured to the side **13**, near the front of the seat **20**. Conveniently, the braces **24** are the sides of a third length of metal tubing bent into a U-shape and having an intermediate portion **25** serving as a stretcher rigidly interconnecting the rear legs **21**. In the form shown, the body of each brace lies well below the seat-supporting portion of the associated side **13**, its front end being bent upwardly and secured to such seat-supporting portion and its rear end being bent to extend along the lower side of the rear leg **21**, to which it is secured by rivets **24'**.

The front legs of the chair are interconnected by a second stretcher **26** secured to them desirably adjacent the bends **16** and in position to be engaged by the braces **24** when the chair is in its extended condition.

Arms **30**, conveniently of sheet-metal formed into an L-shaped cross section, have their rear ends pivotally connected to the sides **11** by bolts or rivets **31** located above the axis of the pivot bolts **14**. The front ends of the arms are pivotally connected, as by bolts or rivets **32**, to arm-supports **33** which extend generally downwardly and are pivotally connected to the braces **24** by pivot bolts or rivets **34**. Desirably, the arm-supports **33** continue downwardly below the bolts **34** so that their lower ends may engage the lower stretches **18** of the front chair-legs. As will be apparent from Fig. 4, the arm-supports **33** are desirably formed of metal tubing, and at the lower end of each support the rear wall of such tubing is collapsed against the front wall to provide a rearwardly opening recess or groove the sides of which partially embrace the lower portion **18** of the front leg. Such interfitting of the lower ends of the arm-supports with the front legs restricts the lateral movement of the lower ends of the arm supports; and since the arm supports are connected to the braces **24** by the bolts **34**, lateral movement of the upper ends of the arm supports and of the front ends of the arms will likewise be restricted.

As previously noted, the sides **13** of the structure supporting the seat and providing the rear legs lie inside the sides **11** of the structure which supports the back and provides the front legs. Each brace **24** lies substantially in the same vertical plane with its associate side **13**, and therefore also lies inwardly of the sides **11**. The arm-supports **33** lie outwardly of the sides **13** and braces **24**, and their lower portions therefore lie in the same vertical planes respectively with the sides **11**. Above the pivot bolts **34**, however, the arm-supports **33** are offset outwardly so that their upper ends may occupy lateral positions adapting them for pivotal connection to the arms **30**.

When the chair is in the extended position shown in Fig. 2, the braces **24** engage the stretcher **26**. Because of the presence of the braces **24**, the seat-supporting struc-

ture is extremely rigid in a vertical plane and well adapted to sustain the weight of the occupant of the chair. Portions of such weight are transferred to the front legs, through the pivot bolts **14** and through the stretcher **26**. The engagement of the lower ends of the arm-supports **33** with the lower portions **18** of the front legs imparts stiffness and rigidity to the support of the front ends of the arms **30**.

To collapse the chair, it is necessary only to apply an effort designed to move the intermediate stretches **10** and **12** of the first and second structures toward each other, the various elements of the chair swinging about their points of pivotal connection with other elements until brought into the position illustrated at Fig. 3.

We claim as our invention:

1. In a collapsible chair, crossed first and second structures pivotally interconnected on a horizontal axis at their point of crossing, a chair back, said first structure having two sides extending generally upwardly from said axis to support said back and forwardly and downwardly from the axis to provide front supporting legs, said second structure having a seat portion projecting forwardly from said axis and rear legs extending rearwardly and downwardly from the axis, arms pivoted to said sides above said axis and projecting forwardly therefrom, and generally vertical arm supports pivotally connected to said arms near the front ends thereof and to said second structure at points spaced forwardly from said axis, said arm supports continuing downwardly below their points of pivotal connection to said second structure and engaging said front legs, the interengaging portions of each arm support and front leg having interfitting provisions restricting their relative lateral movement.

2. In a collapsible chair, crossed first and second structures pivotally interconnected on a horizontal axis at their point of crossing, a chair back, said first structure having two sides extending generally upwardly from said axis to support said back and forwardly and downwardly from the axis to provide front supporting legs, said second structure having a seat portion projecting forwardly from said axis and rear legs extending rearwardly and downwardly from the axis, arms pivoted to said sides above said axis and projecting forwardly therefrom, and generally vertical arm supports pivotally connected to said arms near the front ends thereof and to said second structure at points spaced forwardly from said axis, said arm supports continuing downwardly below their points of pivotal connection to said second structure and engaging said front legs.

3. A chair as set forth in claim 1 with the addition that the sides of said first structure are formed of circular stock the lower ends of said arm supports being concave rearwardly to partially embrace the stock forming said front legs.

4. A chair as set forth in claim 3 with the addition that said arm supports are formed of metal tubing, the rear wall of such tubing at the lower end of each arm support being displaced toward the front wall to render the lower end of the arm support rearwardly concave as aforesaid.

5. In a collapsible chair, a first tubular member bent into an inverted U-shape to provide a horizontally extending intermediate portion and two downwardly extending sides, a second tubular member bent into a U-shape to provide an intermediate portion and two sides, the respective sides of said two members crossing each other and being pivotally interconnected on a common horizontal axis, a seat carried by the sides of said second member in advance of said axis, a back carried by the sides of said first member above the axis, the end portions of the sides of the first member constituting front legs extending forwardly and downwardly from said axis and the ends of the sides of the second member constituting rear legs extending rearwardly and downwardly from said axis, a stretcher extending between said front legs at a point spaced forwardly and downwardly from said axis, a third member of elongated stock bent into a U-shape to provide an intermediate portion and two sides, said third member being secured to said rear legs with its intermediate portion extending between them and its sides extending forwardly across and in engagement with said stretcher, the sides of said third member, at points where they engage said stretcher, being spaced downwardly from the sides of said second member, the ends of the sides of said third member extending forwardly and upwardly and being secured to the sides of said second member.

References Cited in the file of this patent

UNITED STATES PATENTS

157,042	Vass	Nov. 17, 1874
240,498	Bartell	Apr. 26, 1881
271,857	Johnson et al.	Feb. 6, 1883
404,589	Batt	June 4, 1889
1,342,650	Schlegel	June 8, 1920
2,639,762	Westcamp	May 26, 1953