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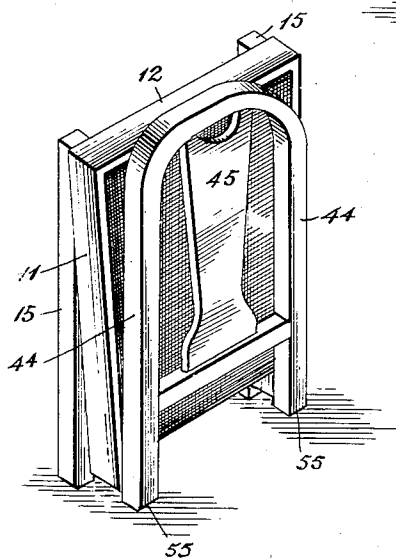
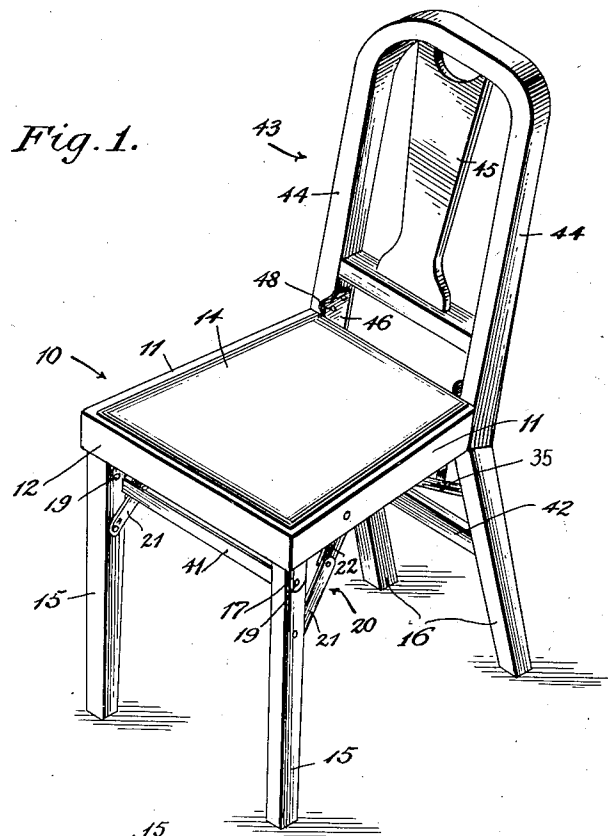
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1,976,567

FOLDING CHAIR

Filed Feb. 21, 1931

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3.

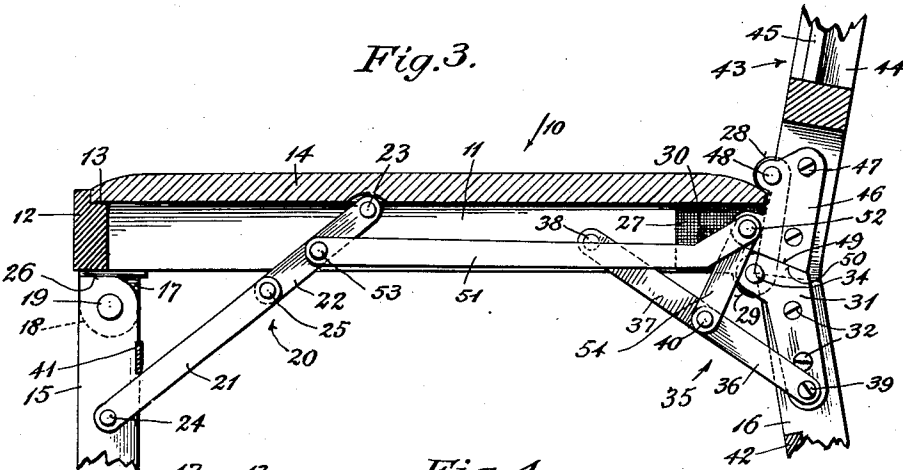


Fig. 4.

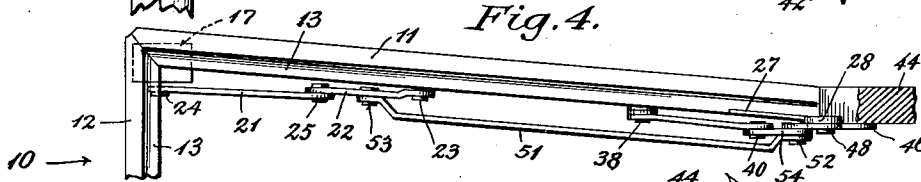


Fig. 5.

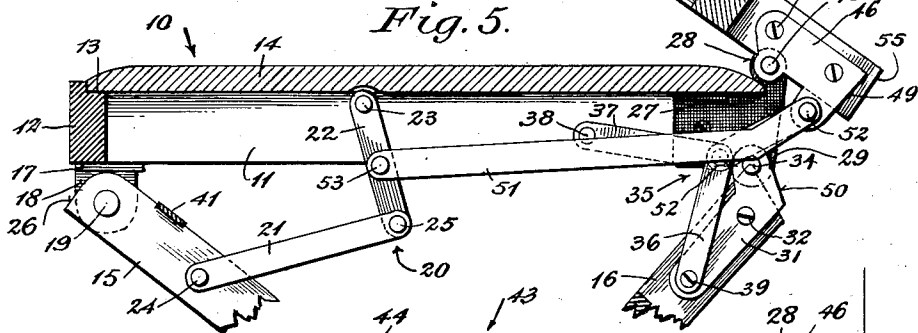
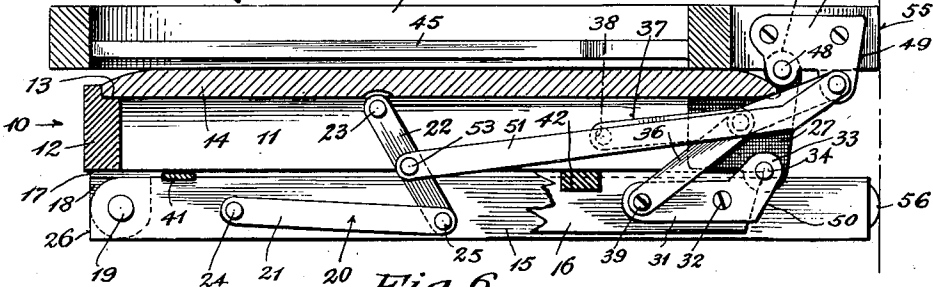


Fig. 6.



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UNITED STATES PATENT OFFICE

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FOLDING CHAIR

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Application February 21, 1931, Serial No. 517,428

9 Claims. (Cl. 155-148)

This invention relates, in general, to foldable chairs, and more specifically to a new and useful improved construction for automatically moving the chair legs into either a folded or extended position when the back is moved. In general it is an improvement on the foldable chair disclosed in my prior application, Serial No. 446,587, filed April 23, 1930.

It is an object of the present invention to provide a very simple mechanism for folding and extending the chair legs, which will be positive in its action.

A feature of the invention is the provision of an improved pivotal supporting means for the back member and rear legs.

Another feature is the provision of a mechanism which serves to move the bottom end of the back member into a plane with the bottom of the front legs, and spaced substantially apart, when the chair is moved to folded position.

A still further feature of the invention is the provision of means for folding the back member and legs in such manner that the metal working parts of said means will not engage and mar the floor when the chair is folded and stood on end.

Other features and advantages will hereinafter appear.

In the drawings—

Figure 1 is a perspective view of the improved chair of the present invention in extended position.

Fig. 2 is a perspective view of the chair in folded position standing on end.

Fig. 3 is a longitudinal section through the center of the chair, showing the parts in extended or unfolded condition, the free or end portions of the back and legs being broken away.

Fig. 4 is a top plan of the chair shown in Fig. 3, with the seat member removed.

Fig. 5 is a longitudinal section through the center of the chair, similar to Fig. 3, but shows the back and legs in partially folded position.

Fig. 6 is a longitudinal section through the center of the chair, similar to Figs. 3 and 5, but shows the back and legs in fully folded position.

The improved chair comprises a seat member 10 of any suitable construction and may, as shown, include two side bars 11 interconnected with a front bar 12 slightly recessed as at 13 for carrying the seat proper 14 of any suitable material or construction. The seat member 10 may be of any desired shape, of course, but in the present construction it is flared somewhat toward the front so that the seat is wider at the front edge than at the rear edge, which is a common shape for

chair seats, and gives a desirable attractive appearance. This arrangement also permits the front legs 15 to be spaced somewhat wider apart than the rear legs 16 so that they will fold longitudinally adjacent each other against the underside of the seat member and will not interfere with each other, as shown in Fig. 6, and as described more completely hereinafter.

The front legs 15 in the present construction are pivoted to the seat member 10 adjacent the front edge thereof preferably by means of brackets 17 secured to the seat member 10 and having a downwardly extending ear 18 forming a support for a stud 19 upon which the leg is mounted for pivotal movement to either a folded or an extended position.

For the purpose of moving the front legs 15 into their extended position and for drawing them into folded position, the present invention provides a toggle 20 for each front leg comprising a pair of toggle links 21 and 22 pivoted on a stud 23 to the side bar 11 of the seat member 10, and at its other end pivoted on a stud 24 to the front leg 15 and pivoted intermediate these pivots with a rivet 25. When the toggles 20 are in fully extended position, as shown in Fig. 3 with the squared end 26 of the leg in engagement with a flat surface of the bracket 17, they serve to effectively brace the front legs.

Near the rear edge of the seat member 10, a bracket 27 is fastened to each of the side bars 11 and is provided with an upper extension 28 and a lower extension 29. These brackets are preferably mounted on the inner portion of the side bars 11 with wood screws 30 or the like, in order to be inconspicuous. The downturned extensions 29 of the brackets serve as pivots for rear legs 16 and to this end the rear legs are preferably provided with plates 31 fixed thereon with wood screws 32, and having extensions 33 provided with a hole aligned with a cooperating hole in the bracket extensions 29 in order to be pivotally connected to the seat member 10 when rivets 34 are passed therethrough. The extensions 33 on the rear legs 15 and lower extensions 29 on the seat brackets 27 and the pivot connection 34 thereon make it possible to move the rear legs to the extended position as shown in Fig. 3, or the folded position as shown in Fig. 6.

In order to limit the movement of the rear legs 16 into extended position, the present invention provides a toggle 35 for each of the rear legs 16 comprising a pair of toggle links 36 and 37 connected to a stud 38 on the seat member 10 and at

the other end connected by a stud 39 to the rear leg 16 and pivoted intermediate these pivots with a rivet 40. These toggles serve to brace the rear legs.

5 When the front leg toggles 20 and rear leg toggles 35 are folded in a manner hereinafter described, they serve to move both the front legs 15 and rear legs 16 into the folded position shown in Fig. 6. They also serve to limit movement of the legs into extended position, shown in Fig. 3, and serve to effectively brace the legs against spreading movement when a load is imposed upon the seat member, as when a person sits upon the foldable chair. The legs can be further braced by a cross member 41 on the front legs and a similar cross member 42 on the rear legs to brace the legs against sidewise pressure.

Pivoted to the upper extensions 28 of the brackets 27 is a back member 43 of any suitable construction, such as the side bars 44 and back panel 45 between them of any suitable material and design. The back member is preferably pivoted to the brackets 27 by a plate member 46 rigidly connected with bolts 47 to the side bars 44 of the back and pivoted to the bracket extension 28 with a pivot stud 48. The pivot 48 on the back member plates 46 is preferably offset slightly with respect to the front edge of the side bars 44 so that the back member will lay substantially flat against the seat member 10 when the back is moved into the folded position shown in Fig. 6. Movement of the back into the extended position shown in Fig. 3 is limited by an edge 49 on the back member plates 46 engaging a cooperating edge 50 on the rear leg plates 31, as shown in Fig. 3.

According to the present invention, the front leg toggles 20 and rear leg toggles 35 are arranged to be controlled, that is, moved from either folded position to extended position, or vice versa, automatically when the back member 43 is moved into folded or extended position with relation to the seat member 10. To this end there is provided a long actuator link 51, for each of the front leg toggles 20, which is connected to an actuator pivot 52 on the lower end of the back member 43, preferably on the plate 46, and extending forwardly underneath the seat member 10 to a pivot 53 on the front toggles 20. The particular location of the pivot 53 is governed by the offset location of the back member actuator pivot 52 with respect to the back member pivot 48, and depending upon just what amount of movement it is desired to give the back member 43 and the front legs 15.

The rear leg toggles 35 are similarly controlled by the back member 43, to be automatically moved into folded or extended positions by the provision of a short actuator link 54 which is pivotally connected to the back member 43 preferably on the offset or actuator pivot 52 already provided for the long actuator link 51, and at its front end is preferably connected to the toggle 35 on the intermediate pivot 40. The location of the rear toggle pivots 40 and the front toggle pivots 53 with respect to the actuator pivot 52 and the latter with respect to the back member pivot 48, is such that relative movements between the front legs 15, back legs 16, and back member 43 are substantially in unison and the legs lie in a substantially flat position against the bottom of the seat member when the back member is manually moved into a position substantially flat against the top of the seat member when folding the chair.

Coming now to the operation of the improved chair, the operator merely grips the front edge of the seat member 10, usually the cross bar 12, and then, taking hold of the back member 43 with the other hand swings the back on its pivot 48 over onto the seat member, an intermediate position being shown in Fig. 5. As the back member is swung on its pivot, the offset or actuator pivot 52 thereon is moved downwardly and rearwardly from the position shown in Fig. 3 to the position shown in Fig. 6, and in this movement it pulls the interconnected toggle actuator links 51 and 54 rearwardly. Initial movements of these links 51 and 54 pulling on the toggle pivots 53 and 40 first break the toggles 20 and 35, then, upon further movement of the back member, continue to fold the toggles and thereby move the front legs 15 and rear legs 16 about the pivots 19 and 34 respectively to fold the front legs rearwardly and fold the rear legs forwardly against the underside of the seat member, as shown in Fig. 6.

In view of the fact that the front legs 15 are spaced somewhat wider apart than the rear legs 16, the former will fold outside the later without interfering with each other.

It should be particularly noted that, according to the present invention, the pivotal connection 48 between the back member 43 and seat member 10 is such that the end 55 of the back member 43 is in alignment with the bottom end 56 of the front leg 15 when the chair is in folded condition, to provide wide spaced supports upon which the chair will stand very steadily when the folded chair is placed on end, as shown in Fig. 2, and the floor being diagrammatically indicated by the dotted line in Fig. 6. Further, it should be noted that the arrangement is such that neither the metal brackets 27, back member plates 46, or rear leg plates 31 engage the floor when the chair is stood on end, thus there is no danger of scratching or marring the floor as might occur if any of these metal parts did engage the floor, and this is of particular importance should the floor be polished or painted.

The hereinbefore described connections between the back member 43 and the front and rear legs 15 and 16 also make it possible for the operator to merely grasp the seat member 10 and manipulate the back member 43 in order to move all the legs into extended position automatically when the back member is moved out of folded position, for, as the back member is moved toward extended position about the pivot 48, the offset or actuator pivots 52 thereon are moved downwardly and forwardly, and at the same time move the toggle actuator links 52 and 54 forwardly. In this forward movement, the actuator links 52 and 54 push against the pivots 53 and 40 to extend the toggles 20 and 35 respectively, and thereby move the front legs 15 and rear legs 16 and the toggles 20 and 35 therefor into the fully extended position as the back member 43 moves to the operative position shown in Fig. 3. At substantially the same time that the legs and toggles reach the extended position, the edge 49 of the back member plate 46 engages the edge 50 of the rear leg plate 31, to limit movement of the back member 43 and to support it solidly in its extended position, especially when an occupant leans against the back.

Although it is preferred to pivotally connect the rear legs 16 and the back member 43 to the seat brackets 27 through the plates 31 and 46, insofar as some aspects of the present invention

are concerned, it is possible to pivotally connect the legs and back member to the seat brackets 27 without the use of these plates, or, connect the back member 43 and rear legs 16 with their respective plates 46 and 31 to the seat member 10 without the use of brackets 27. Because of added strength and improved working relationship between the various moving parts, it is now considered preferable to use the plates 31 and 46 and brackets 27 hereinbefore described in detail.

Similarly, it should be appreciated that a single front toggle 20, rear toggle 35, and single actuator links 52 and 54 respectively therefor may serve to move and hold all the legs 15 and 16 when the connector bar 41 between the two front legs and the similar connector bar 42 between the two rear legs is provided; but, for greater strength and better control of the moving parts, it is preferred to provide a toggle and actuator link for each of the front and rear legs.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is claimed as new and for which it is desired to obtain Letters-Patent, is:—

1. A foldable chair comprising a seat member; a back member pivoted to said seat member for movement into either a folded or an extended position; front legs having a pivot connection with the seat member; rear legs also pivoted to said seat member for movement into either a folded or an extended position; a pair of toggle links pivoted respectively to the seat member and rear legs and having an intermediate pivot about which said links rotate relative to each other; and a link connection between said back member and the intermediate pivot on said pair of toggle links adapted to operate said toggle links to move the rear legs into closed position and into extended position when said back member is moved into closed and into extended positions respectively.

2. A foldable chair comprising a seat member; sheet metal brackets adjacent the rear edge thereof; a back member having a pair of plates fixed thereon at opposite sides and pivoted to said brackets to permit movement of the back member into either a folded or an extended position; front legs having a pivot connection with the seat member; rear legs having plates fixed thereon and also pivoted to said brackets to permit movement of said legs into a folded or an extended position; a pair of toggle links pivoted respectively to the seat member and rear leg plates and pivoted together intermediate these pivots; and an actuator link connection between said back member plate and the intermediate pivot on said pair of toggle links adapted to operate said toggle links to move the rear legs into closed position and into extended position when said back member is moved into closed and into extended positions respectively.

3. A foldable chair comprising a seat member; a back member pivoted to said seat member for movement into either a folded or an extended position; front legs pivoted to the seat member; a pair of toggle links pivoted respectively to the seat member and front legs and pivoted together intermediate these pivots; rear legs pivoted to the seat member, spaced from each other differently than the front legs so that one set of legs folds within the confines of the other set of legs; another pair of toggle links pivoted respectively to the seat member and rear legs and pivoted to-

gether intermediate these pivots; an actuator link pivotally connected to said front leg toggle links; another actuator link pivotally connected to said rear leg toggle links; and a common pivot pin passing through said actuator links and mounted upon the back member for moving said actuator links and the interconnected toggle links to move the front legs and rear legs into folded position and extended position respectively when the back rest is moved into folded and extended positions.

4. A foldable chair comprising a seat member; a back member having a pair of plates fixed thereon at opposite sides and pivoted to said seat member; front legs pivoted to the seat member for movement into either a folded or an extended position; rear legs having plates fixed thereon and also pivoted to said seat member for movement of the rear legs into either a folded or an extended position, and being spaced from each other differently than the front legs so that one set of legs folds within the confines of the other set of legs; means connected to said back member plates for automatically moving said front legs and rear legs from the folded position into extended position when said back member is moved from its folded position; and means on said back rest plates coacting with means on said rear leg plates to limit movement of the back rest and support it in extended position when the legs are in extended position.

5. A foldable chair comprising a seat member; a back member pivoted to said seat member for movement either into a folded or an extended position; front legs pivoted to the seat member; a pair of toggle links pivoted respectively to the seat member and front legs and pivoted together intermediate these pivots; rear legs pivoted to the seat member, spaced from each other differently than the front legs so that one set of legs folds within the confines of the other set of legs; another pair of toggle links pivoted respectively to the seat member and rear legs and pivoted together intermediate the pivots; an actuator link pivotally connected to one of said front leg toggle links; another actuator link pivotally connected to said rear leg toggle links; and pivotal connections between the back member and said actuator links for moving the interconnected toggle links to move the front legs and rear legs into folded position and extended position respectively when the back rest is moved into folded and extended positions.

6. A foldable chair comprising a seat member; sheet metal brackets adjacent the rear edge thereof; a back member having a pair of plates fixed thereon at opposite sides and pivoted to said brackets to permit movement of the back member into either a folded or an extended position; front legs pivoted to the seat member; a pair of toggle links pivoted respectively to the seat member and front legs and pivoted together intermediate these pivots; rear legs having plates fixed thereon and also pivoted to said brackets, spaced from each other differently than the front legs so that one set of legs folds within the confines of the other set of legs; a pair of toggle links pivoted respectively to the seat member and rear leg plates and pivoted together intermediate these pivots; and link connections between said front leg and rear leg toggle links and said back member plate to move said front and rear legs into folded position and extended position when the back member is moved into folded and extended positions respectively.

7. In a folding chair the combination of a seat member; a back member having a pivotal connection with the seat member and adapted to be folded and extended; legs having a pivotal connection with the seat member; sets of toggle links, each connected at one end to the seat member and at the other end to one of the legs and having an intermediate pivot connecting said links; and actuator links each having a pivotal connection at one end with the pivotally mounted back member to be moved thereby and at its other end being connected to an intermediate pivot, to fold and extend the toggle connection and thereby the legs conjointly with the folding and extending of the back member.
8. A foldable chair comprising a seat member; sheet metal brackets on the seat member adjacent the rear edge thereof; a back member; a pair of plates on the back member at opposite sides thereof and pivoted to said brackets; front legs pivoted to the seat member; rear legs; plates on the rear legs pivoted to said brackets; two sets of toggle links, each connected at one end to the seat member and at the other end to one of the front legs; two long actuator links, one connected to each set of said front leg toggle links; two sets of toggle links, each connected at one end with the seat member and at the other end with one of the rear leg plates; two short actuator links, one connected to each set of rear leg toggle links; and a pair of pivots, one on each of said back member plates, each connecting one long and one short actuator link to said back member plates to operate said sets of front leg and rear leg toggle links and thereby effect movement of the front legs and rear legs conjointly with the back member into folded and extended positions.
9. A foldable chair comprising a seat member; sheet metal brackets on the seat member adjacent the rear edges thereof; a back member; a pair of plates on the back member at opposite sides thereof and pivoted to said brackets; interconnected front legs pivoted to the seat member; interconnected rear legs; plates on the rear legs pivoted to said brackets; a set of toggle links connected at one end to the seat member and at the other end to a front leg; a long actuator link connected to said set of front leg toggle links; a set of toggle links connected at one end with the seat member and at the other end with a rear leg plate; a short actuator link connected to said set of rear leg toggle links; and a pivot on said back member plate connecting said long and said short actuator links to the back member plate, to operate said sets of front leg and rear leg toggle links and thereby effect movement of the front legs and rear legs conjointly with the back member into folded and extended positions.

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