June 16, 1936. R. G. GELLER 2,044,473

FOLDING CHAIR

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Fig. 1.

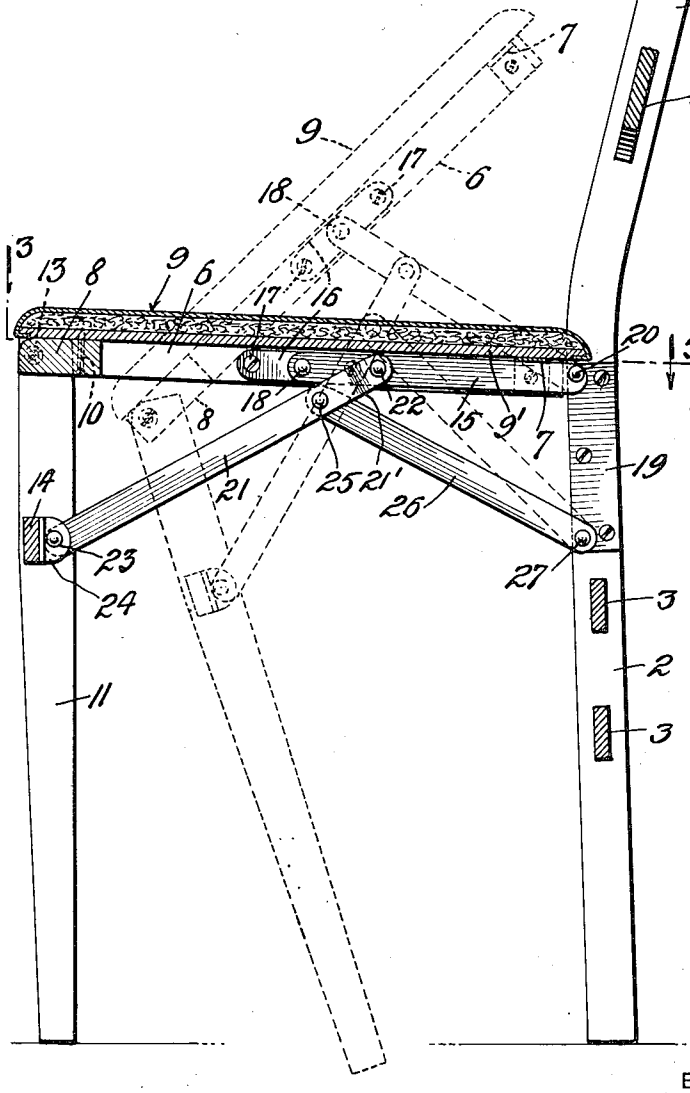
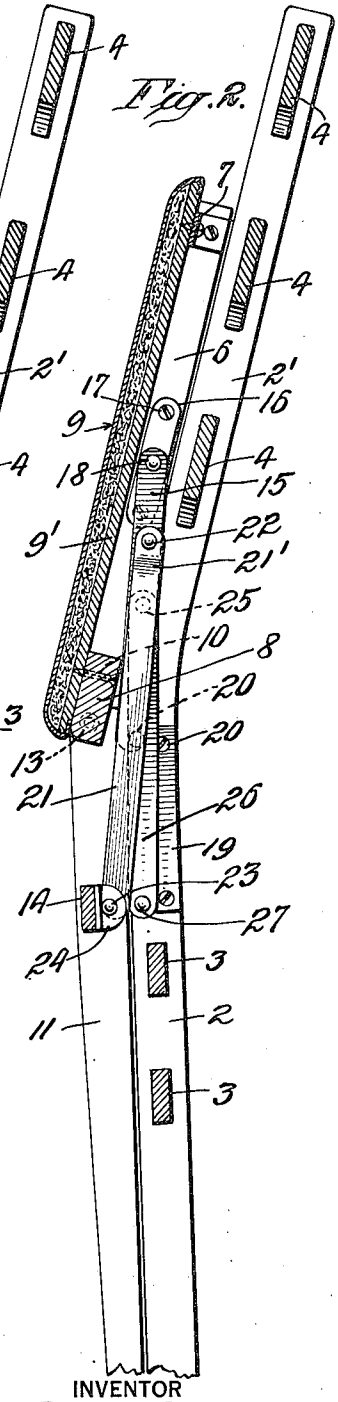


Fig. 2.



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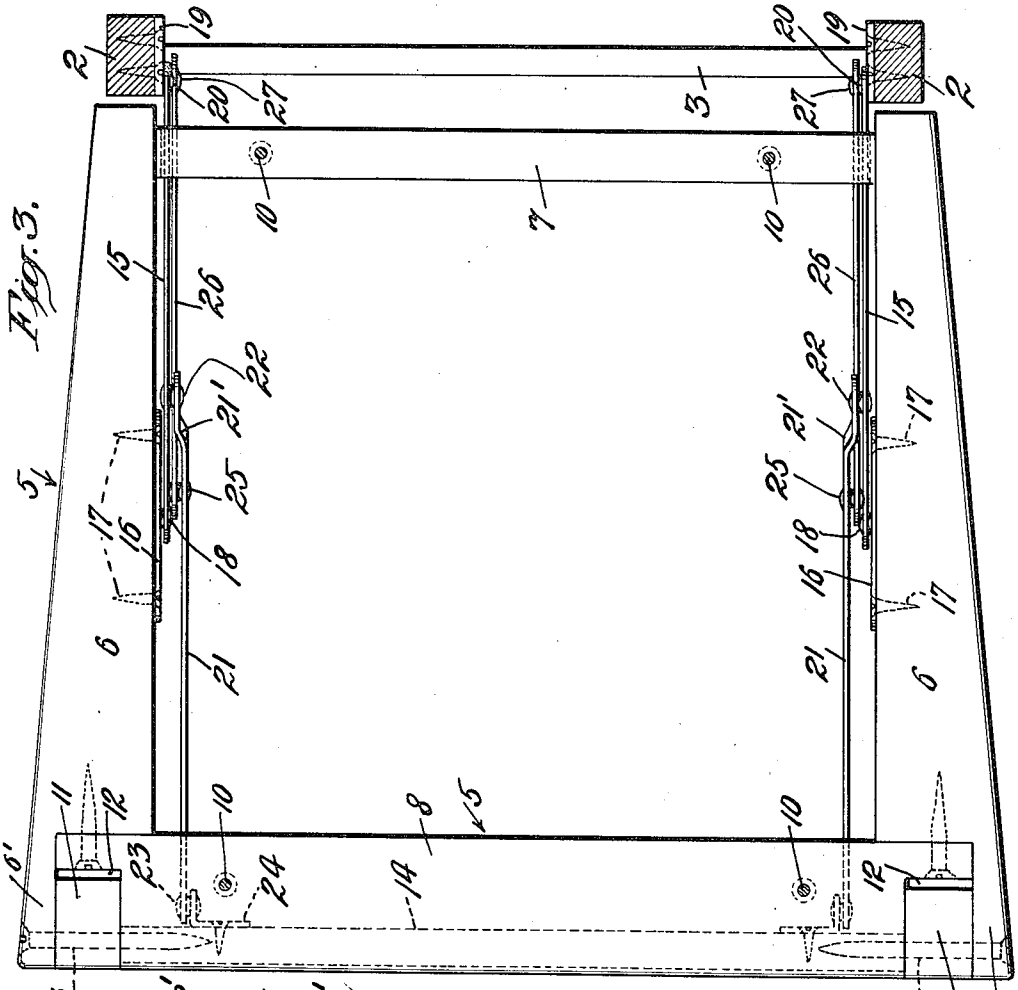


Fig. 3.

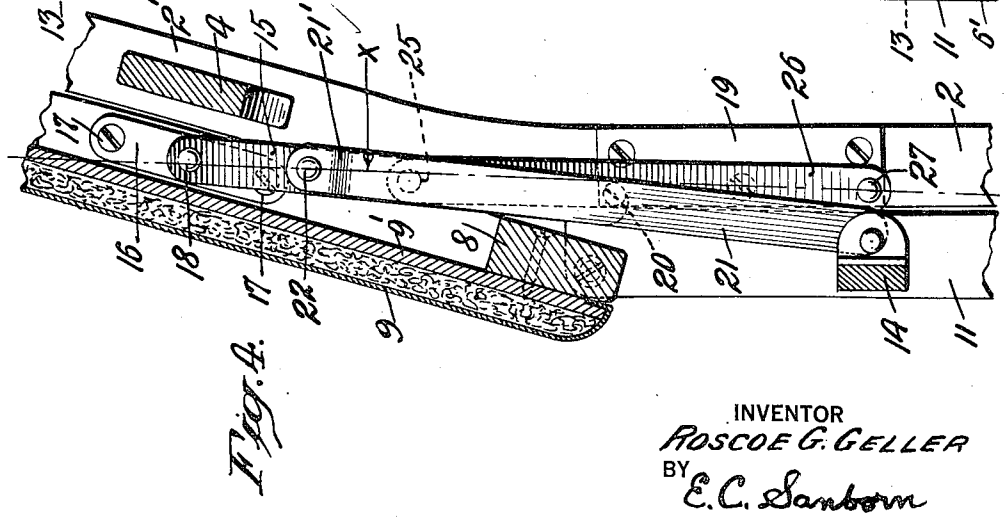


Fig. 4.

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FOLDING CHAIR

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9 Claims. (Cl. 155—141)

This invention relates to folding chairs. An object of the invention is the provision of novel and improved means enabling the chair to be conveniently and expeditiously folded. Another object is the provision of novel folding mechanism which effectively braces the foldable portions of the chair when in unfolded position. My invention further provides a folding means so arranged that when the chair is folded the front legs and seat conform to and lie against the rear legs and back rest, respectively. The invention further provides a folding chair presenting the appearance, comfort and style of a rigid non-foldable chair, and having a minimum of visible evidence of foldability. Another object of the invention is the provision of folding mechanism capable of effectually performing its functions and consisting of a minimum number of parts. A further feature resides in novel provisions whereby the foldable parts may be locked in folded position. Other features of the invention will be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a view, partly in side elevation and partly in longitudinal vertical section, of a chair embodying my invention; the chair being shown in unfolded position.

Fig. 2 is a view similar to Fig. 1 but showing the chair in folded position.

Fig. 3 is a view in horizontal section, taken on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary detail view partly in vertical section and partly in elevation, showing how the chair is locked in folded position.

Referring to the drawings, the chair shown comprises a pair of rear legs 2, 2 joined by cross-pieces or stretchers 3. The legs 2 are extended upwardly and rearwardly to form the elements 2', 2', which are joined by the stretchers 4, forming the back rest. Said back rest and rear legs form the rear frame of the chair. A seat frame 5 comprises longitudinal bars 6, 6, joined at the rear by cross bar 7 and at the front by cross bar 8. The seat body 9 may be conveniently attached to the seat frame by screws 10 or other suitable securing means, passing through the bars 7, 8, and into the base 9' of said body, as shown. The front legs 11, 11 are pivotally mounted at their upper ends in the seat frame. For this purpose, the bar 8 may, as shown, be cut away to provide recessed portions 12, 12. Each of the front legs extends into a corresponding one of said recesses and is mounted in the seat frame by a pivot element 13, which extends through a forward projection 6' of the associated bar 6, thence through the leg 11 and into the bar 8, as illustrated in Fig. 3. The foregoing arrangement provides a particularly sturdy construction while at the same time enabling the legs 11 to pivot with respect to the seat frame. A stretcher 14 extends from one leg 11 to the other.

The seat frame is pivotally connected to the rear legs 2, 2, through a pair of links 15, 15, each of which is pivoted at one end to a respective one of said rear legs and at its other end to an intermediate portion of the corresponding side bar 6. The pivotal connection between each link 15 and the associated bar 6 may conveniently be provided by a plate 16 secured to the bar 6 by screws 17 and having a rivet 18 passing through a hole in the link 15 and forming a pivot therefor. Similarly, each leg 2 may have a plate 19 secured thereto by screws and provided with a rivet 20 passing through a hole in the adjacent end of the associated link 15 to form a pivot therefor.

A pair of links 21, 21 are pivotally connected between the links 15, 15 and the front legs of the chair. As shown, each of said links 21, 21 is pivoted at one end, by means such as a rivet 22 to a respective one of the links 15. At its opposite end each link 21 is pivoted to the front stretcher 14, as by a rivet 23 in a clip or bracket 24 secured to said stretcher.

Each link 21 has pivoted thereto, by a rivet 25, an end of a corresponding one of a pair of links 26, 26. The opposite end of each link 26 is pivoted by a rivet 27 to the plate 19 on the associated rear leg 2.

It will be seen that when the chair is in open or unfolded position the links 21 and 26 act as braces for the seat. The chair may be closed by moving the seat thereof upwardly and rearwardly with respect to the rear frame, said seat passing through the dotted line position shown in Fig. 1 to the completely folded position in Fig. 2. During this operation the links 15 pivot about the rivets 20 on the rear legs, while the links 21 and 26 control the turning of the front legs about the pivots 13 so that at the time that the seat frame 5 is folded against the rear frame members 2', 2', the legs 11 lie parallel and adjacent to the rear legs 2. Due to the links 15, 21, 26, moreover, the bottom ends of the front legs, when in folded position, lie approximately on the same level as the lower ends of the rear legs. It will be seen that the chair when closed or folded presents a

compact construction and is foldable in a simple and expeditious manner. Furthermore, while the elements 2' of the back frame extend at an angle to the legs 2, the linkage 15, 21, 26 aforesaid enables the seat to assume a position parallel to said members 2' when the chair is folded. In the embodiment shown, the linkage pivots are so arranged that the distance from the center of the hole for rivet 22 to that of the hole for rivet 20, plus the distance from the center of the hole for rivet 20 to that of the hole for rivet 27 substantially equals the distance from the center of the hole for rivet 27 to that of the hole for rivet 25, plus the distance from the center of the hole for rivet 25 to that of the hole for rivet 22. This relationship, however, may be varied and these distances may be made slightly unequal to assist in maintaining the chair locked in folded position.

Any suitable latching means may, if desired, be employed for insuring that the chair is maintained in folded position. In the embodiment disclosed, however, the folding mechanism is so arranged as of itself to maintain the parts in folded relation. This is shown particularly in Fig. 4 from which it will be noted that the seat 5 has been moved rearwardly to such extent that a line (designated X) drawn through the centers of the pivots 22 and 27 passes to the rear of the center of the pivot 20. In a chair construction as described above the parts may be held positively in folded position, even though the chair be turned upside down; and in order to open the chair it is necessary first to impart a positive forward push to the chair seat, forcing the latter to a slightly forward position wherein the line aforesaid through pivots 22 and 27 passes to the front of the center of pivot 20. The chair may then be brought to completely unfolded position by simply pushing downwardly on the seat. The position wherein the above mentioned line through pivots 22 and 27 passes through the center of pivot 20 may be termed the dead center position of the chair seat and front legs.

The linkage 15, 21, 26 may be enabled to pass readily beyond dead center position by providing an enlarged hole in one or more of the links for receiving the associated rivet. For example, the hole in link 21 for receiving rivet 25 may be enlarged for providing play between said rivet and link sufficient to enable the linkage to be moved from one side of dead center to the other. It will also be seen that, if desired, the links may be made of metal sufficiently resilient for this purpose, without providing one or more enlarged rivet holes. As a further alternative one or more of the distances between pivot centers of the links may be changed.

The chair may be conveniently moved from unfolded to folded position by grasping the rear frame with one hand and the seat with the other and drawing the seat upwardly and rearwardly with respect to the rear frame, giving the seat a final rearward push when adjacent dead center position to move the seat past dead center and into the completely folded and locked position shown in Figs. 2 and 4. A particularly expeditious manner of folding the chair, however, is simply to tilt the chair forwardly on its front legs and then push downwardly on the chair back, whereby the seat and legs are caused to move through the dotted line position of Fig. 1, toward the back to a position adjacent dead center. The seat and legs may then be shifted to final folded and locked position by imparting a rearward push to the chair seat.

The links 21 may each be bent as shown at 21' (Fig. 3), avoiding the necessity of providing spacing washers for cooperation therewith. It will also be noted that said links are pivoted at their forward ends to the stretcher 14 between the front legs 11 instead of to said legs themselves. In this way the legs 11 may be spaced apart more widely than the rear legs 2, and the seat correspondingly widened, without any change in measurements of the links 15, 21, and 26.

The bar 7 is preferably of metal and acts as a spreader and stretcher, maintaining an exact distance between the rear ends of the side bars 6. It also allows the links 15 to disappear within the seat frame, previously noted, and provides a means for attachment of the upholstered seat body 9.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any mechanical equivalents of the features shown and described or portions thereof, but recognize that various structural modifications are possible within the scope of the invention claimed.

What I claim is:

1. In a folding chair, a rear frame, a seat, legs pivotally connected to said seat, and means enabling said seat and legs to fold with respect to said rear frame; said means comprising a link pivoted at one end to said rear frame and at the other end to said seat, a link pivotally connected at one end to a leg and at the other end to the first mentioned link, and a link pivotally connected at one end to the rear frame and at the other end to the second mentioned link.

2. In a folding chair, a rear frame, a seat, a leg pivotally connected to the seat, a link pivotally connecting said seat and said rear frame, a link pivotally connecting said leg to the first mentioned link at a point spaced from the point of connection of the first mentioned link to said seat, and a link pivotally connecting the second mentioned link to the rear frame.

3. In a folding chair, a rear frame, a seat having legs pivoted to the front thereof, and folding means providing for vertical upward movement of the rear end of the seat with respect to the front end of the seat, said means comprising links interconnecting said rear frame, said seat, and said legs, said links providing means for locking said seat and legs in folded position with respect to said rear frame.

4. In a folding chair, a rear frame, a seat, a link pivoted at one end to said rear frame and at the other to said seat, a leg pivoted to said seat, a link pivotally connected at one end to said leg and at the other end to the first mentioned link, a link pivoted at one end to the second mentioned link and at the other end to said rear frame, said parts being so constructed and arranged as to enable said seat and leg to be folded into such position with respect to the rear frame that a line passing through the pivotal connection between the first link and the second link and the pivotal connection between the third link and the rear frame passes to the rear of the pivotal connection between the first link and the rear frame.

5. In a folding chair, a rear frame comprising rear legs and a back, a front frame including a pair of front legs, a seat pivotally connected to one of said frames, means connecting said seat

to the other of said frames for assisting in guiding said frames and seat into folded position, a link pivotally connected to and extending diagonally from said rear frame, a link pivotally connected to and extending diagonally from said front frame, one of the links being pivotally connected to the other of the links intermediate the ends of said other link, and said other link being pivotally connected to said connecting means.

6. In a folding chair, a rear frame comprising rear legs and a back, a front frame including a pair of front legs, a seat pivotally connected to said front frame, means connecting said seat to the rear frame for assisting in supporting the seat in unfolded position and assisting in guiding said frames and seat into folded position, a link pivotally connected to and extending diagonally from the front frame, a second link pivotally connected to and extending diagonally from the rear frame, said second link being pivotally connected to the first link intermediate the ends of said first link, and said first link being pivotally connected to said connecting means.

7. In a folding chair, a rear frame comprising a back and rear legs, a front frame comprising a pair of front legs, a seat, means connecting said seat in both folded and unfolded positions to said front and rear frames, and a plurality of links connected together and cooperating with one of said connecting means for both supporting the chair against collapse when unfolded and for guiding said seat and said front legs into a position adjacent said rear frame with the front legs and seat in approximate alignment when folded.

8. In a folding chair, a rear frame comprising a back and rear legs, a front frame comprising a pair of front legs, a seat pivotally connected to one of said frames, and a plurality of links connecting said frames and seat for supporting the chair against collapse in unfolded position and all of said links positively guiding said seat and said front legs into a position adjacent said rear frame with the front legs and seat in substantial alignment when folded.

9. In a folding chair, a rear frame comprising a back and rear legs, a front frame comprising a pair of front legs, a seat pivotally connected to one of said frames, and means comprising a plurality of links connected together and connected to said frames and seat for supporting the chair against collapse in unfolded position and for maintaining said chair locked in folded position.

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