Aug. 11, 1942. F. C. VERNON 2,292,414

UPHOLSTERED ADJUSTABLE CHAIR

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FIG. 1.

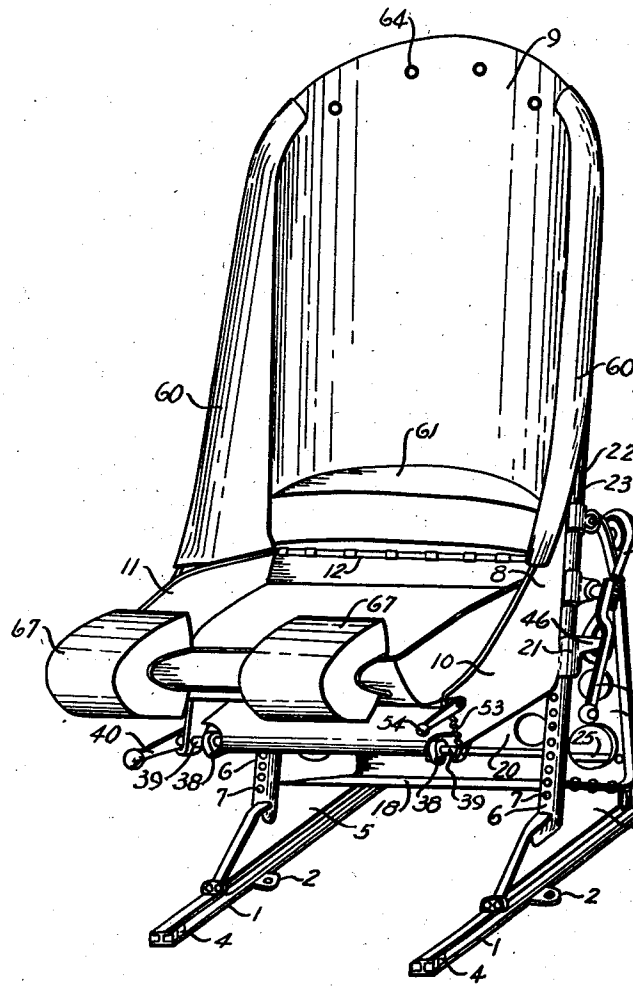


FIG. 2.

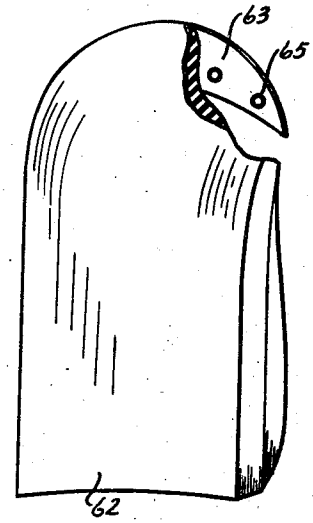
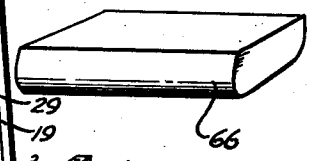


FIG. 3.



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FIG. 4.

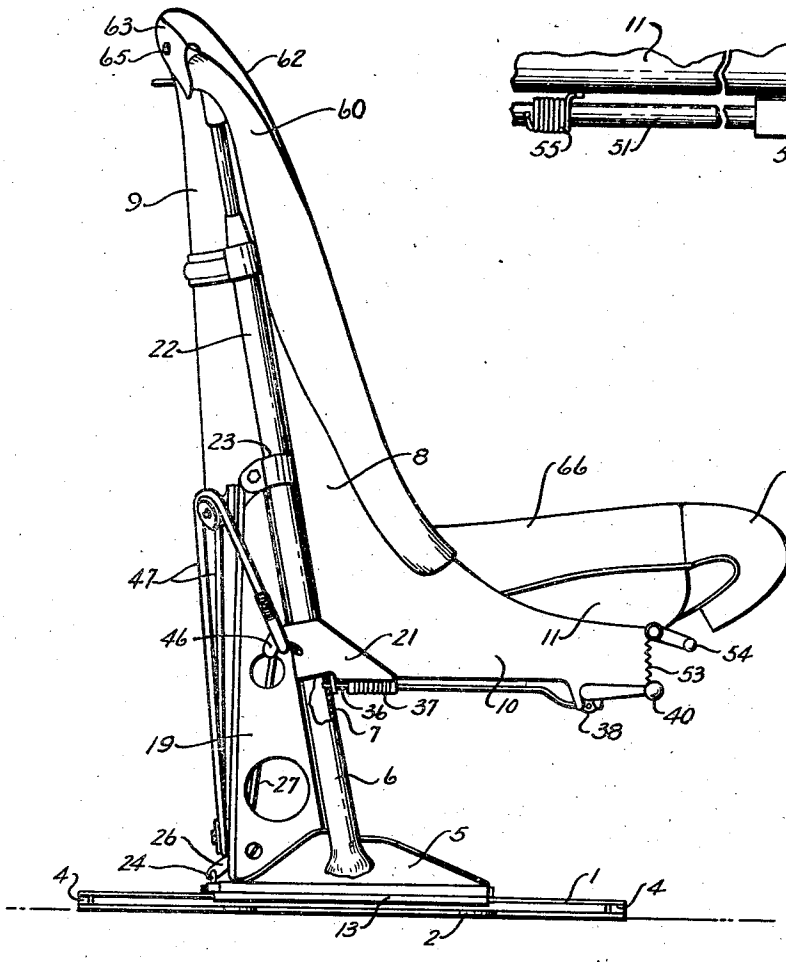
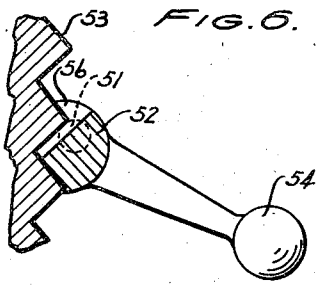


FIG. 5.

FIG. 6.



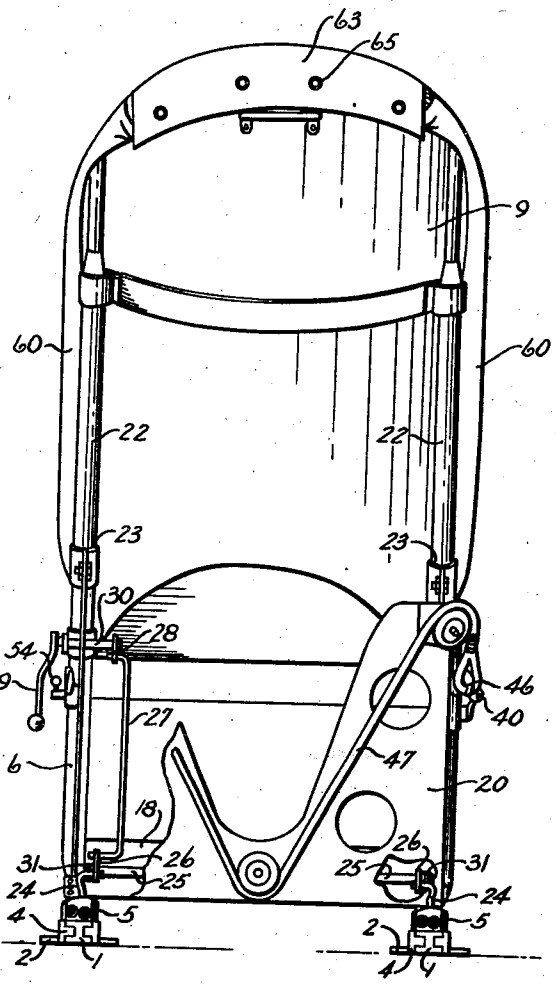
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FIG. 7



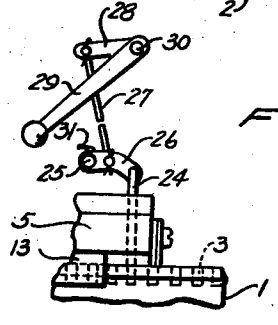


FIG. 8.

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UNITED STATES PATENT OFFICE

2,292,414

UPHOLSTERED ADJUSTABLE CHAIR

Forest C. Vernon, Dayton, Ohio

Application January 28, 1941, Serial No. 376,325

5 Claims. (Cl. 155—5)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The invention relates to an improved adjustable chair, and has particular reference to a chair, or seat, for a vehicle such as an airplane or the like.

The general object of the invention is to provide an improved chair, for use in vehicles, which is readily adjustable to accommodate persons of different stature, and which is, at the same time, strong and rugged in construction.

A particular object is to provide a chair having adjustments to vary the height of the seat, the inclination of the seat portion with respect to the back portion, and the fore-and-aft position of the chair as a whole.

A further object is to provide a chair, for an airplane or the like, having elements of permanent upholstery, and also having elements of removable upholstery, or cushions, which may be removed when a parachute pack of either the seat or back type is worn.

These and other objects will become apparent as the description proceeds in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a chair constructed according to the present invention, having the back and seat cushions removed;

Fig. 2 is a perspective view of a back cushion in which a portion is broken away;

Fig. 3 is a perspective view of a seat cushion;

Fig. 4 is a side elevation view of the chair with the removable cushions in place therein;

Fig. 5 is a fragmentary view in front elevation showing the locking device for maintaining the forward part of the hinged seat element at a selected height and inclination;

Fig. 6 is a section taken on the line 6—6 of Fig. 5;

Fig. 7 is a rear elevation of the chair with parts broken away;

Fig. 8 is a fragmentary view showing the locking device for holding the chair in a desired fore-and-aft adjusted position.

The chair of the present invention is supported upon the tracks 1 for fore-and-aft adjustment, the said tracks being provided with ears 2 for securing the same to a floor or other support. The tracks 1 are constituted by structural members resembling small I-beams having a plurality of apertures 3 of limited depth provided in the top surfaces for locking the chair in selected positions. Stops 4 are provided at the ends of the tracks for limiting the movement of carriages 5 which directly support the chair. The carriages 5 are constructed to ride upon the tracks 1 by means of rollers or antifriction surfaces and are provided with flanges 13 partially surrounding the upper flanges of the tracks to prevent disengagement or removal of the carriages from the tracks.

Each carriage 5 carries an upright tubular support 6 provided with apertures 7 in the manner illustrated, these tubular supports slidably carrying thereon a seat shell 8. The seat shell 8 comprises essentially a back portion 9 and a bottom portion 10, and carries an adjustable seat element 11 pivotally connected at the rear edge thereof, by means of the hinge 12, with the said shell 8. To provide for vertical adjustment, the shell 8 carries a pair of guides 21 slidably encircling the tubular supports 6, and a pair of depending posts 22 slidably telescoping into the tubular supports 6, the open upper ends of the tubular supports 6 being indicated by the reference numeral 23. Structural members 18, 19, and 20 maintain the supports 6 in proper alignment. The structure thus far described provides for fore-and-aft, or longitudinal, movement of the seat shell upon the tracks 1, height adjustments of the seat shell by vertical movement on the tubular supports 6, and variation of the inclination of the seat element 11 with respect to the back portion 9.

Locking means are provided for each of these adjustments operative in any one of a plurality of selected positions. Carriages 5 may be locked in selected positions upon the tracks 1 by means of detent rods 24 which are urged by springs 31 into engagement with the apertures 3. A transverse rod 25, pivotally mounted upon the carriages 5, carries the springs 31 and is provided at its ends with arms 26 for depressing and lifting the detent rods 24. One of the arms 26 is connected by a link 27 to a crank arm 28 operable by a lever 29 which is pivotally mounted upon one of the tubular supports 6. In this manner, it will be seen that the detent rods 24 may be lifted out of the apertures 3, against the spring tension referred to, by lifting upwardly upon the lever 29. Upon releasing the lever 29, the springs 31 return the detent rods 24 into contact with the upper surface of the tracks 1 so that whenever an aperture 3 is presented opposite the lower end of a detent rod 24, the latter will snap into locking engagement with the track. Details of this locking mechanism are best shown in Figs. 7 and 8.

In a similar manner, the underside of the bottom portion 10 of the seat shell 8 carries detent rods 36 having rearward ends engageable with the apertures 7 in each of the tubular supports 6, locking engagement being maintained by means of springs 37. The detent rods 36 have forward ends connected to crank arms 38 on a transverse shaft 39, which shaft is carried by the seat shell 8 and operable by a release lever 40 in such a manner that an upward movement of the lever 40 will withdraw the rearward ends of the detent rods 36 from the apertures 7. The seat shell guides 21 are provided with ears 46 for anchoring the ends of an elastic cord 47, which cord is tensioned to raise the seat shell 8 when the detent rods 36 are withdrawn. Instead of the elastic cord 47, compression springs may be housed within the tubular supports 6 to lift the seat shell 8. The seat shell is lowered to a selected position by the action of the occupant in applying sufficient weight to depress the shell to the desired level.

In addition to the fore-and-aft and vertical locking adjustments already described, a further locking adjustment is provided to give support under an occupant's knees at a comfortable height, by varying the inclination of the hinged seat element 11 with respect to the back portion 9. To this end, the underside of the forward portion of the seat element 11 is provided with a pair of bearing breakets 50 carrying a transverse shaft 51 equipped with rotatable dogs 52, as shown in Figs. 5 and 6. The dogs 52 are eccentrically positioned with respect to the shaft 51 in the manner shown in Fig. 6 and are aligned with arcuate toothed portions 53 on the forward parts of the seat shell 8 so that the weight carried by the forward portion of the seat element 11 will bear upon the toothed portions 53 when the dogs 52 are rotated into locking position, as shown. A lever 54 is provided on one end of the shaft 51 for rotating the dogs 52 in a counterclockwise direction, as viewed in Figs. 4 and 6, to clear the tips of the teeth 53 to free the seat element 11 for vertical angular adjustment. When the lever 54 is released, the dogs 52 are returned to the locking position shown by the action of a spring 55 having a portion thereof bearing against, or anchored to, the underside of seat element 11. The eccentric position of the dogs 52 on the shaft 51 is such that when a weight is impressed upon the shaft 51—as, for instance, the weight of an occupant upon the seat element 11—such weight will tend to assist the spring 55 in maintaining the dogs 52 in the locked position shown. This is so because the cam shape of the dogs 52 requires a slight upward movement of the seat element 11 before the dogs can rotate clear of the teeth 53. A flange 56 may be provided on one face of each dog 52, as shown, to assist in maintaining alignment with the toothed portion 53.

Another feature of novelty in the present invention is the provision of improved seat and back cushions which are removable to permit the use of either seat- or back-type parachute packs. If no parachute is worn by the occupant, the seat and back cushions may both be used in the chair. In addition to the removable back cushion, the back portion 9 of the seat shell is seen to be provided with fixed upholstery or cushions 60 to protect the side edges of the bucket-shaped shell. In the present embodiment, a small cushion 61 is also fixed in the lower part of the back portion in the manner illustrated in Fig. 1. The removable back cushion then comprises a main cushion body 62 of the approximate size and shape of a back-type parachute pack which will fit the curvature of the back portion 9 and present a substantially flat cushioning support for the occupant's back. A band of material 63 is attached along the rounded top edge of the cushion 62 in such a manner that it is adapted to fold over and form a pocket to envelop the rounded marginal part of the back portion 9 of the seat shell in the manner illustrated, to hold the top of the cushion 62 snugly against said back portion. The seat shell is provided with quick-release fastening means, such as snap fasteners 64, which are adapted to cooperate with complementary fastening means 65 on the band 63. Thus the cushion 62 may readily be applied to the chair by slipping the band 63 over the top of the back portion 9 and snapping the elements 65 into engagement with the elements 64. The lower end of the cushion 62 will then rest upon the fixed cushion 61 to provide a comfortable, upholstered chair back. If a back-type parachute pack is worn, the cushion 62 may be readily removed, the space occupied thereby being of a size and shape to accommodate the parachute pack with its lower end resting upon the cushion 61.

The seat element 11 is seen to be of a hollow configuration to accommodate the seat cushion 66, which cushion is of the approximate size and shape of a seat-type parachute pack. When a seat pack is not worn, the cushion 66 will support an occupant in the chair in the same relative position as when the occupant is wearing the pack. The forward edge of the seat element 11 is provided with two fixed cushions 67 adapted to provide support under the occupant's knees at an elevation determined by the adjustment on the arcuately toothed portions 53, in the manner previously described. By providing individual cushions 67 for each leg, it is possible to give comfortable support under the knees of the occupant and at the same time maintain an open space therebetween for manipulation of the control stick. In lieu of the two cushions 67, a single fixed cushion may be used by inwardly curving the forward edge thereof in its central portion to provide a space for movement of the control stick. The depth of the hollow seat element 11 is such that the top surface of the cushion 66, or alternatively the top surface of the seat pack, will be substantially continuous with the top surfaces of the cushions 67.

The present structure is intended to illustrate a preferred embodiment and is not to be construed in any way as limiting the invention. Changes may be made, therefore, in the present construction which do not depart from the spirit and scope of the invention as defined in the appended claims. Other locking or latching mechanism may be used which will function to establish the required adjustments.

The terms "horizontal" and "vertical" as herein used are understood to be considered as relative and approximate, and not as strict limitations defining an exact position or angular relationship. For instance, the reference to vertical adjustment and vertical upright supports pertains to the general raising or lowering of the height of the seat, regardless of whether or not the path of travel lies in a strictly vertical line. Likewise, the tracks 1 may be described as horizontal, regardless of whether the floor or support on which they are laid is strictly horizontal or not, because obviously, in a vehicle such

as an airplane, a floor surface which might be described as horizontal would not necessarily remain horizontal.

Thus it is seen that the several objects of the invention have been accomplished in the structure described herein. While it is not intended to limit the use of the invention, it may be pointed out that the chair forming the subject matter of the present invention is particularly suited for long airplane flights where a considerable degree of comfort is essential for the operating crew to maintain alertness by eliminating, as far as possible, fatigue arising from physical discomfort. The construction of the present chair enables an occupant to adjust the position, height, and knee elevation to suit his personal comfort, and to change any of these adjustments from time to time without arising from the chair. In addition, the nature of the removable cushions permits the use of either seat- or back-type parachute packs without sacrificing any of the other advantages pointed out.

I claim:

1. In a vehicle chair or the like having an upright back portion, cushion elements on the side edges of said back portion, and a removable back cushion adapted to fit between said cushion elements, said removable cushion having a pocket along its upper edge adapted to envelop the top of said back portion of said chair and position said removable cushion, said cushion elements serving to prevent lateral displacement of said removable cushion.

2. In an adjustable chair for a vehicle or the like, a pair of supporting carriages, an upright tubular column on each of said carriages, a seat shell having a pair of posts depending from the upper part thereof and slidably received within said columns for vertical movement, a pair of guides on the lower part of said seat shell slidable on said tubular columns, resilient means for raising said seat shell, and means for locking said seat shell in a plurality of vertically adjusted positions, said locking means comprising manipulable detent means associated with said guides on said seat shell and a plurality of detent engaging means on said tubular columns.

3. In an adjustable chair for a vehicle or the like, a vertically adjustable rigid seat shell, said seat shell comprising an integral bucket-shaped back portion and a bottom portion, low side walls formed as forward continuations of said back portion, a deep pan-shaped seat element hinged along its rear side to the lower part of said back portion of said seat shell, said pan-shaped seat element having side walls lying adjacent and within said low side walls on said seat shell, said seat element being of a size and depth to accommodate a conventional seat type parachute pack, means on the forward edge of said seat element to provide support under the knees of an occupant of said chair, and means to adjust the inclination of said seat element in said seat shell to support an occupant's knees at desired heights in accordance with the selected vertical adjustments of said shell.

4. A vehicle chair comprising a back portion and a seat portion, cushion elements on the side edges of said back portion, a removable back cushion for said back portion adapted to fit between said cushion elements, a removable seat cushion on said seat portion, and a forwardly projecting cushion fixed to the leading edge of said seat portion with the top surface thereof in continuation with the top surface of said seat cushion, said removable cushions having thicknesses approximately equal to back and seat type parachute packs respectively so as to support an occupant in the chair in the same position as when wearing a parachute pack of either type.

5. In an adjustable chair for a vehicle or the like, a rigid seat shell comprising an integral bucket-shaped back portion and a bottom portion, low side walls formed as forward continuations of said back portion, a deep pan-shaped seat element hinged along its rear side to the lower part of said back portion of said seat shell, said pan-shaped seat element having side walls lying adjacent and within said low side walls on said seat shell, said seat element being of a size and depth to accommodate a conventional seat type parachute pack, a forwardly projecting cushion fixed to the leading edge of said seat element with the top surface thereof in continuation with the top surface of said parachute pack, and means to adjust the inclination of said element with respect to its supporting seat shell.

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