July 5, 1960 J. T. HOOK ET AL 2,943,672

FOLDING CHAIR

Filed Oct. 31, 1957 2 Sheets-Sheet 1

FIG_1

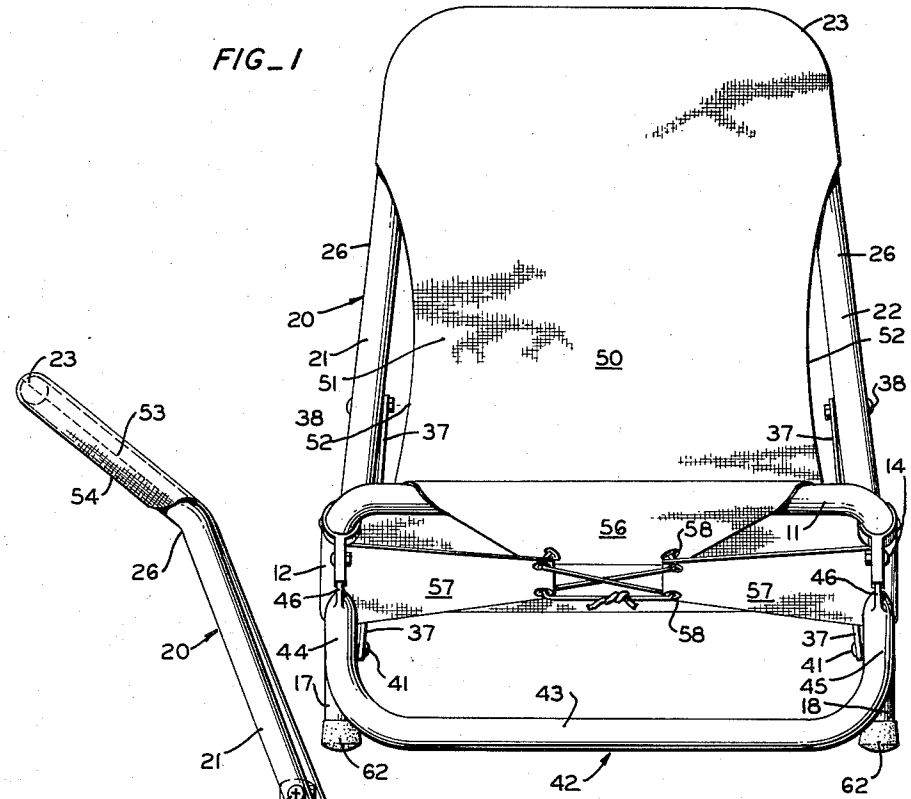


FIG_2

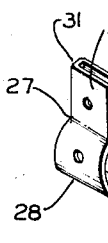


FIG_6

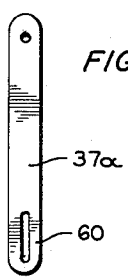


FIG_7

INVENTORS
JOHN T. HOOK
RICHARD G. MACK

BY Henry Gifford Hardy

ATTORNEY

July 5, 1960 J. T. HOOK ET AL 2,943,672

FOLDING CHAIR

Filed Oct. 31, 1957 2 Sheets-Sheet 2

FIG_3

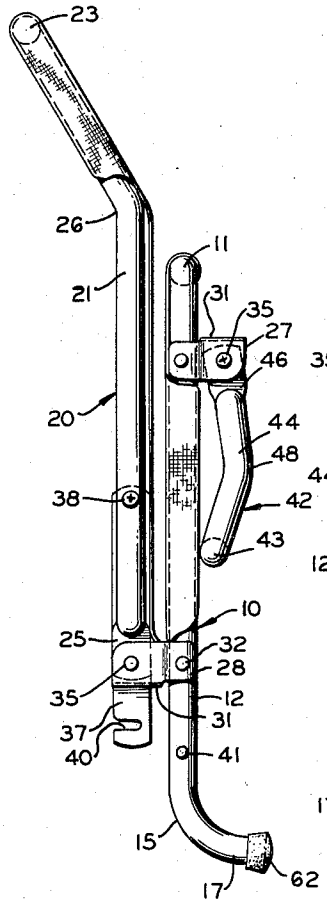
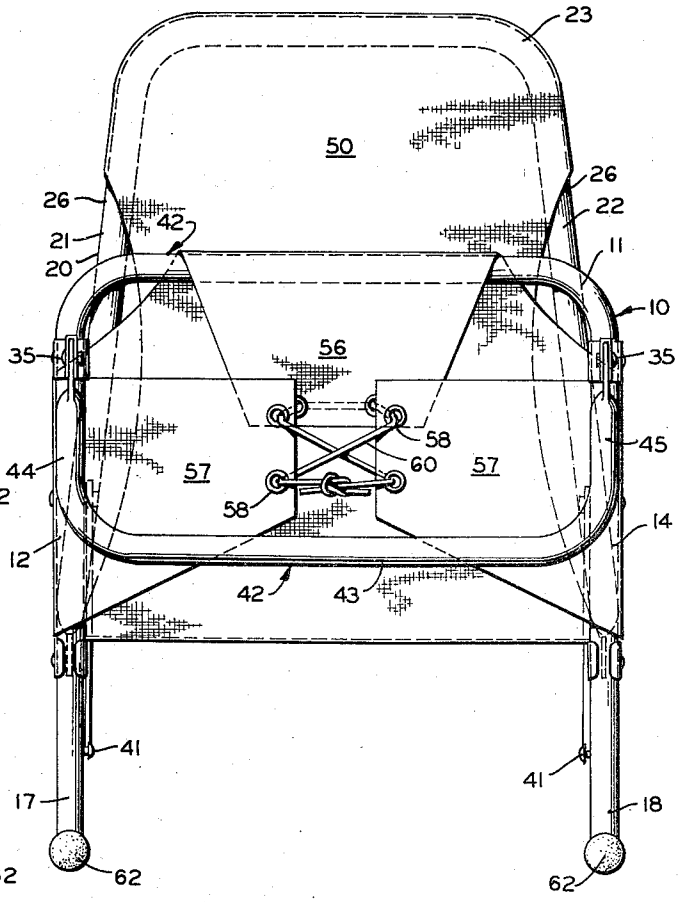


FIG_4



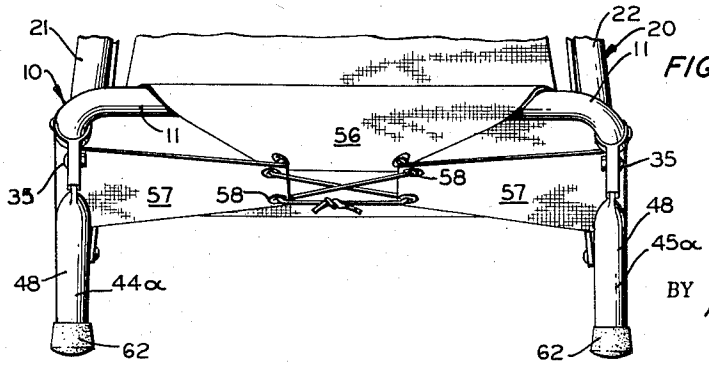


FIG_5

INVENTORS
JOHN T. HOOK
RICHARD G. MACK
BY Henry Griffith Hardy.
ATTORNEY

United States Patent Office 2,943,672 Patented July 5, 1960

2,943,672

FOLDING CHAIR

John T. Hook, 807 Ocean View Ave., Monterey, Calif., and Richard G. Mack, Box 305, Dolores St. and Franciscan Way, Carmel, Calif.; said John T. Hook, assignor to Richard G. Mack

Filed Oct. 31, 1957, Ser. No. 693,778

1 Claim. (Cl. 155—139)

This invention relates to improvements in folding portable chairs, but more particularly to collapsible chairs which are light in weight and scientifically designed to provide the maximum rest with proper posture.

It is well-known that mountain climbers, explorers, and even the usual vacationers, are limited both as to space and weight in the amount of equipment which can be carried. In all such endeavors the individual involved undergoes great physical exertion, and while the amount expended by each may be comparative, nevertheless the body requires rest before undergoing further physical endeavors. Accordingly, it is an object of the present invention to provide an easily portable miniature contour or rest chair which complies with the limits of space and weight, while at the same time providing maximum rest.

It is a further object to provide a collapsible, lightweight chair which is reduced to fundamental essentials with respect to angles and shapes to provide an individual with the maximum of rest and relaxation.

It is also an object to provide a collapsible, lightweight seat which will induce a relaxed seating posture, requiring no muscular effort, and at the same time providing the required support for optimum rest.

Shape, of course, is important in the therapeutic value of relaxed sitting, so it is a further object to provide a form of collapsible chair with a suitably shaped back support for comfortable, relaxing rest.

Another object of the invention is to provide a collapsible chair which has a low center of gravity and is close to the ground, and because of this, to additionally provide the proper angle of the seating to give optimum relaxation and rest.

Still another object of the invention is to provide a collapsible chair which has great strength, with a minimum of weight and suitable to support any adult. Additionally, to provide a chair small enough to give proper support and posture when used by children and light enough in weight to be carried by a young child, either in the open or in the closed position.

Another object is to provide a folding chair which can easily be set up by a child and with a low center of gravity so that it may be used with safety and confidence.

Further objects are to provide a construction of maximum simplicity, economy and ease of assembly and disassembly, and also such further objects, advantages and capabilities as will fully appear and as are inherently possessed by the device and the invention described herein.

The invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, and while there is shown therein a preferred embodiment thereof and a small modification, it is to be understood that the same are illustrative of the invention and that the invention is capable of modification and change, and comprehends other details of construction without departing from the spirit thereof or the scope of the appended claim.

Referring to the drawings:

Fig. 1 is a front elevational view of the chair of this invention, in open operative position;

Figure 2 is a side elevational view of the chair shown in Figure 1;

Figure 3 is a side elevational view of the chair in folded position;

Figure 4 is a front elevational view of the chair in folded position;

Figure 5 is a fragmentary front elevational view illustrating the modification of individual front legs; and

Figure 6 is a detail of the bracket unit;

Figure 7 is an enlarged detail in plan of a back brace suitable for permanent attachment to the frame.

Referring more particularly to the drawings in which like reference numerals indicate like parts in the several views, the base or seat of the chair comprises a U-shaped frame **10** which is preferably made of lightweight tubular material in a continuous, formed piece, with the bottom of the U becoming the front edge **11** of the seat. The leg portions of the U-shape form the sides **12** and **14** of the seat frame. As the side portions **12** and **14** extend rearwardly, they each curve downwardly in a vertical plane adjacent the open end of the U-frame as at **15**. The arc of the downward turn is less than 90° so as to leave an upwardly angled plane for the seat level, but turned far enough so that the axes of these ends are substantially perpendicular to the supporting surface **16**, on which the seat is intended to be placed. The downward curvature of these end portions produces the short rear legs **17** and **18** for the chair, and as will be observed, the rear legs are continuations of the seat frame **10**, and a part thereof.

The back frame **20** of the chair is also substantially U-shaped, but in this instance the legs **21** and **22** of this U-shaped frame are spread apart to make the opening wider than the top. The bottom of the U-shape forms the top of the back **23**. The frame for the back **20** of the chair is also preferably made from a single length of tubular material, bent to the required shapes so that the same will be all in one piece. The ends of the side members **21** and **22** are flattened as at **25** so as to provide a suitable flat tab for attachment to the seat **10**, as will hereinafter be explained. The top portion of the U-shaped back frame **20** is bent backwardly as at **26**, adjacent the top **23** away from the plane of the remainder of the frame in order to accommodate the physical structure of a human being in a comfortable and correct position. If the top portion of the back frame member were made straight and kept in the same plane as the rest of the frame, it would be quite impossible for any individual to sit comfortably in the chair and all therapeutic advantages would be dissipated.

The manner of attaching the back frame member **20** to the seat frame member **10** is accomplished by special brackets **27**. These brackets are so formed from a single stamping of a tough and rigid material that the lower portion **28** thereof is provided with a radius adapted to partially encircle the tubular frame **10**. The upper portion of the bracket is provided integrally with two parallel walls **30** with one end **31** closed therebetween. The bracket **27** is secured to the frame **10** in any suitable manner, such as by rivets **32**, to prevent rotation or lateral movement. The flattened ends or tabs **25** of the back frame **20** are inserted between the side walls **30** of the bracket **27** with the bracket opening forward and the solid wall **31** to the rear. The flattened ends or tabs **25** are pivotally held therein by pivots **35**. It is apparent that since the closed portion of the bracket **27** is substantially perpendicular to the sides **12** and **14** of the seat frame **10**, that rotation of the back frame **20** on the pivots **35** will be stopped and held in a plane perpendicu-

lar to the plane of the seat **10** by the wall **31**. Forward rotation of the back frame **20** is made to bring about the closed position shown in Figures 3 and 4 and the movement describes an arc of substantially 90°. However, it is to be observed that when the chair is in the open operative position shown in Figures 1 and 2, the brackets **27** hold the back frame firmly against rotation and in proper position with respect to the seat level.

Since the positioning of the brackets **27** on the frame **10** determines the depth of the seat, the depth may be generally defined as being substantially in the ratio of three to five in relation to the height of the back. While this distance may appear unusually short for the depth of any seat, nevertheless it represents the minimum required as support for the buttocks and upper legs. To assure a firm back support in the open operative position, and relieve the brackets **27** of excessive strain, each of the side members **21** and **22** may be provided with a hanging, pivoted brace member **37**, pivoted at **38** and notched at the opposite end with notch **40**. In the open position the notch **40** engages a stud **41** and locks the back frame **20** in the open position. As a safety measure the direction of the notch **40** is substantially parallel to the supporting surface **16** when engaged, so that the weight is directed transversely thereto. Since the notch **40** opens rearwardly, forward pressure on the braces **37**, when no weight is carried by the chair, is sufficient to release them for folding the chair to the collapsed position shown in Figures 3 and 4.

Since the vertical axis of the legs **17** and **18** of the seat frame **10** involves a turn of less than 90°, it is obvious that when this axis is perpendicular to the support level **16**, the plane of the seat angles upwardly and forwardly. Accordingly, the seat frame requires suitable support at its forward portion. This may be accomplished by a shallow U-shaped member **42**, which may also be a continuous tubular member, with the bottom of the U presenting a continuous front support **43**. The short upturned legs **44** and **45** of the U member **42** are flattened at their ends to provide tabs **46**. Brackets **27** are used to attach this support **42** to the frame **10** of the seat at a point adjacent the front portion **11** of the seat, only in this instance the brackets **27** are directed downwardly with the solid wall portion **31** placed forwardly with respect to the chair frame. The leg portions **44** and **45** with their flattened tabs **46** are pivoted in the forward brackets **27** by means of pivots **35**, but because of the back stop **31** of the bracket **27**, the open position is the full forward movement as shown in Figures 1 and 2, while the closed position is back against the under portion of the seat as shown in Figures 3 and 4. Also as shown in Figures 1 and 2, the bottom portion **43** of the U-shaped member **42** acts as the front support for the chair and gives continuous support all across the front thereof. The short leg members **44** and **45** are preferably bent as at **48** so that the upper portion thereof is substantially perpendicular to the plane of the seat frame **10** with the lower portion substantially perpendicular to the plane **16** on which the chair is intended to rest. Thus, both the supporting portions, front and rear, are substantially perpendicular to the surface **16** on which the chair is intended to rest.

As shown in Figure 5, the front legs may be individual members **44***a* and **45***a*, and separately pivoted by pivots **35**. They are, of course, bent at **48** as described above.

The frame covering, forming the back and seat of the chair may be a single piece of fabric **50**, such as army duck or any other suitable material. The back portion thereof, **51**, stretches between the leg members **21** and **22** of the back frame and may be cut out at either side as at **52** in order to provide hand holes for carrying or easy access to the braces **37**, if the occasion demands. Above the bend in the back frame, as at **27**, the fabric is bent back on itself and stitched along the edges as at **53** in order to provide a pocket or envelope **54** which is shaped

to fit over and be retained by the top portion of the back frame **20**. The seat portion **55** has three flaps, the front flap being designated **56**, and the two side flaps **57**. The front flap **56** folds over the front seat frame **11** while the side flaps **57** pull over the side members **12** and **14** between the front and rear brackets **27**. Each of the tabs **56** and **57** are preferably provided with grommets **58** adjacent their marginal edges so that they may be laced together as shown in Figure 4, by a suitable cord or line **60**, which not only holds the seat portion in proper place but permits a suitable adjustment of the tension of the seat material **55**. It is apparent, therefore, that by merely loosening the lacing of the cord **60**, the depth of the seat portion **55** may be increased.

Each of the individual leg members **17**, **18**, **44***a* and **45***a* may be provided with caps or treads **62**, not only to cover the ends of the tube, but to provide frictional resistance against movement of the chair in the open, functional position.

By referring to Figures 3 and 4, it will be seen that by releasing the brace members **37** from the studs **41**, the back frame **20** may be moved forwardly and folded against the seat frame **10**. Likewise, the front support portion **42** may be folded rearwardly on pivots **35** against the under portion of the seat frame **10**. If the structure is like that shown in Figure 5, the individual leg portions **44***a* and **45***a* are each folded or moved rearwardly. This provides the storage or packing position which is illustrated in Figures 3 and 4, and amply demonstrates the compact disposition of the chair, when not required for functional use. The ease of attaching and detaching the fabric forming the back and seat for this chair amply provides for quick replacement, washing, or even changing the color of the seat material with a substitute covering.

In Figure 7 a variant form of the back brace is illustrated. In this form the brace **37***a* is pivoted to the back frame **20** as previously described, but does not hang freely or require engagement with the stud or rivet **41**. Instead the brace **37***a* is permanently attached at its lower end by the stud **41** which rides freely in the internal slot **60**.

Reference is here made to the copending application of one of the joint inventors, Richard G. Mack, which was filed May 31, 1955, under Serial No. 511,859, now Patent No. 2,822,117.

It is therefore evident that not only are each and all of the objectives accomplished by the structure of this chair but many others which will readily occur to those skilled in this art.

We claim:

A lightweight collapsible chair comprising in combination a continuously formed tubular U-shaped seat frame, the closed portion of which forms the front of the seat, said frame ends being turned downwardly at an angle less than 90° to form the back legs of said chair having axes perpendicular to the supporting surface for said chair, a continuously formed tubular U-shaped back frame the closed portion of which forms the top of the back, said frame ends being pivotally mounted for independent movement on said seat frame above the horizontal center line thereof, said back frame also being bent rearwardly adjacent the top thereof, brackets secured to the seat frame adjacent the said back legs pivotally mounting the ends of said back frame with restricted movement of 90° forward toward the front of the seat to the collapsed position said brackets having a supported stop for said back frame in the operative position, releasable brace members associated with said back frame and said seat frame for additionally securing the chair in the open, functional position, a pair of separately pivotally mounted front leg supports, said legs each being bent rearwardly so that the axes of the lower portions thereof will be perpendicular to the supporting surface for said chair, said front leg supports being greater in height than the

back supports to incline the seat rearwardly downward, brackets secured to the seat frame adjacent the front thereof pivotally mounting the said front leg supports below the horizontal center line of said seat, with restricted movement of 90° rearwardly to the collapsed position said brackets having a supported stop in the operative position, and readily removable single cover means associated with and covering a substantial portion of said back frame and seat frame forming the back and seat for said chair.

References Cited in the file of this patent

UNITED STATES PATENTS

2,047,178	De Coninck	July 14, 1936
2,600,374	O'Neill	June 10, 1952
2,815,799	Lo Vico	Dec. 10, 1957

FOREIGN PATENTS

431,084	Great Britain	July 1, 1935
524,460	Canada	May 1, 1956
1,129,661	France	Sept. 10, 1956