May 1, 1951 W. R. GOLDFINE 2,550,993

FOLDING CHAIR

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Fig. 4.

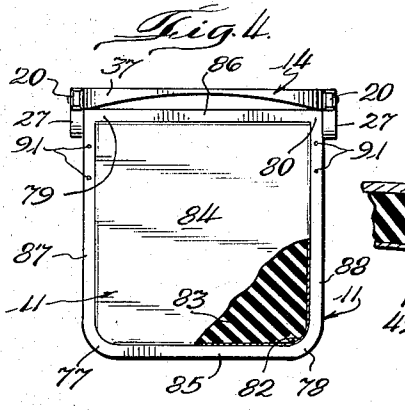


Fig. 6.

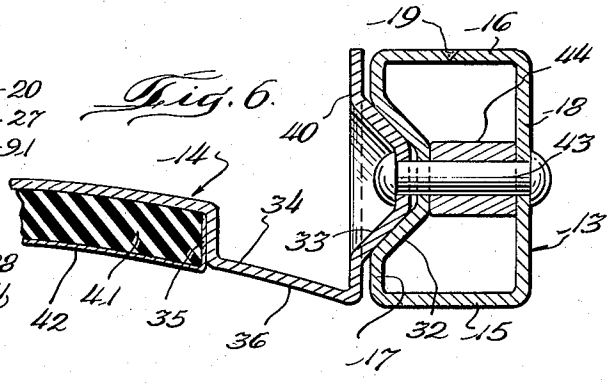


Fig. 1.

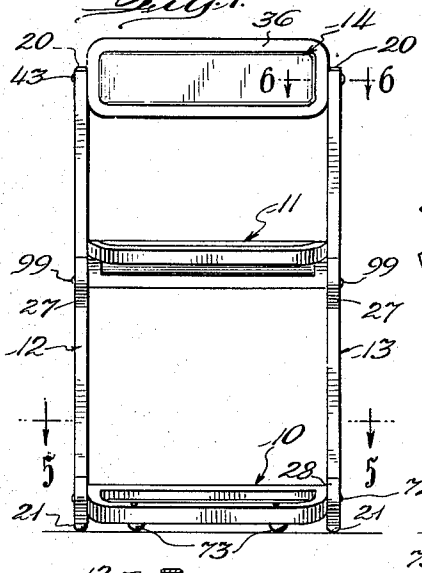


Fig. 2.

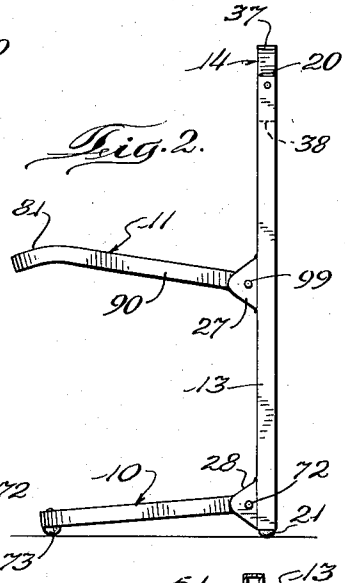


Fig. 3.

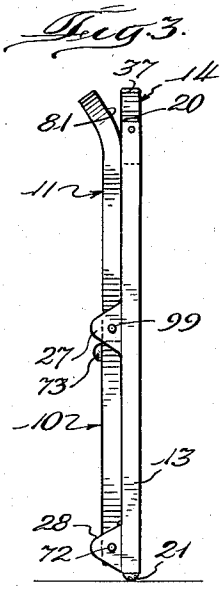


Fig. 5.

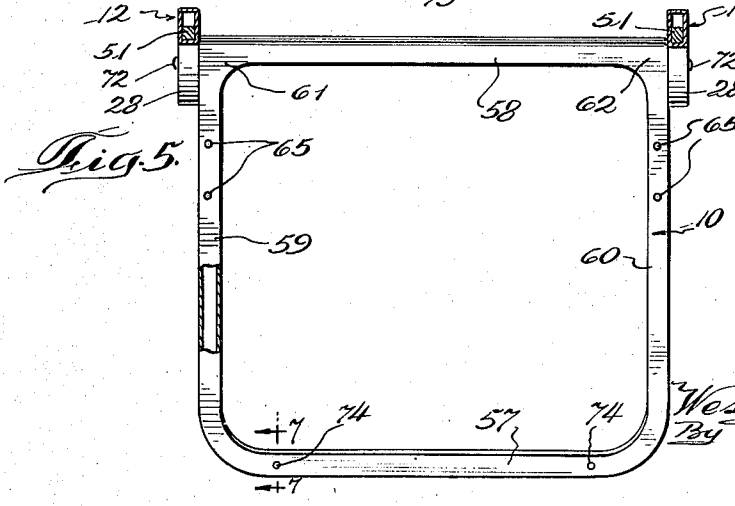
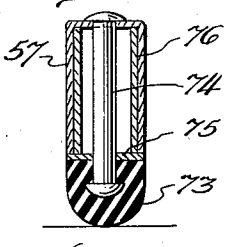


Fig. 7.

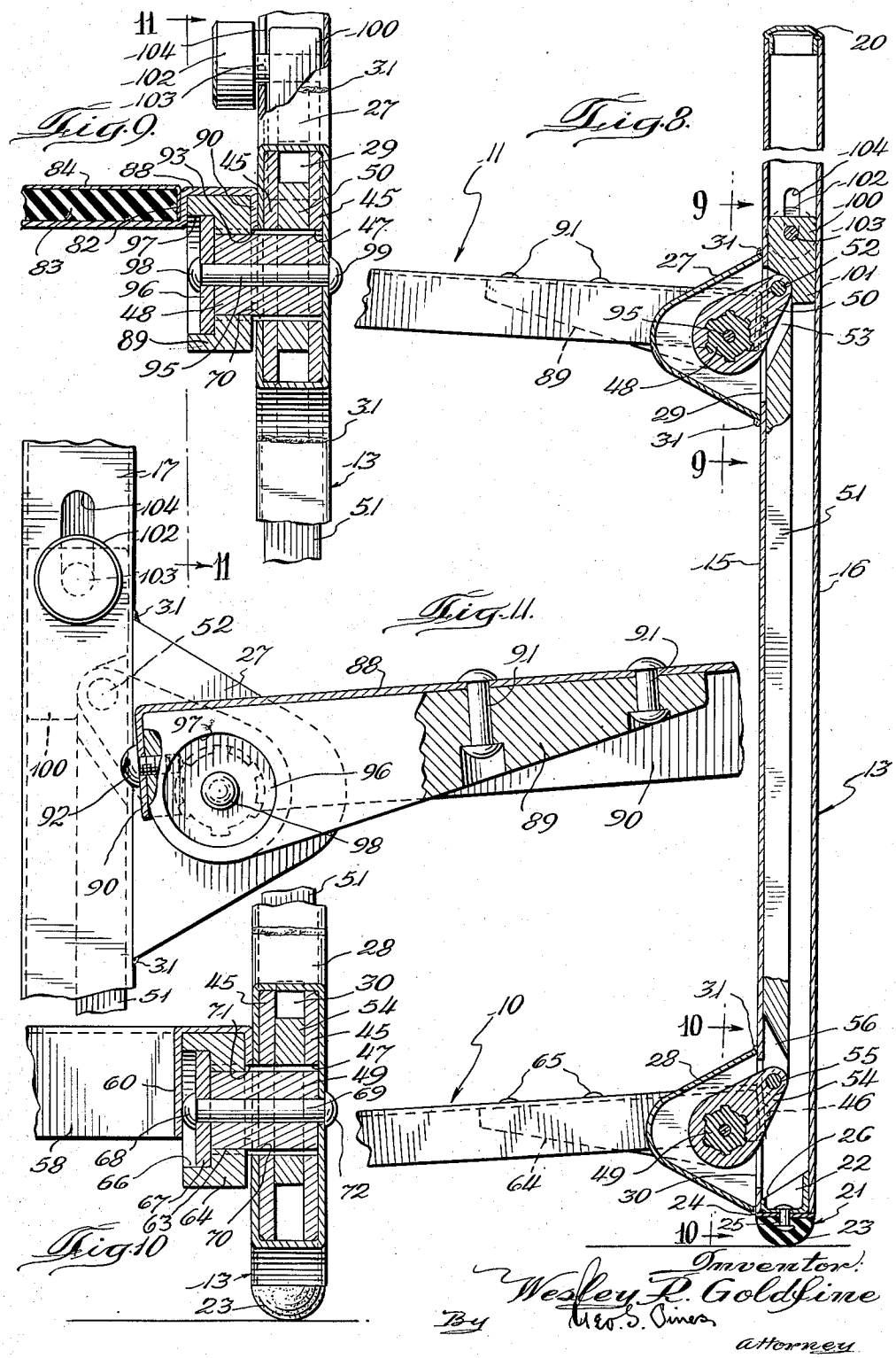


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May 1, 1951 W. R. GOLDFINE 2,550,993

FOLDING CHAIR

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FOLDING CHAIR

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11 Claims. (Cl. 155—139)

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This invention relates to folding chairs and more particularly to that type of folding chair in which base and seat are arranged to collapse simultaneously.

The primary object of the invention is to provide a simple well-constructed folding chair the supporting base and seat of which are adapted to readily collapse simultaneously, rendering the folded article substantially flat and compact.

A further object of the invention is to provide a folding chair having a minimum of parts and being simple to operate.

A further object of the invention is to provide a folding chair wherein the mechanical linkages whereby the chair is rendered collapsible will be hidden.

Still further objects of the invention are to provide a folding chair of extreme sturdiness; to provide a chair which can be economically manufactured on a large-scale production basis; to provide a novel mechanism for causing seat and base to swing simultaneously; to provide a novel locking device.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and a combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of this invention, there is illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, this invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

Fig. 1 is a front elevational view of a folding chair constructed in accordance with the invention.

Fig. 2 is a side elevational view thereof.

Fig. 3 is a view similar to that of Fig. 2 except that the chair is shown in a folded condition.

Fig. 4 is a top plan view of the folding chair in an opened condition.

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Fig. 5 is a sectional view taken along the line 5—5 of Fig. 1 and looking downwardly.

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 1 and looking downwardly to show certain constructional details.

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 5 and in the direction indicated by the arrows.

Fig. 8 is a vertical sectional view taken through the left leg of the chair, with portions thereof broken away and other portions shown in section.

Fig. 9 is a detailed sectional view taken through the seat pivot point as shown at 9—9 in Fig. 8 and in the direction indicated by the arrows.

Fig. 10 is a view similar to Fig. 9 but taken through the base pivot point as indicated by 10—10.

Fig. 11 is a fragmentary view of the seat attachment arrangement showing certain details in section.

The reference character 10 designates generally the folding chair base, while 11 designates the seat, 12 and 13 the legs, right and left respectively, and 14 the backrest. These elements, to all outward appearances, form the sum total of the parts forming the chair whereby the chair is extremely simple in construction and use. However, internally of these parts there are mechanisms whereby the folding movement of either base 10 or seat 11 will simultaneously cause folding movement of the other element, and, when in an opened condition the chair may be rendered safe and non-collapsible.

Each of the legs 12 and 13 is formed as a column, for strength, comprising front, rear, and side walls 15, 16, 17, and 18 respectively. These may be formed from a single sheet metal member bent and welded into proper shape. A butt weld along the rear wall 16 is shown at 19 in Fig. 6. The open ended columns constituting legs 12 and 13 are closed at opposite ends thereof by means of ornamental caps 20 at the top, and by padded feet 21 at the bottom. The feet 21 consist of metal dish-like members 22 adapted to snugly fit into the lower end of the legs 12 and 13 each having a rubber pad 23 supported on a plate 24 attached thereto by the rivet 25 molded into the pad 23 during formation thereof. The front portion 26 of the member 22 is foreshortened for clearance of the chair's folding mechanism.

The legs 12 and 13 are each provided on its front wall 15 with upper and lower generally triangular shaped housings 27 and 28 respectively which overlie the slotted openings 29 and

30 formed in said wall 15. These housings 27 and 28 are attached to the legs 12 and 13 by welding as indicated at 31. The purpose of the housings 27 and 28 will presently be explained.

At the upper end of each of the legs 12 and 13 there is provided a conical depression 32 formed on the wall 17 which serves as a bearing surface for protruding conical portion 33 formed on the backrest 14. The backrest is of a generally curved configuration, and is formed from a metal member 34 having a dished portion providing a slight depression 35 on the forward face thereof with a surrounding rim portion 36. The member 34 is provided with upper and lower conformingly shaped flanges 37 and 38, respectively, as well as end flanges 40 from which are formed the protruding conical bearing portions 33.

A pad, preferably of sponge rubber 41 and covered with fabric 42 is attached within the depression 35 to render the backrest 14 comfortable.

The backrest 14 is connected between the legs 12 and 13 in rotatable engagement with the conical portions 32 and 33, being held in this position by a pintle or rivet 43 extending through appropriate openings in walls 17 and 18 and flange 40. A spacer 44 is provided between the inner surface of wall 18 and the base of depression 33. It should be obvious that the rotatable attachment just described is a tight one so that the backrest 14 may assume an adjusted position relative to the sitter's back, but will not rotate freely.

Each of the housings 27 and 28 is provided internally thereof with a pair of bearing plates 45 which are substantially of the same general triangular configuration as the respective housing within which said plates are disposed. Each plate has a central opening 47 within which a spline shaft is adapted to rotate freely. There are four of such spline shafts, two associated with the housings 27 as shown at 48 and two with the housings 28 as shown at 49. Each of the spline shafts 48 is provided with a lever arm 50 having a cooperating splined opening engaging said spline shaft 48 and adapted to rotate therewith. Said lever arm 50 is sandwiched between the bearing plates 45 and extends through the opening 29 into the interior of the leg 12 or 13 where it is pinned to the upper end of an elongated link member 51 by means of the pin 52. The link members 51 are bifurcated at the upper ends thereof, as shown at 53 to provide clearance for movement of the lever arm 50, said arm being straddled by said bifurcated end 53.

In a similar manner, the spline shafts 49 are each provided with a lever arm 54 sandwiched between bearing plates 45, having a portion extending through the opening 30 and into the center of the column comprising legs 12 and 13 where said arms 54 are pinned to the lower ends of the link members 51 by pins 55. The lower ends of link arms 51 are bifurcated as shown at 56 for purposes of clearance.

From the above description it should be readily apparent that rotation of a spline shaft, such as for example 49 will cause similar rotation of the shaft 48 linked thereto by means of the lever arms 50 and 54 and the link member 51.

At the bottom of the folding chair there has been provided a base 10 which is formed of sheet metal having a substantially U-shaped cross section, the open end of the section facing downwardly. The base 10 is formed as a rigid frame member having front, rear, and side portions 57, 58, 59 and 60 respectively. The jointure of side portions 59 and 60 with the front portion 57 is rounded as shown in Fig. 5, but, the rear jointures are squared as shown at 61 and 62. Each of the squared corner portions 61 and 62 are provided on their undersides, with support members 64 extending forwardly and held between the arms of the U-shaped section to the side portions 59 and 60 and riveted in place as shown at 65. As an additional fastening means, a screw 46 extends through the rear wall of portion 58 into each member 64.

Said members 64 are substantially wedge-shaped cantilever support members, formed as a pair, right and left. Only the left of these members 64 is shown therein, but the right is identical therewith but opposite in formation. The member 64 is splined to the shaft 49 as shown at 63 and the shaft 49 rotates therewith. A counterbored portion 66 permits the placement of a washer 67 and the head 68 of a rivet 69 by means of which the spline shaft 49 is held in position attached within housing 28 and the slide portion 60 of the base 10. Note that the inner wall of the housing 28 is provided with an opening 70 to permit passage of said spline shaft 49, and by reason of the conformal shape of the bearing plates 45, the spline shaft 49 remains centered therein. The side portion 60 is also provided with a clearance opening 71 as is the side portion 59 (not shown). Note that the outer wall of the housing 28 has an opening only of such size to permit the rivet body 69 to extend therethrough so that the head 72 serves to retain the entire spline assembly and the right hand end of the shaft 49 as viewed in Fig. 10 abuts against the inner face of the right hand wall of housing 28.

The front portion 57 of the base 10 is provided with a pair of feet comprising rubber pads 73 moulded onto rivets 74 carried on the plates 75 and having an elongated extension portion 76 for centering same within the bottom of said portion 57 and between the two side walls thereof. The rivets 74 extend through appropriate openings in the member 57 and are peened over as shown to hold said feet in place.

The chair seat 11 is formed of sheet metal and is shaped as shown in Fig. 4 with rounded corners at the front thereof as shown at 77 and 78 and squared corners 79 and 80 adjacent the legs 11 and 12. The front end of the seat 11 is curved as shown at 81 in order to promote comfort. The chair seat is preferably stamped from a metal sheet member and provided with a downwardly dished portion 82 within which there is affixed a soft pad, such as sponge rubber 83 covered with fabric 84. The resulting rim comprises front, rear, and side portions 85, 86, 87, and 88, respectively. By reason of a downwardly depending flange 90 about the seat 11, there is formed between said flange 90 and the dished portion 82 substantially the same inverted U-shaped cross section described in connection with the base 10.

The chair seat 11 is attached to the spline shafts 48 in the same manner as the base 10 is attached to spline shafts 49. Thus, the side portions 87 and 88 are provided at the corners 79 and 80 with cantilever support members 89 held between the flange 90 and dished portion 82 on the underside of the seat 11 by rivets 91 and screws 92. The flange 90 is provided with clearance openings 93 corresponding to openings 71. The housing 27 also has clearance openings 94 corresponding to clearance openings 70. There are provided rivets 95 and washers 96 corresponding to rivets 69 and washers 67 used in attachment of the base. The identical manner of

assembly and attachment are used for the seat 11 as for the base 10. The counterbored portion 97, rivet heads 98, and 99 correspond to counterbored portion 66, and rivet heads 68 and 72, respectively.

When the chair is in an opened condition and it is desired to collapse same, the seat 11 is rotated upwardly and this causes the base 10 to likewise rotate upwardly by reason of the mechanical linkages described. In an open condition the amount of rotation of seat 11 and base 10 in a counter clockwise direction is limited by the engagement of link members 51 with the inner faces of walls 15 of legs 12 and 13. In order to cause the chair to maintain this condition without danger of collapsing, there is provided within leg 13 a block member 100 which has a portion 101 adapted to engage between link member 51 and inner face of wall 16 of the leg 13. Thus, if movement of link arm 51 is prevented, the seat and base cannot be folded and the chair remains open. The block is manipulated by means of a knob 102 which is provided upon a pin 103 attached to said block 100 and riding in slot 104 positioned on the inner wall 17 of leg 13.

It is believed that this invention, its mode of construction and assembly, and many of its advantages should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of this invention as defined in the appended claims.

What it is claimed and desired to secure by Letters Patent of the United States is:

1. In a folding chair, a pair of hollow legs, a base, a seat, said base and seat each being swingably attached only at one end thereof to said legs and each having the opposite end thereof free, means carried internally of said legs and connected with the said one end of each of said seat and base causing simultaneous collapse of both said base and seat upon the folding movement of either.

2. In a folding chair, a pair of hollow legs, a base, a seat, said base and seat each being swingably attached only at one end thereof to said legs and each having the opposite end thereof free, means carried internally of said legs and connected with the said one end of each of said seat and base causing simultaneous collapse of both said base and seat upon the folding movement of either, said means comprising mechanical linkages interconnected between said seat and base.

3. In a folding chair, a pair of hollow legs, a base, a seat, said base and seat each being swingably attached only at one end thereof to said legs, and each having the opposite end thereof free, means carried internally of said legs and connected with the said one end of each of said seat and base causing simultaneous collapse of both said base and seat upon the folding movement of either and means for locking said base and seat in an open position.

4. In a folding chair comprising upright legs, seat, and base, means for causing simultaneous folding of said base and seat comprising shafts attached to said seat and base and rotatable therewith, journal means carried by said legs for mounting said shafts rotatable relative thereto, lever arms carried by said shafts for rotating

therewith, and means linking said arms so that motion of the shafts is simultaneous, said linking means being contained within said legs hidden from view.

5. In a folding chair comprising upright hollow legs, seat, and base, means for causing simultaneous folding of said base and seat comprising shafts attached to said seat and base and rotatable therewith, journal means carried by said legs for mounting said shafts rotatable relative thereto, lever arms carried by said shafts for rotating therewith, and means linking said arms so that motion of the shafts is simultaneous, said linking means being contained within said legs hidden from view, said legs having housing for said journal means and lever arms whereby same are also hidden from view.

6. In a folding chair construction, uprights, seat and base members pivoted on said uprights, pairs of journals carried by said uprights and mounting rotatable shafts therein, cantilever support members fixedly secured to said shafts and having said seat and base each independently attached to a pair of said journals, lever arms attached to each of said shafts, and means linking pairs of said lever arms whereby pivotal motion of either the seat or base member will be duplicated by the other member.

7. A folding chair construction comprising a pair of hollow upright leg members, each provided with a housing adjacent the bottom thereof and a second housing intermediate the ends thereof, a seat member and a base member, rotative means carried by the lower housings extending through confronting walls thereof and connected to said base member, rotative means carried by the upper housings and extending through confronting walls thereof and connected to said seat member, means for limiting downward rotation of said seat and base member whereby said chair may remain open and be collapsed by folding said base and seat members upwardly.

8. A folding chair construction comprising a pair of hollow upright leg members, each provided with a housing adjacent the bottom thereof and a second housing intermediate the ends thereof, said leg members being provided with openings opposite said housings providing communication between said housings and the interior of said leg members, a seat member and a base member, rotative means carried by the lower housings extending through confronting walls thereof and connected to said base member, rotative means carried by the upper housings and extending through confronting walls thereof and connected to said seat, means for limiting downward rotation of said seat and base member whereby said chair may remain open and be collapsed by folding said base and seat members upwardly, lever arms attached to said rotative means within said housings and extending through said openings into the hollow interior of said legs, said rotation limiting means including links interconnecting the upper and lower of said levers whereby said base and seat will move simultaneously during swinging thereof.

9. A folding chair construction comprising a pair of hollow upright leg members, each provided with a housing adjacent the bottom thereof and a second housing intermediate the ends thereof, said leg members being provided with openings opposite said housings providing communication between said housings and the in-

terior of said leg members, a seat member and a base member, rotative means carried by the lower housings etxending through confronting walls thereof and connected to said base member, rotative means carried by the upper housings and extending through confronting walls thereof and connected to said seat, means for limiting downward rotation of said seat and base member whereby said chair may remain open and be collapsed by folding said base and seat members upwardly, lever arms attached to said rotative means within said housings and extending through said openings into the hollow interior of said legs, said rotation limiting means including links interconnecting the upper and lower of said levers whereby said base and seat will move simultaneously during swinging thereof and means locking said seat and base in an unfolded position.

10. A folding chair construction comprising a pair of hollow upright leg members, each provided with a housing adjacent the bottom thereof and a second housing intermediate the ends thereof, said leg members being provided with openings opposite said housings providing communication between said housings and the interior of said leg members, a seat member and a base member, rotative means carried by the lower housing extending through confronting walls thereof and connected to said base member, rotative means carried by the upper housings and extending through confronting walls thereof and connected to said seat, means for limiting downward rotation of said seat and base member whereby said chair may remain open and be collapsed by folding said base and seat members upwardly, lever arms attached to said rotative means within said housings and extending through said openings into the hollow interior of said legs, said rotation limiting means including links interconnecting the upper and lower of said levers whereby said base and seat

will move simultaneously during swinging thereof, and means locking said seat and base in an unfolded position comprising a member slidable within a leg of said chair to wedge one of said links in an immovable position, said member having manipulating means externally of said leg.

11. A folding chair construction including a chair back formed of a pair of hollow, tubular, upright legs, a swingable member supported in pivotal relationship on said legs with an edge adjacent the upright and the edge opposite free, said member being attached to swing from a position lying in a plane parallel to the upright to a second position lying in a plane substantially perpendicular to the plane of the upright, said swingable member including a lever attached thereto at the pivoted end thereof extending into the interior of one of said hollow legs and having means at the end of said lever adapted to engage the interior wall of said leg to limit downward pivotal motion of said member.

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