Nov. 9, 1937. P. E. G. ERICSON 2,098,743

CHAIR

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Fig. 1

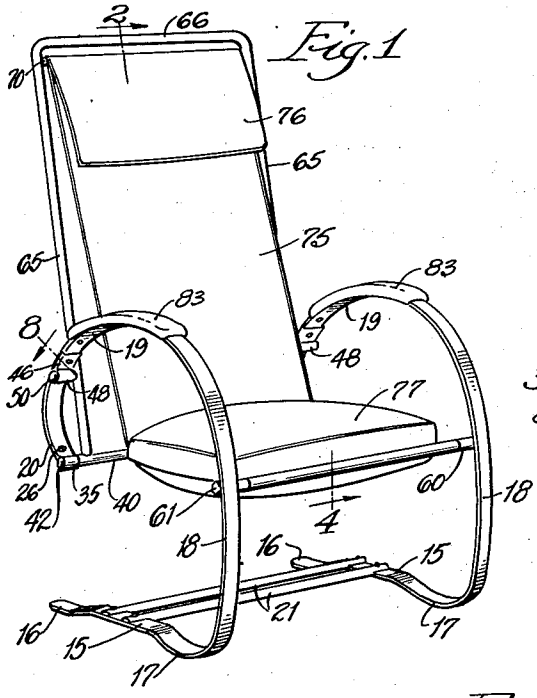



Fig. 2

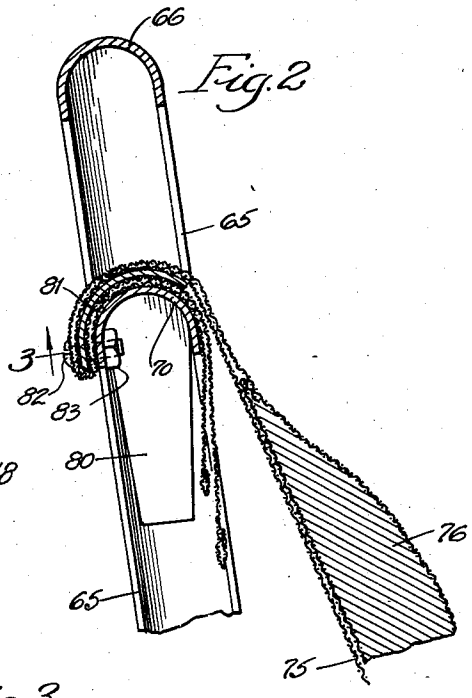



Fig. 3

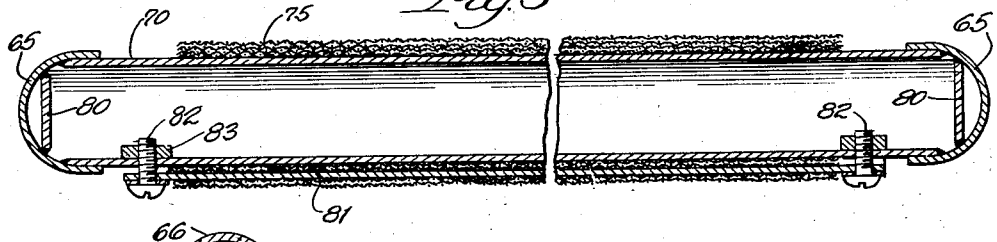



Fig. 4

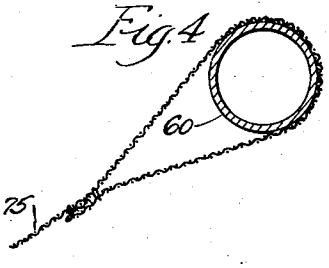
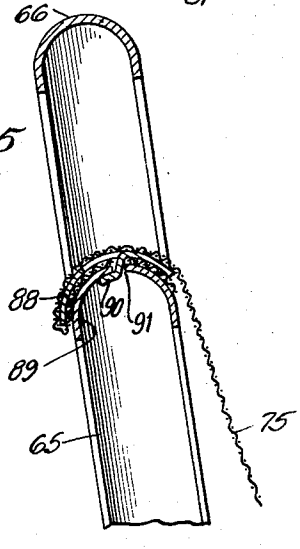



Fig. 5




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Fig. 6

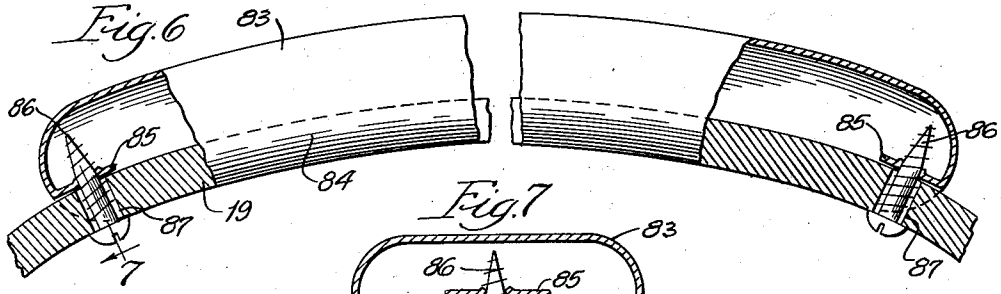



Fig. 7

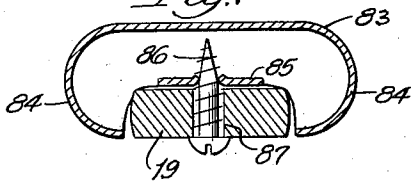



Fig. 8

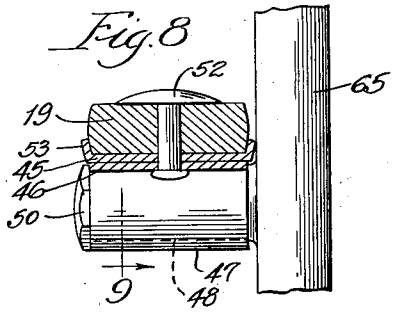



Fig. 9

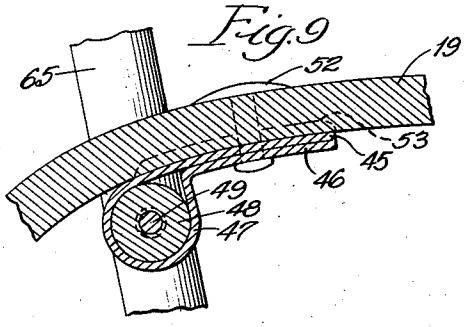



Fig. 10

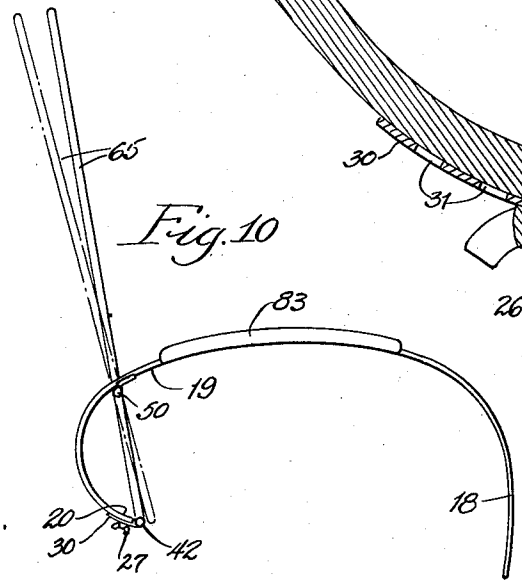
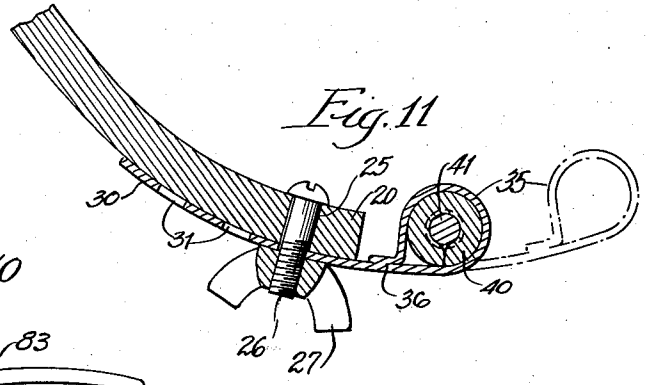



Fig. 11




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Fig. 12

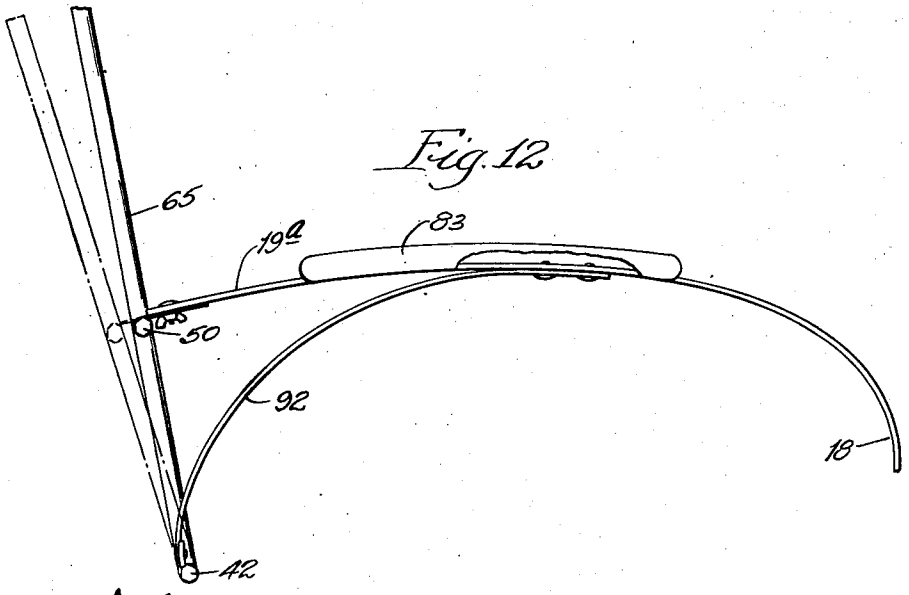
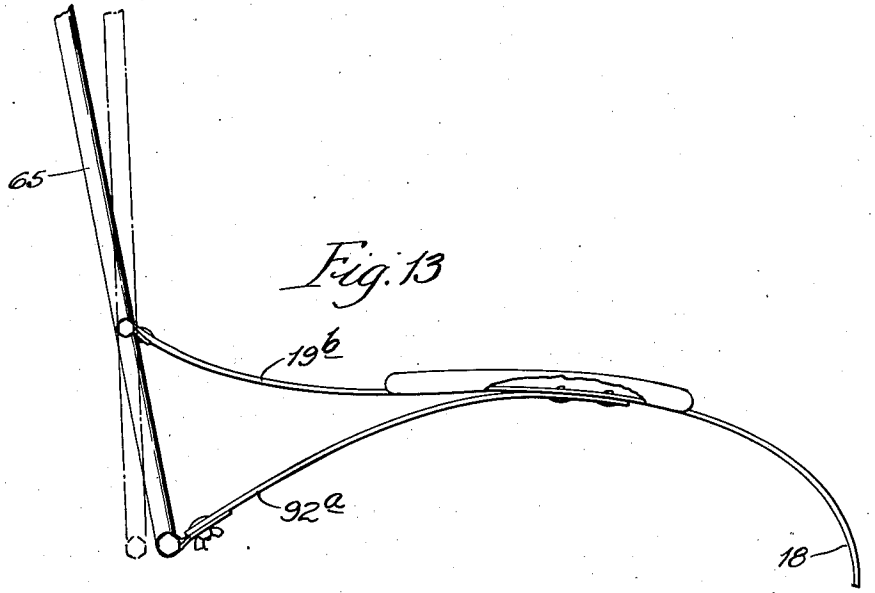



Fig. 13




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# UNITED STATES PATENT OFFICE

2,098,743

## CHAIR

Philip E. G. Ericson, St. Charles, Ill., assignor to The Howell Company, St. Charles, Ill., a corporation of Illinois

Application November 26, 1935, Serial No. 51,646

6 Claims. (Cl. 155—50)

This invention relates to a chair having a metallic frame which supports a sheet forming a seat and back for the chair. More particularly, the present improvements have to do with the combination of a resilient base or supporting frame and a rigid chair or back frame, the one being connected to the other in such a manner as not to impair the resilient action which, in part, is depended upon to afford comfort and ease to the occupant. In addition, the present improvements are directed to certain details of construction, such as means for adjustably connecting to the chair frame the flexible sheet which forms the seat and back; means for tensioning the seat so as to prevent sagging with consequent conformation to the form and figure of the occupant; means for constructing and connecting arm rests to the base frame; means for adjustably connecting the chair frame to the base frame; and various other features of construction, all as hereinafter pointed out and claimed. Certain exemplifications of this invention are illustrated in the accompanying drawings, wherein,—

Figure 1 is a perspective view in elevation of the chair in its entirety;

Fig. 2 is an enlarged detail in section on line 2 of Fig. 1;

Fig. 3 is an enlarged detail in section on line 3 of Fig. 2;

Fig. 4 is an enlarged detail in section on line 4 of Fig. 1;

Fig. 5, which is an enlarged detail in section, shows a modification of the construction illustrated in Fig. 2;

Fig. 6 is a longitudinal section through the arm rest and associated arm portion of the base frame;

Fig. 7 is a transverse section on line 7 of Fig. 6;

Fig. 8 is an enlarged detail in section on line 8 of Fig. 1;

Fig. 9 is an enlarged detail in section on line 9 of Fig. 8;

Fig. 10 is a fragmentary side elevation of the chair base frame, showing in dotted lines a moved position of the former;

Fig. 11 is an enlarged detail in section through the depending extremity of the arm portion of the base frame showing its adjustable connection to an associated fitting;

Fig. 12 is a view similar to Fig. 10, showing a modification in the construction of the base frame; and

Fig. 13 is a similar view showing a further modification thereof.

The present chair comprises a resilient base frame which carries a relatively rigid chair frame therein wherein is supported a yielding seat and back. As shown, the base frame consists of two C-shaped resilient straps of spring steel or the like, together with certain connecting bars. Starting from its lower end, each strap proceeds horizontally to provide a supporting base portion 15 having downset feet 16 and 17. Adjacent the forward foot the strap swings through an upward turn and thence vertically to provide an upright supporting portion 18, which at its upper end extends rearwardly through a wide arc to provide an arched arm rest portion 19. Continuing rearwardly the terminal arm portion is bowed to afford a reverse turn downwardly and forwardly so as to present its extremity 20 at a point definitely below the arm rest and at a point in advance of the rearmost turn of the arm portion. Between the two feet, the strap is arched upwardly at 15, as shown in Fig. 1, so that floor contact is limited to the feet. Connecting the two C-straps are one or more bars 21, the ends of which are secured thereto in the elevated portion between the feet, thus affording a firm and rigid base structure extending rearwardly to a sufficient extent to afford the entire support and serving to suspend the chair as a whole above the base structure thus afforded. Near the forwardly turned free end of each C-strap is a transverse bolt opening 25, through which may be inserted a bolt 26 equipped with a removable wing nut 27. The bolt serves to hold in place a tongue 30 formed by preference with several openings 31 therethrough. The bolt which serves to connect the tongue to the end of the C-strap may be inserted through a selected one of these openings, whereby to secure the tongue in a selected position longitudinally of the C-strap. The forward tongue end projects beyond the extremity of the C-strap, at which point it is curved around in the form of an eye or loop 35. The loop end may be secured in place as by a welding connection 36.

Accommodated within the eye or loop of the tongue is one end of a pipe bar 40 which may conveniently be formed from flat stock which is bent into cylindrical form. This pipe bar may be threaded interiorly to receive a stud bolt 41 having a head 42 (See Fig. 1). The pipe bar extends transversely between the two spaced C-straps to provide a means of connection therebetween. The head of each stud bolt is adapted to bear against the end of the eye or loop so as to retain the pipe bar in place. If these bolts be

withdrawn, the pipe bar may be taken out for purposes of disassembly.

Each C-strap is further provided with a clip (see Fig. 9) affixed to its under side at a point above its rear extremity. This clip, as shown, may be in the form of a metal strap loop having its two ends 45 and 46 in overlapping relation, and an interior eye 47 through which extends a cylindrical stud 48 extending laterally from the back frame presently to be described, and having an axial socket which is threaded to receive a stud bolt 49 with a head 50. Registering openings are formed through the overlapping ends of the clip for the reception of a bolt or rivet 52 which passes through a hole in the arm portion of the C-frame. In addition, the turn of the clip which lies next to the arm portion is provided at its sides with upturned flanges 53 embracing opposite edges of the C-strap. These flanges serve to hold the clip securely against motion of any kind when secured in place with the aid of a single rivet or bolt 52. It will be understood that a similar clip is provided for the arm portion of each C-strap.

Corresponding to the rear bar 40, which extends transversely between the two C-frames to interconnect their rear ends, is a second connecting bar 60 lying in a forward position. This latter bar may be made from rolled stock, as already described, with its ends received within loops of clips the same in construction and mode of attachment as the one already described in connection with Fig. 9. As by means of bolts having heads 61, this forward bar may be removed for purposes of disassembly or otherwise.

Associated with a resilient base frame having the construction described is a relatively rigid chair or back frame. As shown, the back frame is made of flat stock rolled into half round channel form with its concave side inwardly disposed. The frame comprises two standards 65, which spring from the bar 40 and extend in substantially vertical direction and a connecting horizontal portion 66 at their upper ends.

In addition to the connection between the lower extremities of the back frame and the rear crossbar 40, I have provided further medial connections with the clips on the under side of the arm portions of the seat frame. These connections are afforded by studs 48 (see Fig. 9) which extend laterally from the standards 65 and combine with the connections afforded by the bar 40 to hold the back frame in yielding upright relation at the rear ends of the flexible C-straps without other contact or connection with the floor. The rigid back frame is thus held suspended at the free ends of the flexible C-straps, which in turn are supported at their lower ends only upon the floor. As shown in Fig. 10, the flexibility of the free bowed ends of the C-straps is sufficient to allow the back frame within rather close limits to rock or pivot on the studs 48 as an axis, and to swing back into the rear position indicated in dotted lines under the spring tension of the C-straps, which are thus drawn forward beyond their normal positions.

I may add a crossbar 70 to the chair frame at a point near its upper end, preferably in slightly spaced relation to the connecting bar 66. This cross bar serves as a support for the upper end of the chair back which may comprise a sheet 75 of fabric or the like extending downwardly and then horizontally to connect with the forward bar 60 to provide also a seat for the chair. This combined back and seat which is otherwise unsupported hangs suspended between the arched over arm rest portions of the C-straps. If desired, a pillow 76 may be carried near the upper end of the fabric sheet to serve as a headrest, and a further pillow or cushion 77 may be set on the sheet in its lower region, furnishing a comfortable seat for the occupant.

The cross bar 70 is shown in detail in Fig. 2, where it appears in the form of a half round channel bar with depending tongues 80 at opposite ends fitting into the concave inner faces of the upright legs of the chair frame. The connection may be made permanent, if desired, as by welding. Associated with the rounded cross bar is an overlying clamp bar 81, also of half round channel form, extending for substantially the entire distance between the two legs of the chair frame. This clamp bar is adapted to be secured in place to the cross bar as by means of bolts 82 equipped with nuts 83. The sheet fabric forming the combined back and seat is extended over the clamp bar and thence around its end to pass over the cross bar, the ends of the material continuing for a short distance therebeyond but in a position of obscurity.

The bolts 82 are located beyond the edges of the sheet material (see Fig. 3), which need not therefore be perforated for the bolts to occupy their effective positions. When tightened, the clamp bar will be pressed against the cross bar with the sheet of material clamped therebetween. In addition, the material passes around the lower and rearward edge of the clamp bar, thus developing a resistance to slipping which enhances that afforded by the clamping action between the two bars.

The arm rest portions of the C-strap are provided with arm rests of the character shown in Figs. 6 and 7. Each arm rest is in the form of an upwardly bowed metal strap 83 having its sides 84 bowed downwardly and inwardly to embrace the edges of the arm rest portion 19, and also having its ends bowed downwardly and inturned to afford tongues 85 which are apertured to receive and engage the threads of steeply pitched metal screws 86 entered through the burred apertures 87, the burrs of which enter between the threads, the arrangement affording an arm rest which is smoothly rounded throughout and adequately secured with concealed fastenings.

Fig. 5 illustrates a modification in the fastenings provided for the upper end of the fabric 75. In this case its upper end is looped around an outer half round clamping plate 88, and under said plate which overlies a cross bar 89, so that the fabric is clamped between the plate and the bar, the plate 88 being provided with tines 90 which pierce the fabric and enter apertures 91 in the cross bar, thus holding the fabric tightly clamped throughout its upper edge and reinforcing the same from side to side so that the strain will not be centered at any point in sufficient degree to cause tearing.

In Fig. 12, a modification is shown, in which the arm rest portions 19a of the C-straps extend directly backward and connect with a medial portion of the back frame through fittings similar to those illustrated in Fig. 11. The connection thus afforded is supplemented by a bowed brace bar 92, which at its rear lower end connects with the bar 40 of the back frame by means of similar fittings, so that the back frame is thus firmly held and suspended at the free ends of the C-straps while the bowed brace bars are sufficiently flexible to permit limited movement of the back

frame against the spring tension of the brace bars to the extent indicated in dotted lines. Fig. 13 shows a construction similar to that last described, except for the fact that the arm rest portions 19b are curved upwardly to the points of connection for the back frame, and the brace bars 92a are less deeply bowed, but in other respects the construction is similar and functions in a similar manner.

The chair of the present invention is one which is extremely simple in its general structure, in that it affords an extended base for floor contact and suspends the entire weight of the chair with the occupant from the C-straps which arch over the base in such a way as to bring the center of weight into substantially coincident relation with the center of the base, so that there will be no likelihood of overturning the chair even when the occupant presses backward to the extreme limit of yield afforded in the connections.

The chair is one which combines a flexible or yielding support with a rigid back frame having a two-point pivotal connection with the free end of each C-strap, so that the rigid back frame will, within close limits, swing or pivot upon the medial connections thus afforded and against spring tension applied to the connections at the lower end of the back frame. This limited yielding thus afforded to a back frame which is itself inherently rigid supplements the variable flexation which is afforded by the arm rest portions of the C-straps, so that the occupant of the chair can enjoy considerable variation of movement, without, however, flexing the chair to an extreme degree or to an extent which might cause overturning.

The construction is also one which serves to suspend the fabric of the combined seat and back between the upper portion of the back frame and the forward cross bar 60, without additional connection with any other portion of the chair structure, thereby affording free opportunity for the combined seat and back to adapt itself to the posture and contour of the occupant, without, however, permitting undue sagging or unrestrained flexation. This is due to the fact that the back frame is itself a rigid structure which at all times serves to distend the fabric to the required degree within the desired limits of movement, since the flexation of the metallic structure of the frame is centered and confined entirely within the C-bars themselves and is not distributed in part to the back frame, which maintains its rigidity at all times irrespective of the angle to which it may be tilted.

The fittings provided are of a nature to afford adequate pivotal connection between the C-bars and the medial and lower end portions of the back frame, without, however, complicating the structure or introducing obtrusive and unsightly disfigurements which would tend to impair the simplicity of outline of the chair or unduly complicate its structure, and are at the same time of a nature which will permit of a quick and easy assembly or disassembly of the parts as occasion may require. Likewise, the means provided for retaining the fabric are of a nature which will permit easy adjustment to regulate the amount of slack or sag desired, and when clamped together will prevent the centering of strains in any one point which might cause warping or tearing of the fabric when subjected to long continued use.

The chair as a whole is one which presents an attractive appearance and affords sufficient flexation to provide for the comfort of the occupant, without, however, permitting sufficient yield to occasion apprehension in the mind of the occupant regarding the security or stability of the chair.

Although the form shown in Fig. 1 is preferred, for the reason that it provides the necessary two-point separated connections between the arm portions and the back frame, without the necessity for providing additional brace bars, nevertheless the forms of construction illustrated in Figs. 12 and 13 may in some instances be preferred, both by reason of the variation in appearance afforded and by reason of the fact that the modified forms provide for a somewhat different shaping of the arm rests, and afford some variation in the factors involved in the resultant yield or flexation to which the chair is subjected.

Although the invention has been described with particularity as to detail, it is not the intention, unless otherwise indicated in the claims, to limit the invention to the forms shown, since modifications thereof may be made without departing from the spirit of the invention.

I claim:

1. In a chair, the combination of a base frame comprising a floor contacting member and a resilient supporting member consisting of spaced side portions extending upwardly from the forward edge of the floor contacting member and then rearwardly to overlie the floor contacting member with their rear ends standing in freely suspended relation thereto over the rear end of the floor contacting member, a back frame located between the spaced side portions of the supporting member and having on each side two vertically separated points of direct connection with the freely suspended ends of the side portions of the supporting member, the rear end of each of said side portions terminating at the lowermost connection with said back frame and providing between said vertically separated points of direct connection a resilient support for the back frame, and a seat and back carried by the back frame and the side portions of the supporting member.

2. In a chair, the combination of a base frame comprising a floor contacting member and a resilient supporting member consisting of spaced side portions extending upwardly from the forward edge of the floor contacting member and then rearwardly to overlie the floor contacting member and stand with their rear ends in freely suspended relation thereto over the rear end of the floor contacting member, a back frame located between the spaced side portions of the supporting member and having on each side two vertically separated points of connection with the freely suspended rear ends of the side portions of the supporting member, the upper points of connection providing an axis for the tilting of the back frame and the lower points of connection being adapted to yieldingly resist tilting of the back frame, and seat and back portions connected at the upper end to the upper portion of the back frame and connected at the forward end to the front of the supporting member.

3. In a chair having a base frame comprising a floor contacting member and a resilient supporting member extending upwardly from the forward side of the floor contacting member and recurved rearwardly to overlie the floor contacting member and stand in freely suspended relation thereto over the rear end of the supporting member, the members of the base frame being

composed of separated C-shaped steel straps, a rigid back frame having on each side adjacent its lower extremity two vertically separated points of direct connection with freely suspended rear end portions of the supporting member, the rear end portions of the supporting member terminating at the lowermost connection with the back frame and providing between said points of connection a resilient support for the back frame, and a combined seat and back connected at its upper end to the upper portion of the rigid back frame and connected at its forward end to the front of the supporting member.

4. In a chair having a base frame formed of two erected resilient C-shaped steel straps having capacity for flexing only in a vertical plane, each strap being formed to provide a floor contacting member, an upwardly extending front member and a rearwardly extending member, said rearwardly extending member providing an arm rest, a rigid back frame directly connected to each of the rearwardly extending members at two vertically spaced points, said spaced points of connection permitting limited tilting of the back frame relatively to the rearwardly extending members under the spring resistance thereof, between said points of direct connection with the back frame, and back and seat portions connected respectively near the top of the rigid back frame and to the upright forward portions of the C-shaped steel straps.

5. In a chair, the combination of a base frame formed of two erected flexible C-shaped steel straps having capacity for flexing only in a vertical plane, each strap being bent to provide a floor contacting portion, a forward upright portion and a rearwardly recurved arm portion, the arm portions being downwardly and forwardly recurved at their rear ends, a forward transverse bar connecting the two upright portions, a rearward transverse bar connecting the rear ends of the arm portions, a rigid U-shaped back frame having its lower ends joined to the rearward transverse bar and extending upwardly therefrom, pivotal connections between the two arm portions and the back frame and located at points above the rearward transverse bar and affording an axis for the limited tilting of the back frame against the spring tension exerted upon the rearward transverse bar, and a combined seat and back of flexible sheet material connected at its upper end to the upper portion of the back frame and at its forward end to the forward transverse bar.

6. In a chair having a base frame formed of two erected C-shaped flexible steel straps having capacity for flexing only in a vertical plane, each of said straps being bent to provide a floor contacting portion, a forward upright portion and rearwardly extending arm portions, the rearward ends of said arm portions being supplemented by brace bars connected at their forward ends to the arm portions and diverging at their rear ends therefrom to afford a rearwardly bifurcated arm portion, a back frame pivotedly connected on each side to the adjoining upper member of the bifurcated arm portion and having the lower end of the frame connected to the lower member of the bifurcated arm portion, the upper points of connection affording an axis for the limited tilting of the back frame against the spring tension of the lower members of the bifurcated arm portions, and a combined seat and back connected at its upper end near the top of the back frame and connected at its forward end between the upright portions of the C-shaped steel straps.

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