June 1, 1954

K. J. ZOERCHER

2,679,895

FOLDING CHAIR

Filed Dec. 29, 1952

2 Sheets-Sheet 1

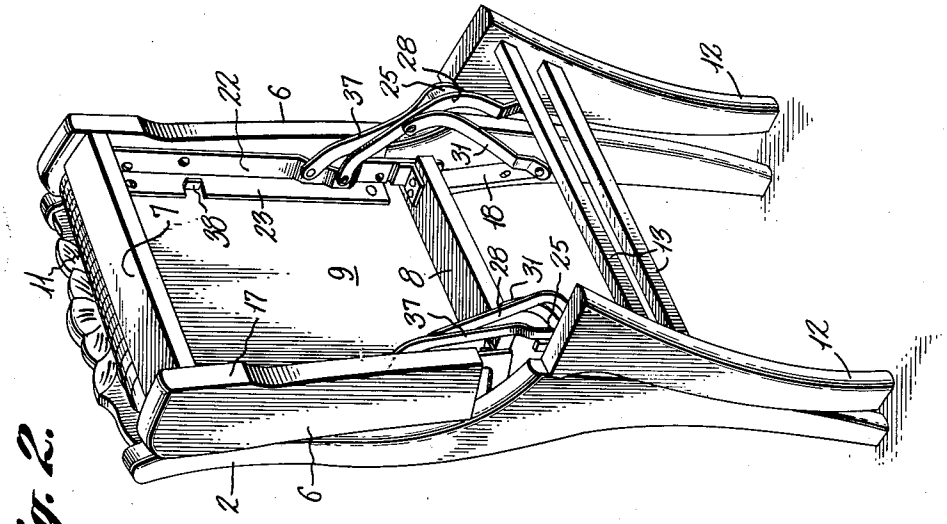

Fig. 2.

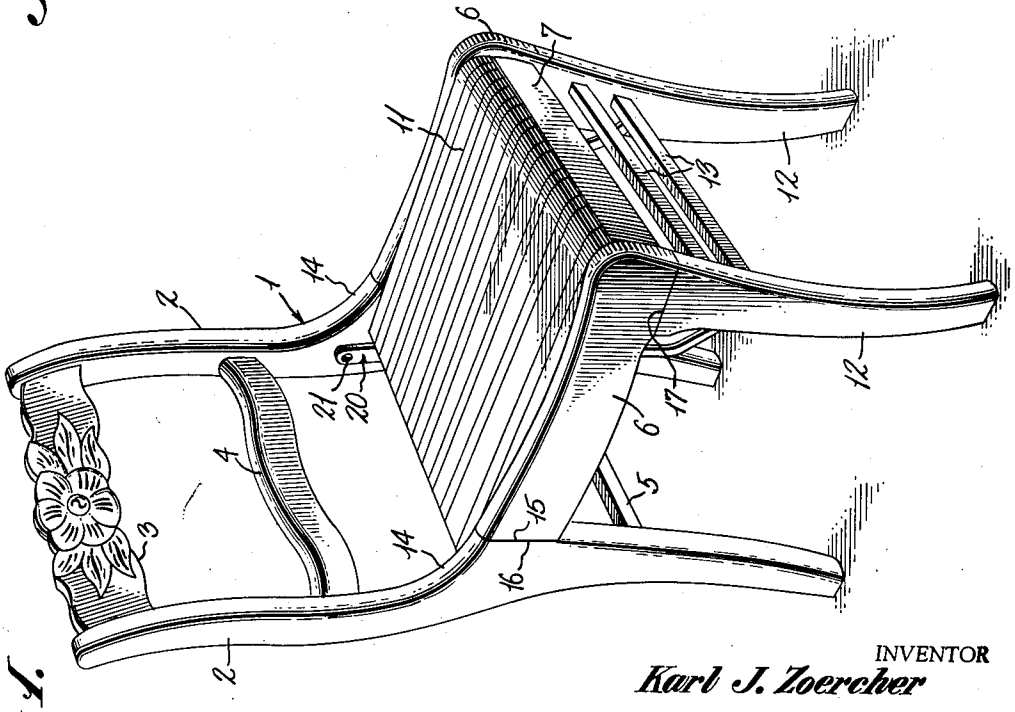

Fig. 1.

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Fig. 3.

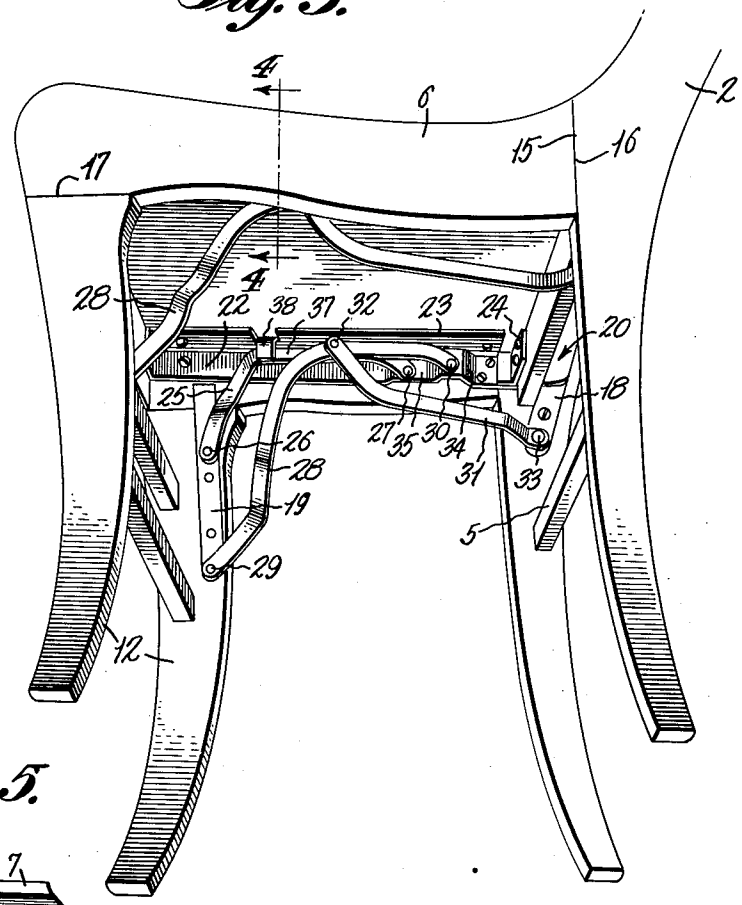


Fig. 5.

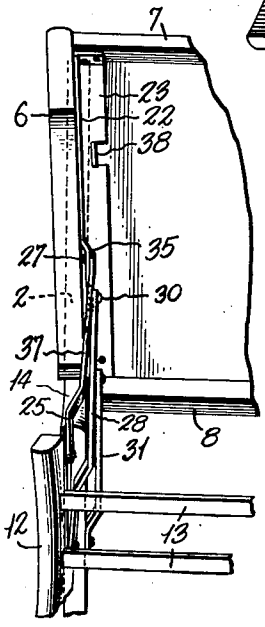
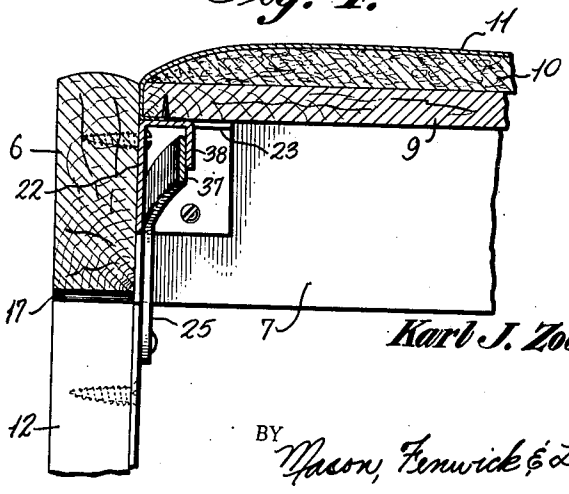


Fig. 4.



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Patented June 1, 1954

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UNITED STATES PATENT OFFICE

2,679,895

FOLDING CHAIR

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Application December 29, 1952, Serial No. 328,321

3 Claims. (Cl. 155—141)

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This invention relates to chairs, and particularly to folding chairs of the dining room or occasional types.

Although folding chairs have been known for many years, all that have been manufactured have been of a more or less standard style, and have been easily recognizable as being folding chairs. In all of these chairs the legs are all straight and parallel to one another, and the seat is perfectly square. This has been necessary to ensure all portions of each side of the chair to lie in the same plane to permit operation of standard linkage for folding. This has precluded more widespread use of these chairs. It has been recognized that there is a definite need for a folding chair which has the appearance of a permanent part of the room furniture when set up for use.

The object of the present invention is to provide a chair of period, or recognized, style which can be folded and stored away when not in use, the chair to have the appearance of permanent chairs of the same type when set up for use.

Another object is to provide a chair of this type which will have improved bracing qualities, so that it will be extremely rigid when set up for use.

A still further object of the invention is to provide improved means for holding the chair in erected position.

Yet another object is to utilize the particular features of the style of chair to obtain a more compact unit when the chair is folded.

Other objects will become apparent from the following description of one practical embodiment of the invention when taken in conjunction with the drawings which accompany and form a part of this specification.

In the drawings:

Fig. 1 is a perspective view of a chair constructed in accordance with the present invention, shown in position for use;

Fig. 2 is a perspective view of the chair folded for storage;

Fig. 3 is a perspective view looking underneath the seat of the chair to show the linkage for folding;

Fig. 4 is a section through one of the side rails and a portion of the seat to illustrate the holding means to maintain the parts of the chair in set-up position; and,

Fig. 5 is a partial elevational view of the chair in folded position showing the linkage for permitting folding as attached to one side of the chair.

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In general, the invention consists of a chair of a recognized style or type which can be folded when not in use. The chair may be of the so-called "period" type, or of a design made famous by a particular craftsman. Although the invention contemplates folding chairs of various types, it will be described in connection with a chair of "Duncan Phyfe" design. This is a distinctive style, easily recognizable due to the curved legs, low back and careful combining of straight lines with curves. The side rails of the seat are left uncovered and the seat proper is upholstered.

The particular chair illustrated has a back 1 which includes the side members 2, which are continuous to form the sides of the back and also the back legs of the chair. The side rails are held in spaced relation by means of the top and bottom rails 3 and 4 respectively, and the rung 5 which extends between the leg portions of the side members. It will be seen from Figs. 1 and 5 that the side rails of the back are positioned at an angle so that the rails converge toward the bottom. The seat comprises side rails 6, front rails 7 and back rail 8. Extending between the side rails and overlying the front and back rails is the seat proper, which includes the seat board 9 upon which is placed the usual padding 10 covered by suitable upholstery material 11. The side rails of the seat also converge, so that the seat is wider at the front than at the back. The front legs 12 support the front end of the seat, and these legs are held in spaced relation by means of rungs 13. As usual in the Duncan Phyfe design, the front legs curve forwardly and the rear legs curve rearwardly. Due to the fact that the seat flares toward the front, the front legs are spaced apart a greater distance then the rear legs.

The portions of the side members of the back which form the back proper are concavely curved in the region of their juncture with the side rails of the seat, as at 14, and reversely curved at their upper ends. The concave curvature, at 14, merges smoothly into the curvature of the side rails of the seat. The rear ends of the seat side rails 6 are cut off straight, as at 15, and the forward edges of the back side members 2 are provided with flat rests 16, which match the cross-section of the side rails, so that the ends 15 of the side rails may rest firmly and flush against the rests 16 of the back members, to form a relatively inconspicuous joint between the back members and the seat side rails when the chair is set up for use. The joint between these members is preferably along a vertical line. Although

the side rails of the seat are curved from end to end, the lower sides of these rails near their forward ends are flat, as at 17, for an extent equal to the width of the front legs at their tops. This will permit the same flush, inconspicuous joint between the seat and front legs as described in connection with the seat rails and the rear side members. The edges of the back side members 2, the seat side members 6 and the front legs 12 are all fashioned to curvatures which when the members are juxtaposed as shown in Fig. 1, will provide smooth, uninterrupted curves which continue across the various lines of juncture between the respective members.

The back, the seat and the front legs form three separate assembleis which are connected together by means of linkage to permit folding of the chair, as will be described. Two matching linkages are used, one on each side of the chair, and as these linkages are identical only one will be described.

The various parts of the linkage are interconnected and the entire assembly may be mounted upon the chair as a pre-assembled unit. The mounting means includes a rear anchor plate 18 and a front anchor plate 19. The rear anchor plate is fastened to the inside face of the back side member 2 by means of screws, and the side member 2 is preferably recessed to receive the anchor plate so it may be flush with the surface of the side member. The front anchor plate is similarly secured to the front leg 12 of the chair. At the upper end of the rear anchor plate 18 a hinge bracket 20 is pivoted, as at 21. The hinge bracket for the major portion of its length is of angle construction, providing a side flange 22 which is vertically disposed and a horizontally disposed top flange 23. These flanges are secured respectively to the side rail 6 of the seat and the seat board 9. They may be fastened by screws or other appropriate means. As the side rails of the seat converge toward the rear, the hinge brackets will also converge. The side flange 22 is extended at the rear and curved upwardly, and has its upper end pivotally connected to the anchor plate 18 at 21, as described. The side rails of the back will converge transversely as well as vertically, so that their surfaces will form smooth continuations of the side rails of the seat. This will permit the extension at the rear of the side flange 22 to lie in the same plane as the balance of the flange. By this arrangement the seat is pivotally connected to the back and may be freely swung around the pivot 21. At its forward end, the side flange 22 of the bracket is turned at right angles to lie against the inner side of the front rail 7 of the seat and is secured thereto. An auxiliary angle bracket 24 may be welded to the side flange 22 near the rear edge of the seat, with one flange extending at right angles to the plane of the side flange to lie against the inner face of the rear rail 8 of the seat and be secured thereto. Thus, the hinge bracket 20 serves not only as a hinge member, but also to rigidly connect the side, front and back rails of the seat and to hold the seat proper in position upon these rails. In order to permit proper operation of the linkage, which will be described, it is necessary for the ends of the rear rail of the seat to be spaced from the side rails to permit free movement of the linkage during the folding operation. If it were not for the bracket 24 the rear rail of the seat would be quite weak.

The top of the front anchor plate 19 is connected to the hinge bracket by means of a link 25, which is pivotally connected to the respective anchor plate and hinge bracket at 26 and 27. The lower portion of the anchor plate 18 is also connected to the hinge bracket by means of a link 28. The respective pivotal connections of this link are shown at 29 and 30. A third link 31 has one end pivotally connected to the link 28 intermediate the ends of this latter link, as at 32, and has its opposite end pivotally connected at 33 on the rear anchor plate 18.

Due to the fact that the seat of the chair tapers from front to back and the back tapers from top to bottom, all of the pivotal connections of the linkage will be in different vertical planes. By reason of this, the end of each link will have an arcuate movement in a vertical plane which is different from the plane of movement of the opposite end of the link and from the ends of the other links. Special provision must be made to permit this action and to allow the links to pass one another in folding and unfolding. This can be done if the major portions of the links are substantially parallel to one another and to the links on the assembly on the opposite side of the chair. The action of the links will be somewhat more free if they diverge slightly so as to increase the space between them and prevent frictional contact as the links pass one another. As the link 31 has its pivot 32 closest to the longitudinal center line of the chair seat, the vertical plane of that link at its pivot 32 may be chosen as the vertical plane for the major portion of that link. At its rear end, the link is turned outward to bring that end adjacent to the plane of the lower end of the rear leg bracket. Link 28 is the center link of the group. It is positioned in a plane substantially parallel to, and outward of, the link 31. It is shown in Fig. 4 as diverging rearwardly slightly from the link 31. The forward end of link 28 is bent outward sharply to bring it to the plane of its pivot 29 with the lower end of the front bracket 19 on the front leg. The side flange 22 of the hinge bracket is pressed out in the region of its pivotal connection with link 28 so that it will be flush with the side of the link at its rear end. It will be noted that the offset 34 has its face parallel to the major portion of link 28 so that the pivotal connection with the link will form a smoothly operating joint. The third link 25 lies substantially parallel to link 28, but it diverges forwardly slightly from link 28. Its forward end is bent sharply outward to bring it to the plane of its pivot with the top of bracket 19. The rear end of this link is connected to the hinge bracket flange 22, and the flange is pressed out at this point as at 35. The pad 35 is adjacent the face of link 25 and, therefore, not as far out of the plane of flange 22 as the pad 34. This will place the ends of links 25 and 28 in different vertical planes. Thus all of the links will have their ends connected to the respective portions of the chair while the major portions of each link lies in a separate vertical plane. All of the foregoing description relates to the links when viewed from above or below.

When viewed from the side, each link is arcuate. Each has a rather sharp bend at a point between its ends and angularly related arms extending therefrom. This is for two purposes, it enables the links to pass around the rear rails of the seat when the chair is folded and it causes the links to follow the general configuration of

the parts of the chair when the chair is erected so that the linkage will be inconspicuous.

One arm **37** of link **25** lies closely adjacent the horizontal flange **23** of the hinge bracket when the chair is set up for use. A portion of the horizontal flange is struck out and turned downwardly, to form a latching tongue **38** to frictionally engage the side of the link **25** when the chair is set up for use and hold it in position to prevent accidental movement of the various parts of the linkage. The frictional contact of the tongue with the link is sufficiently great to securely hold the entire chair in erected position.

When the chair is to be folded, the front end of the seat is lifted and the seat will swing about its pivotal connection with the back of the chair until it assumes a substantially vertical position against the back. The arrangement of the linkage is such that the front legs will be drawn rearwardly until they are against the back legs. The location of the pivot **21** between the rear anchor plate and the hinge bracket is very important in this particular arrangement. The pivotal point is positioned to the rear of the end of the seat side rails and above the top of the joint line between the back and the seat. This will enable the rear edges of the side rails to move away from their rests against the back and clear the upper corners of these rests, and the entire seat to move into the concave curvature **14** of the back to provide an extremely compact unit when folded. In other words, the curved back, which adds greatly to the appearance of the chair, is utilized as a pocket to receive the seat when folded. By providing this function for the curved back, a seat having deep side rails may be used to carry out the proportions of the particular style of chair and yet the folded chair may be stored in a space but slightly larger than that needed for the back of the chair alone. By providing the concave back and the flat rest areas **16** on the side members of the back, together with the particular positioning of the pivot **21** as shown, the seat will move into position with the side rails in tight abutment with the seats of the side members of the back when the chair is erected, so that all appearance of a folding chair is overcome. The forward portions of the side rails of the seat will fit snugly upon the upper ends of the legs, and all joints will have the appearance of permanent ones.

The arrangement of the linkage, as described, will permit free movement of the parts even though the pivotal points are in different vertical plane, due to the particular styling of the chair.

While in the above only one practical embodiment of the invention has been disclosed, it will be apparent to those skilled in the art that various changes from the precise structure described and illustrated may be made without departing from the spirit of the invention, as set out in the appended claims.

I claim:

1. In a chair of period styling, back, seat and front leg assemblies, said back assembly having side members held in spaced relation by cross rails, said side members each being provided with a rest midway between its ends and on the front edge of the side member, the rests having substantially vertically disposed faces, said seat assembly having spaced side rails disposed in the planes of the side members of the back assembly and having their rear faces matching the rests on the said side members and adapted to be brought into abutment therewith, said seat assembly side rails having flat lower edge portions near their front ends, said lower edge portions being substantially horizontal, said front leg assembly having a pair of spaced legs held apart by rungs, said legs being in the vertical planes of the seat assembly side rails and having their tops matching the flat lower edge portions of the side rails which rest thereupon, hinge brackets secured to said seat assembly and pivotally connected to said back assembly, and linkage means interconnecting said back, seat and front leg assemblies to permit folding of the chair and to move said back, seat and front leg assemblies as the chair is set up for use to position the side members, side rails and front legs of the respective sides of the chair in common vertical planes.

2. In a chair as claimed in claim 1, said back side members converging toward one another from top to bottom, said seat side rails diverging from one another from back to front, and said linkage comprising a plurality of interconnected links, said links being substantially parallel to one another for the major portions of their lengths and having their ends offset to the vertical plane of the chair part to which they are attached, said hinge bracket being offset at the points of connection with said links to bring those portions of said bracket into the planes of the major portions of the links attached to said bracket.

3. In a folding chair having a back, seat and front leg sections and the seat section comprising side, front and rear rails and a seat board, a linkage assembly attached to the back, seat and front leg sections, said assembly including a hinge bracket of angle cross-section for the major portion of its length to provide vertical and horizontal flanges, said horizontal flange being secured to said seat board and said vertical flange being secured to the side rail, an extension projecting rearwardly from said vertical bracket and pivotally connected to said back section, said linkage assembly including a plurality of links connected to the respective back and front leg sections and the hinge bracket, and a tongue struck out from said horizontal flange and bent downwardly adjacent the path of movement of one of said links to frictionally engage said link and hold it when the chair is set up for use.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
428,032	Albert	May 13, 1890
1,869,365	Corduan	Aug. 2, 1932
1,904,891	Tinsley	Apr. 18, 1933
2,098,711	Rastetter	Nov. 9, 1937
2,110,519	Croft	Mar. 8, 1938
2,382,300	Dick	Aug. 14, 1945
2,633,183	Norquist	Mar. 31, 1953