April 2, 1963 R. W. BRADSHAW ETAL 3,083,995

FOLDING CHAIR

Filed Nov. 3, 1958

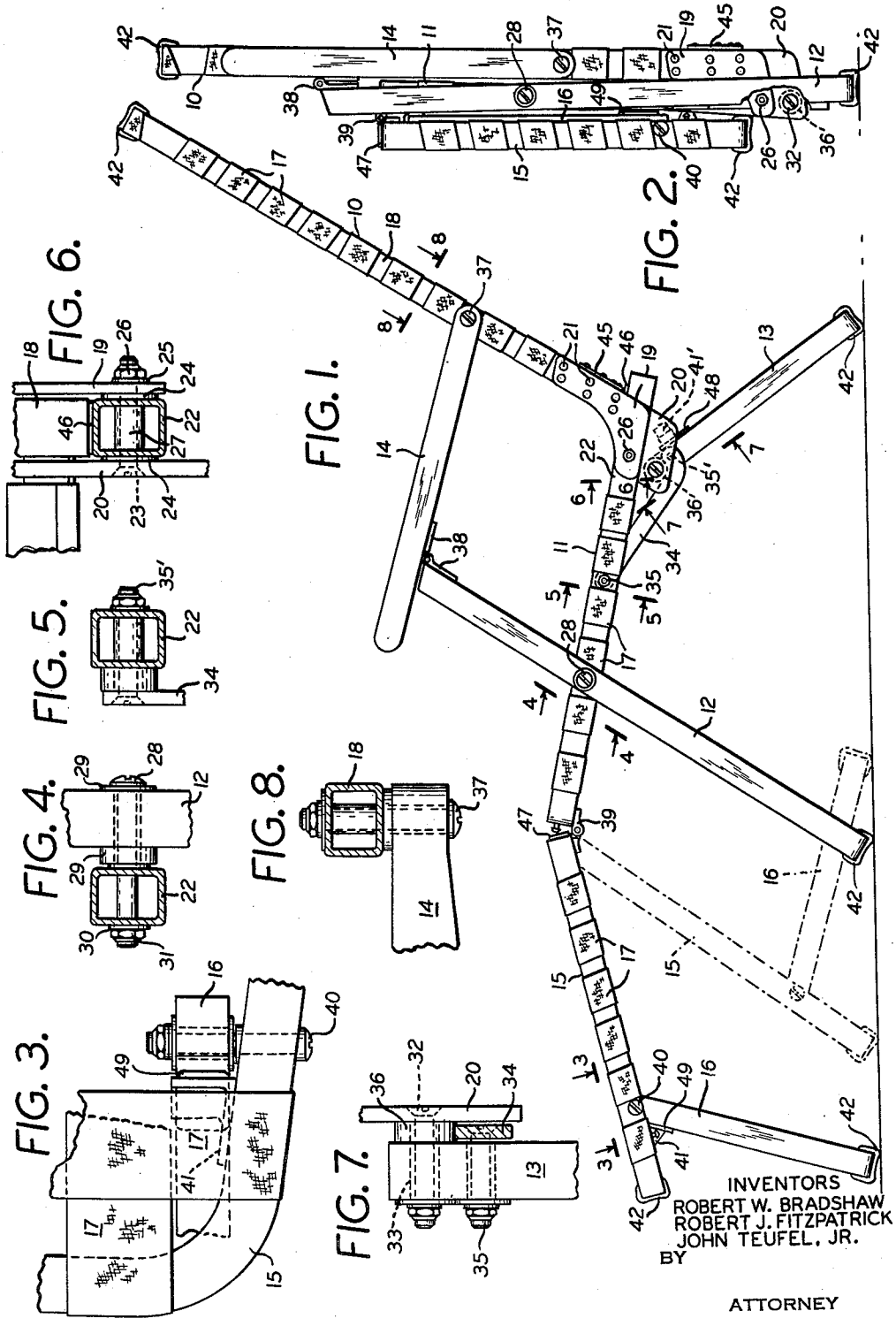


FIG. 1.

FIG. 2.

FIG. 6.

FIG. 5.

FIG. 4.

FIG. 8.

FIG. 3.

FIG. 7.

INVENTORS
ROBERT W. BRADSHAW
ROBERT J. FITZPATRICK
JOHN TEUFEL, JR.
BY

ATTORNEY

United States Patent Office 3,083,995 Patented Apr. 2, 1963

3,083,995

FOLDING CHAIR

Robert W. Bradshaw, Huntington, Robert J. Fitzpatrick, Garden City, and John Teufel, Jr., Babylon, N.Y., assignors to Grumman Aircraft Engineering Corporation, Bethpage, N.Y., a corporation of New York

Filed Nov. 3, 1958, Ser. No. 771,403
3 Claims. (Cl. 297—39)

This invention relates to folding chairs.

More particularly, the invention is concerned with folding chairs of semi-reclining type, such as deck chairs.

It is an object to provide a chair of the type indicated which is adapted to manufacture from metal extrusions and drawn tubing and which requires a minimum of specially fabricated shapes.

A second object of the invention is to provide a chair of the type indicated which folds easily into as compact a shape as possible.

A further object of the invention is to provide a chair of the type indicated, in which the back, seat and leg rest (if provided) may be collapsed flat against each other and in which the arm and leg elements fold up alongside or inside them so as not to increase the thickness of the folded chair.

A folding chair embodying the invention in a preferred form will now first be described with reference to the accompanying drawing, and the features forming the invention will then be pointed out in the appended claims.

In the drawing:

FIG. 1 is a side elevation of a deck chair embodying the invention in a preferred form;

FIG. 2 is a side elevation showing the chair folded up;

FIG. 3 is a fragmentary or partial plan view, at the location of and looking in the direction of the arrows 3—3 of FIG. 1;

FIGS. 4–8, inclusive, are detail sections taken on the respective lines 4—4 to 8—8 of FIG. 1.

The chair comprises a back **10**, seat **11**, a front leg member **12**, a rear leg member **13** and arm rests **14** and includes also a leg rest **15** and a supporting leg member **16** for the leg rest.

The structure of the back, seat and leg rest may be varied and in itself forms no part of the present invention except as pointed out below. These elements consist in general of framing structural members as more particularly described below, together with interwoven straps or webbing **17** forming supporting surfaces for the body of the user.

The structural elements forming the chair are generally made up of tubular aluminum alloy drawn shapes of rectangular or approximately square cross section, providing a strong and sturdy chair at comparatively low cost.

The side members **18** of the back carry joint plates **19** and **20** (FIGS. 1, 6 and 7) secured thereto by rivets **21** and straddling the side structural members **22** of the seat **11**. Bolts **23** passing through the plates **19**, **20** and through the members **22** pivotally secure the back **10** to the seat **11**. Washers **24** are interposed between each member **22** and the plates **19**, **20**. Each such pivot assembly is retained in position by a washer **25** and lock nut **26**, and a bushing **27** takes the axial force due to tightening the nut **26**, leaving the parts free to turn. The front leg member **12** is pivotally secured to the same members **22**, as shown in FIG. 4, by means of bolts **28** together with washer elements **29** and **30** and lock nut **31**, as shown. Rear leg member **13** (FIGS. 1 and 7) is pivoted to the inner plates **20** by means of bolts **32** and bushings **33** and a spacer **36**, together with washers and lock nuts, as indicated. Links **34** are pivotally connected to the seat elements **22** as shown at **35** and to the leg member **13**, as indicated at **35'**, the pivotal connections being formed of elements similar to those previously described in the case of the other joints. The arm rests **14**, which may be formed of wood, plastic or metal as desired, are, in turn, pivotally connected to the back side members **18** by similar bolted joint elements **37** (FIG. 8) and are connected to the top of the leg member **12** by means of strap hinges **38** as shown in FIG. 1. The leg rest **15** is pivotally connected to the front end of the seat **11** by strap hinges **39** and has its supporting leg member **16** pivotally connected to its frame members by bolted connections **40**, as shown in FIG. 3. The leg rest may occupy either the full line position of FIG. 1 or the broken line position, as desired. When in the full line position of FIG. 1, pad **49** provided on the supporting leg member **16** abuts stop element **41** consisting of an angle bracket provided on the frame of the leg rest **15**. The front edge of the leg rest **15** as well as the bottoms of the leg members **12**, **13** and **16** and the top of the back **10** may be fitted with buffers **42** of rubber or other suitable material, as desired.

The back, seat and leg rest elements **10**, **11** and **15** may be formed by bending the frame elements into a U-shape, the ends of the legs of the U's being joined together by cross members. Similarly, the leg members **12**, **13** and **16** may be formed by bending the frame elements into a U-shape.

In the position of FIG. 1, the weight of the occupant of the chair is transmitted to the front leg member **12** through pivot bolt **28** and to the rear leg member **13** through pivot bolts **23** and **32**. The elements **10**, **11**, **12** and **14** form approximately a parallelogram, which in itself tend to collapse or flatten when supporting the weight of the occupant. However, such collapse is prevented by the engagement at the lower ends of the side members **18** of the back **10** against pads **46** provided on the seat members **22**, and the engagement of pads **48** provided on the leg member **13** with stop elements **41'** similar to stop elements **41** provided on the inner surface of the plates **20**.

If it is desired to fold the chair, the arm rests **14** are pulled back up alongside the back **10** as shown in FIG. 2, collapsing the parallelogram structure of the chair, so that leg member **12** and seat **11** are also lined up and lie flat against the back **10** and arm rests **14**. At the same time, the links **34** are pulled up, swinging the rear leg member **13** forwardly around the pivot bolts **32**, so that these elements come up flat against the under surface of the webbing **17** of the seat **11**. Leg member **16** may be folded back into the leg rest **15** which then drops down and lies flat against the seat **11**, so that the chair collapses into the form shown in FIG. 2, providing exceptionally easy folding together with compactness for transportation and storage. The setting up of the chair reverses the foregoing procedure and in a manner which is obvious. It will be observed that the plates **19** and **20** extend forwardly from the plane of the back **10** generally, locating the pivot bolts **23** and **32** forwardly of the back **10** by a suitable distance to permit the element to lie flat as mentioned above. The axial distance from bolt **37** to bolt **23** plus the axial distance from bolt **23** to bolt **28** equals the sum of the distance from the bolts **28** and **37** to the axis of hinge **38**, permitting folding into the flat condition of FIG. 2 and which involves folding the seat **11** through an angle of about 110° with relation to the back **10**. At the same time, the leg member **13** is required to swing around through an angle of approximately 250°, and this is accomplished by suitably proportioning the links **34** and suitably locating the pivot bolts **35**, **35'** and **32** relative to the pivot bolt **23**.

What is claimed is:

1. In a folding chair, a joint structure for the chair back, seat and a rear leg, comprising a side structural seat element, a fork fixed to the back and straddling the said seat element, a pivot passing through the fork and seat element and maintaining the outer fork element in spaced relation to the seat element, a rear leg and a pivot passing through the inner fork element and the upper end of the leg for pivoting the leg to the back, a link, a second pivot joining the link to the said seat element at a point spaced from the first said pivot and a third pivot joining the link to the leg at a point below the first said pivot, the said link drawing the leg up flat against the seat when the seat is folded up flat against the back.

2. In a folding chair, a joint structure for the chair back, seat and a rear leg, comprising a side structural seat element, a fork fixed to the back and straddling the said seat element, a pivot passing through the fork and seat element and maintaining the outer fork element in spaced relation to the seat element, a rear leg and a pivot passing through the inner fork element and the upper end of the leg for pivoting the leg to the back, a link, a second pivot joining the link to the said seat element at a point spaced from the first said pivot and a third pivot joining the link to the leg at a point below the first said pivot, the said link being curved upwardly and drawing the leg up flat against the seat when the seat is folded up flat against the back.

3. In a folding chair, a joint structure for the chair back, seat and a rear leg, comprising a side structural seat element, a fork fixed to the back and straddling the said seat element, a pivot passing through the fork and seat element and maintaining the outer fork element in spaced relation to the seat element, a rear leg and a pivot passing through the inner fork element and the upper end of the leg for pivoting the leg to the back, a link, pivots joining the link to the said seat element at a point spaced from the first said pivot and to the leg at a point below the first said pivot, the said link drawing the leg up flat against the seat when the seat is folded up flat against the back, the three said pivots being approximately aligned with each other both in position for use and when the chair is folded.

References Cited in the file of this patent

UNITED STATES PATENTS

2,225,306	Kovats	Dec. 17, 1940
2,467,909	Rechler	Apr. 19, 1949
2,503,508	Parks	Apr. 11, 1950
2,599,164	Cudini	June 3, 1952
2,600,374	O'Neill	June 10, 1952
2,714,921	Rechler	Aug. 9, 1955
2,729,277	Rechler	Jan. 3, 1956
2,783,823	Tong	Mar. 5, 1957

FOREIGN PATENTS

387,975	Great Britain	Feb. 16, 1933
773,127	France	Aug. 27, 1934
191,572	Austria	Sept. 10, 1957