June 16, 1942. R. A. CRAMER ET AL 2,286,468

POSTURE CHAIR

Filed May 1, 1939

Fig. 1.

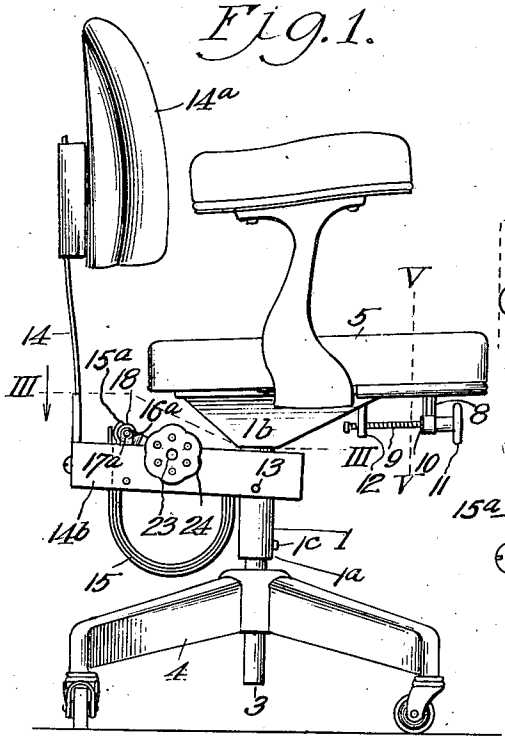
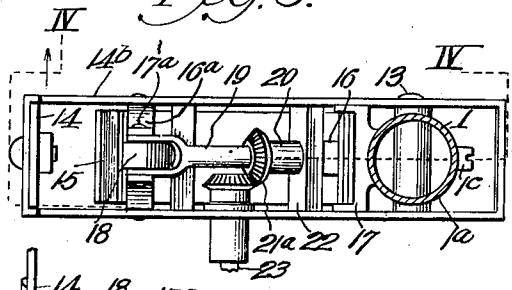


Fig. 3.



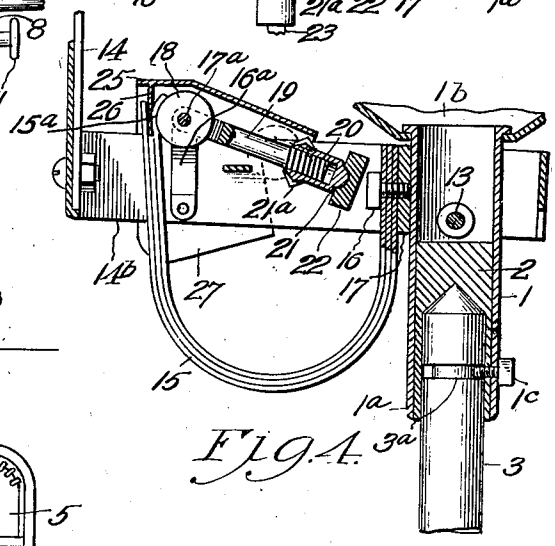


Fig. 4.

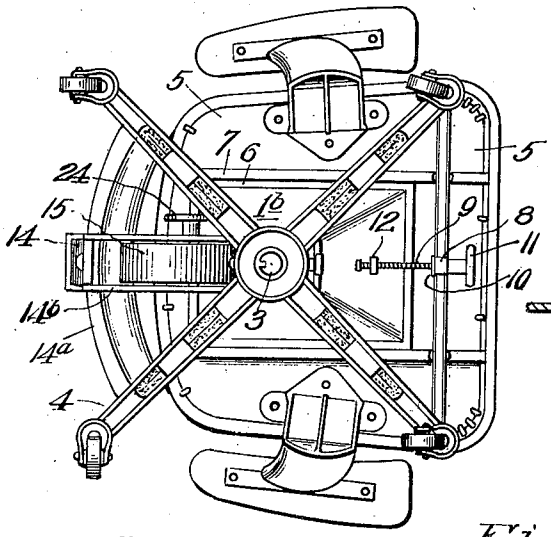


Fig. 2.

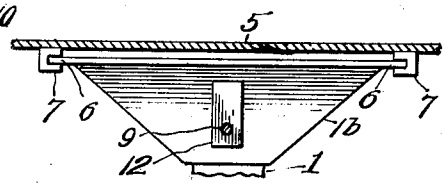


Fig. 5.

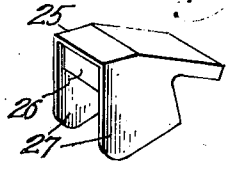


Fig. 6.

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POSTURE CHAIR

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Application May 1, 1939, Serial No. 270,982

5 Claims. (Cl. 155—164)

This invention relates to posture chairs and has for its general object to produce a chair of this type in which the back member may swing rearwardly against the resistance of a spring while the seat remains non-tilting so that the abdominal muscles of the user are exercised. One of the objects of the invention is to produce a chair of this type in which the seat may be adjusted toward and from the back member, according to the preference of the occupant, to increase or decrease the length of support offered by the front edge of the seat in relation to the upper portions of the legs of the occupant of the chair, so that long and short legged persons may be comfortably accommodated, without causing a change in the spring tension of the back member and independently of the type of spring employed. In this regard the chair of the present invention is similar to that shown in our Patent No. 2,195,241, issued March 26, 1940.

In addition to the advantages of adjustment for depth of seat in accordance with the length of the legs of the occupant of the chair, another object of the invention is to provide considerable resistance to initial backward swinging or tilting of the back rest as disclosed in our application Serial No. 175,766, filed November 22, 1937. In other words, our object is to provide a yielding or friction lock to hold the chair back in upright position, of such nature as to require a distinct muscular effort on the part of the chair occupant to shift the chair from back non-tilting to back tilting position.

Another object of the invention is to produce an improved type of spring back chair, an improved sliding seat construction, and a seat support which are of strong, durable, efficient and inexpensive construction; 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 embodying the invention with a cover or housing member removed to more clearly disclose a part of the tensioning mechanism of the chair.

Figure 2 is a bottom plan view of the chair as shown in Figure 1.

Figure 3 is an enlarged section on the line III—III of Figure 1, with the supporting legs and housing member omitted.

Figure 4 is a section on the line IV—IV of Figure 3, with the housing member in operative position.

Figure 5 is a vertical cross section with the upper part of the seat and the parts in the background omitted.

Figure 6 is a reduced perspective view of the housing member.

In the said drawing, where like reference characters identify corresponding parts in all of the figures, 1 is a seat support which, in its preferred form, has a tubular lower portion 1*a* and welded or otherwise secured to its upper end is an inverted conical portion 1*b* having its upper end formed to generally rectangular shape. If it is desired that the chair be of the swivel type, the seat support 1 may be rotatively mounted in any suitable manner, as by being provided in the lower end of the tubular portion 1*a* with a plug 2 forming a conical bearing support rotatably resting on the upper end of a post 3. The tubular portion telescopes over the post as shown, and may be locked against accidental dislocation by a locking pin 1*c* engaging a peripheral groove 3*a* in the post 3. The post 3 may be vertically adjustable in a floor-engaging spider or legs 4. The exact construction of the seat support and its floor-engaging elements are immaterial to the invention, except that the seat support preferably has means to retain a seat 5 in position for sliding adjustment backwardly and forwardly. One convenient means of providing such a construction is to form a pair of opposite side edges of the rectangular upper end of the seat support portion 1*b* with a pair of oppositely projecting guide flanges 6 bearing a parallel relation to each other.

The seat 5 may have a pair of downwardly projecting parallel ribs or strips 7, or equivalent arrangement, having grooves on their opposed faces in sliding interlocking engagement with the flanges 6 of the seat support (see Figure 5), so that said seat may be slid backwardly and forwardly on the seat support and be retained against upward movement should the chair be lifted by the seat, as well as to resist tilting of the seat on the seat support. In order to provide means for conveniently adjusting the position of the seat on the seat support, the seat may have a depending bar or lug member 8 having an opening in which a bolt 9 is journaled. The bolt 9 is held against longitudinal travel through the lug 8 by means of a cotter pin or the like 10 abutting one side of the lug, and a hand wheel 11 abutting the other side of the lug. The threaded end of the bolt 9 is threaded through a threaded opening in a lug 12 projecting from the seat support 1. With this construction, it will be evident that rotation of the bolt

will cause it to travel longitudinally and that corresponding movement will be imparted to the chair seat.

Rockingly mounted on a pivot bolt 13 carried by the tubular portion 1e of the seat support 1, is a back member 14 for the support of the back of an occupant of the chair. In the embodiment of the invention illustrated, the back member 14 is of generally L-shape, having a substantially vertical portion which may be padded as at 14a, the other leg of the back member being relatively horizontal and in the shape of a rectangular skeleton frame 14b, the bolt 13 engaging the long arms of the portion 14b intermediate their ends. In the preferred construction, as illustrated, it has been found desirable to pivot the horizontal portion 14b intermediate its ends, so that its shorter projecting end constitutes a stop by contacting the overlying conical portion 1b of the seat support and positively prohibits rearward swinging or tilting of the chair back 14 beyond a fixed limit. This is a safety measure in case the spring breaks, as will hereinafter more particularly appear.

15 is a leaf spring (which is shown as of laminated character) secured at one end, in any suitable manner, as by a bolt 16 threaded into a lug or enlargement 17 formed integrally with or welded to the seat support 1. The spring 15 in the present construction is of U-form with its free end or leg projecting upwardly between the long side arms of the rectangular portion 14b of the back member 14. As in other chairs of this general type, the function of the spring is to throw the back member toward the chair seat and to resist rearward tilting of the back member by an occupant of the chair.

To transmit force from the spring to the back member to throw the latter forwardly toward the seat, it will be evident that the back member must have an abutment portion in contact with the spring, the center of pivotal movement of the back member on the seat support being located in relation to the abutment and spring so that rearward pivotal movement of the back member is continuously resisted by the leaf spring. One convenient method of securing this result, as well as of providing means whereby the tension of the spring can be manually adjusted, is, as follows: A yoke 16a is rockingly mounted between the side arms of the rectangular portion 14b of the back member, and journaled on a pin 17a carried at the upper end of the yoke is a roller 18 adapted to contact and travel on the spring when the back member is tilted. The roller 18 is held against receding under the pressure of the spring and the spring may be adjustably tensioned by a longitudinally extensible member comprising a stem portion 19 pivotally secured to the pin 17a, the other end of said stem being threaded in a sleeve 20 having a ball and socket abutment as at 21 with a cross brace 22 forming an integral part of the portion 14b of the back member. The internally threaded sleeve 20 may be manually rotated in any suitable way to regulate the extension of the stem 19, as by being formed integrally with a miter gear 21a which is enmeshed with a second miter gear 22 keyed on the end of a shaft 23 journaled in one side arm of the portion 14b of the back member, and provided with a hand wheel 24. It will be noted that adjustment of the tensioning mechanism shifts the axis of the abutment roller 18 to increase or decrease the spring tension tending to throw the back member forwardly toward the seat.

In order that the chair back may normally remain in vertical position and require considerable force to initiate tilting movement, it has been found preferable to form the end of the spring 15 with a depression 15a in which the abutment roller 18 normally rests. This construction acts as a friction lock to hold the chair back in upright position, and in normal use, the occupant of the chair must expend appreciable conscious muscular effort to unlock the chair and cause it to swing to tilting position by overcoming the resistance of the spring sufficiently to move the roller 18 out of the notch 15a.

To lend a more attractive and finished appearance to the chair, the tensioning mechanism may be housed or enclosed in a detachable housing 25. In the present embodiment of the invention where the spring 15 is laminated, the housing is mounted in position by engaging its depending arm or edge 26 between a pair of laminations of the spring. The side portions 27 of the housing are of sufficient length to conceal the tensioning mechanism at any point in its normal travel over the surface of the spring according to the degree to which the back member of the chair is tilted.

From the above description it will be apparent that we have produced a construction embodying all of 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 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 seat carried by said seat support, a back member pivotally connected to the seat support, a leaf spring projecting from the seat support, a yoke rockingly mounted in the back member, a roller journaled in the yoke and in rolling engagement with the leaf spring, the center of pivotal movement of the back member being so related to the spring that force imposed by the spring on the roller tends to pivot the back member forwardly toward the seat when the back member is tilted rearwardly, and manually operable means for swinging the yoke to shift the axis of the roller in relation to the back member to increase the tension on said spring.

2. In a chair, a seat support, a seat carried by said seat support, a back member pivotally connected to the seat support, a leaf spring projecting from the seat support, a yoke rockingly mounted in the back member, an extensible member pivoted to the yoke at one end and having rocking connection with the back member at its other end, a roller journaled on the axis of pivotal movement of the yoke and extensible member and in tensioning rolling engagement with the spring, the center of pivotal movement of the back member being so related to the spring that force imposed by the spring tends to pivot the back member forwardly toward the seat when the back member is tilted rearwardly, and manually operable means for extending the extensible member to press the roller against the spring to increase the tension thereon.

3. In a chair, a seat support, a seat carried by the seat support, a back member pivotally connected to the seat support, a laminated spring projecting from the seat support, certain

laminations terminating short of adjacent laminations at one end to form a terminal socket, a tensioning device carried by the back member and contacting said spring, the center of pivotal movement of the back member being so related to the spring that force imposed by the spring tends to pivot the back member forwardly toward the seat, and a flanged housing for the tensioning device, said housing having a flange detachably engaged in the terminal socket formed between the laminations of the spring.

4. In a chair, a seat support, a seat carried by the seat support, a frame-like back member embracing opposite sides of the seat support and pivoted thereto, a U-shaped spring having one leg secured to the seat support and having its other leg projecting between the sides of the frame-like back member, and a tensioning device carried by the frame-like back member and abutting the spring, the pivotal point of the back member being so related to the spring that the spring tends to resist rearward tilting movement of the back member.

5. In a chair, a seat support, a back member pivotally connected to the seat support, a leaf spring projecting from the seat support and having a locking socket, a yoke rockingly mounted in the back member, a roller journaled in the yoke in rolling engagement with the leaf spring, the center of pivotal movement of the back member being so related to the spring that force imposed by the spring on the roller tends to pivot the back member forwardly until such movement is stopped by entry of the roller into the spring socket, and manually operable means for swinging the yoke to shift the axis of the roller in relation to the back member to increase the tension on said spring.

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