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POSTURE CHAIR Original Filed Nov. 22, 1937



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# UNITED STATES PATENT OFFICE

#### 2,195,241

#### POSTURE CHAIR

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### 6 Claims. (Cl. 155-157)

This invention relates to posture chairs and has for its general object to produce a back support of usual type in such chairs, such as shown in our Patent No. 2,054,557, issued September 15, 1936, but which, in addition, has its back support pivoted so that the occupant may lean back and secure a restful rocking position when desired. This result is secured by maintaining

substantial equilibrium at any point throughout 10 the range of rocking movement so that the occupant need exert no force in either direction to

maintain balance. Another object of the invention is to produce a spring back which not only progressively

- 15 increases its resistance to increasing load of the body weight as the chair back recedes from the vertical as in the usual arrangement having helical springs, but also one in which the initial resistance of the spring to movement from posture position is great to avoid accidental recession of
- 20 the back from posture position, this construction being claimed in our copending application Serial No. 270,982, filed May 1, 1939. After the occupant forcibly pushes or trips the back beyond 25 posture position, the tension arrangement is such
- 25 posture position, the tension arrangement, the parts that for its range of rocking movement, the parts are in substantial equilibrium up until the chair has almost reached its limit of rocking movement, when the resistance to backward move-30 ment of the chair back increases more rapidly
- 30 then the shift in the center of gravity of the body weight, thus avoiding the possibility that the occupant will unintentionally swing the chair back to its fixed stop with the abrupt blow now 35 common with the ordinary type of spring mount-
- 35 common with the ordinary of the chair of the invention, it takes a decided effort by the operator, greater than mere body weight, to start the chair back from posture position, the chair back then has a range of movement in which the spring
- <sup>40</sup> has a range of motional to balance increased body weight, and finally before the fixed stop is reached, the tension of the spring is increased more than is necessary to balance body weight,
  <sup>45</sup> making it necessary for the occupant to exert
- 45 making it necessary for the occupant of the chair an additional force before the back of the chair can be forced back its full course of travel. Another object of the invention is to provide a pivoted or rocking back for chairs, of such na-
- pivoted or rocking back for chains, of such and
  ture that the back may be adjusted toward and
  from the seat in a straight line by a sliding movement without rocking the back or changing the
  relation between horizontal planes passing

through the seat and back, whereby the chair 55 can be adjusted for tall or short occupants with-

out changing the tension resisting rearward tilting of the back as more particularly claimed in our copending application Serial No. 270,982, filed May 1, 1939.

A further object of the invention is to produce **a** resilient cushion or chair seat having a flexible covering member secured in position against shifting under the flexing of the seat or cushion due to body movements when the chair is in use, as more particularly claimed in our copending application Serial No. 302,198, filed October 3, 1939.

With the general objects named in view and others as will hereinafter appear, the invention consists in certain novel and useful features of **15** construction and organization of parts as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawing; in which:

Figure 1 is a side elevation of a chair embody- **1** ing the invention.

Figure 2 is an enlarged fragmental side elevation, partly in section to illustrate the tensioning device for the pivoted chair back support.

Figure 3 is an inverted plan view of the chair seat or cushion to illustrate the method of securing the flexible cover to the cushion.

Figure 4 is a plan view of the spider supporting construction, the seat having been removed. **20** 

Figures 5 and 6 are respectively bottom plan and edge views of a cushion embodying certain features of the cushion shown in Figure 2.

In the said drawing, where like reference characters identify corresponding parts in all of **35** the figures, the supporting pedestal structure will not be described in detail since it is shown in our aforesaid Patent No. 2,054,557, other than to point out that the upper ends of the legs | where welded to the spindle supporting casing 2, 40 are preferably enclosed in a housing member 3 which reinforces and braces the legs and adds a more finished appearance to the chair. Pivotally mounted on the upper end of the spindle 4 is a spider 5 to support the seat. Although 45 this spider may be as shown in our previous patent, we have found that it is desirable to have the spring pressed locking pin 6 rearwardly of the spindle instead of forwardly thereof as shown 50 in our previous patent, since it makes it possible to secure the same range of adjustment of the back toward and from the seat with a shorter horizontally adjustable supporting bar 7 slidingly mounted in a channelled portion a of the spider  $\mathbf{g}$ 

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and below downwardly projecting protuberances

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To of the seat, hereinafter identified. The back supporting member 7 has a series of perforations 8 for cooperative engagement by the

locking pin 6, but the rear end of said horizon-Б tally adjustable support instead of being upstanding to form a back support or standard as in our previous patent, terminates in a downwardly and forwardly curved portion 9, which is prefer-10 ably of spring or resilient nature. Secured to the end of the curved portion 9, which preferably

- terminates substantially parallel to, but under-lying the main body of the member 7, is an upstanding square tube 10 slidingly but non-ro-15 tatably receiving a squared stem 11 equipped at
- its lower end with a journaled anti-friction roller member 12. When the parts are assembled as hereinafter described, the roller 12 cannot fall from position, but the parts may be provided
- with a locking pin to prevent disengagement if thought desirable. The upper end of the rec-20 tangular tube 10 is closed by a plug 10a, the latter being threaded for engagement with adjusting bolt 13 having a hand wheel 14. The bolt
- 25 13 is unconnected with, but is adapted to press against, the end of the non-rotatable stem 11, and it will be apparent that by adjusting the hand wheel, the bolt 13 will project the stem 11 carrying the roller 12 for tensioning purposes as will so hereinafter appear.
  - Welded or otherwise secured to the bar member 7 forwardly of its resilient portion 9 is a fixed block member 15. Embracing the downwardly curved spring end of the bar 7, but spaced
- 35 therefrom, is a yoke member 16 which is provided with a pivot pin mounting 17 journaled in the fixed block 15. The closed end of the yoke fixedly carries an upright standard or back member 18, the latter at its upper end carrying a vertically and tiltably adjustable back rest 19, such as
- shown in our patent aforesaid. The lower end of the back member 18 is bent forwardly to form a cam surface or track 19a, it being understood in this connection that the cam or track mem-45 ber, although preferably of resilient or spring
- nature, can be unyielding, the entire resiliency being in the member 9. In other words, either one of the members 9 or 19a may be resilient, or both may be resilient as shown, without so changing the operation of the chair. The cam
- member 19a is adapted to be in constant contact with the roller 12, and it will be apparent that by adjusting the hand wheel 14, the tension on members 9 and 19a, and consequently the pressure on the back support to be overcome by the
- 55 body weight of the occupant, may be set at the desired limit. Thus, by regulating the distance between the ends of members 9 and 19a, through the operation of the tensioning means (the hand
- wheel 14, bolt 13, and roller 12), the force resist-60 ing rearward rocking or swinging of the back member 18, may be adjusted. Stop means must be provided to limit the forward and rearward swinging of the back member. To limit forward
- movement, the front lower corner of the yoke 65 16 carries a cross pin 20, which, by contact with one side of the U-spring member 9, prevents the back member 18 from being thrown forwardly of a substantially vertical position, as shown in Figures 1 and 2. To reinforce the yoke **16** its rear lower corner is strengthened by a cross pin
- 21 which also acts to limit rearward swinging movement of the back member 18, since as the yoke 16 and the back member rigidly secured thereto, swing around the axis of the pivot bolt

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vented as there is no resiliency in the small length of the member 9 between the point of contact of cross pin 21 and the pivotal point 17. It has been found that by forming a depressed portion 22 in the front end of the cam track 19a 10 (see Figure 2), corresponding to posture or upright position of the back standard, considerable resistance is offered to recession of the chair back, this resistance, of course, being subject to manual adjustment by the hand wheel 14. After 15 the chair back has passed rearwardly of posture position, it will be evident by consideration of the dotted arc "a-a," struck from the center of rotation, the axis of the pin 17, Figure 2, that the curvature of the cam track 19a as it moves 20 past the roller 12, will entirely control the degree of tension of the members at any predetermined angle of tilt of the back member of the chair. In helical spring back chairs, the tension of the

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spring is practically always in direct proportion 25 to the extent of swinging movement, but with our cam track arrangement it will be apparent that the curvature of the track can be such as to give any desired rate of increase in tension.

As previously mentioned, the chair seat is 30 preferably of sponge rubber or the like, and by preference, the chair bottom or base plate 23 is provided with a multiplicity of openings 24 to permit of ready entrance and exit of air to the interstices in the cushion. To hold the cushion 35 in proper position, it is usually glued, and in addition, it is preferably to form the side margin of the base plate with an upturned flange 25 which snugly embraces the edge of the cushion. The cushion is then completely covered by a 40 flexible fabric 26, the side edge of the cover underlying the base plate and being hemmed to receive a draw cord 27 underlying the base plate. To hold the cover in proper position and under tension, one end of the draw cord is secured to 45 one of a series of downwardly extending ears 28 constituting limiting abutments for the draw cord, said ears projecting from the base plate 23, and spaced inwardly from the margin of the seat. The other end of the draw cord is provided 50 with a resilient spring terminal 29 engaged with one of the ears 28 to effect the return of the seat cover to proper position if it is pulled to one side or the other under the pressure of the seat occupant. 55

In Figures 5 and 6, the cushion member is shown as comprising a pad of resilient rubber 30. The rubber pad is covered by a fabric covering 31 having its edge tubular to receive a flexible cord 32 by means of which the cover is stretched 60 smoothly and underlies the marginal edge of the pad. To prevent the bottom edge of the seat cover from being pulled from the position shown in Figure 5 at any side of the seat, a series of tapes 33 are stitched to opposite edges of the  $^{65}$ cover. Strain tending to pull one side of the cover is thereby transmitted to an opposing side or portion of the cover.

From the above description it will be apparent  $_{70}$ that we have produced a chair and cushion embodying all the features of advantage set forth as desirable, and while we have described and illustrated the preferred embodiment, it is to be understood that we reserve the right to all 75

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changes within the spirit of the invention and without the ambit of the prior art.

We claim:

1. In a chair, a seat support, a supporting 5 member secured to the rear of the seat support and having a rearward and downwardly curved resilient extension, a tensioning device on the end of the extension, a back member pivotally connected with the supporting member, said back

- 10 member having a lower cam-like resilient extension of gradually increasing curvature slidably engaging the end of the tensioning device, where-by the spring tension on the supporting member extension and on the cam-like extension is in-15 creased as the back member is swung rearwardly.
- 15 creased as the back memory a supporting 2. In a chair, a seat support, a supporting member secured to the rear of the seat support and having a rearward and downwardly curved resilient extension, a tensioning device on the end
- 20 of the extension, a back member pivotally connected with the supporting member, said back member having a lower cam-like extension of gradually increasing curvature slidably engaging the end of the tensioning device, whereby the
- 25 spring tension on the supporting member extension is increased as the back member is swung rearwardly.

3. In a chair, a seat support, a supporting member secured to the rear of the seat support

- 30 and having a downwardly curved extension, a tensioning device on the end of the extension, a back member pivotally connected with the supporting member, said back member having a lower cam-like resilient extension of gradually in-
- **35** creasing curvature slidably engaging the end of the tensioning device, whereby the spring tension on the cam-like extension is increased as the back member is swung rearwardly.
- 4. In a chair, a seat support, a seat carried by
  40 said seat support, a back supporting member carried by the seat support, a back member pivotally connected to the back supporting member, said back supporting and back members each

having an extension, one of said extensions being resilient, and a tensioning device carried at one of its ends by one of said extensions, said tensioning device having its opposite end abutting against the other extension, said extensions being 5 so shaped that the force imposed by the resilient extension tends to pivot the back member forwardly toward the seat when the back member is tilted rearwardly.

5. In a chair, a seat support, a seat carried 10 by said seat support, a back supporting member carried by said seat support, a back member pivotally connected to said back supporting member and provided with an extension, a leaf spring projecting from the back supporting member, and a 15 tensioning device carried by said leaf spring and abutting the extension, the shape of the extension being such that the distance from the pivotal point of the back member to the point of contact of the tensioning device on the extension 20 gradually decreases on rearward pivotal movement of the back member to increase the tension on said leaf spring.

6. In a chair, a seat support, a seat carried by the seat support, a back supporting member car- 25 ried by the seat support, said back supporting member being mounted on the seat support for relative back and forth horizontal adjustment with respect to the seat, a back member pivotally connected to the back supporting member, 30 a back rest carried by the back member, tensioned resilient means between the back member and back supporting member resisting rearward pivotal movement of the back member when force is imposed on the back rest, the tension imposed 35on said resilient means being unaffected by the back and forth horizontal adjustment of the back supporting member with respect to the seat, and manually operable mechanism for adjustably regulating the tension imposed on said re- 40 silient means.

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