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2,600,374

FOLDING METAL DECK CHAIR

Filed Aug. 12, 1950

2 SHEETS—SHEET 1

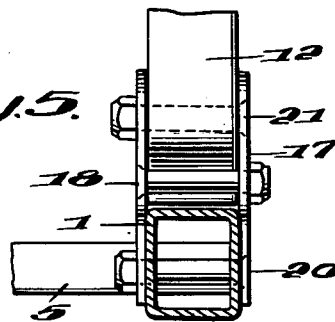
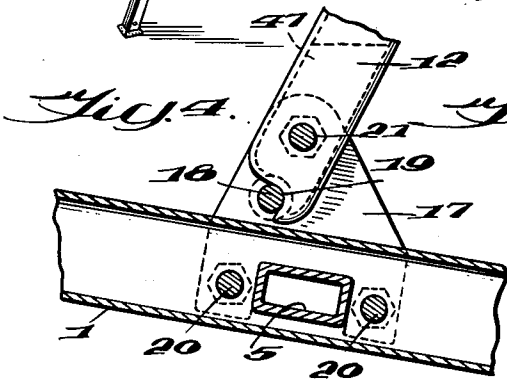
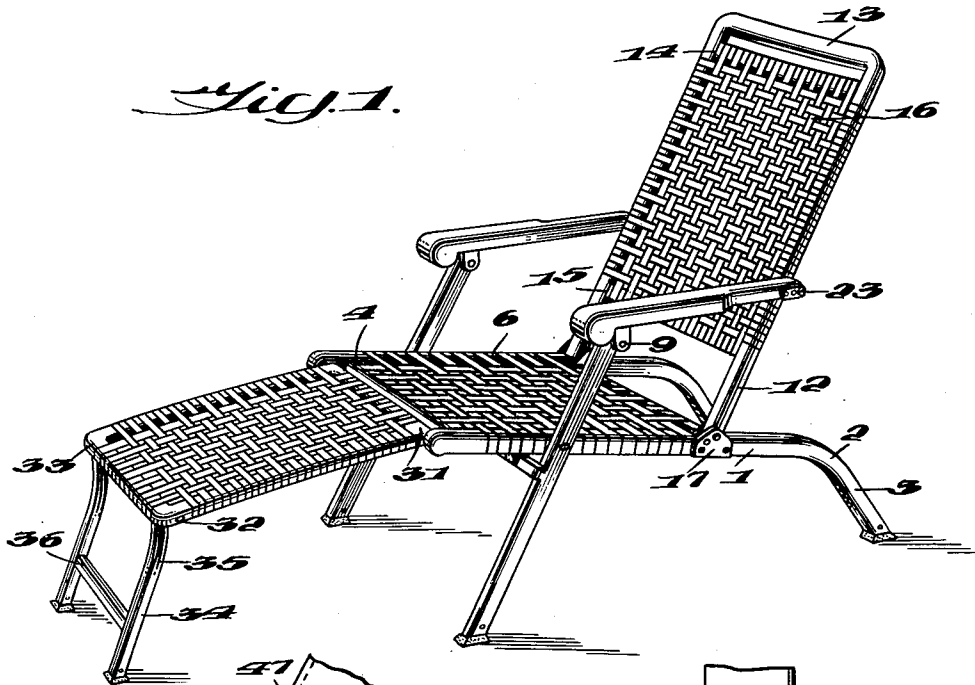


Fig. 6.

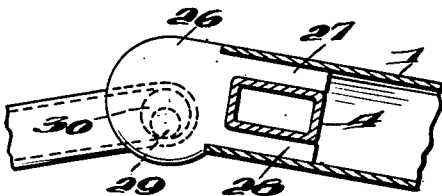
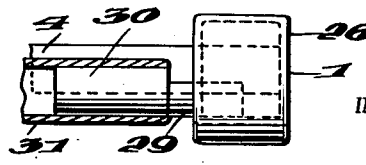


Fig. 7.



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2 SHEETS--SHEET 2

The drawing illustrates a mechanical assembly, possibly a pump or engine component, with various parts labeled with numbers. The main assembly consists of a curved arm (1) pivoted at one end (2) and connected to a vertical rod (3) at the other end (4). The rod (3) is further connected to a horizontal rod (5) which is pivoted at its other end (6). A vertical rod (7) is connected to the horizontal rod (5) at its other end (8). The vertical rod (7) is further connected to a horizontal rod (9) which is pivoted at its other end (10). A vertical rod (11) is connected to the horizontal rod (9) at its other end (12). The vertical rod (11) is further connected to a horizontal rod (13) which is pivoted at its other end (14). The horizontal rod (13) is further connected to a vertical rod (15) which is pivoted at its other end (16). The vertical rod (15) is further connected to a horizontal rod (17) which is pivoted at its other end (18). The horizontal rod (17) is further connected to a vertical rod (19) which is pivoted at its other end (20). The vertical rod (19) is further connected to a horizontal rod (21) which is pivoted at its other end (22). The horizontal rod (21) is further connected to a vertical rod (23) which is pivoted at its other end (24). The vertical rod (23) is further connected to a horizontal rod (25) which is pivoted at its other end (26). The horizontal rod (25) is further connected to a vertical rod (27) which is pivoted at its other end (28). The vertical rod (27) is further connected to a horizontal rod (29) which is pivoted at its other end (30). The horizontal rod (29) is further connected to a vertical rod (31) which is pivoted at its other end (32). The vertical rod (31) is further connected to a horizontal rod (33) which is pivoted at its other end (34). The horizontal rod (33) is further connected to a vertical rod (35) which is pivoted at its other end (36). The vertical rod (35) is further connected to a horizontal rod (37) which is pivoted at its other end (38). The horizontal rod (37) is further connected to a vertical rod (39) which is pivoted at its other end (40). The vertical rod (39) is further connected to a horizontal rod (41) which is pivoted at its other end (42). The horizontal rod (41) is further connected to a vertical rod (43) which is pivoted at its other end (44). The vertical rod (43) is further connected to a horizontal rod (45) which is pivoted at its other end (46).

Fig. 2.

Fig. 3.

Fig. 8.

Fig. 9.

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FOLDING METAL DECK CHAIR

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Application August 12, 1950, Serial No. 179,081

7 Claims. (Cl. 155—139)

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This invention relates to a folding chair, useful as a deck chair for steamers, or similar usage.

The invention has for its objects and comprehends a foldable chair that is simple in design and soundly constructed, with the attributes of ability to withstand rough usage and yet be light in weight and comfortable to sit in; a foldable deck chair in which the load of the occupant is distributed so that each member of the structure and frames are at work, with the result that there is a general distribution of stresses such that the chair is substantially unbreakable in use; a folding deck chair in which the back frame is self-supporting without reliance upon the arms or arm pivots, and the front legs are self-supporting without reliance upon the arms or arm pivots; a deck chair which has a quadrangle pivoting arrangement, without reliance upon pin-pivots for basically supporting the load to be carried thereon; a deck chair with a novel hinge bracket and stop construction for joining the back rest and seat in foldable relation.

Further objects of the invention include a folding chair that has side frames extending rearwardly to form rear legs, and a back frame the side posts of which are swingably mounted and lie in the planes of the side frames without being laterally offset therefrom; a folding chair having an aluminum alloy tubular frame defining a seat portion and rear legs, an aluminum alloy tubular frame defining a back portion, plastic webbing stretched over the seat portion and back portion, and means connecting the frames in hinged relationship whereby the frames do not pass through the transverse planes of the webbing during movement between folded and open position.

One of the primary objects of the invention is to provide a folding steamer deck chair having a supporting frame structure of metal, and preferably an aluminum alloy, in which the construction is practical, rugged and non-corrosive, and does not utilize excessive number of members, which latter result in great weight and high cost; a chair which permits complete, snug closing, and when in open position has a back frame provided with an automatic stop and unbreakable support; a chair which utilizes stops to arrest motion and to support chair loads; a chair which sustains loads in its main beam members with greatest strength of the beam members at points of greatest stress.

Another object of the invention is to provide a folding steamer deck chair with the supporting framework formed of metal and which has plastic material forming the seat, back rest, and foot

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rest; a folding steamer deck chair with the foot rest permanently secured thereto in folding rotatable relation.

Other objects of the invention will be apparent from the description and claims herein.

In the prior art, folding deck chairs are known, but they have various disadvantages, and their engineering features generally are not practicable for chairs of metal construction, and particularly where steamer deck chairs are concerned. Steamer deck chairs must be light, rugged, non-corrosive, comfortable, foldable to occupy a small space, and have a minimum of parts so that the costs are not prohibitive. Wooden frame deck chairs become warped and broken, deteriorate and rot at the metal pivots, and are not weldable. The present invention meets all the desired hereinabove named requirements and tests of a metal steamer deck chair, and additionally introduces engineering features of great advantage and novelty in this art in which the chair occupant load is distributed, so that each member of the structure and frames are at work; i. e. the back frame is self-supporting (without arms or arm pivots), and the front legs are self-supporting (without arms or arm pivots), the result being a general distribution of stresses such that the chair is unbreakable due to use.

The present invention will be understood more readily by referring to the accompanying drawings, wherein:

Figure 1 is a perspective view of the chair in position of use to seat an occupant.

Figure 2 is a view in side elevation of the chair shown in Figure 1.

Figure 3 is a view showing the chair of Figures 1 and 2 in folded or non-use position.

Figure 4 is a view of vertical cross-section of the hinge bracket and stop support in assembly of back frame with the seat frame.

Figure 5 is a front view of Figure 4 partly in cross-section.

Figure 6 is a side view, partly in cross-section, of the construction showing the attachment of the foot rest to the seat frame.

Figure 7 is a front view, partly in cross-section, of the construction shown in Figure 6.

Figure 8 is a side view, partly in cross-section, showing the attachment of the rubber feet to the chair legs.

Figure 9 is a detail view in cross-section showing the attachment of the plastic webbing to the frame.

Referring to the drawings, the chair has rails

or side members 1 formed of hollow rectangular metal tubes which curve downwardly at 2 to form rear legs 3. Cross bars 4 and 5 are assembled with the two rail members 1 to form a seat frame having plastic webbing 6 attached thereto to form a seat. Tubular metallic members 7 pivotally attached to the side rails 1 at 8 form supporting legs of the chair, the upper portions 7' thereof being provided with inserted drilled arm hinge strengthening plugs for bolting at 9 to the arm hinge bracket 10 carried by each of the arms 11. The back frame is composed of side members 12 formed of hollow rectangular metal tubes integrally welded to a top member 13 and to cross-bars 14 and 15, the cross-bars and side members having attached thereto plastic webbing 16 to form a back rest for the chair. As shown in detail in Figures 4 and 5, the lower ends of the back frame side members 12 are pivotally mounted or hinged at 21 on the brackets 17 which are each provided with a cross-bolt 18 which serves as a stop and support for the notched lower ends 19 of the side members 12. The brackets 17 are fixedly secured to the side rail members 1 by bolts 20. The lower notched ends 19 of the side members 12 have solid aluminum plugs 47 inserted therein for strengthening purposes to support the highly stressed hinge and stop. The arm rests 11 are pivotally connected to the respective side members 12 at 23. The cross-bar 24 carried transversely by the legs 7 has a rubber stop 25 thereon. As shown in detail in Figures 6 and 7, each side rail member 1 is provided at its forward end with a foot-rest hinge casting 26 which is forked to provide portions 27 and 28 to straddle the forward cross-bar 4 of the seat frame, the forked portions lying within the tubular side frame 1. Each casting 26, one on the right and other on the left, is provided with a hole to rotatably receive the stud end 29 of the stud casting 30 secured to the cross-bar 31 of the footrest frame, whereby the foot rest frame is pivotally mounted on the seat.

The foot-rest frame is composed of two side frame rectangular tubular members 32 slightly bent over a wide radius and integrally welded to a front tubular member 33 and having a cross-bar 31 at the rear which carries the stud castings 30. The legs 34 of the foot-rest frame are bent at 35 to provide for snug closing of the chair, and are formed of tubular metal members welded in H-shape, one of the members 35 serving as a horizontal cross-bar. The legs 34 are plugged at the top ends thereon and have pivots 37 therethrough for pivotally mounting on the foot rest. As shown in Figure 8, each tubular leg of the chair, viz, the rear legs, the front legs, and the foot-rest legs, is plugged with a metal strip 38 at the lower end thereof and which secures and supports rubber foot members shown at 40, through which the bolt 39 extends. The manner of attachment of the plastic webbing to back, seat and foot-rest frames is shown in Figure 9. The metal tube 41 which is illustrative of the various tubular frame and cross-bar members, is provided with a hole 42 extruded in one wall thereof. The plastic webbing 43 is wrapped around the tube and its end 44 is encased in a U-shaped metal clip 45 having holes therein to receive a tapered self-tapping screw 46 which enters the hole 42 and thus tightly secures the plastic webbing to the tube 41 of the framework. Polyethylene plastic is preferred.

As shown in Figure 2, the cross-bars 13, 14 and 15 are curved, the cross-bar 15 having a deeper curvature; that is, on a shorter radius, than 13

and 14. The side bars 32 of the foot-rest frame are slightly curved in a downward direction over a wide radius, as shown in the drawings.

As shown in Figure 2, the arms 11 are preferably disposed parallel to the side rails 1 where they extend thereover.

It will be observed that the back frame side members 12 are in the same vertical planes as the respective side rails 1 upon which they are swingably mounted, and side members 12 are not offset laterally from the respective side rails 1. This is an important feature of the invention, as it permits the back frame and seat frame to function in the manner of a flat folding hinge without interference with the webbed material which covers these frames. When the chair is folded, as shown in Figure 3, it is a compact unit occupying a minimum of space. Since the framework of the chair is of metal, warping and decay of wooden frames is eliminated. The framework is preferred to be made of a suitable aluminum alloy which is readily weldable, relatively corrosive resistant and of high tensile strength, and comparatively light in weight. The arms of the chair may be of metal or of wood, and it will be noted that the arms do not support the basic load carried by the chair.

The chair frame disclosed herein and the method of making and assembling it are the subject of a separate copending application filed on even date herewith, wherein I have claimed the framework and method of assembling it; the method of assembling the foot-rest frame to the seat frame; the hinge bearing casting shown in Figure 6; a joint formed with each casting as disclosed in Figure 6, the method of attaching plastic webbing to the frame, and the joint produced thereby disclosed in Figure 9; the method of joining the rubber foot to the legs as shown in Figure 8. The said application is entitled "Folding Metal Deck Chair Frame and Method of Making and Assembling Same." It bears Serial No. 179,082.

I have also described and claimed in said copending application the method of providing the back frame, seat frame and foot-rest frame with longitudinally disposed aluminum alloy tubular metal slats, and the chair frame containing such slats. I consider such an arrangement to be within the scope of my invention, wherein the slats replace the plastic webbing.

I claim:

1. A folding chair capable of carrying a load with general distribution of stresses comprising side frame members defining a seat attaching portion and rearwardly extending legs, a back frame pivotally mounted on the side frame members, other leg members pivotally mounted on the side frame members, arm members pivotally mounted on the back frame members and the said other leg members, bracket means carried by the side frame members including means for supporting a load on the back frame member independently of the arm members, means carried by said bracket means for pivotally mounting the back frame, and means carried by the said other leg members for supporting a load on such leg members independently of the arm members, the said load supporting means permitting folding movement of the back frame without being removed from the bracket means.

2. A folding deck chair having a pair of side frames defining a forward seat sustaining portion and rearwardly extending leg portions, other leg members pivotally mounted on said side frames, a back frame member swingably mount-

ed on said side frames, said back frame member including a pair of side posts spaced apart the distance said side frames are spaced apart, a seat carried by the side frames, a back carried by said back frame, means carried by the side frames adapted to contact the lower ends of the side posts for stopping the movement of the side posts when in load supporting position and means carried by the said other legs stopping movement of such legs when in load supporting position, the said means carried by the side frames adapted to stop the movement of the side posts being fixedly secured and permitting folding movement of the back frame without being removed from the assembly.

3. A folding chair having a pair of tubular metal side frames extending rearwardly continuously to form rear supporting legs, plastic webbing united to the forward portion of the side frames forming a seat thereon, a tubular metal back frame having a pair of posts defining the sides thereof, plastic webbing united to the posts forming a back rest thereon, bracket means carried by the side frames including means for pivotally mounting the posts of the back frame thereon, other leg means pivotally mounted on the side frames, arm rests pivotally mounted on the said other leg means and the posts of the back frame, the posts of the back frame being in the same vertical planes as the respective corresponding side frames upon which they are mounted without lateral offset, means located on the bracket means adjacent the pivotally mounting means for stopping the pivotal movement of the side posts and supporting the back frame in load carrying position independently of the arm rests, and means carried by the said other leg means to support the seat in load-carrying position independently of the arm rests.

4. A folding steamer deck chair having in combination, a metal back frame, said back frame having two metal posts constituting the vertical sides thereof, each of said posts being provided at its lower end with a notch, a metal strengthening plug incased in each post at its lower end and conforming to the configuration of the notch, a metal seat frame having hinge brackets thereon, each bracket defining with said seat frame a pair of parallel disposed members in which the lower ends of said metal posts are received therebetween, a pivot bolt passing through said parallel disposed members, said plug and said lower end of said post, and a cross-bolt passing through said parallel sides in engageable stop relation with said notch.

5. A folding steamer deck chair including a seat having two side rails of tubular metal and a forward cross-bar transversely passing through the same, a foot-rest having a rear cross-bar with studs extending horizontally outward therefrom, stud receiving members each having a pair of bifurcated ends secured to the ends of said side rails and said bifurcated ends straddling said first-named cross-bar in interfitting relation, said studs extending into said stud-receiving members for pivotally connecting the foot rest to the seat in foldable relation, a back rest swingably mounted on said side rails, leg members pivotally mounted on said side rails, and arm rests pivotally joined with said back rest and said leg members.

6. A folding chair having a pair of metal side frames extending rearwardly continuously to form rear supporting legs, means carried by the forward portion of the side frames to form a seat thereon, a metal back frame having a pair of posts defining the sides thereof, means carried by the posts to form a back rest thereon, bracket means carried by the side frames including means for pivotally mounting the posts of the back frame thereon, other leg means pivotally mounted on the side frames, arm rests pivotally mounted on the said other leg means and the posts of the back frame, the posts of the back frame being in the same vertical planes as the respective corresponding side frames upon which they are mounted without lateral offset, means located on the bracket means adjacent the pivotally mounting means for stopping the pivotal movement of the side posts and supporting the back frame in load carrying position independently of the arm rests, and means carried by the said other leg means to support the seat in load-carrying position independently of the arm rests.

7. A foldable chair capable of carrying a load with general distribution of stresses comprising side frame members defining a seat attaching portion and rearwardly extending legs, a back frame pivotally mounted on the side frame members, said back frame including a pair of side posts in the same vertical planes of the side frames without lateral offset therefrom, other leg members pivotally mounted on the side frame members, arm members pivotally connected to the back frame member, bracket means carried by each of the side frame members, means on each of said bracket means immovably secured thereto for supporting a load on the back frame member, each side post at its lower end having a recess therein engageable with the load supporting means on the bracket means, means carried by each of said bracket means for pivotally mounting the back frame, the said load supporting means permitting folding movement of the back frame without being removed from the bracket means.

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