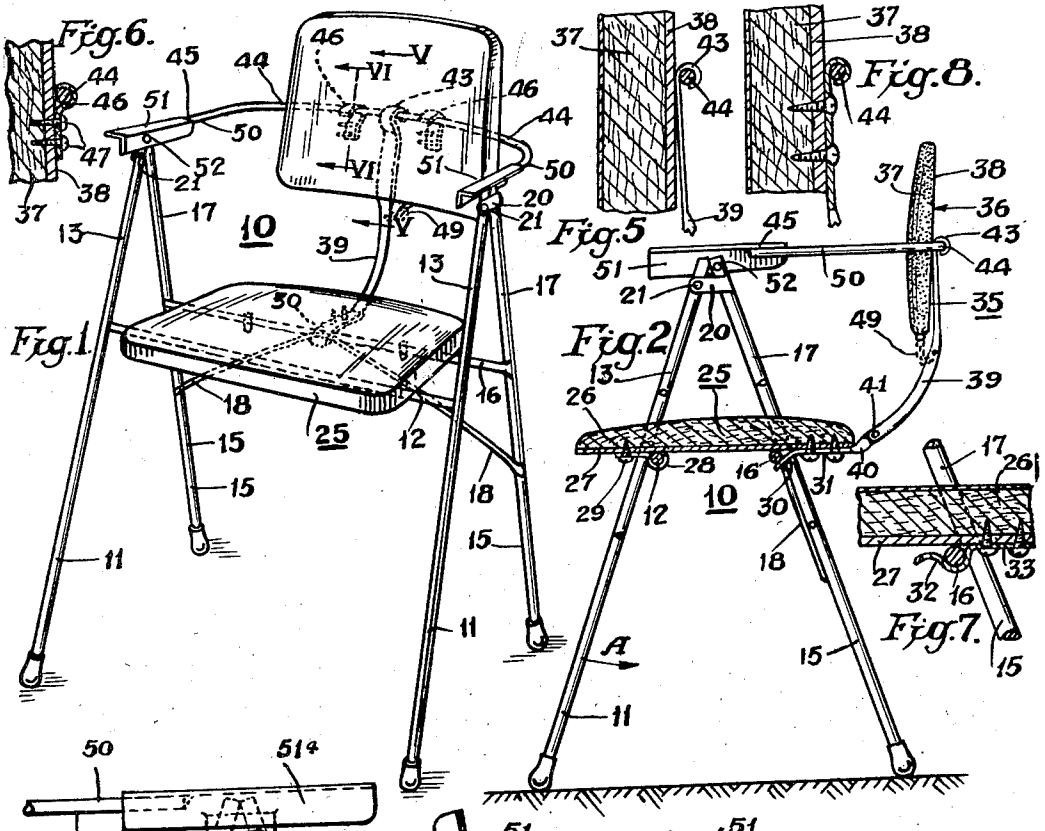
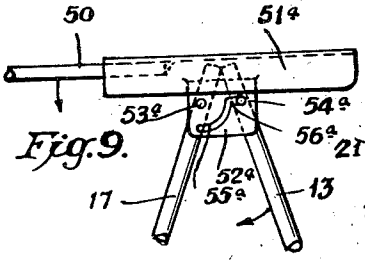
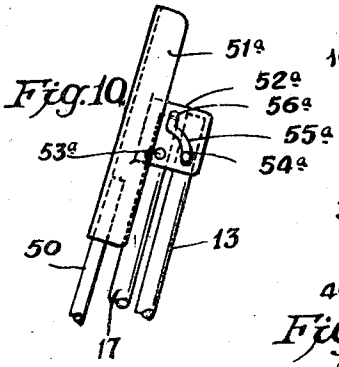
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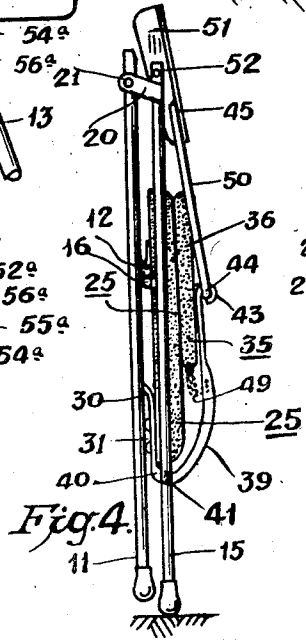
COLLAPSIBLE CHAIR

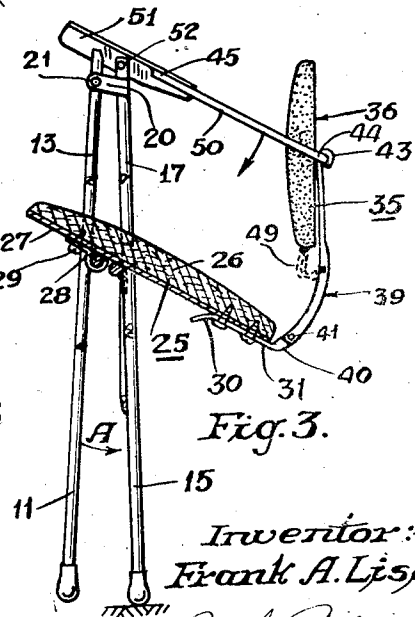
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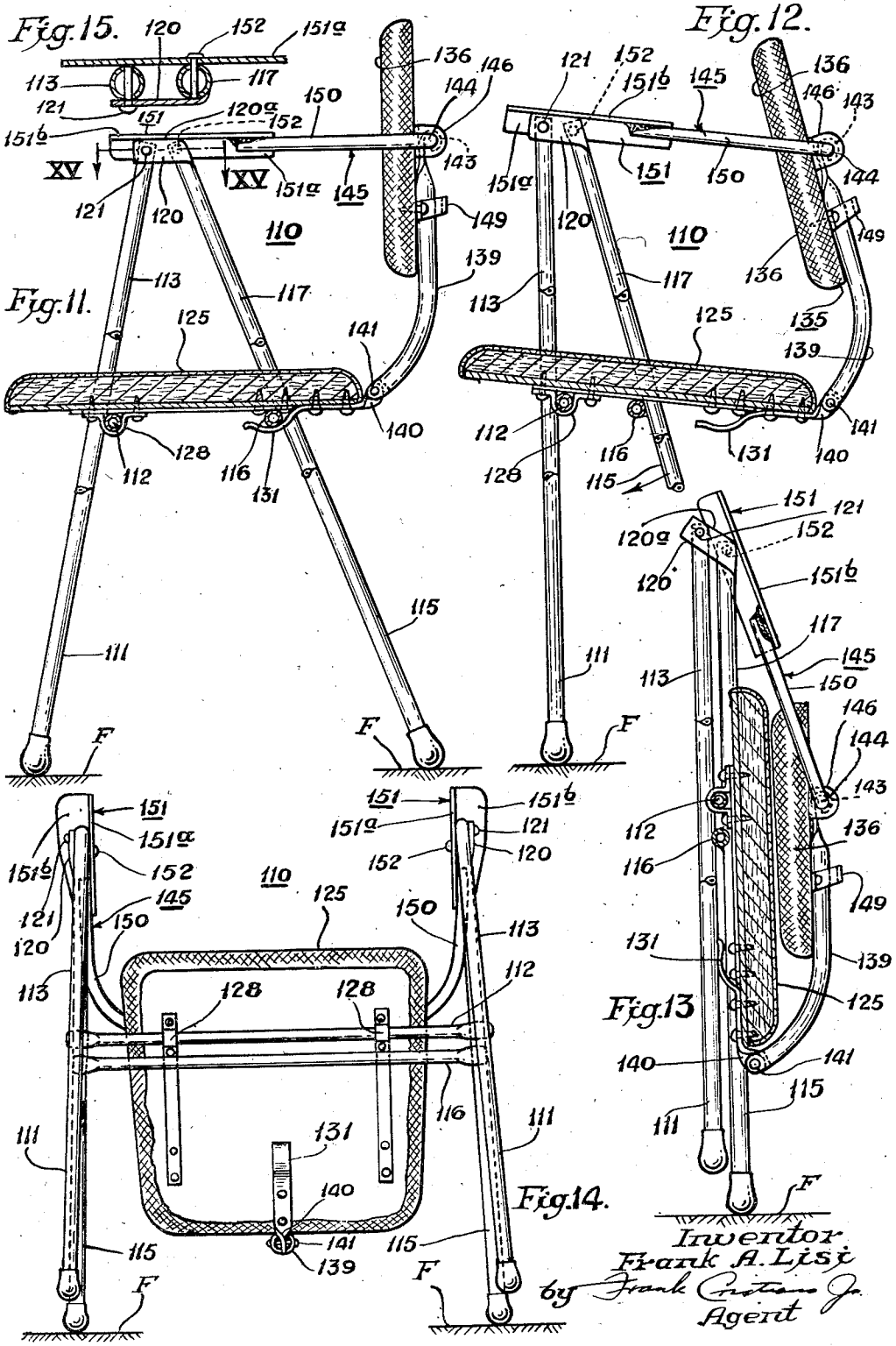


Inventor:-
Frank A. Lisi
by Frank Gustem Jr.
Agent

April 23, 1957 F. A. LISI 2,789,623

COLLAPSIBLE CHAIR

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Inventor
Frank A. Lisi
by Frank Cristaino Jr.
Agent

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COLLAPSIBLE CHAIR

Frank A. Lisi, Philadelphia, Pa.

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9 Claims. (Cl. 155—139)

This invention relates to chairs, more particularly to folding chairs; and this application is a continuation-in-part of co-pending application Serial No. 457,328, filed September 21, 1954, now abandoned.

It is an object of the invention to provide a folding chair of novel and simple construction, which will occupy a minimum of space when folded.

Another object of the invention is to provide a foldable armchair which will provide a high degree of comfort when opened for use and which will occupy a minimum of space when closed or folded for storage.

A further object of the invention is to provide a foldable chair which may be unfolded and folded in a simple manner, yet is sturdy and may be carried about without folding inadvertently.

These and other objects are effected by the invention as will be apparent from the following description and claims, taken in accordance with the accompanying drawings forming a part of this application, in which:

Fig. 1 is a perspective view of a folding armchair constructed in accordance with the present invention;

Fig. 2 is a side elevational view of the chair shown in Fig. 1, with portions broken away in the interest of clarity;

Fig. 3 is a view similar to that of Fig. 2, but showing the chair partially closed;

Fig. 4 is a view similar to that of Figs. 2 and 3, but showing the chair fully closed;

Fig. 5 is an enlarged fragmentary sectional view, taken along the line V—V of Fig. 1, looking in the direction indicated by the arrows;

Fig. 6 is an enlarged fragmentary sectional view, taken along the line VI—VI of Fig. 1, looking in the direction indicated by the arrows;

Fig. 7 is an enlarged fragmentary sectional view of a modified detail of the stop carried by the seat of the chair for limiting rearward movement of the rear legs;

Fig. 8 is an enlarged fragmentary sectional view of a modified connection between the chair back and its supporting structure;

Fig. 9 is an enlarged side elevational view of the left arm of the chair, showing a modified pivotal connection;

Fig. 10 is a view similar to that of Fig. 9, but showing the parts in the position they occupy when the chair is folded;

Fig. 11 is a side elevational view of another chair embodiment, with portions broken away in the interest of clarity;

Fig. 12 is a view similar to Fig. 11 but showing the chair partially closed;

Fig. 13 is a view similar to Figs. 11 and 12 but showing the chair fully closed;

Fig. 14 is a front view of the chair in the fully closed position; and

Fig. 15 is an enlarged fragmentary sectional view taken on line XV—XV of Fig. 11, looking in the direction of the arrows.

Referring now to the drawings in greater detail, especially Figs. 1–4 incl., the reference character **10** indicates, in its entirety, a folding arm chair constructed in accordance with the invention and comprising a pair of front legs **11**, joined by a first transverse bar **12**, and each leg having an upwardly-directed integral extension **13**. Similarly, a pair of rear legs **15** are joined by a second transverse bar **16**, and have upwardly-directed integral extensions **17**. It will be readily apparent from reference to the drawings that the front legs, together with their extensions and transverse bar, form an integral H-shaped frame structure, and the same is true of the rear legs, their extensions and transverse bar.

Either or both pairs of legs may be provided with gracing means supplementing the transverse bars **12** and **16**, and one form of such supplemental brace is shown at **18** in Fig. 1. The rod **18** is bent at its center, and has the center bend secured to the second transverse bar **16** at the center of the latter, and its terminal portions likewise secured to the rear legs **15** at points thereon spaced from the transverse bar **16**.

The upper terminal portions of the front and rear frame structures are pivotally joined by connecting arm portions **20** rigidly secured at one end to the rear leg extensions **17** and pivoted, as at **21**, to the front leg extensions **13** at their other ends. As well illustrated in Fig. 2, the connecting arms **20** are of sufficient length to permit limited pivotal movement of the front and rear H-shaped frame structures relative to one another, the two limits of such pivotal movement being shown in Figs. 2 and 4.

A seat structure **25** is supported by the frame structures, and may be of any suitable form and materials. As herein illustrated, a pad **26** is secured to the upper surface of a sheet of plywood **27**. When the chair **10** is opened for use, the seat structure **25** rests on, and is supported by, the two transverse bars **12** and **16**, and is pivotally secured to the first transverse bar **12** by looped straps **28** secured to the plywood **27**, at **29**. The rear portion of the plywood sheet **27** is at all times in contact with the second transverse bar **16**, and when the chair is in fully opened position is held in fixed relation thereto by a stop **30**, Figs. 2 and 3, formed at the forward end of the strap **31** which is secured to the under side of the seat structure **25** near the rear thereof.

A modified form of stop is shown in Fig. 7, wherein the forward portion **32** of the strap **33** is formed as a spring clip which serves to temporarily lock the seat structure **25** to the rear frame structure.

A back structure, indicated in its entirety by the reference character **35**, consists of a body-engaging member **36**, which, like the seat **25**, may comprise a pad **37** supported on a plywood backing **38**, and a depending supporting link **39**. The link **39** is pivoted at its lower terminal portion to the rear end **40** of the strap **31**, carried at the lower rear edge of the seat structure **25**, this pivotal connection being indicated at **41** in Figs. 2 and 3.

For a clear understanding of the preferred form of connection between the body-engaging member of the back, and its associated structure, reference is made to Figs. 1 and 5. In this form of the invention, the upper end of the link **39** is formed with an eye **43**, which pivotally receives the central portion **44** of an arm structure, indicated in its entirety by the reference character **45**. This arm structure **45** is of U-shape with its central por-

tion 44 forming the bottom of the U. The back's body-engaging member 36 is pivotally mounted on the central portion 44 of the U-shaped arm structure 45, by clips 46 secured to the rear of the body-engaging member 36, as at 47 (Fig. 6). With this construction, the member 36 is free to swing or pivot about the arm central portion 44 to adjust to the position of the user's back. Preferably, means is provided to limit the amount of pivoting of the member 36, so that it will not be too far out of parallel with the seat structure 25 as closing movement of the chair parts nears completion. Note Fig. 4. Such limiting means may be quite simple in form, and as herein shown comprises a short length of chain 49, extending from the bottom of the member 36 to the link 39.

The U-shaped arm structure includes, in addition to the central portion 44, a pair of side or arm portions 50, terminating in channel-shaped rests 51. The rests 51 are pivotally connected to the upper terminal portions of the rear leg extensions 17, as at 52.

In order that the chair, when in folded position, as shown in Fig. 4, may be compact as possible, it is desirable that the distance from pivot 52 to that of 44 be substantially equal to the distance from the pivot at 28 to the pivot at 41, and that the distance between pivots 52 and 28 be substantially equal to the distance between pivots 44 and 41. When so dimensioned, the various members connecting the four pivot points form, in effect, a parallelogram.

It is believed that little or no explanation is necessary regarding the operations of opening and closing the chair herein illustrated. Figs. 2, 3 and 4 well illustrate the closing action of the structure, and the opening procedure is, of course, the reverse. Considering Fig. 2; when it is desired to close the chair, the latter may be tilted rearwardly slightly, sufficient to raise the front legs 11 off the floor, whereupon the seat may be pushed rearwardly with the front legs moving in the direction indicated by the arrows A (Figs. 2 and 3), such movement resulting in easy closing of the chair.

To open the closed chair, it is merely necessary to lift on the back member 36 while the rear legs 15 are resting on the floor and the front legs 11 are out of engagement therewith, as shown in Fig. 4.

If a somewhat simplified structure is desired, as regards the back structures, the arrangement illustrated in Fig. 8 may be utilized. Here the link 39 has its upper end secured directly to the plywood back member 36 and the pivot clips 46 are omitted. Of course, in this arrangement there is no pivoting of the body-engaging member 36 relative to the link 39 for adjustment to the back of the user.

In Figs. 9 and 10 there is shown a modified connection between the upper ends of the H-shaped frame structures and the arm rests. The arm rests 51*a* have depending plates 52*a* rigidly secured thereto. The rear leg extensions 17 are pivoted to these plates, as at 53*a*, while the front leg extensions 13 have a pin 54*a* projecting laterally therefrom and into a curved slot 55*a* in the plate 52*a*. This curved slot 55*a* terminates at one end in an offset 56*a* in which the pin 54*a* is received when the chair is in fully open position. In fully closed position, the pin is disposed at the opposite end of the curved slot 55*a*. This construction provides the same opening and closing action as is provided by the construction previously described.

Figs. 11–15 inclusive illustrate another embodiment of the invention, wherein the reference character 110 indicates, in its entirety, a folding arm chair generally similar to the arm chair 10 previously described and comprising a pair of front legs 111, joined by a first transverse bar 112, each leg having an upwardly-directed integral extension 113. Similarly a pair of rear legs 115 are joined by a second transverse bar 116 and are provided with upwardly-directed integral extensions 117. The front legs, together with their extensions and transverse bar, form

an integral H-shaped frame structure, as do the rear legs, their extensions and transverse bar.

The upper terminal portions of the front and rear H-shaped frame structures are pivotally joined by arm portions 120 rigidly secured at one end to the rear leg extensions 117 and pivoted as at 121, to the front leg extensions 113 at their other ends. As illustrated in Fig. 11, the arm portions 120 have their upper surface portions 120*a* disposed in substantially flush relation with the upper ends of the front and rear leg extensions 113 and 117, respectively, and are of sufficient length to permit relative pivotal movement of the front and rear H-shaped frame structures between the limits shown in Figs. 11 and 13.

A seat structure 125 is pivotally secured to the first transverse bar 112 by looped straps 128 and is disposed in such a manner that when the chair 110 is unfolded or opened for use, the seat structure rests on, and is supported by the two transverse bars 112 and 116. When the chair is in the fully opened position, the seat structure 125 is held in fixed relation with the second transverse bar 116 by a spring clip 131 which is secured to the underside of the seat structure adjacent the rear thereof.

A back rest structure including a body-engaging portion 136 is pivotally connected to the seat structure 125 by a depending supporting link 139 pivotally connected at its lower terminal portion to the rear end 140 of the spring clip 131 by a pivot pin 141.

The upper end of the link 139 is formed with an eye 143 which pivotally receives the central portion 144 of a U-shaped arm structure 145. The body-engaging member 136 is pivotally attached to the central portion 144 of the U-shaped arm structure 45, by a U-shaped clip 146 secured to the rear of the body-engaging member 136. Hence the body-engaging member is free to pivot about the arm central portion 144. A U-shaped clip 149 loosely encompassing the depending link 139 and attached to the rear of the body-engaging member 136 is provided to limit the amount of pivotal movement of the body-engaging member.

The U-shaped arm structure 145 further includes a pair of side or arm portions 150 extending from the central portion 144 and terminating in channel shaped rests 151. The rests 151 are provided with vertical portions 151*a* and horizontal portions 151*b* and are pivotally connected to the upper terminal portions of the rear leg extensions 117 by rivets 152 or other suitable means. It will be noted that the rivets 152 are attached to the vertical portions 151*a* of the rests and that the horizontal portions 151*b* of the rests are substantially wider than the cross-sectional diameter of the leg extensions 113 and 117 (see Fig. 14). Also, as seen in Figs. 11 and 12 the horizontal rest portions 151*b* extend forwardly of the terminal portions of the leg extensions 113.

When it is desired to fold the chair 110, the user first stations himself behind the chair and grasps the upper portion of the body-engaging member 136. He then pushes the chair forwardly, tilting the entire chair in a forward direction about the front legs 11 as pivots, until the front legs are substantially in a vertical position (as shown in Fig. 12) and the rear legs 115 are off the floor F. The rear legs 115 may then be momentarily nudged with one foot toward the front legs 11 until the transverse bar 116 becomes disengaged from the spring clip 131. The weight of the body-engaging member 136 in addition to the weight of the depending link member 139 and the U-shaped arm structure 145 will then provide a continuing motion tending to fold the chair. During this continuing motion the horizontal rest portions 151*b* remain in abutment with the arm portions 120 and provide a counterclockwise movement about the pivotal point 121 causing the rear legs 115 to continue their movement toward the front legs 111. This condition is illustrated in Fig. 12. After movement of the rear legs

111 is arrested by abutment against the front legs, the horizontal rest portions continue their counterclockwise movement about the rivets 152 (as shown in Fig. 13) to effect complete folding of the seat structure 125 against the rear legs 115 and of the body-engaging member 136 against the seat structure.

When it is desired to unfold the chair it is merely necessary to grasp the body-engaging portion 136 from behind and lift upwardly, thereby causing the seat portion 125 to be unfolded by the upward movement thereon about the transverse bar 112 by the depending link member 139. Concomitantly therewith, the U-shaped arm structure 145 together with its rest portion 151 is rotated upwardly about the rivets 152 until the rest portions are rotated into abutment with the upper surface 120*a* of the arm portions 120. At this point, the rear legs 115 begin to leave the floor F and the lifting forces on the rest portions 151*b* are transmitted as a counterclockwise force about the pivots 121 forcing the rear legs past the position shown in Fig. 12 to the fully open position shown in Fig. 11 (into engagement with the spring clip 131). The chair is thus locked in the unfolded or open position and may be carried about by grasping the rest portions 151 or the U-shaped arm structure 145 in the conventional manner without causing the chair to collapse to the folded position. The reason why the chair will not collapse when carried about in this manner is that the lifting force on the horizontal rest portions 151*b* is transmitted to the arm portions 120 as a counterclockwise force tending to move the rear legs in counterclockwise direction (or unfolding direction). Obviously, the result is that the rear legs 115 are retained in the fully unfolded position, although the spring clip 131 is not a positive lock.

It will now be seen that the invention provides a folding arm chair of sturdy construction which may be easily folded or unfolded, which folds compactly for storage purposes, is highly rigid when in the open position and which may be carried about in the open position without folding.

While the invention has been shown in several forms, it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. In a folding chair, integral front and rear H-shaped frame structures pivotally joined adjacent their upper ends, a seat structure pivotally mounted on the transverse bar of the front H-shaped frame structure, and adapted to rest on the corresponding bar of the rear H-shaped frame structure, a U-shaped arm structure having its free end portions pivotally connected to one of the H-shaped frame structures adjacent the upper end of the latter, and a back structure pivotally connected to the central portion of the U-shaped arm structure and to the rear portion of the seat structure.

2. In a folding chair, integral front and rear H-shaped frame structures each comprising a pair of spaced side members and a transverse bar joining the spaced side members intermediate their terminal portions, means pivotally joining said front and rear frame structures adjacent the upper terminal portions of the side members, seat structure pivotally secured to the transverse bar of one of said H-shaped frame structures and slidable relative to the transverse bar of the other of said H-shaped frame structures and adapted to be supported by the transverse bars of both of said frame structures when the chair is open for use, a generally U-shaped arm structure having the leg portions of its U pivotally joined to the upper terminal portions of one of said frame structures, and a back structure pivotally connected to the U-shaped arm structure at the bottom of the U, and also pivotally connected adjacent its lower portion to the rear portion of the seat structure.

3. Structure as specified in claim 2, wherein the seat structure is secured to the transverse bar of the front frame structure and rests upon the transverse bar of the rear frame structure when the chair is open for use.

4. Structure as specified in claim 2, wherein the back structure includes a body-engaging portion pivotally mounted on the U-shaped arm structure at the bottom of the U, for pivotal movement about a horizontal axis.

5. Structure as specified in claim 3, including means for temporarily latching the seat structure to the transverse bar of the rear frame structure when the chair is open for use.

6. In a folding chair, a pair of front legs and a first transverse bar joining the front legs, a pair of rear legs and a second transverse bar joining the rear legs, an integral extension carried by each of said legs and projecting upwardly beyond the transverse bars, means including an arm portion rigidly secured to each rear leg extension and pivotally connecting each front leg extension to the corresponding rear leg extension adjacent the upper terminal portions thereof, seat structure adapted to rest on and be supported by the first and second transverse bars, means providing a pivotal connection between said seat structure and the first transverse bar, means carried by said seat structure for engaging the second transverse bar when the chair is in open position to limit pivotal movement of the rear legs in an opening direction relative to the front legs, back structure pivoted to said seat structure and pivotable between an open position where it lies in a plane normal to the plane of the seat structure and a closed position where it lies in a plane approximately parallel to, and close to, the plane of the seat structure, arm structure comprising a pair of side portions pivotally secured to the upper terminal portions of said rear leg extensions, and a central rear portion joining said pair of side portions and pivotally secured to said back structure.

7. In the folding chair, a first pair of legs and a first transverse bar joining the first pair of legs, a second pair of legs and a second transverse bar joining the second pair of legs, an integral extension carried by each of said legs and projecting upwardly beyond the transverse bars, means including a connecting arm portion rigidly secured to each of the extensions of said first pair of legs and pivotally connected to the extensions of the second pair of legs adjacent the upper terminal portions thereof, seat structure adapted to rest on and be supported by the first and second transverse bars, means providing a pivotal connection between said seat structure and one of said transverse bars, means for limiting the pivotal movement of the first pair of legs relative to the second pair of legs in an opening direction, arm structure comprising a pair of rest portions pivotally secured to the upper terminal portions of one said pair of legs and a central rear portion joining said pair of rest portions, each said connecting arm portion having an upper surface portion formed in a manner to abut a lower surface portion of one of said rest portions when the chair is in the open position.

8. The structure recited in claim 7 and further including a body-engaging portion attached to the central rear portion, and means pivotally securing the central rear portion to the seat structure.

9. In a folding chair, a pair of front legs and a first transverse bar joining the front legs, a pair of rear legs and a second transverse bar joining the rear legs, an integral extension carried by each of said legs and projecting upwardly beyond the transverse bars, means including a connecting arm portion rigidly secured to each of the extensions of said rear pair of legs and pivotally connected to the extensions of said front pair of legs adjacent the upper terminal portions thereof, seat structure adapted to rest on and be supported by the first and second transverse bars, means providing a pivotal connection between said seat structure and said first transverse bar, means for limiting the pivotal movement of

said rear pair of legs relative to said front pair of legs in an opening direction, arm structure comprising a pair of rest portions pivotally secured to the upper terminal portions of said rear pair of legs and a central rear portion joining said pair of rest portions, each said connecting arm portion having an upper surface portion adapted to abut a lower surface portion of one of said rest portions when the chair is in the open position.

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