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[54] **AIRCRAFT CREWSEAT**
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A47c 1/02, A47c 1/06
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244/122, 141; 248/399, 401

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ABSTRACT: A seat structure which results in minimal movement between an occupant and the back of the seat when the seat is reclined. Members respectively extending from the seat back and a seat base are pivotally connected together by a pair of nonparallel links. Centerlines of the links intersect at a point essentially coincident with the pelvic point line of the occupant. An extensible link is connected to the seat base and the seat back for adjustably positioning the seat base and the seat back at a plurality of relative positions.

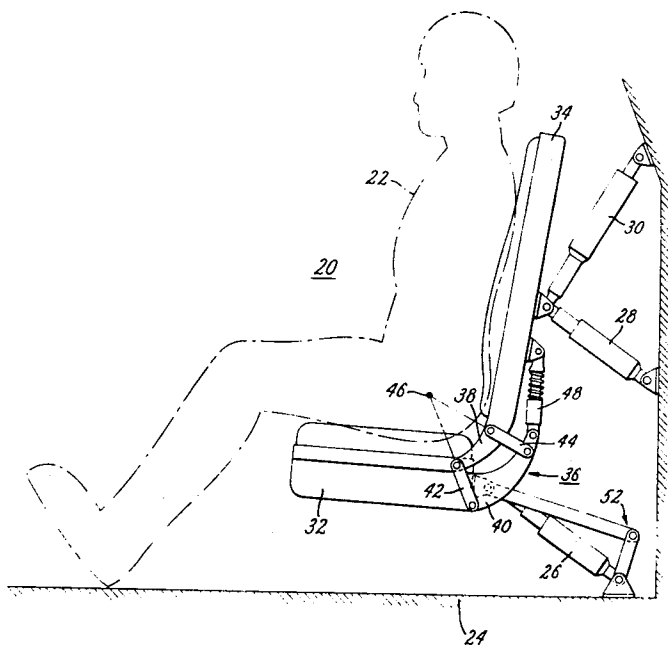


Fig. 1.

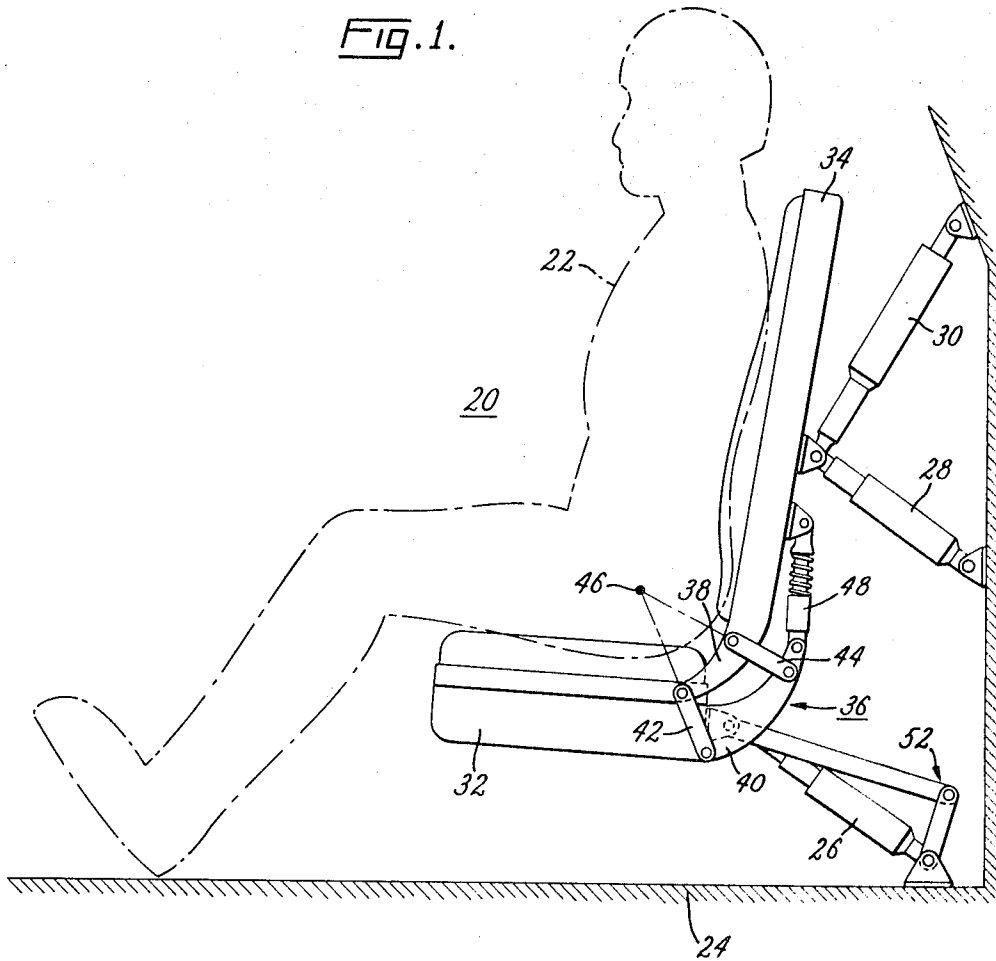
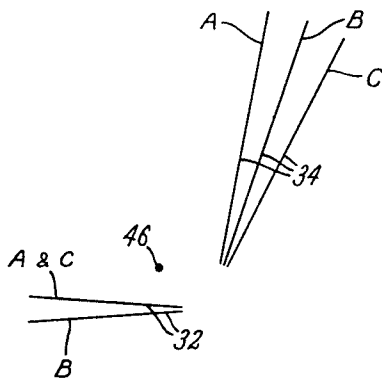


Fig. 4.



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Fig. 2.

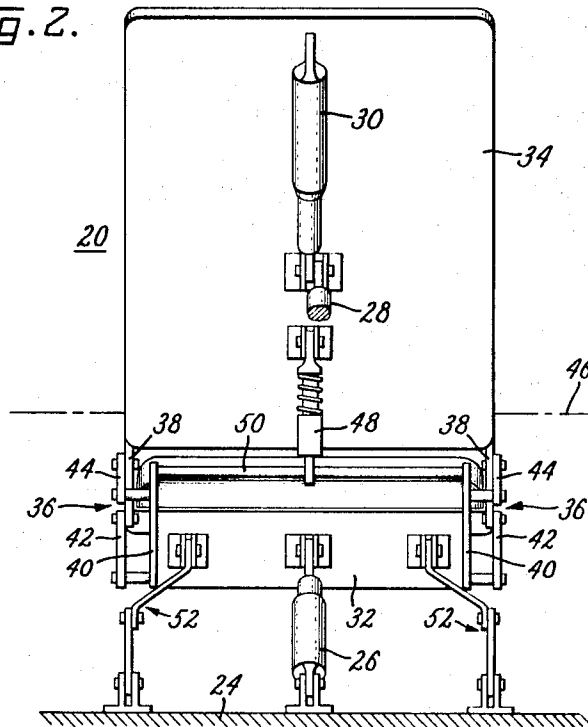
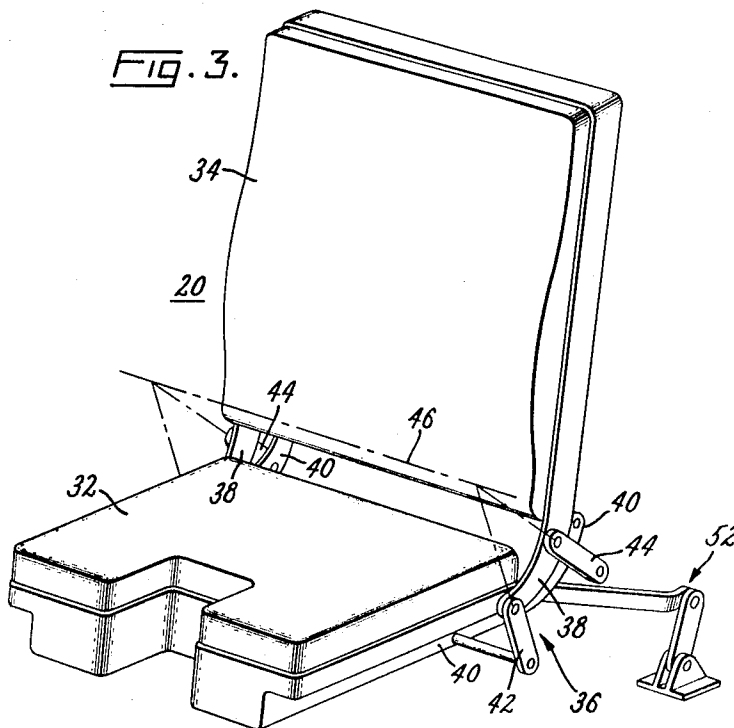


Fig. 3.



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AIRCRAFT CREWSEAT

This invention relates generally to seats adapted for use in a vehicle and particularly to aircraft crew seats.

For the purposes of this disclosure, the word "tilt" and its derivatives shall be taken to mean movement of the seat as a unit about a lateral axis, and the word "recline" and its derivatives shall be taken to mean a relative angular change of position between the seat back and the seat base.

In vehicles having high vibratory characteristics, crew members and passengers can become fatigued in a relatively short period of time. In the past, fatigue has been minimized by designing easily adjustable seats which provide proper support for the occupant. Seats of this type preferably have a seat back which is suitably curved to support the occupant's lumbar region and additionally are provided with structure which permits the seat to recline. The reclining feature assists in minimizing fatigue by permitting the occupant to attain and maintain a comfortable position.

In these prior constructions, seats would usually recline about a pivot line located at the juncture of the seat back and the seat base. As the seat reclines, an occupant reclines about a second pivot line or pelvic pivot line which passes through his hip joints. An inherent difficulty with seats of this type is that the occupant and the seat pivot respectively about a pair of spaced axes, causing the occupant's back to move relative to the seat back when the seat is reclined. As a result, the occupant receives proper support from his seat at only one position, and is therefore subject to increased fatigue at other relative positions of the seat base and the seat back.

The present invention overcomes the aforementioned difficulty by mounting the seat back to the seat base in such a manner that the seat and the occupant have substantially the same pivot line when the seat is reclined. This is achieved through the use of a hinge which includes a pair of extension members integral with the seat base and the seat back, respectively. The hinge further includes a pair of nonparallel links, each of which is pivotally connected at spaced locations to both of the extension members. The pivot line of the seat embodying the present invention is located at the intersection of the centerlines of the two links. This intersection point, or pivot line, is determined by the angle between the two links and by their lengths. By locating the line of intersection coincident with the occupant's pivot line, the occupant receives proper support, thereby minimizing fatigue. A jack pivotally connected at its opposite ends to the seat back and the seat base, respectively, is adjustable to vary the relative positions between the seat base and the seat back. The jack can also be locked to prevent relative movement between the seat base and the seat back.

Therefore, a primary object of the invention is to provide a new and improved seat for a vehicle.

Another object of the invention is to provide a new and improved adjustable seat for a vehicle.

Another object of the invention is to provide a new and improved seat having a seat base and a seat back which are movable relative to each other about a line substantially coincident with the occupant's pelvic pivot line.

Still another object of the present invention is a reclinable seat which prevents motion or shifting of positions between the occupant's back and the seat back from one reclined position to another.

A further object of the invention is to provide a seat having a base member and a back member relatively movable about a hinge having a center of rotation offset from the intersection of planes in which the base and back members lie.

Other and further objectives and advantages will be described in the description which follows, taken together with the accompanying drawings.

In the drawings, in which like numerals refer to like parts:

FIG. 1 is a side elevation view of a seat embodying the invention;

FIG. 2 is a rear elevation view of the seat illustrated in FIG. 1;

FIG. 3 is a perspective view of the seat illustrated in FIGS. 1 and 2; and

FIG. 4 is a schematic view of the seat in side elevation indicating parts of the seat in a plurality of relative positions.

Referring to FIGS. 1, 2, and 3, a seat 20 for an occupant 22 is mounted to a vehicle 24 by a lower extensible link 26, an upper extensible link 28, and by a third extensible link 30. The lower and upper extensible links 26 and 28 are substantially parallel to each other, as shown. One end of the lower extensible link 26 is pivotally connected to a seat base 32 and the other end to the vehicle 24. Similarly, the extensible links 28 and 30 are pivotally connected at opposite ends to the seat back 34 and to the vehicle 24. The seat base 32 and the seat back 34 are pivotally connected to one another by a pair of spaced hinges 36 (FIG. 2).

Each hinge 36 can be described as having four elements. Specifically, each hinge includes a pair of arcuately shaped members 38 and 40 which are integral with the seat back 34 and the seat base 32, respectively. A pair of nonparallel links 42 and 44 extend between the members 38 and 40 and each link is pivotally connected to the members 38 and 40, respectively.

The hinge 36 permits variations of the angle formed by the plane of the seat base 32 and the plane of the seat back 34 about a line of rotation or pivot line 46. The location of pivot line 46 in relation to the seat base 32 and the seat back 34 is determined by the intersection of the centerlines of links 42 and 44. It should be appreciated that the position of pivot line 46 is determined either by the lengths of links 42 and 44 or by the angle between them.

The seat 20 can be reclined and can also be maintained in desired positions by a suitable jack 48 which may be either powered or manually adjustable. The occupant 22 of the seat 20 can thus control the position of the seat 20 by varying the length of the jack 48 to achieve different positions as desired and by securing the jack 48 at a particular length when a desired position is achieved. This control can be effected either by an electrical switch (not shown) or through a manual operation, depending upon which type of jack 48 is utilized. One end of the jack 48 is pivotally connected to a rod 50 which extends between the members 40 and is fixed at its ends to each of the members 40. It is, therefore, readily apparent that operation of the jack 48 is effective to adjust the relative positioning of the seat base 32 and the seat back 34 through both of the hinges simultaneously.

When it is desired to cause the seat back 34 to recline or move rearwardly about the hinges 36 from a first position (position A), as indicated in FIG. 4, to a second position (position B), the jack 48 is retracted or shortened by the occupant.

Because the seat 20 is solely supported by the lower extensible link 26, the upper extensible link 28, and the extensible link 30, the seat back 34 moves rearwardly and the seat base 32 moves downwardly by equal increments as jack 48 is retracted. This is schematically represented in FIG. 4 at position B. In some instances, it is desirable to have a constant angular relationship between the seat base 32 and the vehicle 24. This can be achieved by tilting and reclining the seat 20 simultaneously or by tilting the seat subsequent to reclining the seat. A desirable final position of the seat 20 after these movements have been completed is schematically represented in FIG. 4 at position C. Tilting movements of the seat 20 in a clockwise direction (FIG. 4) are achieved by extending the lower extensible link 26 and retracting the upper extensible link 28.

Since the seat 20, the vehicle 24, and the lower and upper extensible links 26 and 28 form a parallelogram support structure having pivotal connections, the extensible link 30 is employed as a primary support member for the seat 20. The aforementioned extensible link 30 need not be extensible but is shown as such in this preferred embodiment. By virtue of being extensible, the link 30 permits movement of the seat 20 in a substantially vertical direction upon its extension or retraction. In a like manner, if the lower and upper extensible links 26 and 28 are simultaneously extended or retracted, the seat 20 can be moved in a substantially horizontal direction.

Lateral motions of the seat 20 are prevented by a pair of spaced scissor linkages 52. Each scissor linkage 52 connects one side of seat 20 to the vehicle 24 such that lateral restraint is provided. As illustrated, the scissor linkages 52 are pivotally connected to the extension members 40 of the seat base 32, but it will be understood that they can be pivotally connected to any part of seat 20 without affecting their function.

It should now be clear that with a seat having the construction described, the back of an occupant will not be caused to move relative to the seat back when the seat base and the seat back are moved in relation to one another for the reason that the axis about which movement takes place is substantially coincident with the pelvic pivot line of the occupant.

What is claimed is:

1. An adjustable seat structure for an occupant of a vehicle comprising: a seat base lying substantially in a first plane; a seat back lying substantially in a second plane transverse to said first plane and coinciding with said first plane at a line of intersection; and means connecting said seat base to said seat back including operative means for moving said seat base relative to said seat back and hinge having first and second mem-

bers integral respectively with said seat base and said seat back and means pivotally mounted to and extending between said first and second members including first and second links pivotally mounted to and extending between, said first and second members, said first and second links being angularly disposed such that imaginary extensions thereof intersect at a second line spaced from the line of intersection and parallel thereto, said second line being located above said seat base and forward of said seat back so as to be substantially coincident with the pelvic pivot line of the occupant when normally seated such that relative motion between said seat structure and the occupant is minimized as the seat structure is reclined.

2. The seat structure of claim 1, in which said operative means includes a jack pivotally mounted to said seat back and said first member for selectively moving said seat base and said seat back to a plurality of different relative position.

3. The seat structure of claim 2, in which said first and second members are arcuately shaped.

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