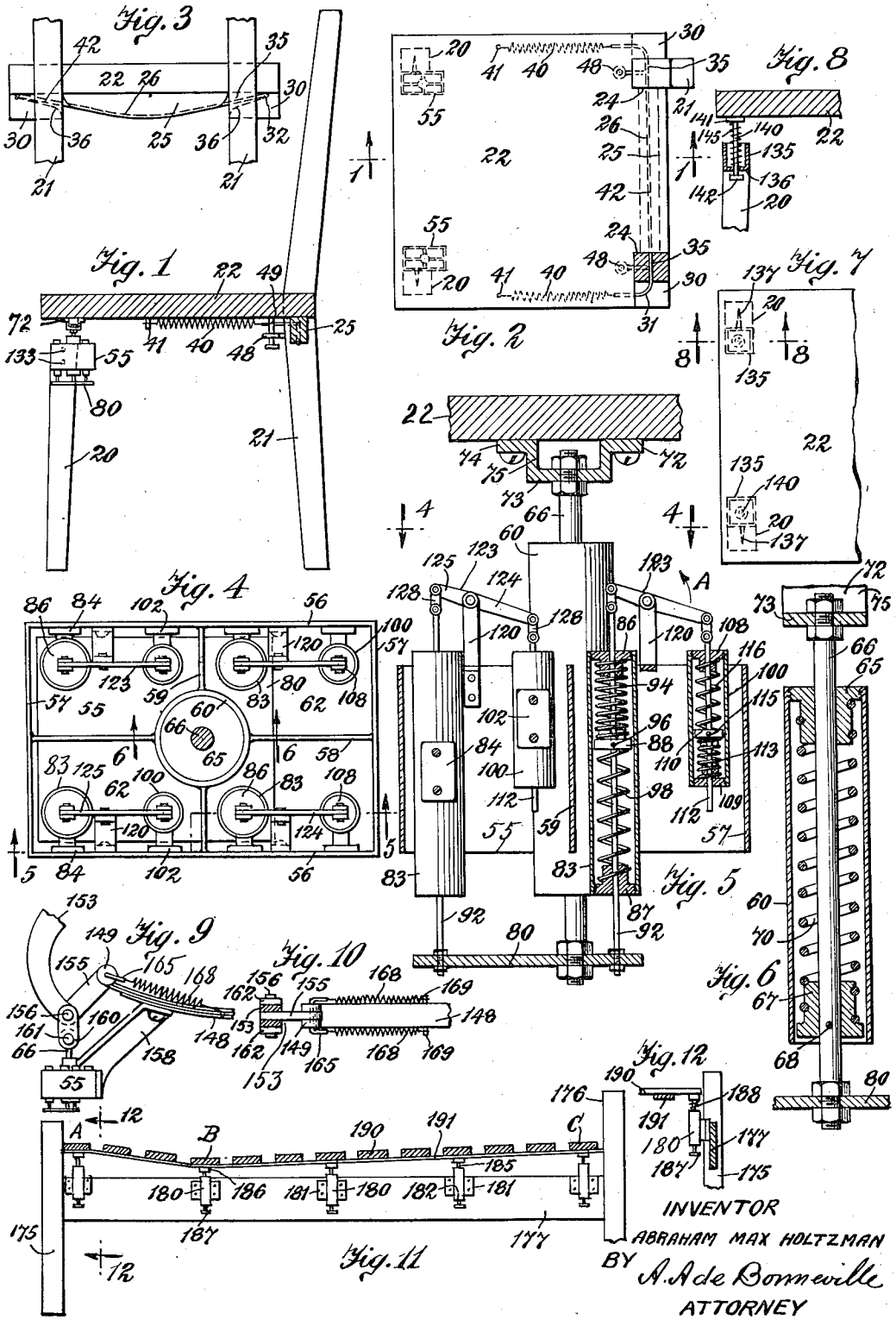
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CHAIR HAVING A FLEXIBLY SUPPORTED SEAT

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CHAIR HAVING A FLEXIBLY SUPPORTED SEAT

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5 Claims. (Cl. 155—50)

This invention relates to a chair having a flexibly supported seat.

The object of the invention is the production of a chair having a seat flexibly supported at its front and rear ends.

The second object of the invention is the production of a spring casing for an object to be flexibly supported, in which a tension spring and pairs of tension and compression springs coact to produce a flexible support for the said object.

Various other objects will be apparent from the description of the invention.

Fig. 1 represents a side view, partly in section as on the line 1.1 of Fig. 2 of an exemplification of the improved chair having a flexibly supported seat; Fig. 2 is a top view of Fig. 1 partly in section; Fig. 3 is a partial rear view of Fig. 1; Fig. 4 is a section of Fig. 5 on the line 4.4; Fig. 5 represents a section of Fig. 4 on the line 5.5; Fig. 6 shows section of Fig. 4 on the line 6.6; Fig. 7 shows a fragmentary portion Fig. 2 with a modification; Fig. 8 is a section of Fig. 7 on the line 8.8; Fig. 9 shows a side view of an automobile spring with some of its appurtenances and the essential elements of the invention; Fig. 10 is a top view of Fig. 9 partly in section; Fig. 11 represents a longitudinal section of a bed with the essential elements of the invention incorporated therein; and Fig. 12 shows a section of Fig. 11 on the line 12.12.

Referring to Figs. 1 to 6 inclusive, a chair is indicated having the pair of front legs 20, the rear legs 21 and the seat 22 in flexible relation to said legs. The seat 22 has indicated in its rear end the recesses 24, through which extend the rear legs 21. Adjacent to the rear edge of the seat 22 is fastened the guide block 25, curved at its lower side and in which is indicated the curved guide groove 26. To the lower face and at the rear corners of the seat 22 are fastened the guide blocks 30, that have indicated therein the curved guide openings 31, which incline downwardly as shown at 32. In each of the rear legs 21 is indicated the vertical slot 35 having the lower curved end 36. A pair of spiral springs 40 are positioned adjacent to to the lower face of the seat 22 and near its side edges. One end of each of the springs 40 is fastened to the lower face of the seat 22 by means of a pin 41. From the other end of each of the springs 40 extends the flexible supporting wire 42. The said supporting wire 42 leads through the curved guide openings 31, the slots 35 on the bottom walls of which it bears and the curved guide groove 26, to support the rear end of the seat 22. Eyelets 48 extend from the rear legs 21, and guide pins 49 extend from the lower face of the seat 22. The guide pins 49 extend through the eyelets 48 to maintain the seat 22 in operative position.

Below the front portion of the seat 22 are shown the spring casings, each indicated in its entirety by the numeral 55. Each of said casings comprises the longitudinal walls 56, the end walls 57, the longitudinal middle wall 58 and the cross wall 59. The walls 58 and 59 have integral therewith the central guide sleeve 60. The walls of the casing form the pockets 62. Each guide sleeve 60 has secured therein at its top end the cap 65. Through each cap 65 extends the rod 66, which at its lower portion has secured thereto the guide plug 67 by means of the pin 68. A helical tension spring 70 has its upper end fastened to cap 65 as indicated, and the lower end of the spring is fastened to the guide plug 67.

For each of the rods 66 there is fastened to the lower face of the seat 22 a guide and supporting bracket 72, which has indicated therewith the lower wall 73, the top flanges 74 and the side walls 75. The upper end of the rod 66 is secured to the wall 73 by nuts as indicated.

Below each spring casing 55 is indicated the connecting plate 80. The lower end of each of the rods 66 is secured to the plate 80 by nuts as indicated.

In each of the pockets 62 are indicated a pair of supplemental guide sleeves 83 and 100. The said sleeves have respectively extending therefrom the brackets 84 and 102, which are fastened to the longitudinal walls 56 of the spring casings 55. In the top end of each sleeve 83 is fastened the cap 86 and in its lower end is fastened the cap 87. An intermediate guide plug is shown at 88. A rod 92 extends through the caps 86, 87 and the plug 88. A tension spring 94 in the upper portion of the sleeve 83 having its coils adjacent to each other, has its upper end fastened to the cap 86 and its lower end is fastened to the plug 88. A pin 96 connects the plug 88 and the rod 92. A compression spring 98 has its lower end fastened to cap 87 and its top end bears against the plug 88. The lower end of the rod 92 is fastened to the connecting plate 80 by nuts as indicated.

In the top end of each sleeve 100 is fastened the cap 108 and in its lower end is fastened the cap 109. An intermediate guide plug is shown at 110. A rod 112 extends through the caps 108, 109 and the intermediate plug 110. A tension spring 113 in the lower portion of the sleeve 100 having its coils adjacent to each other, has its lower end fastened to the cap 109 and its upper end is fastened to the plug 110. A pin 115 connects the

plug 110 and the rod 112. A compression spring 116 has its upper end fastened to the cap 108 and its lower end bears against the plug 110. The guide sleeve 83 and its springs are larger in diameter than the guide sleeve 100 and its springs. Journal brackets 120 are fastened to the walls 56 of the spring casing 55. Each of the journal brackets 120 coacts with its adjacent pair of supplemental guide guide sleeves 83 and 100. To each journal bracket 120 is pivoted the oscillating beam 123 having the long arm 124 and the short arm 125. Between the rods 92 and 112 and the beam 123 are pivoted the links 128.

It will be noted that the upper ends of the front legs 20 are spaced from the lower face of the seat 22, and the spring casings 55 are fastened to the inner faces of the legs 20 by means of screws or bolts 133.

When a person is seated on the seat 22, the spiral springs 40 extend, by virtue of which the rear end of the seat will slightly lower and be flexibly suspended, producing a sensitive cushioning support for the rear portion of the seat 22, for the comfort of the person on the seat. At the same time the front portion of the seat 22 will slightly lower under the control of the compression of the helical springs 70. When the front portion of the seat 22 lowers the rods 66 lower therewith, and with the descent of the rods 66 the connecting plate 80 is lowered. When the connecting plate 80 lowers, the rods 92 descend and the compression springs 98 are compressed. At the same time the tension springs 94 are extended. Also while the rods 92 descend the beams 123 are swung in the direction of the arrow A, Fig. 5, by virtue of which the rods 112 will rise and the compression springs 116 will be compressed and the tension springs 113 will be elongated. The coaction of the compression and tension springs in the pairs of the supplemental guide sleeves 83 and 100 produces a sensitive cushioning support for the front portion of the seat 22.

Referring to the modification indicated in Figs. 7 and 8, the seat is again indicated at 22 with its front legs 20. In place of the spring casings 55 there are substituted the spring casings 135 having the bottom walls 136. The casings 135 are fastened to the legs 20 as indicated at 137. At the front portion of the seat 22, below its lower face, are indicated the guide pins 140 having the collars 141 and 142. The pins 140 extend through openings in the walls 136, and the flanges 141 are fastened to the seat 22. The flanges 142 extend below the walls 136. A helical spring 145 encircles each guide pin 140 and bears between the flange 141 and the wall 136 of its coacting spring casing 135. The springs 145 with their appurtenances, provide a sensitive cushioning means for the front end of the seat 22 and the rear portion of the seat is flexibly suspended as already described.

Referring to the modification indicated in Figs. 9 and 10, the invention is applied to the spring of a vehicle. In this modification a fragmentary portion of a plate spring is indicated at 148 with its eye end 149, and a fragmentary portion of the chassis is shown at 153. The usual link 155 connects the pin 156 of the chassis and the eye end 149 of the plate spring. To the lower leaf of the spring 148 is fastened the supporting bracket 158. To the supporting bracket 158 is fastened the spring casing 55 with its appurtenances. The rod 66 of the guide sleeve 60 has the hub 160 at its upper end. A pin 161 extends through the hub 160 and a pair of links 162 connect the pin 156 and the pin 161. A wire 165 extends through the eye end 149 of the spring 148, and the helical springs 168 extend from the ends of the wire 165 and their ends are connected to the spring 148 by pins 169 as indicated.

In this modification the pin connection between the chassis and the plate spring 148 is avoided and the wire 165 with its springs 168 is substituted. By this construction supplemental cushioning means are provided between the chassis and the said plate spring.

Referring to Figs. 11 and 12, the invention is shown applied to bed springs. In this modification the head of a bed is shown at 175 and its foot is indicated at 176. Sides 177, one of which is shown, are connected to said head and foot. Guide sleeves 180 have each integral therewith the flange bracket 181 which are fastened to the sides 177 of the bed. A bottom wall for each sleeve 180 is shown at 182. Through each of the guide sleeves 180 and its wall 182 extends the guide pin 185 having the collars 186 and 187 at its ends. A spiral spring 188 encircles each pin 185 and its ends bear against the collar 186 and the wall 182. A plurality of cross slats are shown at 190 and adjacent to their ends they are connected by straps 191. The collars 186 are fastened to the slats 190. The flange brackets 181 are fastened to the sides 177 of the bed, so that the upper faces of the slats 190 will be positioned in a curved surface which inclines downwardly from the head A to the position B and then rises toward the foot of the bed C. By this disposition of the slats, 190 when a mattress is placed upon the slats 190 it will take the contour of the positions of the slats as just described for the comfort of the user.

The chair may be modified by supporting a spring casing 55 with its appurtenances upon a platform supported by the legs 20 and 21, and having its supporting bracket 72 connected to about the central portion of the seat 22.

Various other modifications may be made in the invention and the present exemplifications are to be taken as illustrative and not limitative thereof.

Having described my invention, I claim:

1. The combination of a spring casing, a guide sleeve supported in the casing, a helical spring in said guide sleeve having its upper end fixed, a rod extending through the sleeve having its lower end in fixed relation to said spring, means to connect the upper end of the rod to an object to be supported, a connecting plate connected to the lower end of the rod, a pair of supplemental guide sleeves connected to the spring casing, caps fixed to the ends of each supplemental sleeve, a compression spring and a tension spring in each supplemental guide sleeve, a rod in each supplemental guide sleeve and in connection with its tension spring, the lower end of one of the latter rods connected to said connecting plate, a beam positioned above said supplemental guide sleeves having its ends connected to the rods in the latter sleeves and means pivotally mounting the beam upon the spring casing.

2. The combination of a spring casing, a guide sleeve supported in the casing, a cap fixed in the upper end of the sleeve, a guide plug slidably positioned in the lower end of the sleeve, a rod extending through said cap and plug and connected to the plug, a helical spring connecting said cap and said plug, means to connect the upper end of said rod to an object to be supported,

a connecting plate connected to the lower end of the rod, a pair of supplemental guide sleeves connected to the spring casing, a cap fastened to the upper and lower end of each supplemental sleeve, an intermediate guide plug in each supplemental guide sleeve, a rod extending through each supplemental sleeve, its caps and guide plug, means to connect said rod to its adjacent guide plug, means to connect one of the rods of the supplemental sleeves to said connecting plate, a tension spring in one of the supplemental sleeves having its ends connected to the cap at the upper end thereof and to the guide plug therein, a compression spring in the latter sleeve having its lower end connected to the cap at the lower end thereof and the upper end of the latter spring bearing against the guide plug in the sleeve, a compression spring in the other supplemental guide sleeve with its upper end connected to the cap at its upper end, a tension spring in the latter sleeve with its lower end connected to the cap at its lower end, the upper end of the latter tension spring bearing against the guide plug therein, the guide plug in the latter sleeve connected to the rod therein, a beam positioned above the supplemental guide sleeves having its ends in pivotal connection with rods of said supplemental guide sleeves and means pivotally mounting the beam upon the spring casing.

3. In a chair the combination of a seat, front legs and rear legs for the chair, flexible elements between said seat and said front legs, said seat in slidable relation with the said rear legs, a slot in each rear leg, a helical spring at each side of said seat with one end connected thereto and a wire connecting the other ends of the helical springs and extending through the guide slots of the said rear legs and on the bottom walls of which it bears said wire supporting the rear portion of said seat.

4. In a chair the combination of a seat, front legs and rear legs for the chair, flexible elements between said seat and said front legs, said seat in slidable relation with said rear legs, a slot in each rear leg, a guide block extending from the lower face of said seat at the rear end thereof, a curved guide groove in said guide block, a helical spring at each side of said seat with one end connected thereto and a wire connecting the other ends of the helical springs, said wire extending through the slots of the said rear legs, on the bottom walls of which it bears and through the guide grooves of the guide blocks and thereby flexibly supporting the rear end of the seat.

5. In a chair the combination of a seat, front legs and rear legs for the chair, the front legs of the chair spaced from said seat, a spring casing connected to each of said front legs, a guide sleeve in each casing, a tension spring in said casing with its top end fixed therein, a rod in the casing fixed to the lower end of the spring, a connecting plate connected to the lower end of the rod, the top end of the rod fixed to the seat, pairs of supplemental guide sleeves fixed in the casing, a tension spring and compression spring in each supplemental guide sleeve, a rod in each supplemental sleeve coacting with the springs therein, an oscillating beam connecting the rods of each pair of supplemental sleeves, one rod of each pair of supplemental guide sleeves connected to said connecting plate and means pivotally mounting the beams upon the spring casing.

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