Feb. 11, 1964 A. G. VAN SYOC, SR 3,120,976

FOLDING FURNITURE ARTICLE

Filed March 19, 1962 3 Sheets-Sheet 1

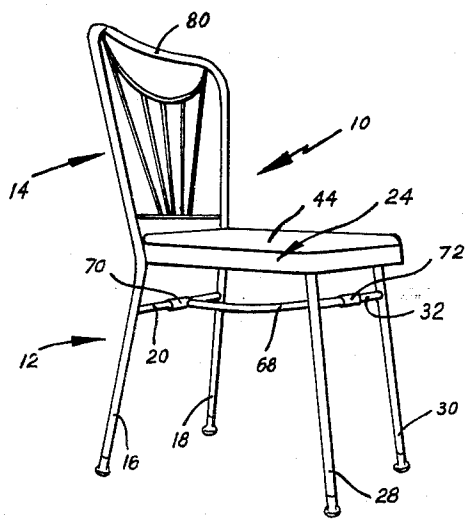


FIG. 1.

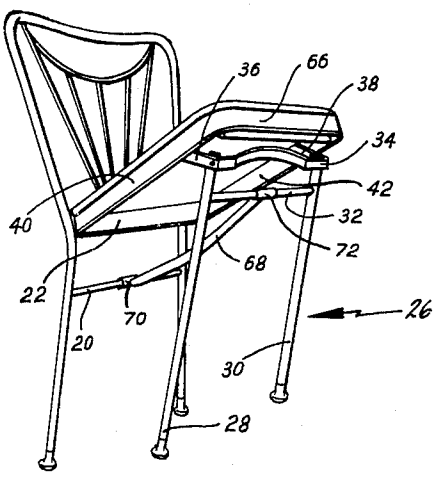


FIG. 2.

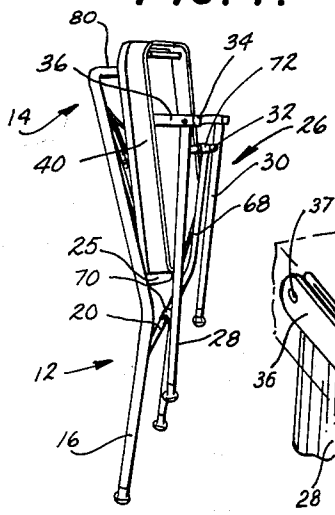


FIG. 3.

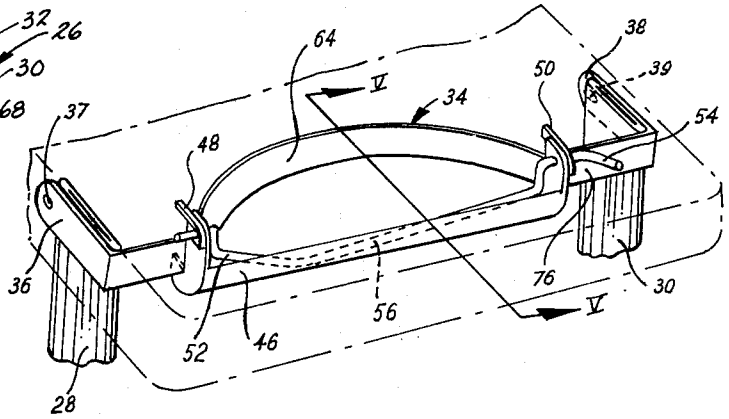


FIG. 4.

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FOLDING FURNITURE ARTICLE

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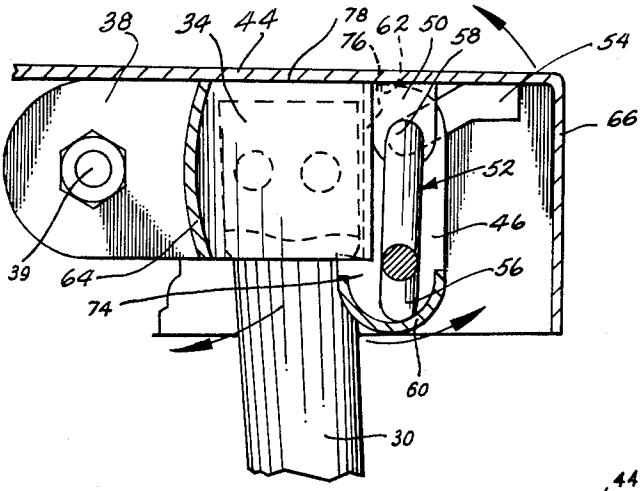


FIG. 5.

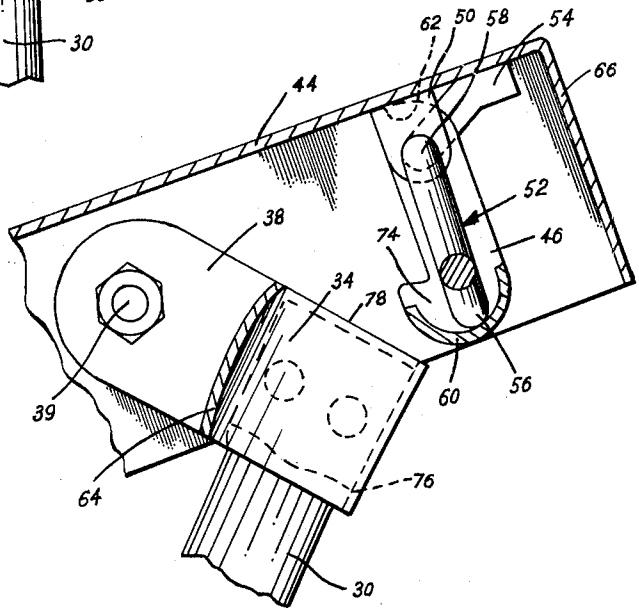


FIG. 6.

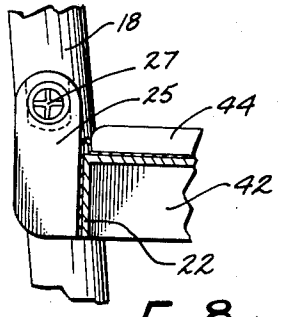


FIG. 8

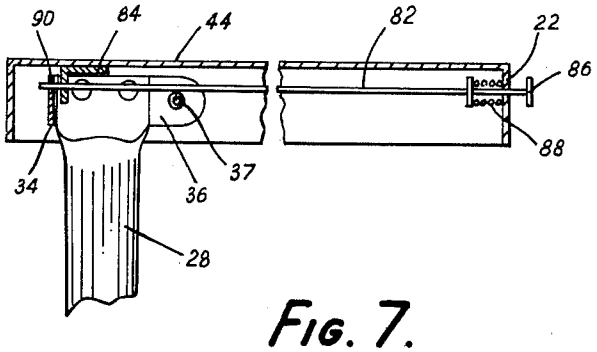


FIG. 7.

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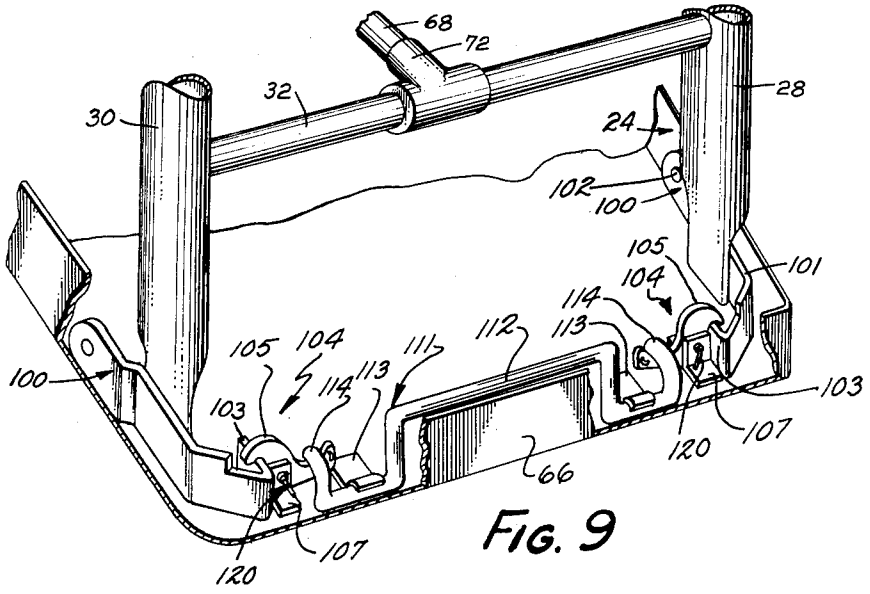


FIG. 9

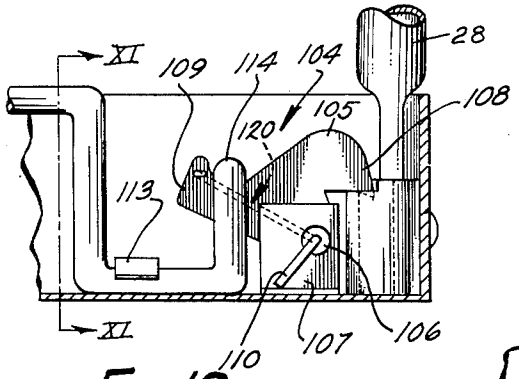


FIG. 10

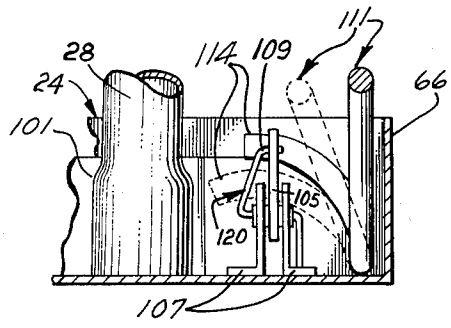


FIG. 12

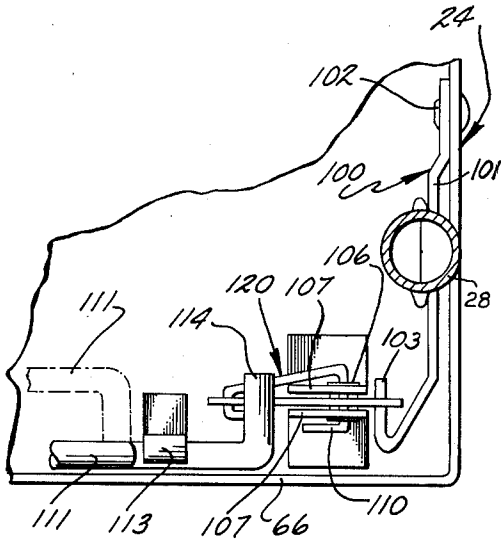


FIG. 11

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United States Patent Office 3,120,976 Patented Feb. 11, 1964

3,120,976

FOLDING FURNITURE ARTICLE

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Filed Mar. 19, 1962, Ser. No. 180,497
1 Claim. (Cl. 297—60)

This invention relates to folding chairs.

In the manufacture of folding chairs such as are used in large numbers in both public places and homes, the basic problems to be solved by any chair design are sturdiness, aesthetic appeal, ease of folding, and low manufacturing cost. In other words, a folding chair should be as strong and rigid as an ordinary chair, should look like an ordinary chair, should be capable of being folded with a single movement of one hand if possible, and should cost no more than the rigid chair of similar quality.

The present invention provides a solution to these manufacturing problems which comes nearer to meeting these ideal conditions than any other structures heretofore known. The device of this invention achieves its result by providing a front leg frame which is preferably rigidly braced at two well-spaced points on each leg, and which is hinged to the seat at points substantially spaced from the points where the front edge of the seat rests on the front legs in the erected position of the chair. In this manner, the entire weight of the person sitting in the chair rests directly on the legs and on the braced portion of the front leg frame without unduly stressing the pivot points of the front leg frame. As a result, the inventive chair is not only as sturdy as a rigid chair, but is also less subject to the distrurbing squeaking which often originates at the pivot points when a person sitting in the chair shifts his position.

The attractive appearance of the chair and its easy foldability is achieved by arranging the latch mechanism for holding the chair in erected position inside the seat frame immediately underneath the front edge of the seat, and by tying the crossbrace of the front leg frame to that of the rear leg frame in such a manner as to produce a pantograph-like structure which keeps the leg frames in a generally parallel relationship as the chair is folded and thus automatically folds the chair as the seat is swung upwardly about its rear hinges. From an aesthetic point of view, the only element whose presence would not normally be expected in a rigid chair is the center link, and due to its position in the center of the chair in relatively close proximity to the underside of the seat, it is substantially hidden from view.

It is therefore the object of this invention to provide an attractive, sturdy, easily foldable, and inexpensive folding chair.

It is another object of the invention to provide a folding chair in which the folding mechanism is automatically locked upon erection of the chair but can be readily released by substantially the natural hand movement a person would be apt to use when picking up the chair.

These and other objects of this invention will readily become apparent from a perusal of the following specification, taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of the chair of this invention in the erected position;

FIG. 2 is a perspective view of the chair in a partly folded position;

FIG. 3 is a perspective view of the chair in a fully folded position;

FIG. 4 is a perspective view of a preferred embodiment of the latching mechanism;

FIG. 5 is a vertical section along line V—V of FIG. 4 showing the latching mechanism in the latched position;

FIG. 6 is a view similar to FIG. 5 but showing the latching mechanism in the unlatched position;

FIG. 7 is a vertical section of a portion of the chair showing an alternative embodiment of the latching mechanism; and

FIG. 8 is a fragmentary vertical section showing the attachment of the seat to the rear frame.

FIG. 9 is a fragmentary, oblique view of the front portion of the bottom face of a chair equipped with a modified latch;

FIG. 10 is a fragmentary, sectional elevation view of an inverted chair seat taken along the plane X—X of FIG. 11;

FIG. 11 is a fragmentary view of one side of the latch structure shown in FIG. 9, viewed upwardly from beneath the chair seat; and

FIG. 12 is a fragmentary elevation view taken along the plane XII—XII of FIG. 10.

Basically, the chair of this invention achieves unusual sturdiness for a folding chair by providing independent cross-braced frames for the front and rear legs and hinging the front leg frame to the seat in such a manner that when the chair is erected, the weight of the occupant does not rest on the hinges, but entirely on the braced portions of the leg frame. Twisting motion of one leg frame with respect to the other is prevented by providing double anti-twisting support by both the seat frame and the center link which automatically folds the leg frames against one another when the latch is released and the seat is pulled up. In the preferred embodiment of the invention, the latch release is so mounted underneath the front edge of the seat that a person exerting a firm grip on the front edge of the seat and on the back rest (a natural gesture in picking the chair up from its side) would automatically release the latch and pull the chair into folded position.

Referring now to the drawings, the chair of this invention is generally shown at 10. The chair 10 has a rear leg frame 12 which may incorporate a back rest 14. The rear leg frame 12 consists of the rear legs 16, 18 and the crossbar 20. The rear member 22 (FIG. 2) of the seat frame 24 is pivotally attached to the rear legs 16, 18 by brackets such as 25 (FIG. 8) as points 27 above the level of the seat so as to swing the seat outwardly clear of the back rest 14 when the chair is folded. The front leg frame 26 consists of the front legs 28, 30, the crossbar 32 and the top brace 34 with its ears 36, 38 which are pivotally attached to the side members 40, 42, respectively, of the seat frame 24 rearwardly of the legs 28, 30. A seat 44 is rigidly mounted to the seat frame 24, and a latch bar 46 (FIG. 4) is pivotally suspended underneath the seat 44 from brackets 48, 50 by a torsional spring 52. The finger 54 of spring 52 engages the underside of seat 24 as best shown in FIGS. 5 and 6 and urges the central portion 56 of spring 52 in a clockwise direction (in FIGS. 5 and 6) about the pivot axis 58. The central portion 56 of spring 52 in turn engages the trough 60 of latch bar 46 so as to push the latch bar 46 clockwise about pivot 58 as far as the camming of surface 62 against the underside of seat 44 permits it to go.

The central portion 64 of top brace 34 is curved rearwardly as best shown in FIG. 4 to avoid interference with the fingers of a person embracing both the latch bar 46 and the front edge 66 of the seat frame 24 when picking up the chair. It will be noted that the latch bar 46 is located immediately adjacent the front member 66 of the seat frame, so that a person grasping the front edge of the seat would naturally also grasp the latch bar 46.

The crossbars 20 and 32 are connected by a center link 68 which is provided with tubular end portions 70, 72 which embrace the crossbars 20, 32 and are able to pivot about them. It will be readily seen that the ap-

preciable lateral extent of the tubular portions 70, 72 serves as a bracing means which effectively prevents twisting movement of the front leg frame with respect to the rear leg frame. It should be understood, of course, that if such anti-torsional bracing is not deemed necessary, the center link 68 may merely be hinged to the crossbars 20, 32, or it may even be rigidly affixed thereto, in which case the crossbars 20, 32 must be pivotally attached to the legs 6, 18, 28 and 30.

Operation

In the erected position of the chair, the parts have the relationship shown in FIGS. 1 and 5. In this condition, the spring 52 biases the hook portion 74 of latch bar 46 into engagement with the portion 76 of top brace 34. The weight of the person sitting on the seat 44 is entirely absorbed in this condition by the surface 78 of the top brace 34 and is transmitted directly to the leg 30 rather than to the pivot 39. When it is desired to fold the chair, the chair is gripped with one hand by the top member 80 of the back rest 14, and with the other hand by the front member 66 of the seat frame 24. By squeezing the latch bar 46 toward the front member 66, the hook portion 74 is withdrawn from engagement with portion 76 of top brace 34. If the front member 66 is now pulled upwardly, the center link 68 (FIGS. 1, 2 and 3) causes the front leg frame 26 to pivot about pivots 37, 39 until the chair assumes the folded position of FIG. 3. As best shown in FIG. 3, the bent shape of center link 68 allows it to clear the seat frame 24 when the rear member 22 of seat frame 24 swings forward about pivots 25 as the chair is folded. In order to re-erect the chair the above described motion is simply reversed except that squeezing of the latch bar 46 is not necessary because the pressure of the portion 76 against the trough 60 cams the latch bar 46 out of the way until the chair is fully erected and the hook portion 74 can snap into position underneath the portion 76.

Modification I

In those instances where it is desirable to control the latch mechanism from the rear of the chair rather than from the front, the latch bar 46 and spring 52 can simply be replaced, as shown in FIG. 7, by a locking rod 82 supported in a bracket 84 fixed to the seat 44 and in the rear member 22 of the seat frame 24. The rod 82 may be provided with an operating knob 86 and a spring 88 which urges the rod forwardly into engagement with an aperture 90 formed in the top brace 34.

Modification II

FIGS. 9 through 12 illustrate a further modification of the latching mechanism for this chair. In this construction, the legs (not illustrated) are secured to the offset center portion 101 of each of the brackets 100. The brackets, at their rearward end, are pivoted at 102 to the side members of the seat frame 24. The forward end of each bracket 100 is notched out on its lower face and turned back upon itself to form a keeper portion 103. The keeper portion of each bracket 100 cooperates with a latch assembly 104, one on each side of the chair.

Each latch assembly 104 has a latch plate 105 rockably mounted about the bushing 106. The bushing 106 is secured to a pair of supporting brackets 107, one on each side of the latch plate. Each of the latch plates 105 has a hook portion 108 at one end, and a concave leg portion 109 at the other end. These portions are arranged on opposite sides of the pivot 106. The hook portion 108 cooperates with the keeper 103 to secure the bracket 100 against pivotal motion when the bracket is nested against the bottom of the seat frame 24.

The latch plate 105 is biased into locked or bracket engaging position by a spring 120. One end of the spring passes through the outer end of the leg portion 109 and the other end 110 bears against either the horizontal portion of one of the mounting brackets 107 or against the bottom surface of the seat frame 24. The bushing 106 is tubular, permitting the spring to pass through it.

The latch assemblies 104 are arranged on opposite sides of the chair and are connected by a latch bar 111, the central portion of which is offset downwardly to provide a grip or handle 112 positioned approximately in line with the lower edge of the front member 66 of the seat frame 24. The latch bar 111 is pivotally secured to the seat frame 24 by the hinge clips 113. The outer ends 114 of the latch bar 111 are downwardly and inwardly curved, each seating over the concave portion of one of the legs 109 of a latch plate 105.

It will be seen that by pressing the handle portion 112 of the latch bar 111 inwardly (the position illustrated in phantom in FIG. 12), the fingers 114 will be caused to rotate upwardly and inwardly, depressing the ends of the latch plates 105 against the bias of the springs 120. This will withdraw the latch plates 105 from the brackets 100, freeing the brackets to move away from the seat frame 24 as the chair is folded. Upon release of the latch bar 111 it is automatically restored to its initial position by the upward bias of the leg end of the latch plates 105 provided by the springs 120.

The end result of the arrangement above-described, and illustrated in FIGS. 9 through 12, is the same as that of the latch structure illustrated in FIG. 4. However, the movement of the latch bar 111 is opposite to the movement of the latch bar 46. Thus, to release the latches illustrated in FIG. 4, the latch bar 46 is pulled forwardly whereas the latches 104 are released by pushing the latch bar 111 inwardly. While the arrangement of the latch bar 46 is particularly desirable for folding the chair since it is tripped by the same motion that initiates the folding movement of the seat, in some circumstances it may cause difficulty by releasing the chair seat from the legs when the chair is lifted by grasping the back and the front edge of the seat of the chair. This would be a circumstance where the chair is simply to be relocated rather than folded.

The arrangement illustrated in FIGS. 9 through 12 overcomes this difficulty because gripping the latch bar and the front edge of the chair in this manner, will not cause the latch to release. A positive inward movement of the latch bar 111 is necessary to release the latches. Thus, this arrangement divorces the movement necessary to release the latch from the natural gripping action which a person exerts on the chair to pick it up.

It will be seen that the present invention provides a simple, attractive, sturdy, and easily foldable folding chair. Obviously, many modifications of this invention are possible without departing from its spirit, and it is therefore to be understood that the invention is not to be limited by the illustrative embodiments shown, but only by the scope of the following claim.

I claim:

A folding chair comprising:

(*a*) a rigid rear leg frame including a pair of rear legs and a rigid rear crossbar extending therebetween;

(*b*) a seat hingedly attached to said rear leg frame;

(*c*) front leg supporting means pivotally attached to said seat

(*d*) at points substantially spaced from the front edge of said seat;

(*e*) said front leg supporting means including bracket means, a pair of front legs rigidly depending therefrom, and a front crossbar spaced from said bracket means and extending between said front legs,

(*f*) said bracket means including brackets being hinged to said seat at points spaced from the points of dependency of said front legs;

(*g*) a rigid center link so attached to each of said crossbars at to be capable of pivotal movement with respect to both said rear legs and said front legs;

(*h*) and resiliently biased releasable latch means for holding said front legs in their erected position,

(*i*) said latch means including a latch bar adjacent said front edge of said seat and parallel thereto, latch members engaging said brackets to hold them against said seat, said latch bar having a depending grip portion adjacent said front edges of said seat and a portion engaging said latch members,

(*j*) and resilient means acting between said seat and said latch members to bias them into their bracket-engaging position,

(*k*) said resilient mans biasing said grip portion of said latch member toward said front edge of said seat, said latch member being releasable when said grip portion is moved rearwardly away from said front edge.

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