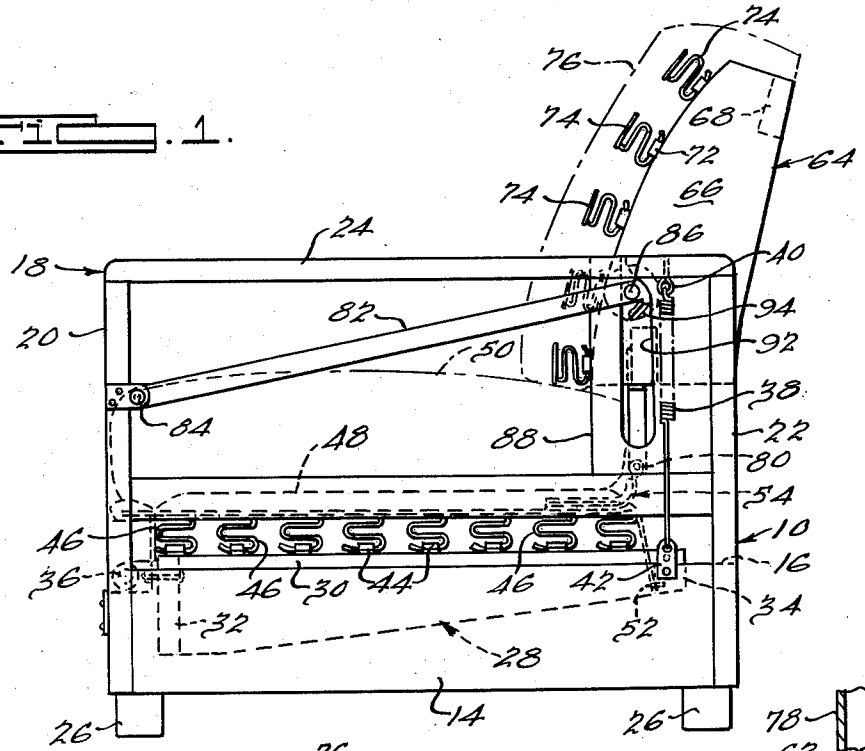
May 2, 1961 H. C. FLINT 2,982,343

CHAIR CONSTRUCTION

Filed Nov. 25, 1957 3 Sheets-Sheet 1

FIG. 1.



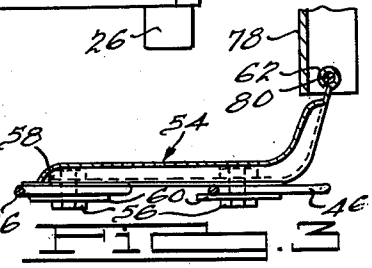


FIG. 3.

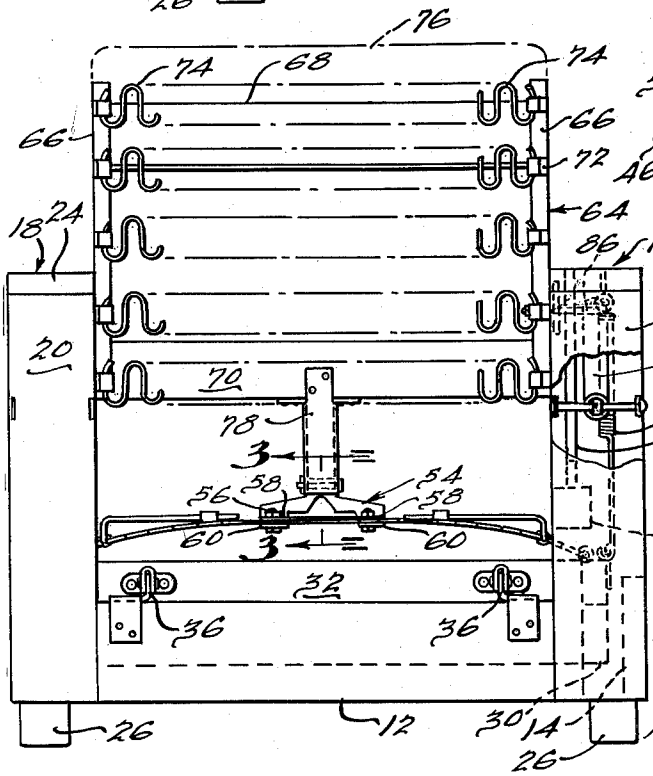


FIG. 2.

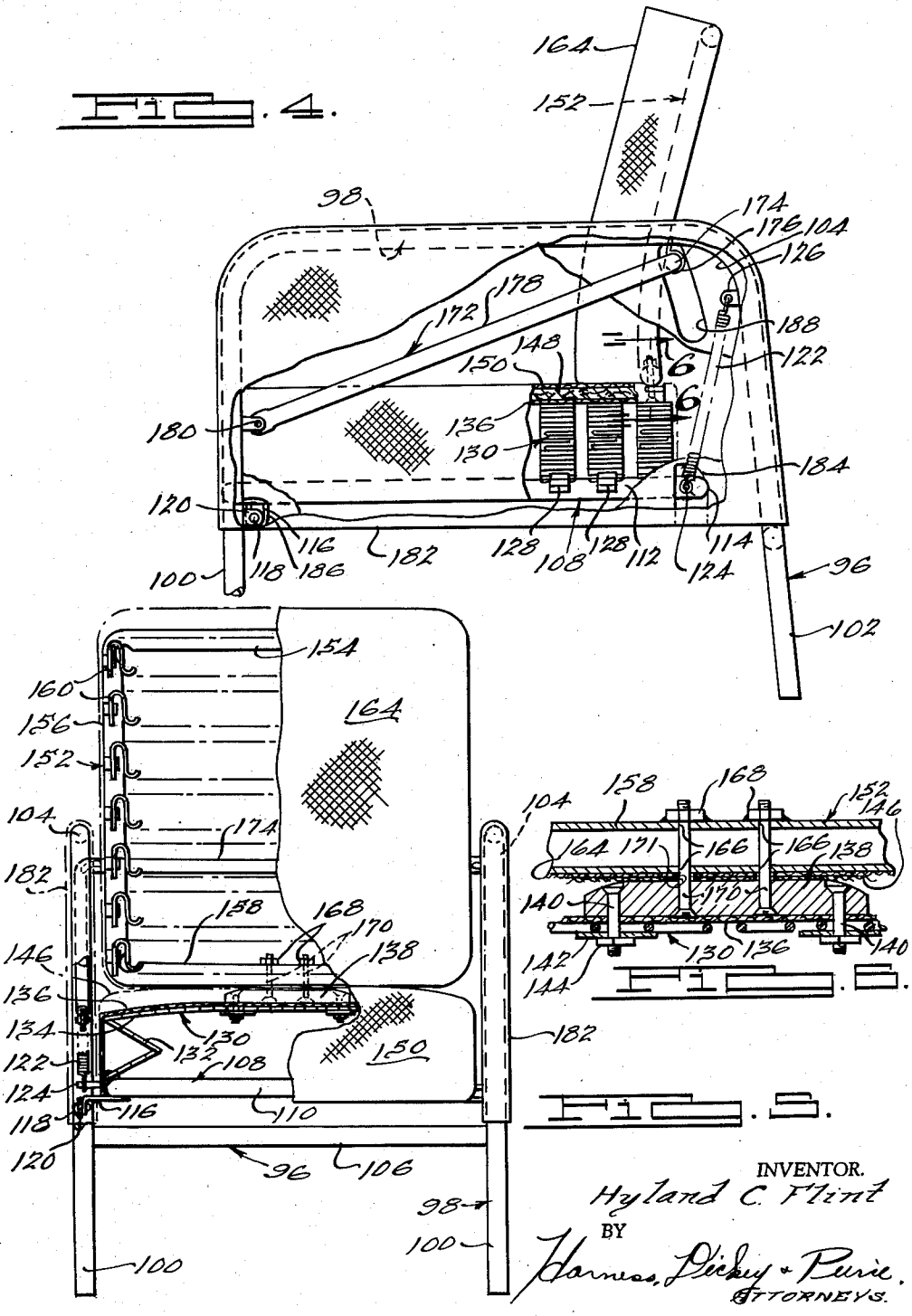
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CHAIR CONSTRUCTION

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FIG. 4.



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CHAIR CONSTRUCTION

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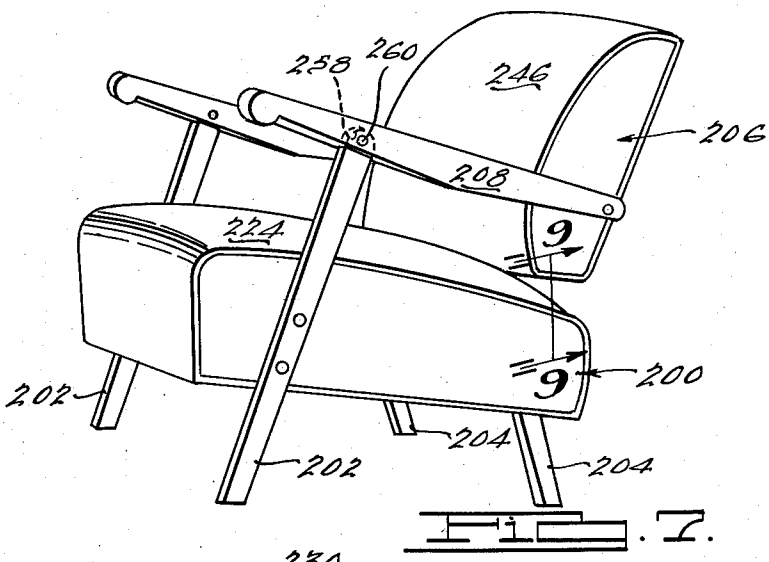


Fig. 7.

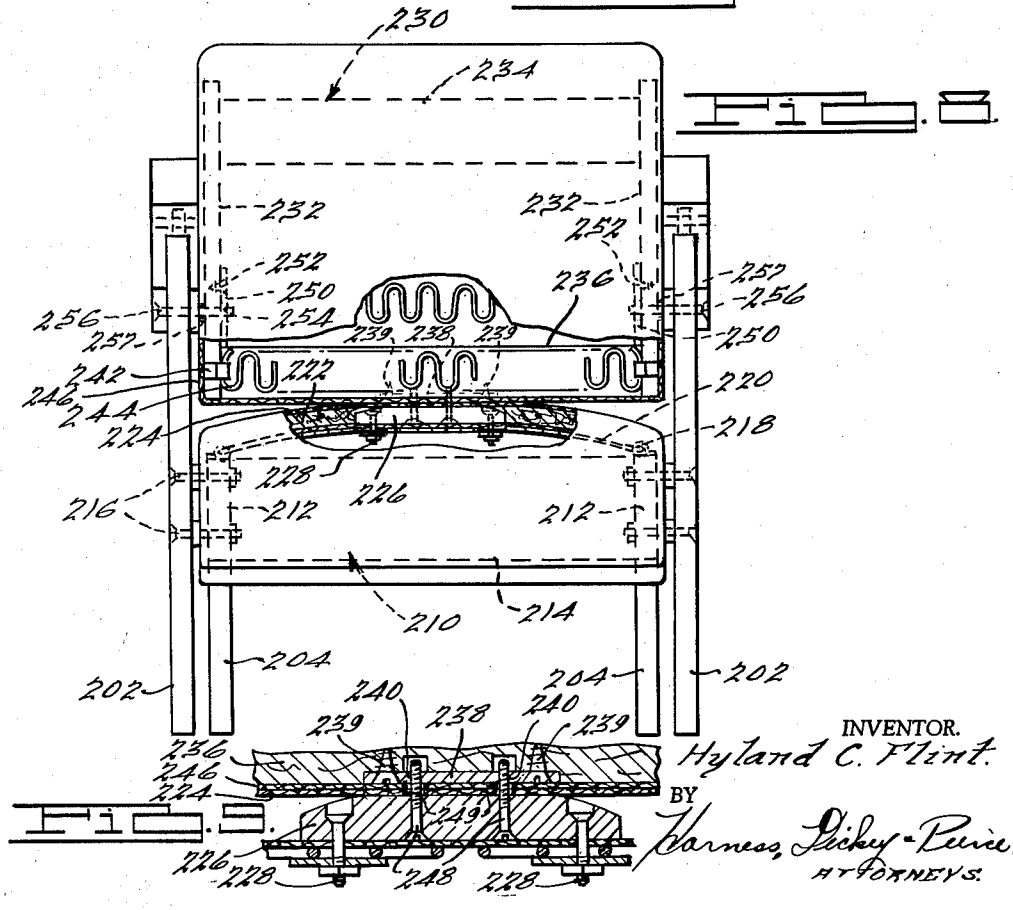


Fig. 8.

Fig. 9.

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2,982,343

CHAIR CONSTRUCTION

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Filed Nov. 25, 1957, Ser. No. 698,496

6 Claims. (Cl. 155—179)

The present invention relates to chair constructions and more particularly to a chair construction including a seat and a unison back.

The present invention pertains to chair constructions including a seat and a back which is supported on the seat for unison movement with the portion of the seat upon which it is supported. The chair includes a main frame which may support a separate seat frame, or which may include the seat frame as an integral part thereof. The frame may be formed either of wood or metal tubing, or other suitable material. The seat includes a plurality of spring strips extending across the seat frame from side to side and the opposite ends of which are secured to the seat frame by attaching clips. The spring strips provide a seating area which may either be upholstered to support an occupant directly, or may be upholstered to receive a loose cushion upon which the occupant of the chair sits. The back includes a back frame which, similarly, may be of wood, metal tubing or other suitable construction and spring strips extending across and having their opposite ends secured to the back frame by attaching clips.

The back is supported on one or more of the seat spring strips at the rear of the seating area and is fastened in place by means extending through the upholstery covering the seating area. The back, at a point spaced above its connection to the seat, is pivotally connected to a link which extends forwardly to and is pivotally connected to a portion of the main frame. In the forms of the present invention illustrated in Figures 1 to 6, inclusive, this link is disposed within hollow arms so that it is hidden from view. Also, in these forms the seat frame is separately formed and pivotally mounted on the main frame at one end and connected to the frame at its opposite end by primary load supporting spring means, which spring means is also housed within the hollow arms.

The material covering the springs of the seat causes a co-operation between the springs of the seat during loading, as when an occupant sits in the chair, with the result that, in addition to the springs directly below the occupant being deflected, the other spring strips are also pulled down and deflected to a lesser degree, including the spring strip or spring strips at the rear of the seating area upon which the back is supported. This produces a simultaneous downward movement of the back. In the constructions in which the entire seat frame moves, upon loading of the seating area, there is an additional component of downward movement of the back.

In the forms illustrated in Figures 1 to 6, in which the chairs include hollow arms, the links connecting the back to the forward portion of the main frame slope downwardly from rear to front and are generally parallel to a line between the pivotal connection of the seat frame to the main frame and the point of connection of the back to the seat. This supports the back with a parallel linkage type action so that the back remains at substantially the same angle as it moves downwardly during its unison action.

In certain preferred forms of the present invention, the seat unit and the back unit may be separately upholstered and subsequently fastened together so that the back unit is supported directly upon the rear portion of the seating area, by connecting means extending through the upholstery of the seat and back units.

Accordingly, objects of the present invention include: to provide a chair construction of the unison type including a seat having spring strips extending from side to side and defining a seating area and a back fastened to and supported on one or more of the spring strips at the rear of the seating area; to provide such a chair including material covering the seating area and distributing the load over the spring strips so that when the seat is occupied, the spring strip or strips at the rear of the seating area are deflected and produce a unison movement of the back; to provide such a unison type chair including a link pivotally connected to the back in spaced relation above the connection of the back to the seat and extending forwardly to and pivotally connected to the chair frame; to provide such a chair in which the link means slopes downwardly from rear to front when the chair is in the unoccupied condition to provide a part of a parallelogram type support for the back; to provide a chair of the above mentioned type including hollow arms which house the link means; to provide such a unison type chair in which the seat frame is pivotally mounted on the main frame and supported by primary load supporting springs which are housed within hollow arms of the chair; to provide an improved unison type chair in which the seat and back may be separately upholstered prior to connection of the back and seat; and to provide generally improved unison type chair constructions which are simple in design, economical of manufacture, pleasing in appearance, comfortable in use and reliable and efficient in operation.

Other objects and features of the present invention will be apparent to those skilled in the art from a consideration of the following specification, the appended claims and the accompanying drawings wherein:

Figure 1 is a side elevational view of a chair embodying features of the present invention showing a part of the upholstery in broken lines and a part of the upholstery removed;

Figure 2 is a front elevational view of the construction illustrated in Figure 1;

Figure 3 is an enlarged sectional view of the construction illustrated in Figure 2, taken along the line 3—3 thereof;

Figure 4 is a broken side elevational view of a chair constructed according to a modified form of the present invention and having parts broken away;

Figure 5 is a front elevational view of the construction illustrated in Figure 4, having parts broken away;

Figure 6 is an enlarged sectional view of the construction illustrated in Figure 4, taken along the line 6—6 thereof;

Figure 7 is a perspective view of a chair constructed according to another form of the present invention;

Figure 8 is a front elevational view of the construction illustrated in Figure 7, showing parts broken away; and,

Figure 9 is an enlarged sectional view of the construction illustrated in Figure 7, taken along the line 9—9 thereof.

Referring to Figures 1, 2 and 3 of the drawings, the chair construction there illustrated comprises a main frame generally indicated at 10 and which, in the construction illustrated, is formed of wood and includes a front frame member 12, side frame members 14, a rear

frame member 16 and a pair of spaced arms generally indicated at 18 and including front and rear arm uprights 20 and 22 and a top member 24. The main frame also includes supporting legs 26. In the construction illustrated in Figures 1 to 3, inclusive, the seat frame is separately formed and generally indicated at 28. This seat frame is generally rectangular in shape, including spaced parallel side members 30 which are interconnected at the front by a transversely extending member 32 and at the rear by a transverse member 34.

At its forward end the seat frame 28 is pivotally connected to the main frame 10 by hinges 36, one element of which is mounted on the front member 12 of the main frame and the other element of which is mounted on the transversely extending front member 32 of the seat frame 28 adjacent the upper edge thereof. The seat frame 28 is supported adjacent the rear thereof by primary load support springs 38, the upper ends of which are supported in eyes 40 fastened in the underside of the top member 24 of the arm 18 and the lower ends of which are connected to brackets 42 secured to the sides of the seat frame 28 adjacent to the rear edge of the seat frame 28. The side members 30 of the seat frame 28 have attaching clips 44 spaced therealong which receive the terminal portions of spring strips 46 extending transversely of the seat frame 28 to provide a seating area.

The seating area is covered in a conventional manner by upholstery material indicated at 48 adapted to support a loose cushion shown in broken lines at 50. This upholstery material 48 includes suitable padding and trim material, the outer portion of which is of higher quality in accordance with usual practice. The covering material at the rear of the seat frame extends downwardly between the side members 30 and is secured to the transverse member 34 at the rear of the seat frame, as by staples 52. The forward portion of this covering material extends downwardly and is secured to the transverse member 32 at the front of the seat frame 28. The side portions of the covering material are secured to the side members 30 of the seat frame in a conventional way.

A supporting bracket 54 is connected to the two spring strips 46 at the rear of the seat frame 28 by screws 56 extending through loops of the spring strips 46 and flange portions 58 provided on the bracket 54. As best illustrated in Figures 2 and 3, washers 60 are provided between the heads of the screws 56 and the loops of the spring strips 46. The rear portion of the support bracket 54 is turned upwardly and extends through the upholstery 48, as seen in Figure 1, and has a cylindrical connecting portion 62.

The chair illustrated in Figures 1 to 3, inclusive, also includes a back frame generally indicated at 64 which includes spaced parallel side boards 66 connected to their upper ends by a transversely extending back member 68 and connected at their lower ends by transversely extending back frame member 70. The side members 66 carry spring strip attaching clips 72 similar to the attaching clips 44 which receive the terminal portions of spring strips 74 which extend transversely of the back frame 64 and define a back rest area. These spring strips are covered by conventional upholstery shown in broken lines at 76 and which includes suitable padding material and trim material. This upholstery is secured along the top of the back frame 64 to the transverse frame member 68, along the sides to the side member 66 and along the bottom to the transverse member 70.

As best illustrated in Figures 2 and 3, the transverse member 70 of the back frame carries a downwardly extending channel-shaped connecting bracket 78 which is pivotally connected at its lower end to the supporting bracket 54 mounted on the rear springs 46 carried by the seat frame 28. This connection is effected by a pin 80 extending through the flanges of the channel-shaped bracket 78 adjacent its lower end and through the cylindrical connecting portion 62 of the supporting bracket 54 which is received between these flanges.

Pivotal movement of the back frame 64 relative to the seat frame 28 about the pin 80 is controlled by a pair of links 82 which are individual to and housed within the arms 18. These links are pivotally connected at their forward ends to the uprights 20 at the front of the arms 18 as indicated at 84 and extend upwardly and rearwardly and are pivotally connected at their rear ends to the back frame 64. This just mentioned pivotal connection is effected by pivot pins 86 which are mounted in the side members 66 of the back frame 64 and extending outwardly thereof and into the arms 18. These pins 86 at their outer ends extend through and provide a pivotal connection with the rear end portions of the links 82. These links 82 extend generally parallel to a line between the hinge 36 and the pivot pin 80, with the result that the back 64 is supported at substantially the same inclination throughout its unison movement.

To provide suitable clearance between the back 64 and each arm 18, each arm 18 is provided with a panel 88 which extends downwardly from the top 24 of the arm and forwardly from the back post 22 of the arm, as shown in Figure 1, and is set inwardly from the inner face of the arm 18, as shown in Figure 2. The lower edge of the panel 88 is secured to a horizontal frame member 90 extending between and secured to the forward and rear arm posts 20 and 22. The top bar 24 of the arm 18 is cut away adjacent the panel 88 so that the rear portion of the arm 18 is of reduced width throughout the portion which is coextensive with the panel 88. The panel 88 is provided with a generally vertically extending slot 92 through which extends the pivot pin 86 which provides the pivotal connection between the back 64 and the link 82. Each arm 18 is upholstered in a generally conventional way with the upholstery material secured to the panel 88 around the edges of the slot 92, to leave a corresponding slot in the upholstery. To prevent interference between the upholstery covering the arm 18 and that covering the side member 66 of the back, a plastic washer 94 is mounted on the pin 86 between these upholstery materials.

It will now be appreciated that in constructing the chair, the main frame 10 may be constructed, the seat frame 28 may be constructed and the springs 46 and upholstery 48 placed thereon and the seat frame 28 mounted in the main frame. The back frame 64 may be separately assembled, the springs 74 mounted thereon and the upholstery 76 applied thereto, after which the back unit may be connected to the seat unit by moving the connecting portion 62 of the bracket 54 into the channel-shaped connector 78 and inserting the pivot pin 80. After the shaft 86 at the inner end of the link 82 is connected to the back frame side member 66, the upholstering may be finished.

In the construction illustrated in Figures 1 to 3, inclusive, a single piece of trim material (not shown) may be mounted with its upper portion secured to the rear of the back 64 and its lower portion secured to the lower part of the rear posts 22 of the arms 18.

From the foregoing description of the construction illustrated in Figures 1 to 3, inclusive, it will be appreciated that when an occupant sits on the seat cushion 50, two simultaneous actions take place. First, the springs 46 of the seat frame 28 deflect, including some deflection of the rear spring strips 46 upon which the back 64 is mounted, thus affording a component of downward movement of the back. Simultaneously, the seat frame 28 pivots downwardly about the hinge connections 36 until the primary load support 38 elongates sufficiently to carry the additional load imposed by the occupant. During this movement the support for the rear spring strips 46 moves downwardly introducing a second component of downward movement of the back 64 which is supported on the seat spring strips 46. During this movement the rear end of the links 82 moves downwardly carrying the

pins 86 downwardly in the slots 92 while interference between the upholstery of the back and that covering the adjacent portion of the arms 18 is prevented by the large plastic washer 94.

Figures 4, 5 and 6 shows a unison type chair constructed according to a modified form of the present invention which is in many respects similar to the construction illustrated in Figures 1 to 3, inclusive. In the construction trated in Figures 4, 5 and 6, the main frame generally indicated at 96 is constructed of metal tubing and includes side frame elements 98 which have generally the shape of an inverted U, the lower portions of these U-shaped elements 98 serving as front and rear legs 100 and 102 and the upper portion of these U-shaped elements 98 forming arms 104. The rear legs 102 are interconnected and held in spaced relation by a transversely extending frame element 106. A seat frame generally indicated at 108 is generally rectangular in shape and formed of tubing and includes a front portion 110, side portions 112, and a rear portion 114. This seat frame 108 is pivotally supported on the front legs 100 of the main frame 96 by depending brackets 116 mounted on the side sections 112 adjacent the front ends thereof, which are pivotally connected by rivets 118 to rearwardly extending brackets 120 mounted on the front legs 100. The rear portion of the seat frame 108 is supported by a pair of primary load support springs 122, the lower ends of which are connected to bars 124 extending laterally outwardly from the seat frame 108 adjacent the rear thereof, and the upper ends of which are anchored on supports 126 mounted on the upper portion of the arms 104 at the inner side thereof.

The side sections 112 of the seat frame 108 carry a plurality of attaching clips 128 spaced therealong to which are connected the terminal portions of a plurality of spring strips generally indicated at 130 which extend across the seat frame from side to side to provide a seating area. In the construction illustrated, the springs are formed of sinuous wire and have V-shaped legs 132 at their opposite ends and an arcuately shaped intermediate portion 134 providing the seating area. In the construction illustrated, the springs are covered by a burlap or cloth sheet 136, the lower edges of which are secured in conventional manner to the seat frame 108. Centrally of the intermediate portion 134 of the rearmost spring strip 130, a wood connecting block 138 is secured in place, as best illustrated in Figure 6, by screws 140 extending through the block 138, the sheet 136, the loops of the spring 130 and washers 142 disposed beneath the spring 130, and receiving nuts 144 threaded in their lower ends. The seating area is covered by upholstery indicated in broken lines at 146 and including suitable padding 148 and trim material 150 (see Fig. 4).

The chair includes a back frame generally indicated at 152 which is rectangular in shape and formed of a single length of metal tubing. This frame 152 includes a top section 154, side sections 156, and a bottom section 158. The back frame 152 carries a plurality of spring strips 160 which extend across the the frame 152 and the opposite ends of which are attached to the side sections 156 thereof. In the construction illustrated, these spring strips 160 are similar to the spring strips 130 and provide a back rest area. The back frame 152 and spring strips 160 are covered with suitable upholstery, indicated in broken lines at 162, including a suitable padding and trim material 164. Centrally of its bottom section 158, the back frame 152 has a pair of spaced apertures 166 therethrough and carries nuts 168 welded to the inner side of the bottom section 158 and aligned with the apertures 166. The lower frame section 158 of the back frame 152 is supported upon the upper surface of the block 138, as best illustrated in Figures 5 and 6, and is secured in place by screws 170 which extend upwardly through the block 138, through grommets 171 provided in the trim materials 150 and 164 covering the seat and back, respectively, and through the apertures 166 provided in the back frame 152 and are threaded into the nuts 168 fixed on the inner side of the frame section 158.

The angular position of the back frame 152 is controlled by a U-shaped link 172, the transverse portion 174 of which extends across the back of the frame 152 in spaced relation above the lower frame section 158 and is secured to the side sections 156 for pivotal movement relative thereto by straps 176. The arms 178 of the link 172 extend forwardly and downwardly, when the chair is unoccupied, to the forward portions of the arms 98 to which they are pivotally connected as indicated at 180. As in the construction illustrated in Figures 1 to 3, the arms 178 are generally parallel to a line between the pivot pin 118 and the point of connection of the back to the seat so that the angle of inclination of the back remains substantially the same during its unison movement.

The arm portion 104 of each side frame 98 is covered by an envelope of trim material 182 which may be formed of plastic, fabric, or any other suitable material. The envelopes 182, supported on the frame arm portions 104 provide hollow arms in which are concealed the arms 178 of the link 172 and the pivotal connections at the forward ends thereof, indicated at 180. The envelopes 182 also conceal the primary load supporting springs 122. The inner sides of the envelopes 182 are provided with U-shaped cut-outs 184 extending upwardly from the lower edge of the envelope 182 to avoid interference with the bars 124 projecting laterally outwardly from the seat frame 108 and to which the lower ends of the springs 122 are connected. Also, the inner sides of the envelopes 182 are provided with similar but smaller U-shaped cut-outs 186 extending upwardly from the lower edge thereof to prevent interference with the hinge brackets 116 carried adjacent the front of the seat frame 108. Also, the inner sides of the envelopes 182 are provided adjacent the upper rear portions thereof with slots 188 disposed as illustrated in Figure 4 to prevent interference with the transverse portion 174 of the link 172.

From the foregoing description it will be appreciated that in the chair construction illustrated in Figures 4, 5 and 6, the seat and back may be completely assembled and upholstered prior to connecting the back to the seat, which is accomplished by inserting the screws 170 from the bottom of the seat. After this is done, the bottom of the seat may be covered with a cheesecloth or other conventional material, if desired. The operation of the chair construction illustrated in Figures 4, 5 and 6 is generally the same as that described in connection with the construction illustrated in Figures 1, 2 and 3. It will, of course, be noted that in the construction of Figures 4, 5 and 6, the back is supported only on the rearmost spring strip 130 carried by the seat frame and that the means connecting the back to this seat spring does not include a pivot pin. Accordingly, there will be some slight lateral cocking of this spring strip 130 when the seat is occupied, to compensate for the absence of a pivotal connection.

Figures 7, 8 and 9 illustrate a chair constructed according to a modified form of the invention. This chair includes a seat generally indicated at 200, supported on front and rear legs 202 and 204, a back 206 supported on and connected to the rear portion of the seat 200 and arms 208 pivotally connected at their rear ends to the back 206 and pivotally connected forwardly thereof to the upper extensions of the front legs 202. In the construction illustrated in these figures, a stationary frame generally indicated at 210 serves both as the main frame of the chair and as the seat frame. This frame is rectangular in shape, including spaced parallel side members 212 interconnected by front and rear frame members 214. The front legs 202 and rear legs 204 are rigidly secured to the frame 210, the front legs being disposed externally of and extending above the frame 210 and being secured to the side members 212 by a pair of vertically spaced screws 216. The side members 212 of the frame 210

also carry a plurality of attaching clips **218** spaced along their upper edges to which are connected the terminal portions of arched spring strips **220** which extend across the frame **210** and provide a seating area. The seat **200** is provided with conventional upholstery including padding **222** and trim material **224**. Centrally of the rear spring strip **220**, a connecting block **226**, similar to the block **138** illustrated in Figures 4, 5 and 6, is secured in place by screws **228** in the same manner as described with reference to the construction illustrated in Figures 4, 5 and 6. The back **206** includes a back frame generally indicated at **230** and including side members **232**, an upper cross member **234**, and a lower transverse member **236**. The lower frame member **236** carries a plate **238** embedded in its lower surface and secured thereto by screws **239** and having a pair of laterally spaced tapped openings **240**. The side members **232** of the back **206** have a plurality of attaching clips **242** spaced therealong which receive the terminal portions of a plurality of spring strips **244** extending across the back frame **230** to provide a back rest area. The back **206** has conventional upholstery including suitable padding and a conventional trim material **246** secured in a conventional manner.

The back **206** is supported on the upper rear portion of the seat **200** and is secured thereto by screws **248** which extend upwardly through the block **226**, and through grommets **249** provided in the seat trim **224** and in the back trim **246** and are threaded into the tapped openings **240** in the plate **238**. After these screws are secured in place, the bottom of the seat **200** may be covered with a cheesecloth or other suitable material if desired.

The side members **232** of the frame **230** each carry a plate **250** spaced upwardly from the lower edge thereof and disposed on the inner surface thereof which is secured thereto by screws **252**. Each of these plates is provided with a tapped opening **254** which receives a screw **256** extending through the rear end of the arm **208**, through grommets **257** provided in the trim material **246**, covering the back **206**, and through the side members **232** and is threaded into the tapped opening **254** in the plate **250**. Spaced rearwardly of its forward end, each arm **208** has a recess **258** in its lower surface which receives the upper end of an upper extension of one of the front legs **202** and is pivotally secured thereto by a pivot pin **260**.

It will be appreciated that in the just described construction, the seat **200** and the back **206** may be fully assembled and separately upholstered prior to connecting the back to the seat as described. It will also be appreciated that when the seat **200** is occupied, the padding and trim material **224** extending over the springs **220**, will distribute the load over these springs so that there will be a deflection of the rear spring **220** and an accompanying unison action of the back **206** moving downwardly.

While only three specific embodiments of the present invention have been illustrated and described herein, it will be readily appreciated by those skilled in the art that numerous modifications and changes may be made without departing from the spirit of the invention.

What is claimed is:

1. A unison type chair comprising a main frame having supporting legs, a seat cushion structure, a back cushion structure, means pivotally interconnecting said cushion structures, means pivotally connecting the front of said seat cushion structure to said frame, hollow arms on said main frame, spring means in each said hollow arms connected to one of said cushion structures adjacent to said means pivotally interconnecting said cushion structures and connected to said main frame.

2. A unison type chair as defined in claim 1 including a link in each of said hollow arms connected at its rear end to said back cushion structure in spaced relation above said means pivotally interconnecting said structures and connected at its front end to said main frame in spaced relation above said pivotal connection of said seat cushion structure thereto.

3. A unison type chair comprising a supporting frame, a seat frame hingedly connected to the front portion of said supporting frame, spring means on said seat frame providing a seating area, a back frame hingedly supported at the rear of said seat frame, additional spring means mounted on said back frame providing a back rest area, means connected to said supporting frame providing stationary hollow arms, links individual to and disposed within said arms and pivotally connected at the forward portion of said arms and supporting frame, and means on said back frame projecting into said arms at the rear portion thereof and pivotally connected to the other ends of said links.

4. A unison type chair comprising a supporting frame, a seat frame hingedly connected to the front portion of said supporting frame, spring means on said seat frame providing a seating area, a back frame hingedly supported at the rear of said seat frame, additional spring means mounted on said back frame providing a back rest area, means connected to said supporting frame providing stationary hollow arms, links individual to and disposed within said arms and pivotally connected at the forward portion of said arms and supporting frame, means on said back frame projecting into said arms at the rear portion thereof and pivotally connected to the other ends of said links, and deflectable means supporting the rear end of said seat frame.

5. A unison type of chair comprising a seat unit having a separately upholstered sprung seating area, a back unit having a separately upholstered back rest area, frame means supporting said seat unit, means fastening said units together so that said back unit is supported on at least a portion of said sprung seating area, hollow arms at the sides of said seating area extending thereabove, links individual to said arms having one end pivotally connected to the interior of said arms, means extending into said arms and pivotally connecting the other ends of said links to said back unit within said arms, and spacer elements mounted on said last named means between said back unit and said links.

6. A unison type of chair comprising a seat unit having a separately upholstered sprung seating area, a back unit having a separately upholstered back rest area, frame means supporting said seat unit, means fastening said units together so that said back unit is supported on at least a portion of said sprung seating area, uprights adjacent to the front corner edges of said frame means, and a link at each side of said frame means pivoted to an upright and to the adjacent side of said seat back in a manner to be disposed substantially in a horizontal position to restrict said back to substantially vertical movement when deflected with said sprung seating area.

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