July 1, 1941. W. BOARDMAN 2,247,799

FOLDING CHAIR

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Fig. 1.

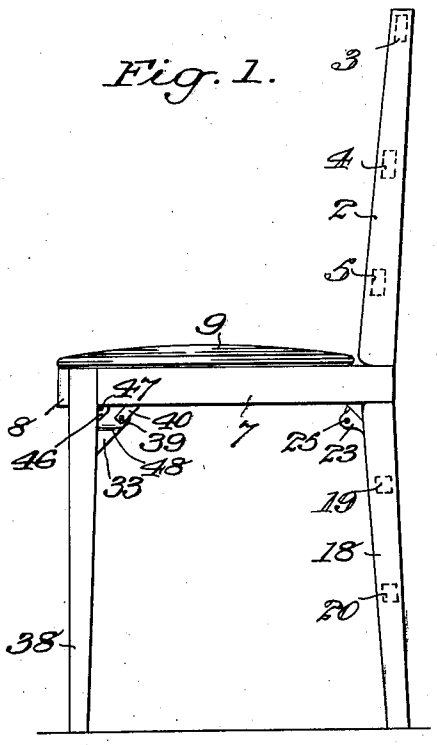


Fig. 2.

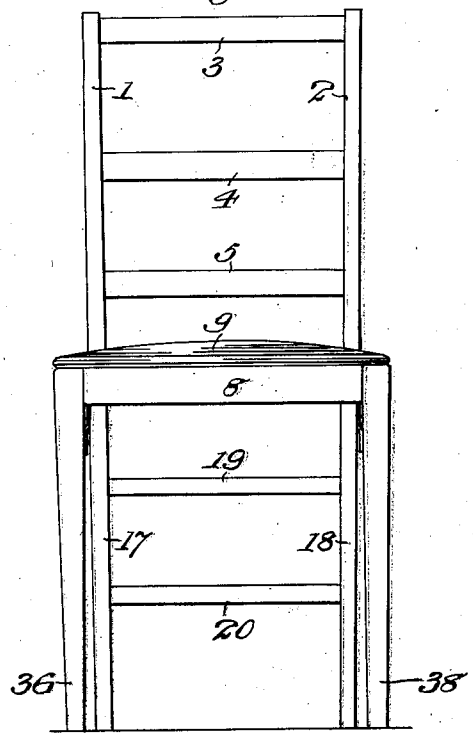


Fig. 3

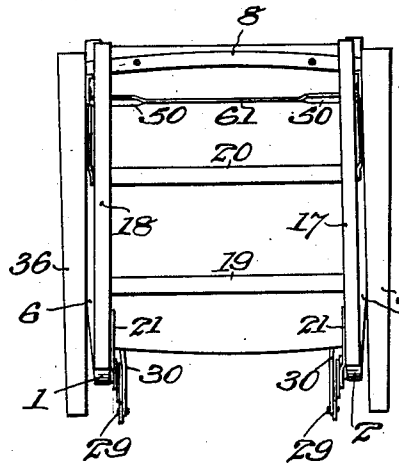


Fig. 4.

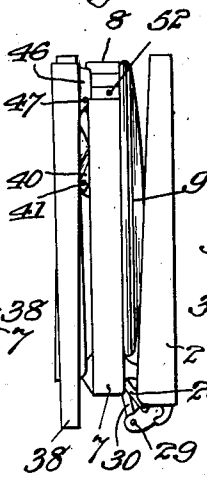
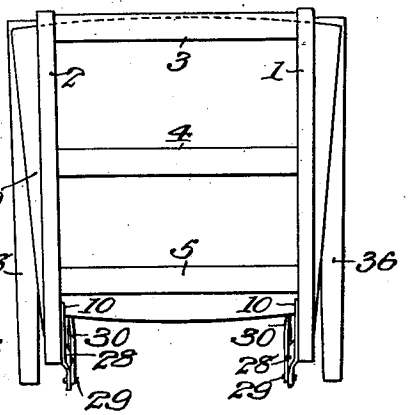


Fig. 5.



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Fig. 6.

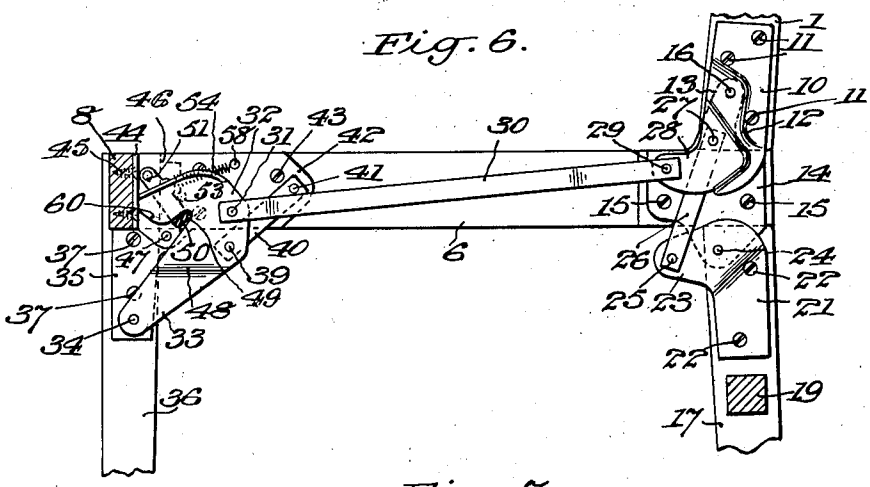


Fig. 7.

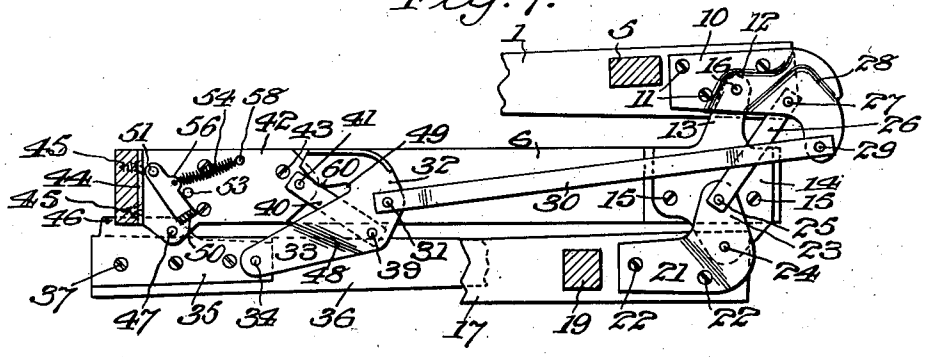
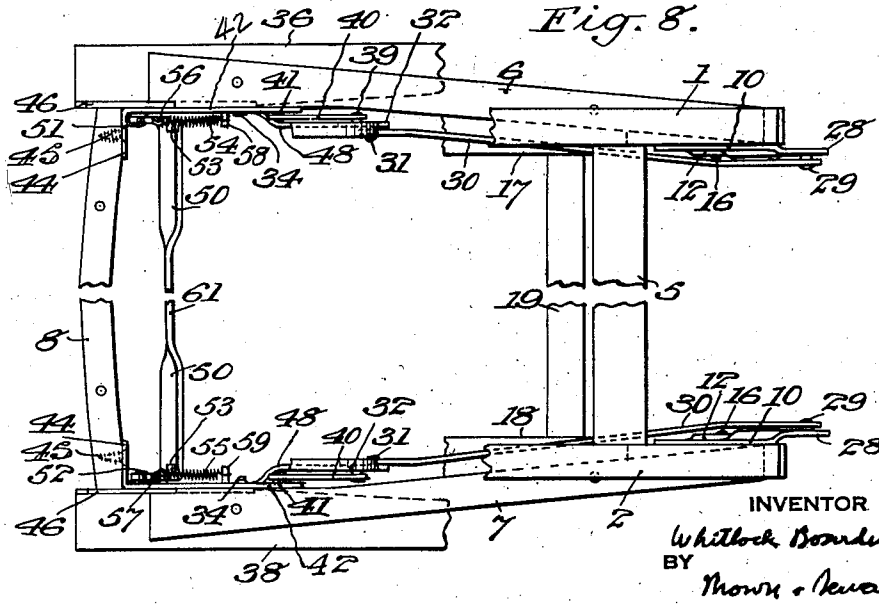


Fig. 8.



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2,247,799

FOLDING CHAIR

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Application August 31, 1939, Serial No. 292,859

7 Claims. (Cl. 155—148)

This invention relates to a folding chair of the type in which mechanism is provided for permitting the folding of the chair seat in substantial parallelism with the back rest and the opposite folding of the rear and front legs, substantially parallel with the seat; so that the area of the chair when folded is not greater than the area of the back rest or seat and the thickness is no greater than the thickness of the back rest, seat and legs combined.

An object of the invention is to provide improved mechanism for permitting the folding, unfolding and locking of the parts in unfolded position, with particular reference to an advanced type and arrangement of locking means.

Another object consists in providing such mechanism in which the locking of the parts in unfolded position is automatically accomplished with the result of extreme rigidity, together with simple manually operable means for releasing the locking mechanism.

Another object consists in providing means for manual releasing the locking mechanism, which means is so arranged as to tend to prevent accidental release by the occupant when handling the chair for the purpose of moving it in one direction or another.

A further object consists in providing folding and locking mechanism in which the several elements are sturdy and cooperate with a minimum of lost motion and with a maximum of precision.

Another object consists in providing such a chair in which the front legs extend to the top of the seat frame so as to enhance the appearance and improve the rigidity of the chair.

A further object consists in providing certain improvements in the form, construction and arrangement of the several parts, whereby the above named and other objects may effectively be attained.

A practical embodiment of the invention is represented in the accompanying drawings, in which

Fig. 1 represents a side elevation of my improved folding chair in its unfolded position ready for use;

Fig. 2 represents a front view of the same;

Figs. 3, 4 and 5 represent front, side and rear views, respectively, of the chair with the parts in folded position;

Fig. 6 represents an enlarged detail vertical section showing the locking mechanism with the parts in unfolded position, the chair seat being removed;

Fig. 7 represents a similar view of the parts in folded position, and

Fig. 8 represents a detail plan view of the parts in the position shown in Fig. 7.

The back rest of the chair consists of uprights 1, 2 and cross braces 3, 4, 5; and the seat includes side members 6, 7, a front member 8, and support and cushion which are indicated collectively by 9. Mechanism is provided for connecting and jointly operating the back rest, seat and legs and, as this mechanism is duplicated at each side of the chair, it will suffice to describe the same in connection with one side only.

To the lower inner surface of upright 1 is secured a plate 10, which is firmly fixed in position by any suitable means such as screws 11. An intermediate portion of plate 10 is offset, as indicated at 12, so as to provide space between the upright and said plate for the reception of a projecting extremity 13 on an angle plate 14 that is firmly secured to the inner rear surface of the seat side member 6 by screws 15. A pivot pin 16 traverses the offset portion 12 and the extremity 13 and enters the upright 1 to establish a pivotal connection between the back rest and seat and permit relative folding and unfolding thereof.

The rear legs of the chair are denoted by 17, 18 and are connected by the usual cross frames 19, 20. An L plate 21 is fastened to the upper inner surface of rear leg 17 by screws 22, and an intermediate portion of its projecting arm 23 is pivoted, as indicated at 24, to a boss on angle plate 14 that projects below seat side member 6; whereby the said rear leg is pivoted to the seat for swinging or folding movement with respect thereto.

The extremity of arm 23 is connected by a pivot pin 25 with an end of a link 26 that has its other end pivoted, as indicated at 27, to a portion 28 of plate 10 that is offset to a greater extent than the intermediate offset portion 12 of said plate; whereby a connection is made between rear leg 17 and back rest upright 1 so that the movement of either the rear leg or the back rest imparts movement to the other.

To the extremity of offset portion 28 on plate 10 there is pivoted, as shown at 29, one end of an actuating strap 30, which strap is slightly bent, as illustrated in Fig. 8, so as to clear adjacent parts of the mechanism, and has its other end pivoted at 31 in the projecting nose of a locking plate 32 which has a forwardly extending arm 33 that is pivoted at 34 to a hinge plate 35 which is set into the upper inner surface of front leg 36 and fastened therein by screws 37. The other

front leg is denoted by 38, and is formed, connected and operated like front leg 36, so that it will only be necessary to give a detailed description touching the latter.

The locking plate 32 has its intermediate portion pivoted at 39 to one end of a link 40, the other end of which is pivotally secured, as shown at 41, to a face plate 42 which is fastened by screws 43 to the inner front surface of seat side member 6. The said face plate 42 has its front end 44 bent at right angles to its body portion and fixed to the adjacent inner surface of seat front member 8 by screws 45, in order to establish a firm connection between the said side and front members of the seat.

Hinge plate 35 on front leg 36 has a rearward projection 46 that is spaced from the top of the leg and pivotally connected at 47 to a depending boss of face plate 42, so as to hinge the said front leg to the seat and permit the leg to be folded into substantial parallelism with the seat side member, or to be folded into normal relationship thereto with the upper end of the front leg occupying the angular space between the seat side member 6 and front member 8, and the top of the leg in the plane of the top of the said seat side member and front member.

The forward edge of locking plate 32 has an inwardly offset portion 48 which is provided with an elongated slot 49 that is fitted for locking engagement with a locking and releasing bar 50 which has its ends bent and pivoted at 51 and 52 to face plates 42. Retractile coil springs 54, 55 are connected to the bent end portions of the locking and releasing bar, as indicated at 56, 57, and to pins 58, 59 set in face plates 42; the effect of the springs being normally to urge the locking and releasing bar in an upward and rearward direction about its pivots 51, 52, the movement of the bar in this direction being limited by stop pins 53, 53.

The edge of the offset portion 48 adjacent slot 49 is curved into cam shape, as indicated at 60; and the relationship of the parts just described is such that, when the chair is unfolded into usable position, the said cam edge 60 will contact locking and releasing bar 50 and move it against the tension of its springs 54, 55 until the slot and bar coincide, at which moment the tension of the springs will draw the bar into the slot and lock the chair in unfolded position. When it is desired to fold the chair, it is merely necessary manually to swing the locking and releasing bar 50 against the tension of its springs 54, 55 until the bar clears the slot 49, whereupon the chair may be folded by swinging the back rest forwardly or the front legs rearwardly or the rear legs forwardly. As previously indicated, there are two slots for engagement with the bar, one at each side of the chair seat, and the fact that the bar is flat in cross section and the slots are elongated lends the construction to a firm and secure locking effect. For convenience in manipulation, the locking and releasing bar 50 is twisted intermediate its ends so that the central portion 61 offers a flat side to the fingers when the bar is manipulated to release the lock.

The chair is most conveniently operated, when it is desired to fold the same, by seizing the front of the seat with one hand and the top of the back rest with the other hand. The fingers of the first hand then move the bar 50 so as to release the lock, and the front of the seat and top of the back rest are moved toward each other simultaneously. Through the connections above described this brings about a very compact structure of the nature set forth at the outset of this description; and it may be added that the rear legs are preferably spaced close enough together so that they will lie within the front legs when the chair is completely folded. To unfold the chair into useful position, the operator may seize the front of the seat and top of the back rest and move them apart until the springs 54, 55 automatically slide the bar 50 into the slot 49 and its mate. Indeed, it is not necessary, in this operation, to take hold of the front of the seat at all, as it suffices to lift the folded chair by the top of the back rest and, with a downward snap, bring it to unfolded and locked position.

When the chair is in unfolded position, the relationship of the locking and releasing bar 50 and slot 49, with its mate, is such that, if the occupant of the chair should reach with one or both hands underneath the front of the seat for the purpose of pulling the chair forwardly to bring it closer to a table, or for any other purpose, there is little or no likelihood of inadvertent releasing of the lock through the manual grasp of the occupant. To effect such a release requires a deliberate downward as well as forward pull on the bar 50 because it is flat in cross section and the slots with which it coacts incline forwardly and downwardly when the chair is unfolded. The fact just stated, when considered in connection wtih the further fact that it is necessary to swing the back rest forwardly toward the seat in order to fold the chair, practically insures against unintentional collapsing or folding with its possibility of injury to the occupant.

The point at which the strap 30, and its mate, are pivoted to the locking plate 32, and its mate; as well as the separate points at which the said strap and link 26, and their mates, are pivoted to the plate 10, and its mate, insure smoothness and ease in folding and unfolding movement, supplemented by pronounced rigidity when the chair is in use. There is no opportunity for any of the parts to get set on dead center and hamper folding movement; nor is there any substantial tendency to lost motion either inherent in the structure or arising from reasonable wear.

The provision whereby the front legs are pivoted so as to, when unfolded, lie in the angular space between the side members and front member of the seat and extend to the top of the seat, also tends to rigidity and imparts a fine and sturdy appearance to the structure. The plates and various other elements of the actuating mechanism may be made in any well known or approved manner, but I prefer to stamp or cut them from metal, which is a facile and economical procedure.

It will be understood that various changes may be resorted to in the form, construction, and arrangement of the several parts without departing from the spirit and scope of this invention, and hence I do not intend to be limited to the details herein shown and described, except as they may be included in the claims.

What I claim is:

1. A folding chair comprising, a back rest, a seat pivoted thereto, rear legs pivoted to the seat for folding forwardly, front legs pivoted to the seat for folding rearwardly, and mechanism permitting the back rest, seat, and legs to be folded into substantial parallelism and for locking said parts in unfolded usable position, said mechanism including plates fixed to the seat having projections pivoted to the back rest, plates on

the rear legs having projections pivoted to the plates on the seat, plates fixed to the front legs having projections pivoted to the seat, additional plates pivoted at one end to the front legs, at an intermediate point to links connected with the seat and having rearwardly projecting noses, plates on the back rest linked to the plates on the rear legs and each connected by a single link to the rearwardly projecting noses of said additional plates on the front legs, and a locking element carried by the seat for engaging said additional plates when the chair is unfolded.

2. A folding chair comprising, a back rest, a seat pivoted thereto, rear legs pivoted to the seat for folding forwardly, front legs pivoted to the seat for folding rearwardly, and mechanism permitting the back rest, seat, and legs to be folded into substantial parallelism and for locking said parts in unfolded usable position, said mechanism including connections between the back rest, rear legs, seat and front legs for swinging the rear legs forwardly and front legs rearwardly when the back rest is swung forwardly, and complementary locking elements consisting of a bar elongated in cross section mounted to swing on the seat and elements pivoted to the front legs and provided with slots for engagement with said bar.

3. A folding chair comprising, a back rest, a seat pivoted thereto, rear legs pivoted to the seat for folding forwardly, front legs pivoted to the seat for folding rearwardly, and mechanism permitting the back rest, seat, and legs to be folded into substantial parallelism and for locking said parts in unfolded usable position, said mechanism including connections between the back rest, rear legs, seat and front legs for swinging the rear legs forwardly and front legs rearwardly when the back rest is swung forwardly, and complementary locking elements consisting of a bar elongated in cross section mounted to swing on the seat and elements pivoted to the front legs and provided with slots for engagement with said bar, and means automatically urging said bar to enter said slots while permitting manual withdrawal of the bar therefrom.

4. A folding chair comprising, a back rest, a seat pivoted thereto, rear legs pivoted to the seat for folding forwardly, front legs pivoted to the seat for folding rearwardly, and mechanism permitting the back rest, seat, and legs to be folded into substantial parallelism and for locking said parts in unfolded usable position, said mechanism including plates fixed to the seat having projections pivoted to the back rest, plates on the rear legs having projections pivoted to the plates on the seat, plates fixed to the front legs having projections pivoted to the seat, additional plates pivoted on the front legs and linked to the seat, plates on the back rest linked to the plates on the rear legs and each connected by a single link to the additional plates on the front legs, locking elements on said additional plates, complementary locking elements carried by the chair seat, and means for automatically engaging and manually disengaging said locking elements.

5. A folding chair comprising, a back rest, a seat pivoted thereto, rear legs pivoted to the seat for folding forwardly, front legs pivoted to the seat for folding rearwardly, and mechanism permitting the back rest, seat, and legs to be folded into substantial parallelism and for locking said parts in unfolded usable position, said mechanism including plates fixed to the seat having projections pivoted to the back rest, plates on the rear legs having projections pivoted to the plates on the seat, plates fixed to the front legs having projections pivoted to the seat, additional plates pivoted on the front legs and linked to the seat, plates on the back rest linked to the plates on the rear legs and each connected by a single link to the additional plates on the front legs, locking elements on said additional plates, complementary locking elements carried by the chair seat, and means for automatically engaging and manually disengaging said locking elements, one of said locking elements being elongated in cross section and the other having a slot, said slot opening in a forward and downward direction when the chair is unfolded so as to require a forward and downward manual movement of its complementary locking element for releasing the lock.

6. A folding chair comprising, a back rest, a seat pivoted thereto, rear legs pivoted to the seat for folding forwardly, front legs pivoted to the seat for folding rearwardly, and mechanism permitting the back rest, seat, and legs to be folded into substantial parallelism and for locking said parts in unfolded usable position, said mechanism including plates on the seat having projections pivoted to the back rest, plates on the rear legs having projections pivoted to the plates on the seat, plates fixed to the front legs having projections pivoted to the seat, additional plates on the front legs linked to the seat, plates on the back rest linked to the plates on the rear legs and to the additional plates on the front legs, slots formed in the front edges of said additional plates, a bar pivotally mounted on the seat, and automatic means for swinging said bar around its pivotal mounting to cause it to enter said slots to lock the chair in unfolded usable position, said automatic means permitting manual movement of said bar in the reverse direction to disengage it from the slots and release the lock.

7. A folding chair comprising, a back rest, a seat pivoted thereto, rear legs pivoted to the seat for folding forwardly, front legs pivoted to the seat for folding rearwardly, and mechanism permitting the back rest, seat, and legs to be folded into substantial parallelism and for locking said parts in unfolded usable position, said mechanism including plates on the seat having projections pivoted to the back rest, plates on the rear legs having projections pivoted to the plates on the seat, plates fixed to the front legs having projections pivoted to the seat, additional plates on the front legs linked to the seat, plates on the back rest linked to the plates on the rear legs and to the additional plates on the front legs, slots formed in the front edges of said additional plates, a bar elongated in cross section pivotally mounted on the seat, and automatic means for swinging said bar around its pivotal mounting to cause it to enter said slots to lock the chair in unfolded usable position, said slots opening in a forward and downward direction when the chair is unfolded whereby forward and downward manual pressure upon the locking bar will disengage it from the slots and release the lock.

WHITLOCK BOARDMAN.