Dec. 25, 1951 R. J. FREEMAN 2,579,918

CUSHIONING ASSEMBLY UNIT FOR BACK RESTS

Filed Jan. 25, 1947 2 SHEETS—SHEET 1

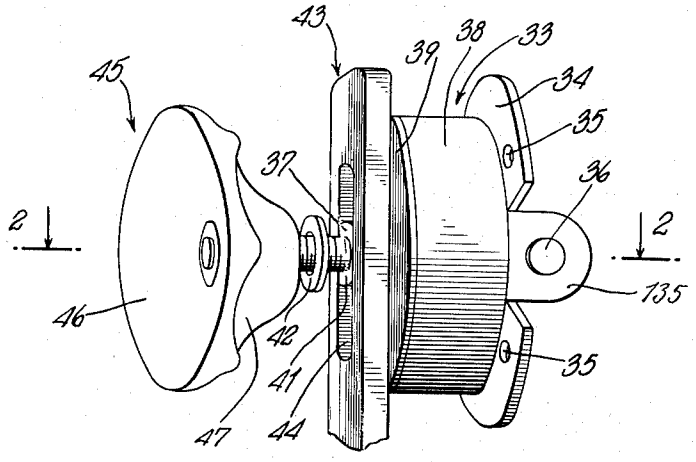


Fig. 1.

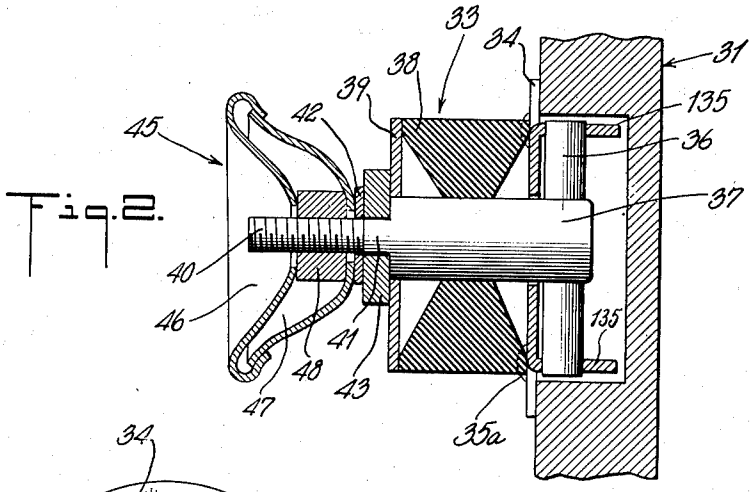


Fig. 2.

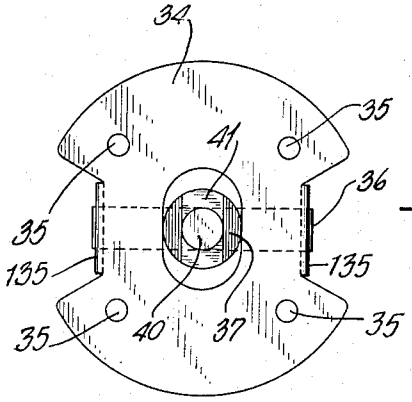


Fig. 3.

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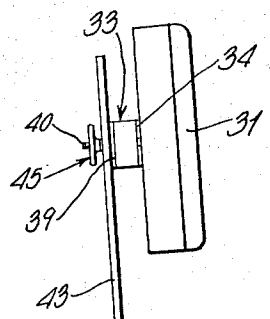
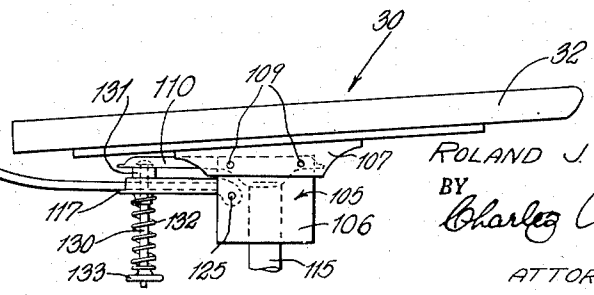


Fig. 4.



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CUSHIONING ASSEMBLY UNIT FOR BACK RESTS

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17 Claims. (Cl. 155—158)

1

This invention relates to improvements in posture chairs, and more particularly to a back-rest cushioning mechanism therefor.

Posture chairs are ordinarily so constructed that the back-rest is either rigidly secured to the back post, or is hinged thereto in such a way that the movement of the back-rest can not be satisfactorily controlled. In some cases a spring mechanism has been employed to return the back-rest into approximate alignment with what may be described as the plane of normal posture, said spring mechanism serving to return said back-rest when released to the said plane.

One object of this invention is a posture chair which can be quickly and simply adjusted to the correct position of normal posture for any user.

Another object is a posture chair which cushions any movement of the back-rest out of the plane of normal posture and back again.

Another object is a posture chair which can be manufactured at low cost without any sacrifice in strength or durability.

Another object is a posture chair of relatively few and simple parts.

Another object is a posture chair which is simple in construction and operation, inexpensive to manufacture, light in weight, compact, easy to dismantle and pack for shipment, to unpack and reassemble, to manipulate, and which is very efficient and durable in use.

Another object is a cushioning assembly unit for resiliently demountably mounting a back rest upon the back post of a posture chair.

Other objects will appear from the detailed description.

In the accompanying drawings consisting of two sheets of four figures, numbered Figs. 1 to 4 inclusive, one convenient form of the invention has been illustrated.

Fig. 1 is a perspective view of a back-rest cushioning mechanism;

Fig. 2 is a horizontal cross-sectional view taken along the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is an end view of the bracket-assembly looking from the left of Fig. 2, with certain of the parts omitted; and

Fig. 4 is a side view of a posture chair and its undercarriage, with the base or pedestal omitted.

Like reference characters designate corresponding parts throughout the several figures of the drawings.

Referring to Figs. 1 to 4, the posture chair 30 includes a back-rest 31, shaped to conform generally to the small of the back and to furnish

2

support therefor. The back-rest 31 is mounted upon a back post 43 (Fig. 4) by means of the cushioning assembly unit 33. The back post 43 is substantially L-shaped, and is bent to conform generally to the contour of the body when seated. The back post may be made of any preferred material such as bar steel which renders the back post inherently resilient.

The seat 32 is supported upon a spider assembly unit 105 which includes a standard 115 (Fig. 4), supported in a chair base or pedestal (not shown) of any conventional type. The standard 115 is male threaded to effect height adjustment relative to the chair base or pedestal.

The back post 43 is preferably mounted in a back post holder 117 which is pivoted at 125—125 to the U-shaped frame 106 of the spider assembly 105. The back post 43 normally assumes the plane of correct posture under the influence of the holder 117 which is actuated by the spring 132. The back-rest 31 is adjustably supported upon the back post 43, and is normally retained in the plane of correct posture for any person of normal physique by the cushioning assembly unit 33.

In general, to adjust the back-rest 31 (Fig. 4) to the correct postural position for a particular individual, two adjustments are desirable, namely the lateral distance between the seat 32 and the back post 43 preferably should be adjustable for girth, and the height of the back-rest 31 above the level of the seat 32 preferably should be adjustable along back post 43 for body or trunk length.

The lateral adjustment of the seat 32 may be effected by making the seat 32 slidable in and out upon the spider assembly 105; while the height adjustment of the back-rest 31 may be effected by forming a vertically elongated slot 44 (Fig. 1) in the back post 43 to allow vertical sliding movement of the cushioning assembly unit 33, which carries the back-rest 31, along the back post 43.

The cushioning assembly unit 33 which is more clearly illustrated in Figs. 1 to 3, may consist of a bracket 34 having a series of holes 35 adapted to receive suitable wood screws 35a (Fig. 2) for attaching the bracket 34 to the back-rest 31. Integral with the bracket 34 are a pair of holed ears 135 forming bearings for a pintle 36, which mounts a stud 37. The stud 37 is provided with a squared shank 41 which slidably engages between the walls of the elongated slot 44 formed in the back post 43. The stud 37 terminates in a threaded shank 40 adapted to receive

the female threaded nut 48 of the hand wheel 45 which can be screwed along the threaded shank 40 against a washer 42, to clamp the annular shoulder of stud 37 (Fig. 2) of the cushioning assembly unit 33 against the opposite face of the back post 43. The cushion of the unit 33 comprises an elastic bushing 38, which may be of rubber, provided with a central opening through which the stud 37 passes, so that when hand wheel 45 is drawn up, the bushing 38 is compressed between the face of the bracket 34 and the face of the washer 39. When the hand wheel 45 is screwed tight upon the threaded shank 40, the cushioning unit 33 is clamped to the back post 43 between the washer 42 and the annular shoulder of the stud 37, the squared shank 41 is seated in the slot 44 to prevent any rotation of the cushioning assembly unit 33, and any swinging movement of the back-rest about the pintle 36 will be cushioned by the compression of the elastic bushing 38.

The hand wheel 45 may consist of a threaded nut 48 seated in a metal cup 47 and anchored therein by crimping the peripheral marginal edge of the cover 46 over the peripheral marginal edge of the cup 47 to clamp the nut 48 between said cup and said cover. The cup 47 and cover 46 are provided with centrally disposed openings which register with the threaded opening in the nut 48.

By this arrangement the back-rest 31 is rockably supported upon the pintle 36, so that whenever the back-rest 31 is rocked responsive to body pressure the angular position of the bracket 34 changes relative to the pintle 36, thus varying the pressure applied to the elastic bushing 38 by the bracket 34, to cushion the movement of the back-rest 31 and of the body upon the back post 43. When body pressure is removed from the back-rest 31, the elastic bushing 38 resumes its normal shape and restores said back-rest to the plane of normal posture.

The bushing 131 spaces the holder 117 away from the bracket 110, the separation between the fixed bracket 110 and the pivoted holder 117 effected by the bushing 131 being such, that when the spring 132 is tensioned sufficiently to retain the holder 117 and the bushing 131 against the bracket 110, the back post 43 which is mounted in the holder 117 will be positioned in the plane of normal posture. Thus, with the bushing 131 in place and the spring 132 under sufficient tension to force holder 117 upwards against bushing 131, the back post 43 will always be positioned in the correct plane for a person of normal posture, and this adjustment, once effected, is a fixed setting. This fixed setting may be changed by substituting a thicker or thinner bushing 131 between the bracket 110 and the holder 117. The tension applied to the spring 132 by the hand wheel 133 determines the body pressure required to move the holder 117 away from the bushing 131 to move the back post 43 off normal.

To dismantle the back post 43, the hand wheel 133 is released, the spring 132, bushing 131 and bolt 130 are removed, and a machine screw (not shown) which passes through the holder 117 into the back post 43 is removed. The back post 43, cushioning assembly unit 33, and the back-rest 31, may now be detached from the posture chair 30 as a single unit, or the assembly unit 33 may also be detached from the back post 43 by unscrewing the hand wheel 45. By this arrangement, the posture chair 30 can be quickly dismantled to facilitate compact shipment without affecting the spider assembly unit 105, and can be reassembled just as quickly at the delivery point.

While the cushioning assembly unit has been illustrated in combination with one preferred form of posture chair, it may if desired be mounted upon the back post of any other conventional form of posture chair.

The back post is biased by the spring 130 against the bushing 131 to normally retain the back post and therefore the back-rest in the plane of normal posture. The back post only moves out of the plane of normal posture responsive to body pressure and then only against increased tension of the coiled spring 130, whose tension may be regulated manually by the hand wheel 133. Body pressure tends to tilt the back-rest upon the back post, but the elastic bushing tends to resist and to cushion this rocking movement. The natural resilience of the elastic bushing tends to cause the back-rest to be automatically cushioned to the occupant's back thus yieldably resisting every change in body pressure resulting from any change in body posture.

Operation

The threaded standard 115 is mounted in the pedestal or chair base (not shown) to regulate the height of the seat above the floor level. The lower end of the back post is inserted in the back post holder 117 with the bolt hole in the back post in registry with the correspondingly disposed hole in the holder 117. The carriage bolt 130, bushing 131, spring 132, and hand wheel 133 are assembled as shown in Fig. 4, with the carriage bolt 130 (Fig. 4) seated in the bracket 110. Hand wheel 133 is manipulated to tension the spring 132 and rock the back post holder 117 about its pivots 125—125 until the post holder is biased against bushing 131. The squared shank 41 of the stud 37 of the cushioning assembly unit to which the back-rest 31 is attached, is inserted through the elongated slot 44 in the upper end of the back post and the hand wheel 45 is left loose until the lateral adjustment of the seat 32 relative to the back-rest, and the vertical adjustment of the back-rest along the back post relative to the seat, are effected, to accommodate the occupant's girth and trunk length, and then the hand wheel 45 is tightened to lock the cushioning assembly unit to the back post at the selected level.

Thus any occupant is able to accommodate the posture chair 30 to the position of correct posture (normal postural position) of said occupant by two adjustments, namely: (*a*) the in and out adjustment of the seat upon the frame 106 of the undercarriage, and (*b*) the up and down adjustment of the back-rest upon the back post. When these two settings have been properly made, the surface of the back-rest provides support for the back of an occupant of normal posture without conscious physical effort on such occupant's part, and regardless of said occupant's physical proportions.

When the occupant moves from the position of correct posture, the body pressure applied to the back-rest changes the angular position of the back post against the increased tension of the coiled spring 130, and the elastic bushing 38 now functions to cushion the back-rest to the occupant's back. The elastic bushing, in producing the cushioning action, functions in effect as a shock absorber. When the occupant resumes the position of correct posture the back post returns to the plane of normal posture, and the back-rest returns to the position of normal posture

thereby removing pressure from the occupant's back.

Thus when the posture chair has been once adjusted to an occupant's normal postural requirements, said occupant may enjoy normal postural support without conscious physical effort or inconvenience.

What is claimed is:

1. A cushioning assembly unit comprising a bracket adapted for attachment to the back-rest of a posture chair, a stud, one end of said stud being adapted to be detachably inserted in the slotted back post of a posture chair for vertical sliding movement in said slot, said bracket being rockably mounted upon the opposite end of said stud, an elastic bushing mounted between said stud ends, and said bracket in rocking being operable in conjunction with said back-post to compress said bushing to cushion movement of a back-rest when attached thereto.

2. A cushioning assembly unit comprising a bracket, a stud, a pintle fastened to one end of said stud and journalled in said bracket, the opposite end of said stud being reduced to form a shoulder a squared shank and a screw-threaded shank, said threaded shank being adapted to be inserted through an elongated slot in a support with said squared shank slidably engaging the side walls of said slot, a hand wheel screw-coupled to said threaded shank to clamp said support between said hand wheel and said shoulder, and an elastic bushing mounted concentric with said stud, said bracket being rockable on said pintle to compress said bushing against said support to cushion the movement of said bracket.

3. A cushioning assembly unit comprising a bracket, a stud, a pintle fastened to one end of said stud and journalled in said bracket, the opposite end of said stud being reduced to form a shoulder a squared shank and a screw-threaded shank, said threaded shank being adapted to be inserted through a slotted support with said squared shank slidably engaging the side walls of said slot, a hand wheel screw-coupled to said threaded shank to clamp said support between said hand wheel and said shoulder, an elastic bushing mounted concentric with said stud, said bracket being rockable on said pintle to compress said bushing and cushion the movement of said bracket, and means controlled by said hand wheel and associated with said stud for regulating the elasticity of said bushing.

4. A cushioning assembly unit comprising a bracket, a stud, a pintle fastened to one end of said stud and journalled in said bracket, the opposite end of said stud being reduced to form a shoulder a squared shank and a screw-threaded shank, said threaded shank being adapted to be inserted through a slotted support with said squared shank slidably engaging the side walls of said slot, a hand wheel screw-coupled to said threaded shank to clamp said support between said hand wheel and said shoulder, a rubber bushing mounted on said stud and abutting said bracket, and a washer mounted on said stud and abutting said support and said bushing, said bracket being rockable on said pintle to compress said bushing against said washer thereby cushioning the movement of said bracket.

5. A cushioning assembly unit for a chair back-rest comprising a bracket, a stud, one end of said stud being pivotally supported upon said bracket, the opposite end of said stud being reduced and partially threaded to form a shoulder a squared shank and a male-threaded end, an elastic bushing freely slidably mounted on said stud, said squared shank being mountable in a support to retain said bushing upon said stud, and a hand wheel screw-coupled to the male-threaded end of said shank to clamp said support between said hand wheel and said shoulder to lock said squared shank in said support and to compress said elastic bushing between said support and said bracket.

6. In a posture chair and in combination, a stud, a bracket pivotally mounted upon one end of said stud, the opposite end of said stud being free, an elastic bushing, a washer, said bushing and said washer being slidably mounted on said stud to compress said bushing between said bracket and said washer to oppose and cushion pivotal movement of said bracket relative to said stud, means whereon said stud is supportable from its free end, and means operable to clamp the free end of said stud to said supporting means and to reduce the spacing between the washer and the bracket to compress the bushing.

7. In a posture chair and in combination, a stud, a bracket pivotally mounted upon one end of said stud, the opposite end of said stud being free, a rubber bushing, a washer, said bushing and said washer being slidably mounted on said stud to compress said bushing between said bracket and said washer to oppose and cushion pivotal movement of said bracket relative to said stud, means whereon said stud is supportable from its free end, and means operable to clamp the free end of said stud to said supporting means and to reduce the spacing between the washer and the bracket to compress the bushing.

8. In a posture chair and in combination, a stud, a bracket pivotally mounted upon one end of said stud, the opposite end of said stud being screw-threaded, an elastic bushing, a washer, said bushing and said washer being slidably mounted on said stud, said washer thus being operable to compress said bushing against said bracket to oppose and cushion pivotal movement of said bracket relative to said stud, means whereon said stud is supportable near its threaded end, and means co-operating with the screw-threaded end of said stud to clamp said stud to said supporting means and to draw said washer against said supporting means and said bracket towards said washer to compress the bushing.

9. In a posture chair and in combination, a stud, a bracket pivotally mounted upon one end of said stud, the opposite end of said stud being male-threaded, a rubber bushing, a washer, said bushing and said washer being slidably mounted on said stud, said washer being operable to compress said bushing against said bracket to oppose and cushion pivotal movement of said bracket relative to said stud, means for supporting said stud adjacent its male-threaded end, and means co-operating with said male-thread to clamp said stud against said supporting means and to compress said bushing between said washer and said bracket.

10. A cushioning assembly unit comprising a bracket adapted for attachment to the back-rest of a posture chair, a stud, one end of said stud being adapted to be inserted in the slotted back post of a posture chair for vertical sliding movement in said slot, means for clamping said stud to the back post, said bracket being rockably mounted upon the opposite end of said stud, and an elastic bushing mounted on said stud and compressed by the bracket against the back post

to oppose and cushion the rocking movement of said bracket upon said stud.

11. A cushioning assembly unit for a posture chair having a back-post-supported back-rest comprising a bracket adapted for attachment to the back-rest, a stud, one end of said stud being adapted to be inserted in the slotted back-post for vertical sliding movement in said slot, means for clamping said stud to the back-post, said bracket being rockably mounted upon the opposite end of said stud, and a rubber bushing mounted on said stud and compressed by said bracket against the back-post under control of said clamping means to oppose and cushion rocking movement of said bracket upon said stud.

12. A cushioning assembly unit comprising a bracket, a stud, a pintle fastened to one end of said stud and journalled in said bracket, an elastic bushing concentrically mounted upon said stud in abutment with said bracket, the opposite end of said stud being reduced to form a shoulder a squared shank and a screw-threaded shank, said threaded shank being adapted to be inserted through an elongated slot in a support with said squared shank slidably engaging the side walls of said slot and said bushing abutting said support, and a hand wheel screw-coupled to said threaded shank to clamp said support between said hand wheel and said shoulder and to draw said bracket towards said support to compress said elastic bushing for opposing and cushioning turning movement of said bracket upon said pintle.

13. A cushioning assembly unit for a posture chair having a back-post-supported back-rest comprising a bracket, a stud, a pintle fastened to one end of said stud and journalled in said bracket, a rubber bushing concentrically mounted upon said stud and abutting said bracket, the opposite end of said stud being reduced to form a shoulder a squared-shank and a screw-threaded shank, said back-post having an elongated slot formed therein, said squared-shank being slidably adjustable in said elongated slot, and a hand wheel screw-coupled to said threaded shank and co-acting therewith to draw said bracket towards said back-post to tighten said squared-shank in said slot and to compress said bushing, and said compressed bushing opposing and cushioning turning movement of said bracket upon said pintle.

14. A cushioning assembly unit for a posture chair having a back-post-supported back-rest comprising a stud, a bracket pivotally supported upon one end of said stud, an elastic bushing mounted upon said stud and compressible against said bracket to oppose and cushion pivotal movement of said bracket, the opposite end of said stud being reduced to form a shoulder and a squared shank and terminating in a male-thread, said back-post having a slotted opening formed therein, said squared shank being mountable in said slotted opening to retain said bushing upon said stud, and a hand wheel screw-coupled to the male-thread of said stud and when tightened locking said squared shank in said slotted opening and drawing said bracket towards said back-post to compress said bushing.

15. A cushioning assembly unit for a posture chair having a back-post-supported back-rest comprising a stud, a bracket pivotally supported upon one end of said stud, a rubber bushing mounted upon said stud and compressible against said bracket to oppose and cushion pivotal movement of said bracket, the opposite end of said stud being reduced and partially threaded to form a shoulder and a squared shank terminating in a male-thread, said back-post having a slotted opening formed therein, said squared shank being mountable in said slotted opening to retain said bushing upon said stud, and a hand wheel screw-coupled to the male-thread of said stud and when tightened co-operating therewith to lock said squared shank in said slotted opening and to draw said bracket towards said back-post to compress said bushing.

16. In a posture chair and in combination, a back-post, a slotted opening formed in said back-post, a stud, a bracket pivotally supported upon one end of said stud, an elastic bushing, a washer, said bushing and said washer being mounted upon said stud, said bracket and said washer being relatively movable to compress said bushing and thus oppose and cushion movement of said bracket upon its pivotal support, the opposite end of said stud being reduced and partially threaded to form a shoulder a squared shank and a male-threaded end, said squared shank being mounted in said slotted opening to position said washer against said back-post, and a hand wheel screw-coupled to the male-threaded end of said stud and co-acting therewith to retain said squared shank in said slotted opening and to draw said bracket towards said washer to compress said bushing.

17. In a posture chair and in combination, a support, a slotted opening formed in said support, a stud, a bracket pivotally supported upon one end of said stud, a rubber bushing, a washer, said bushing and said washer being mounted upon said stud, said bracket and said washer being relatively movable to compress said bushing and thus oppose and cushion movement of said bracket upon its pivotal support, the opposite end of said stud being reduced and partially threaded to form a shoulder a squared shank and a male-threaded end, said squared shank being positioned in said slotted opening to fix said washer against said support, and a hand wheel screw-coupled to the male-threaded end of said stud and co-acting therewith to retain said squared shank in said slotted opening and to draw said bracket towards said fixed washer to compress said bushing.

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