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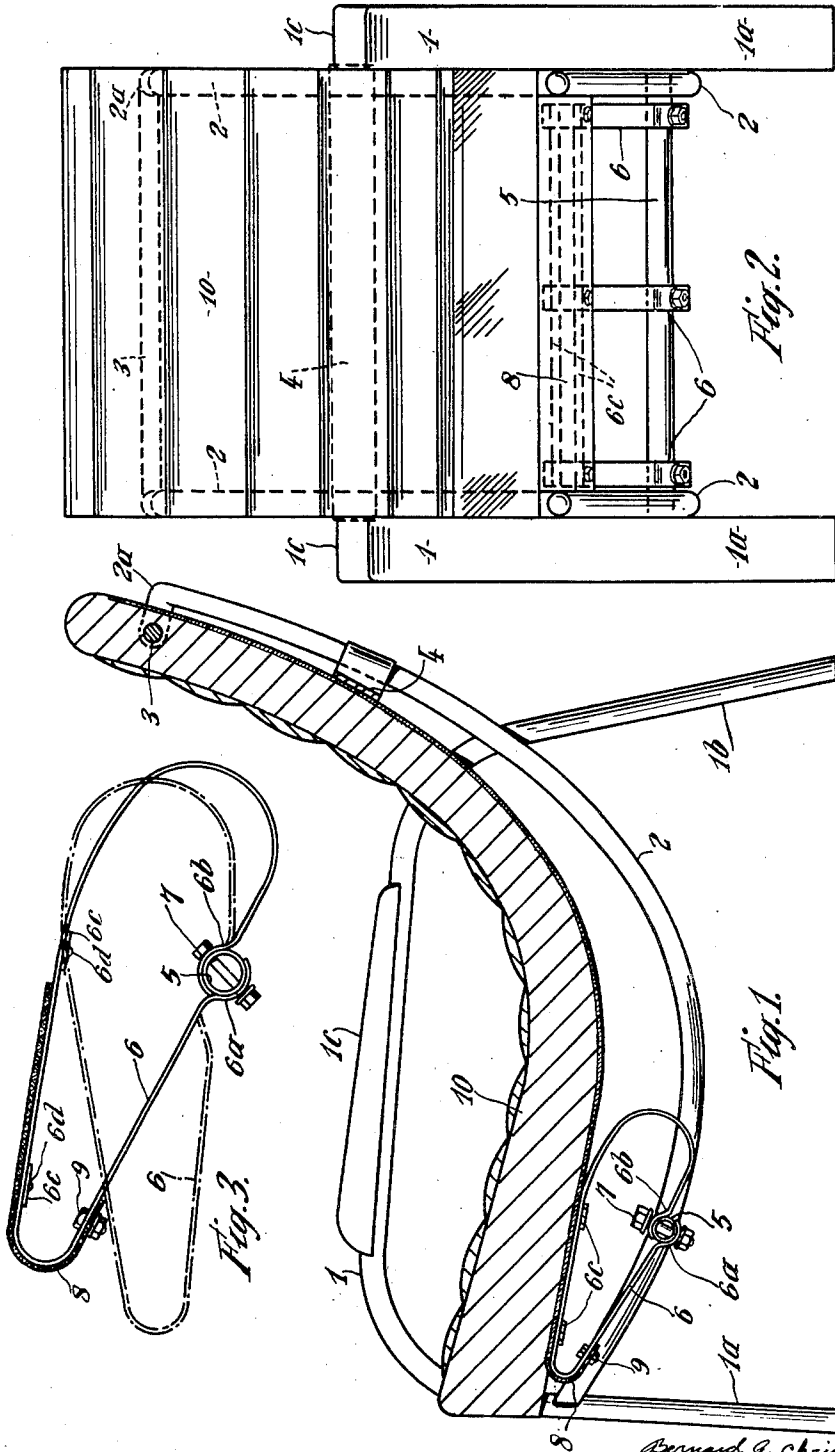
B. A. CHRISTIE

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CHAIR HAVING A SUSPENDED SEAT AND BACK
RESILIENTLY SUPPORTED AT ITS LOWER END

Filed March 29, 1948

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

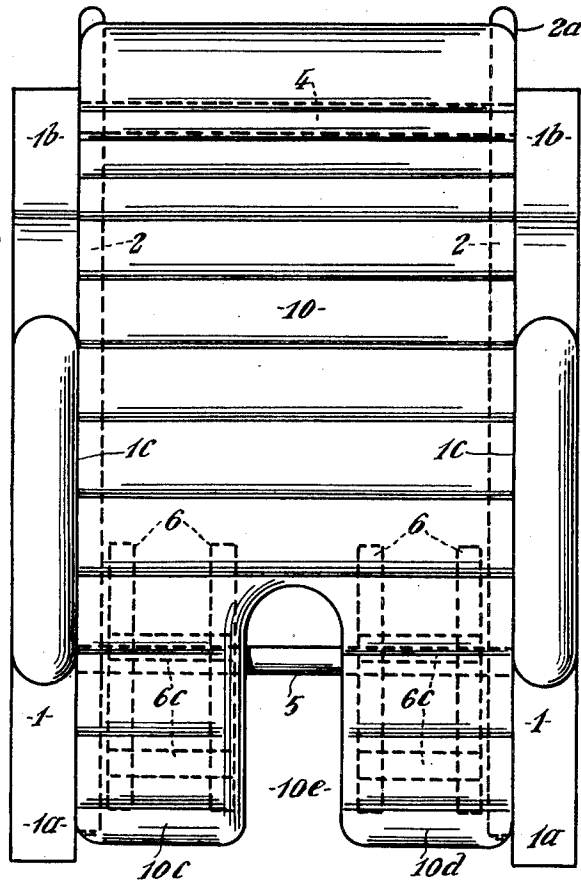


Fig. 1.

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UNITED STATES PATENT OFFICE

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CHAIR HAVING A SUSPENDED SEAT AND BACK RESILIENTLY SUPPORTED AT ITS LOWER END

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This invention relates to seats or the like of the kind wherein a flexible element constituting a combined seat portion and back-rest is slung between a rear upper anchorage and a thigh-rest capable of fore and aft rocking movement for effecting automatic adjustment of said flexible element according to change in position of the user.

For securing the highest possible degree of comfort, seats of the kind referred to are designed so that variations in the position of the thigh-rest by changing the position of the legs of the occupant, result in such variation of curvature of the flexible element that in all positions of use the body is supported continuously from the shoulders to beneath the knees in such manner that at all angles of incline of the body the small of the back, in particular, is adequately supported.

It is known to provide a thigh support as a rigid member of substantial depth from front to rear and to mount the support in such manner, e. g. pivotally, that it is capable of adjusting itself automatically as regards its angular disposition about the pivotal axis depending on the position assumed by the user. It is also known in such a construction to divide the support longitudinally into two independently movable parts for accommodating leg movement and, in the case of a seat or the like for use on aircraft, to provide a central recess to ensure free movement of the control stick.

According to the present invention, a seat or the like of the kind referred to is characterized in that the thigh-rest is constituted or supported by a structure comprising longitudinally extending spring elements anchored to a support beneath the thigh-rest and arranged so that, while maintaining the thigh-rest normally in a neutral position, said spring elements are capable of flexure adjacent the support in such manner that the spring structure as a whole is capable of fore and aft rocking movement with respect to the support. This rocking movement permitted by local flexure of the spring elements adjacent the support gives a pivotal movement of the thigh-rest but without relatively movable wearing parts, while the strength of the spring is such as to determine the limits of movement.

The spring structure preferably is adapted to provide a resilient seating surface curved to a convex formation in the longitudinal direction and comprises two or more suitably bent spring strips extending longitudinally with respect to the seat and bent or curved over at front and rear for attachment to a transverse anchorage member extending below the structure at a suitable intermediate position in the length of the said structure.

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Each spring may be in the form of a continuous strip anchored at its ends to the said transverse anchorage member and preferably is of substantially elliptical formation, the front section of which is of less depth and greater length than the rear section thereof. The longitudinally extending springs may be connected by transverse members.

According to a further feature of the invention, the weight-carrying part of the seat proper and/or the resilient or resiliently mounted structure is divided longitudinally for the whole or a part of its length to provide two parts capable of independent rocking movement.

The spring strips preferably are disposed parallel to the longitudinal axis of the seat or the like, but may be otherwise suitably disposed. The fixed anchorage may comprise a tube, the springs being adapted to embrace the tube and being fixed thereto as by means of bolts. Alternatively, the fixed anchorage may comprise a bar of rectangular cross-section, and the ends of the springs may be clamped to the upper and lower surfaces of the said bar.

The invention furthermore includes the constructional embodiments hereinafter described. The invention is hereinafter described by way of example with reference to the accompanying diagrammatic drawings, in which:

Fig. 1 is a sectional side elevation illustrating one construction of seat or the like in accordance with the invention;

Fig. 2 is a front elevation corresponding to Fig. 1;

Fig. 3 is a detail view in side elevation illustrating the manner in which tilting of the seat support is permitted by flexure of the springs; and

Fig. 4 is a plan view corresponding to Fig. 1 and illustrating a modification in which the seat-supporting structure is divided longitudinally.

In carrying the invention into effect according to one construction, and referring more particularly to Figs. 2 and 3 of the accompanying diagrammatic drawings, the improved seat or the like may comprise two side frames 1, each of which is shaped to provide legs 1a, 1b, while the upper part is provided with an arm-rest 1c. Curved tubular side members 2 are attached to the inner side of the side frames 1 as by welding, said members 2 extending upwardly and at their upper ends being provided with bent portions 2a for the support of a transverse anchorage member 3. A back-rest support 4, preferably in the form of a slightly curved spring strip of flat section, bent over at its ends and secured as by welding to the side members 2, may be provided, such back-rest support 4 serving as a slightly yieldable abutment constituting a support for

the back of the user to enable change of leg position to be effected without moving the position of the body relative to the seat surface.

Towards the front part of the structure the members 2 are connected by a transverse anchorage member 5, conveniently in the form of a tube, and to this anchorage member 5 two or more longitudinally extending springs 6 are connected. As shown, each spring may consist of a strip bent to a substantially elliptical formation such that the front part is of less depth and greater length than the rear part. The ends of the strip are arranged to extend in overlapping relation and are provided with parts 6a, 6b shaped to embrace the anchorage 5 so that, by means such as a bolt 7, each spring 6 may be firmly clamped to the anchorage member 5. The springs 6 may be two or more in number. As shown in Fig. 2, three springs 6 are provided in equally spaced relation and they may be connected at their upper part by means of transverse slats 6c to provide a structure constituting a thigh-rest.

As will be seen more particularly in Fig. 3, the springs 6 fixed to the anchorage member 5 in the manner described, provide a thigh-rest structure which, by flexure of the springs, more especially adjacent the anchorage, is capable of rocking movement in relation to the anchorage to a substantial degree as shown in Fig. 3, wherein the broken lines indicate the approximate forward limit of the rocking movement. Furthermore, the upper parts of the springs 6 are wholly or partially curved to provide a slightly convex formation longitudinally and the springs are of such strength that they provide little, if any, direct cushioning action and maintain the thigh-rest normally in a neutral position, such as shown in Fig. 1. The springs also determine the limits of movement of the structure as a whole and thus eliminate the provision of stops.

As shown in Figs. 1 and 2, a flexible cushion element 10 constituting a combined seat and back-rest, is slung from the upper anchorage 3 and attached to the spring structure as by means of a backing 8 extending around the front ends of the springs and secured thereto as by means of bolts 9. For garden or similar use, the flexible element 10 may consist of connected slats, but may be otherwise constructed in any suitable manner and of any desired material according to the purpose for which the seat or the like is intended.

In the modification illustrated in Fig. 4, the spring structure is divided longitudinally to form two spaced independent parts, each including at least two springs 6 suitably connected together and to the anchorage member 5 as in the manner before described. Similarly, the flexible or other seat element 10 is formed with a longitudinal gap 10e extending from the front end so as to divide the effective weight-carrying part of the seat into two parts. It will be understood that in this construction the two parts 10c, 10d are movable independently so that they are capable of taking up different inclinations with respect to the anchorage member 5, thereby ensuring maximum comfort while allowing independent leg movement. Furthermore, in the case of a seat or the like applied to aircraft, the gap 10e serves to ensure free movement of the centrally arranged control stick.

It will be understood that the invention is not

limited to the particular embodiments hereinbefore described. Thus, the springs 6 may be otherwise constructed and adapted for attachment to a suitable anchorage disposed below the seat member at a suitable position in its length from front to rear and the anchorage member may be of square or other suitable section.

I claim:

1. In a seat of the character described, a frame including rigid upper and lower transverse anchorage members, a thigh rest carried by the lower anchorage member and a flexible seat and back rest member secured at one end on said upper anchorage member and at the other end on said thigh-rest, said thigh-rest comprising longitudinally extending looped spring members each constituted by a spring metal strip, the extremities of which extend into overlapping relation and are bent downwardly and towards each other, the overlapping ends being anchored to said lower anchorage member to maintain the thigh-rest normally in a neutral position, but permitting flexure thereof adjacent the point of attachment to the anchorage member to permit fore and aft rocking movement of the thigh-rest as a whole with respect to the anchorage member.

2. A seat structure according to claim 1 in which the lower anchorage member comprises a tube and the extremities of the spring members embrace opposite sides of the tube and bolts anchor the same to the tube.

3. In a seat of the character described, a frame including rigid upper and lower transverse anchorage members, a thigh-rest carried by the lower anchorage member and a flexible seat and back rest member secured at one end on said upper anchorage member and at the other end on said thigh-rest, said thigh-rest comprising longitudinally extending looped spring members of substantially elliptical formation anchored to said lower anchorage member intermediate the ends of the loop and having a front section forward of the anchorage of less depth and greater length than the rear section thereof, the fastening of the thigh-rest to the lower anchorage member maintaining the thigh-rest normally in a neutral position, but the elasticity of the spring members permitting flexure of the thigh rest adjacent the point of attachment to the anchorage member to permit fore and aft rocking movement of the thigh-rest as a whole with respect to the anchorage member.

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