Jan. 4, 1949. J. B. O'CONNOR 2,458,095

SEAT CONSTRUCTION FOR CHAIRS

Original Filed Oct. 7, 1941 2 Sheets-Sheet 1

Fig. 1

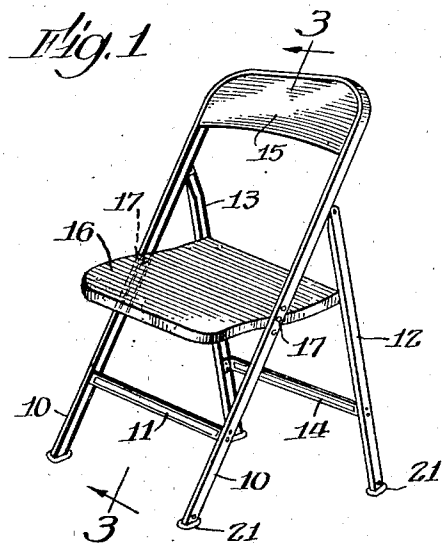


Fig. 2

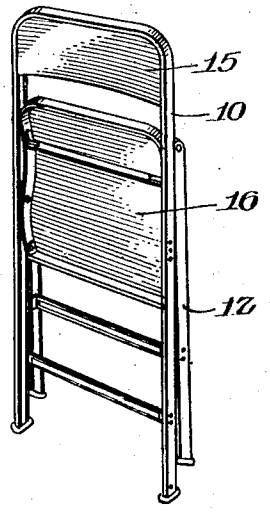
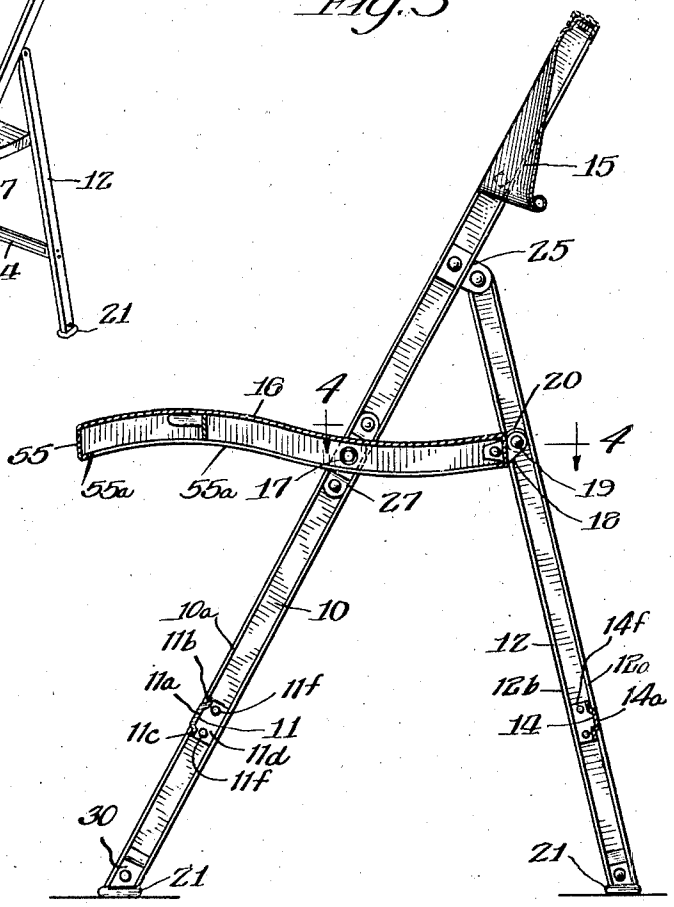


Fig. 3



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Fig. 4.

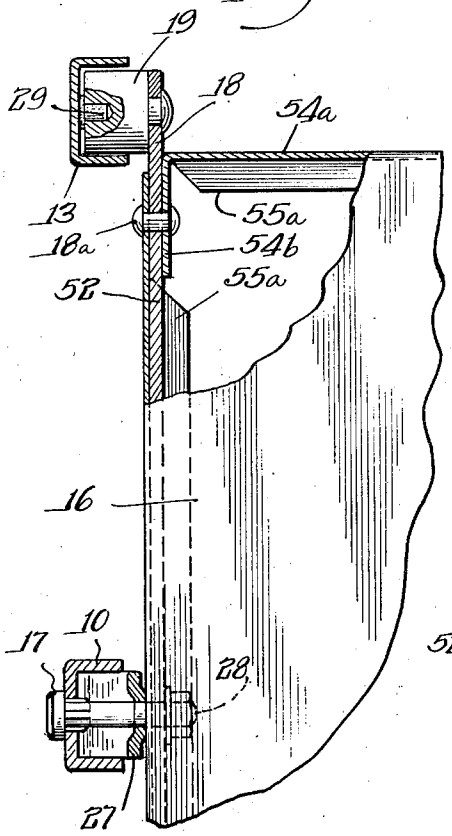


Fig. 5.

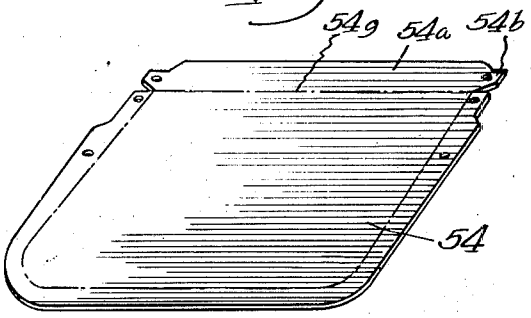


Fig. 6.

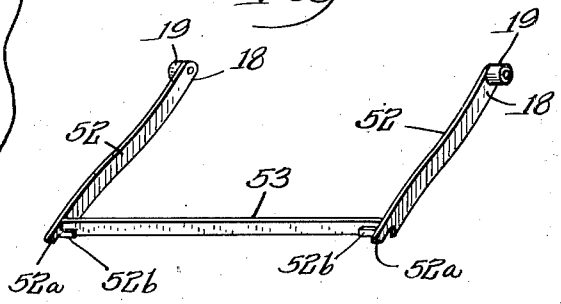
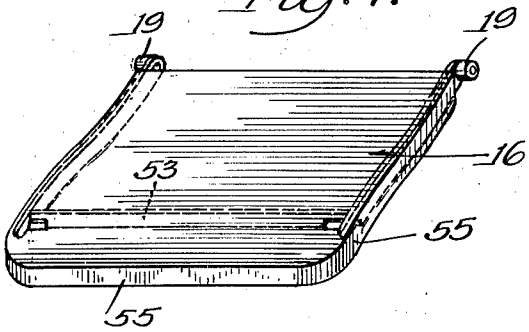


Fig. 7.



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SEAT CONSTRUCTION FOR CHAIRS

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Original application October 7, 1941, Serial No. 413,990. Divided and this application July 22, 1946, Serial No. 685,427

10 Claims. (Cl. 155—194)

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This invention relates to a new and improved construction for chairs, including chairs of the metal frame folding type and more particularly to an improved form of seat construction.

An object of the invention is to provide a sheet metal seat construction including a novel underlying frame constructed and assembled with minimum material and expense for supporting the sheet metal seat, particularly at the front end of said seat for either folding or non-folding metal chairs.

Yet another object of the invention resides in providing a novel construction of sheet metal seat on a metal frame upon which the sheet metal seat is mounted, and particularly with reference to the manner of forming the sheet metal seat with depending skirts or flanges forming a housing or attaching means for the underlying framework of the seat, and particularly with reference to the construction whereby the framework projects outwardly beyond the sheet metal seat at the rear thereof and carries antifriction means adapted to slide freely in a channel-like portion of the rear legs when the chair is folded or unfolded.

Yet another object of the invention resides in the manner of reinforcing the underside of the forward portion of the sheet metal seat beyond the pivotal axis where the seat is pivotally mounted on the front leg members or frame members and by means of which construction the weight of a person sitting in the sheet metal seat is supported forwardly of the cross brace of the frame member by projections on the frame member which extend forwardly of the point where the cross brace and side frame are interconnected.

These and other objects of the invention will be apparent from a perusal of the following specification when taken in connection with the accompanying drawings, wherein:

Figure 1 is a perspective view of an all metal embodiment of the invention showing the chair in open position;

Figure 2 is a similar view showing the chair in closed position;

Figure 3 is a sectional view taken along the line 3—3 of Figure 1;

Figure 4 is a section taken on the line 4—4 of Figure 3;

Figures 5, 6 and 7 are views of the metal seat or chassis.

The present invention is a division of my pending application Serial No. 413,990, filed October 7, 1941, which has now become abandoned, which

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in turn contains subject matter common to my prior application 170,256, filed October 21, 1937, now issued as Patent 2,364,093 of December 5, 1944.

Referring now to the drawings, and particularly to Figures 1, 2 and 3, the chair in general comprises a main frame formed from a metal channel bar 10 bent into U-shape and braced at its lower end by a cross brace 11. In cross section the substantially U-shaped frame is channel shaped, including an intermediate wall and two spaced, parallel flanges 10*a*. As shown in cross section in Figures 2 and 3, this front cross brace 11 comprising a length of relatively heavy strip sheet metal in which a central panel portion 11*a* thereof is bent forwardly substantially into the plane of the outer face of the front flange 10*a* and wherein the portions of the strip above and below the panel 11*a* are bent or are disposed rearwardly of and within the plane of the rear face of the front flange 10*a* of the channel member 10. In addition, the two ends 11*d* and 11*e*, only one being shown, of this cross brace 11 are bent at right angles to the intermediate portions of the strip 11. The brace is preferably of such a width that the width of these bent ends is substantially equal to the width of the channel of the leg member 10 so as substantially to fill and fit within the width of the channel. These normally bent, integral end portions 11*d* and 11*e* are preferably riveted as at 11*f* to the intermediate wall portion 10*a* of the channel front leg by means of two rivets. By means of this construction the lower ends of the legs are rigidified by a brace which has no tendency to turn. A pair of shorter channel bars 12 and 13 of cross section similar to that of the front U-shaped frame are provided as rear legs for the chair except that the panel portion is extended outwardly substantially into the plane of the rear face of the rear flange 12*a* and the upper and lower edge portions of this cross brace 14 are disposed forwardly and within the front face of this rear flange 12*a*. The lower portions of these legs are connected by the cross brace 14. These rear legs 12 and 13 are pivotally secured at their upper ends to the channel 10 and together form a rear support frame or rear leg structure for the chair. A more detailed disclosure of the construction of the pivotal connection between the front and rear legs will be more fully hereinafter given. A sheet metal back 15 is secured to the U-channel 10 at the upper end thereof and a preferably sheet metal seat 16 is pivotally secured to the frame by pivots 17. In addition, each rear corner of the seat is provided with a projection

18, carrying a cylindrical lug 19 slidable within its associated rear channel bar and each of the rear channel bars carries a stop 20 for limiting the upward movement of its associated lug. The lower ends of the channel bars 10, 12 and 13 carry attachable feet, affording a firm and solid support construction for the chair.

The construction of the main sheet metal seat 16 which constitutes the seat chassis or framework for the chair is illustrated in Figures 5, 6 and 7. As herein shown, the seat frame is composed of a pair of side members 52 of relatively heavy metal strap material or metal of heavier gauge than that of the seat proper. These side members carry at their ends the cylindrical lugs 19, as is clearly shown in Figures 3 and 4, and these side members 52 are secured to the cross brace member 53 preferably in the manner hereinafter disclosed. The complete seat is formed by applying a sheet metal piece 54, see Figure 5, of suitable size and shape, and preferably having holes 37 formed therein, as illustrated in Figure 5, to the seat frame. The sheet metal member 54 is formed by stamping or otherwise forming it into the shape shown in Figure 7, where it is provided with a downwardly depending flange 55 which in turn is formed with an internal flange 55*a*, see Figure 3. This sheet metal seat is secured to the frame member 22 by any suitable means which may include welding. As previously indicated, the metal seat 16 is a completely formed seat for the chair and may be used with or without a covering member. The upper surface of the seat is somewhat S-shaped, rendering it very comfortable as a seat support. The cross brace 53, together with the side frame members 52 and the marginal flanges 55 of the sheet metal seat 54, and the S-shape of the seat, makes the seat assembly very rigid and substantial. It is to be understood that the sheet metal piece 54 forming the main seat is considerably thicker than the light sheet metal piece 45, and due to its shaping which affords cantilever action, forms a very strong seat support.

In the construction of the forward ends of the two side strap members 52 and the cross brace 53 it is to be seen that the cross brace 53 is spaced somewhat rearwardly from the forward end of the seat and the side members 52 are provided with forwardly projecting portions 52*a* which constitute generally the upper half portions of the forward ends of these side straps 52. In order to accomplish the foregoing, at their forward ends the straps 52 are slitted substantially midway of their width and substantially parallel to the longitudinal axes of the straps 52 to provide two tongue portions 52*a* and 52*b*. The top edges of the strap extensions 52*a* project forwardly considerably beyond the cross brace 53 and the top edges thereof are in substantially the same plane as the top edges of the straps 52 so that the top edges of the projection 52*a* will form a projecting support for the front portion of the chair seat 54 to resist applied weight upon the seat, thus carrying the support of the seat considerably forwardly of the cross brace 53, and forwardly of the highest point of chair seat curvature. Without this forwardly extending support a relatively heavy load on the chair seat would tend to show a break or creasing in the metal of the seat, at or near the high point of curvature supported by the cross brace 53. Thus I have provided a maximum support using a minimum amount of material. In addition, by bending the tab 52*b* at right angles it may be welded or otherwise affixed to the cross brace 53 at both ends of the same to add additional strength, especially at the seat front edge. By reason of the foregoing construction of the frame 52 and 53 in the manner hereinbefore just pointed out, it is to be noted that both the side rails 52 and the cross brace provide an important design and provide maximum strength at minimum cost because the amount of metal used for bracing is held to a minimum by reason of this construction. It will be noted that in the final assembly the flange portion 55 of the sheet metal seat 54 which encloses the two frame straps 52 is secured to these side straps 52 by means of the rivets or bolts 17 about which the seat pivots and are also secured thereto by means of rivets 18*a* at the rear ends of the seats. It will also be noted that the downwardly turned flange 55 of the seat is bent inwardly as at 55*a* to hide rough edges, and this inturned flange 55*a* likewise snugly fits against the bottom edge of the straps 52. The cross brace 53, together with side members 52 and the marginal flanges 55 and the S-shape of the seat, make the seat very rigid and substantial.

In the operation of the structure, it is to be noted that the side frame members 52 of the seat act as levers supported substantially centrally by the frame pivots 17, and experience a downward thrust at their ends through the stops 19—20 and at their forward ends, due to the fact that the principal weight of the user is carried substantially at the high point or apex of the seat, which substantially overlies the cross frame bar 53. In this connection it is further to be noted that the extending ears 52*a* of the side frame members project sufficiently forwardly so that the supporting action of the levers or side frames 52 is extended substantially to the front of the seat, preventing collapse thereof, while permitting the cross frame bar 53, as stated, to be disposed substantially beneath the apex or high point of the seat to preserve the contour of the seat surface and provide adequate cross support at the most advantageous point. At the same time this construction provides a means whereby the cross support may be simply attached to the side frame members, as by welding, to the bent ear portion of the front of the side frames. The ears 52*a*, the cross bar 53, and the lever-like side frames 52, together with their support fulcrums 17 and 19—20, thus cooperate and combine to effect a firm support of the seat, when in open position, with a minimum of parts and weight of material.

Pivot pin 17, and its cooperative nut 28, and the rivet 18*a*, Figure 4, firmly secure the seat member 54 and the frame bars 52 together as an integral unit, so that the seat and frame act as a unit in the aforesaid lever action in supporting the front part of the chair under the weight of a person sitting thereon.

By reference to Figures 3 and 4 it will be seen that the rear depending flange 55 of the sheet metal seat is cut away at the corners to provide two inwardly extending tabs 54*b* and that rivets 55*c* pass not only through the depending side flange portions 55 of the sheet metal seat, but also through these forwardly bent tabs 55*b* and through the metal frame or strap members 52 whereby these rivets serve to unite three thicknesses of metal at the rear of the chair, to-wit, they rivet the downwardly depending side flanges

of the sheet metal seat to the rear portions of the frame **52** and also to the forwardly extending tabs or ears **54***b* of the rear depending flange of the sheet metal seat. Flanges **55***a* are cut away or are mitered at the corners, see Figure 4, to permit bending of flanges **55***a* at right angles to the flanges **54***a*. And at the same time the rear extensions **18** of the frame members **52** pass beyond rear flange **54***a* of the seat at each rear corner thereof. These rear projections **18** each carry a roller **19** to slide in track bar channel **13** of the rear legs **12**.

It is obvious that various changes may be made in the specific embodiments of the invention and in the several method steps of manufacture heretofore set forth, without departing from the spirit of the invention. For instance, padding could be applied to the back and/or seat of the chair. Accordingly the invention is not to be limited in any way to the precise embodiments shown or described, but only as indicated in the following claims.

The claims of the present application are directed more particularly to the seat construction, various other features of the structure disclosed being set forth and claimed in related cases.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A metal chair construction comprising a metal seat, said seat comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turning flanges extending about peripheral portions thereof and said seat member being of somewhat S-shape from the front to the rear, said seat frame comprising a pair of parallel, spaced apart side frame members lying generally within the depending flanges of the sheet metal seat member and extending substantially from the rear of said sheet metal seat member and terminating short of the front of said sheet metal seat member, and a metal cross brace extending between said side frame members adjacent but spaced rearwardly of the forward ends thereof, each of said side members having portions extending forwardly of said cross brace to provide a forwardly projecting extension having a portion underlying to support the underside of the sheet metal seat member beyond said cross member on each side of said seat, and each of said side frame members adjacent its junction with the cross brace including a second metal extension bent normally to said first metal extension and attached to said cross brace.

2. A metal chair construction comprising a metal seat, said seat comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turning flanges extending about peripheral portions thereof and said seat member being of somewhat S-shape from the front to the rear, said seat frame comprising a pair of parallel, spaced apart side frame members lying generally within the depending flanges of the sheet metal seat member and extending substantially from the rear of said sheet metal seat member and terminating short of the front of said sheet metal seat member, and a metal cross brace extending between said side frame members adjacent but spaced rearwardly of the forward ends thereof, each of said side members having upper portions extending forwardly of said cross brace to provide a forwardly projecting extension having its upper edge underlying to

support the underside of the sheet metal seat member beyond said cross member on each side of said seat, and each of said side frame members adjacent its junction with the cross brace having a lower metal extension bent normally to said upper extension and attached to said cross brace.

3. A metal chair construction comprising a metal seat, said seat comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turning flanges extending about peripheral portions thereof, said seat frame comprising a pair of parallel spaced apart side frame members lying generally within the depending flanges of the sheet metal seat member and extending substantially from the rear of said sheet metal seat member toward the front thereof, and a metal cross brace extending between said side frame members intermediate the length thereof, each of said side frame members adjacent its junction with the cross brace being provided with a metal extension bent normally to the body of the frame member and attached to said cross brace.

4. A metal chair construction comprising a metal seat, said seat comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turning flanges extending about peripheral portions thereof, and said sheet metal seat member being convexly curved in longitudinal cross section along a predetermined length thereof, said seat frame comprising a pair of parallel spaced apart side frame members lying generally within the depending flanges of the sheet metal seat member and extending substantially from the rear of said sheet metal seat member toward the front thereof, and a metal cross brace extending between said side frame members intermediate the length thereof and underlying the curved portion of the sheet metal seat member, each of said side frame members adjacent its junction with the cross brace being provided with a metal extension bent normally to the body of the frame member and attached to said cross brace.

5. A metal seat construction adapted for use with a folding chair and comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turned flanges extending about peripheral portions thereof, said seat frame comprising a pair of side frame members lying within the side flanges of said sheet metal seat member, the rear ends of said side frame members projecting beyond the rear of said sheet metal seat member and adapted for connection with the chair, and the forward ends of said side frame members terminating short of the front edge of said sheet metal seat member, the forward ends of said side frame members being formed to provide an upper tongue and a lower tongue, said lower tongue being bent at right angles to the plane of said side frame members, and a metal cross brace extending across the underside of the forward portion of said sheet metal seat member with its ends disposed adjacent said side frame members and secured to the bent lower tongues of said side frame members, the upper tongue of each of said side frame members projecting forwardly beyond the cross brace with its upper edge underlying portions of the sheet metal seat member forwardly of the cross brace for supporting said portions.

6. A metal seat construction adapted for use

with a folding chair and comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turned flanges extending about peripheral portions thereof, said seat frame comprising a pair of side frame members lying within the side flanges of said sheet metal seat member, the rear ends of said side frame members projecting beyond the rear of said sheet metal seat member and adapted for pivotal connection with the chair, the forward ends of said side frame members terminating short of the front edge of said sheet metal seat member, said forward ends of said side frame members being formed to provide an upper tongue and a lower tongue, said lower tongue being bent at right angles to the plane of said side frame members, and a metal cross brace extending across the underside of the forward portion of said sheet metal seat member with its ends disposed adjacent said side frame members and welded to the bent lower tongues of said side frame members, the upper tongue of each of said side frame members projecting forwardly beyond the cross brace with its upper edge underlying portions of the sheet metal seat member forwardly of the cross brace for supporting said portions, fastening means passing through rear portions of said depending side flanges of the sheet metal seat member and rear portions of said side frame members for securing the same together, and means passing through the depending side flanges of said sheet metal seat member and through substantially central portions of said side frame members and forming a pivot for said seat and also securing said sheet metal seat member flanges to said seat side frame members.

7. A metal seat construction adapted for use with a folding chair and comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turned flanges extending peripherally thereof, said downwardly turned flanges at their bottoms terminating in inwardly bent, shorter flanges, said sheet metal seat member being of somewhat S-shape from front to rear, said seat frame comprising a pair of parallel, spaced apart metal side frame members of heavier gauge than the metal of said sheet metal seat member and lying generally within the depending flanges of the sheet metal seat member along the sides thereof, and said side frame members being of sufficient height to extend substantially from the underside of the seat surface of said sheet metal seat member to the confronting upper faces of said shorter inturned flanges, said side frame members having portions extending rearwardly beyond the rear of said sheet metal seat member and having other portions terminating short of the front of said sheet metal seat member, a metal cross brace extending between said side frame members and lying between the depending side flanges of said sheet metal seat member adjacent the forward ends of said side frame members, said forward ends of said side frame members being formed with a pair of tongues, one of the tongues of each of said side frame members being bent at right angles and being fixed to one of the ends of said cross brace, and the other tongue of each of said side frame members extending forwardly beyond the cross brace and being juxtaposed to the underside of the seat surface of the sheet metal seat member, means providing a seat pivot passing through portions of said depending side flanges of said sheet metal seat member and through adjacent contacting portions of said side frame members and forming means for securing the latter together and said seat pivot being adapted for connection with the chair, and the rearwardly projecting portions of said side frame members supporting bearing members adapted for connection with the chair.

8. A metal seat construction adapted for use with a chair and comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turned flanges extending about peripheral portions thereof and said seat member being of generally S-shape from front to rear, the highest portion of said seat member when the seat is in open position being disposed rearwardly of the front edge thereof and said seat member from said highest portion curving downwardly toward its front edge, said seat frame comprising a pair of side frame members lying adjacent the side flanges of said sheet metal seat member and being generally of a contour conforming to the curved shape of said sheet metal seat member, the rear ends of said side frame members projecting beyond the rear of said sheet metal seat member and having bearing members adapted for connection with the chair, the forward ends of said side frame members terminating substantially at said highest point of the substantially S-shaped curve of said chair seat, and a metal cross brace extending transversely of said chair seat and underlying said sheet metal seat member substantially at said highest point, the ends of said cross brace lying between the side frame members and the flanges of the sheet metal seat member, each of said side frame members adjacent its forward end having a portion bent at right angles to engage the adjacent end of the cross brace and being attached thereto, and each of said side frame members having a portion extending forwardly beyond the cross brace and lying adjacent the side flanges of said sheet metal seat member for supporting laterally spaced portions of the forwardly, slightly downwardly curved front of said sheet metal seat member which is otherwise unsupported.

9. A metal seat construction adapted for use with a folding chair and comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turning flanges extending about peripheral portions thereof, said seat frame comprising a pair of parallel spaced apart side frame members adapted to be secured to the chair and lying generally within the depending flanges of the sheet metal seat member and extending rearwardly therefrom a predetermined distance and adapted for connection with the chair, and a metal cross brace extending between said side frame members intermediate the length thereof and underlying an intermediate portion of said sheet metal seat member, each of said side frame members adjacent its junction with the cross brace being provided with a metal extension bent normally to the body of the frame member and attached to said cross brace.

10. A metal seat construction adapted for use with a folding chair and comprising a seat frame and a sheet metal seat member adapted to overlie and bridge said frame, said sheet metal seat member having downwardly turning flanges extending about the periphery thereof, said seat frame comprising a pair of parallel spaced apart side frame members lying within the depending

side flanges of the sheet metal seat member and having portions extending rearwardly therefrom and adapted for connection with the chair, the depending rear flange of said sheet metal seat member having laterally turned end portions lying parallel to the side frame members, common securing means for connecting the depending side flanges of the sheet metal seat member and the end portions of the depending rear flange to the side frame members, and means extending through the side frame members and the depending side flanges of the sheet metal seat member arranged to form a connection with the chair.

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