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McKee et al.

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[54] **ADJUSTABLY POSITIONABLE SEAT SUPPORT**

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[73] Assignee: **Burchfield and Turner Enterprises,** Fresno, Calif.

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[52] **U.S. Cl.** **248/371,** 248/418, 403/84

[51] **Int. Cl.** **F16m 11/04**

[58] **Field of Search** 248/184, 185, 186, 371, 248/393, 397, 398, 399, 407, 409, 425

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Primary Examiner—William H. Schultz

[57] **ABSTRACT**

A seating support particularly adapted for use in motor homes and like vehicles to selectively adjust multi-purpose seats, namely the driver and front passenger seats. Hardware is provided for rotational positioning and for adjustable inclination and height as well, there being a manual control readily accessible to the person while seated to adjust the seat as desired. Durability is increased by revolvement of a seat adapter about a metacenter which migrates so as to establish straight-line positioning of inclination stops in a carrier aligned with rotational stops in a base; and to the end that one control means serves dual purposes.

22 Claims, 7 Drawing Figures

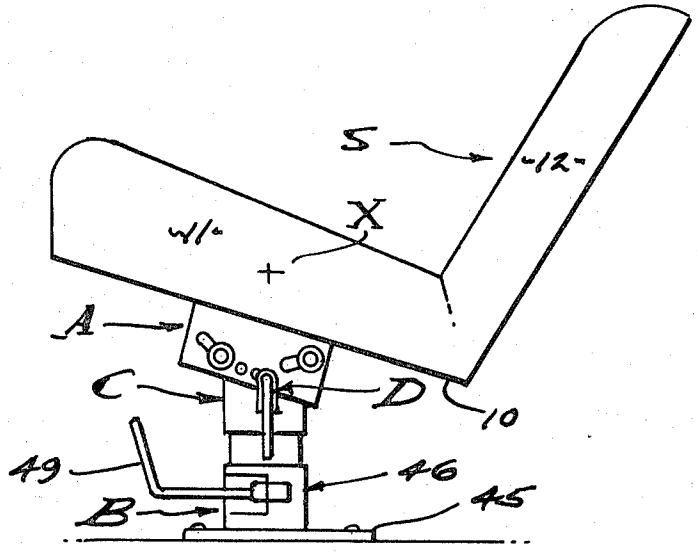


FIG. 1.

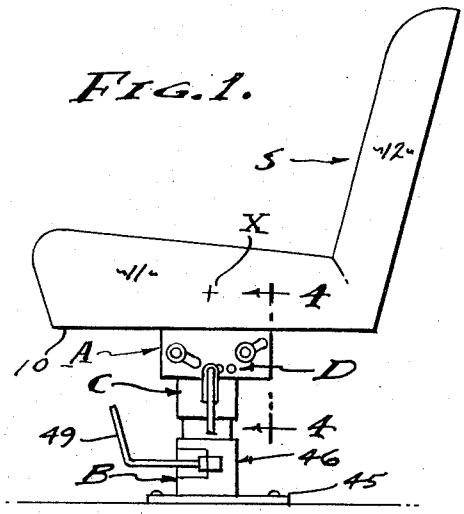


FIG. 2.

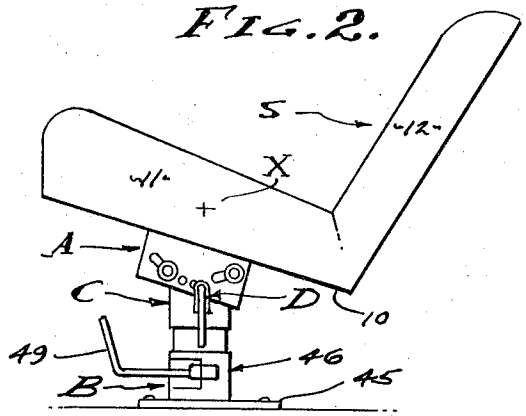


FIG. 3.

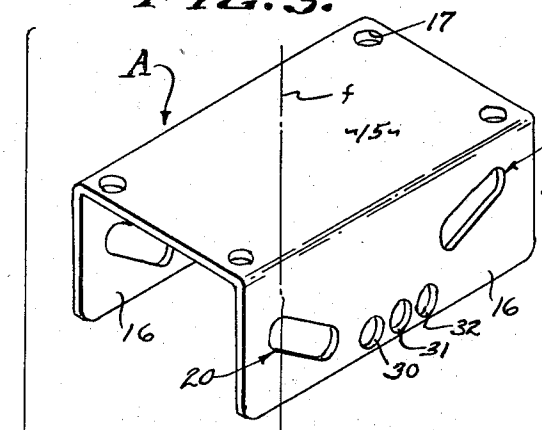
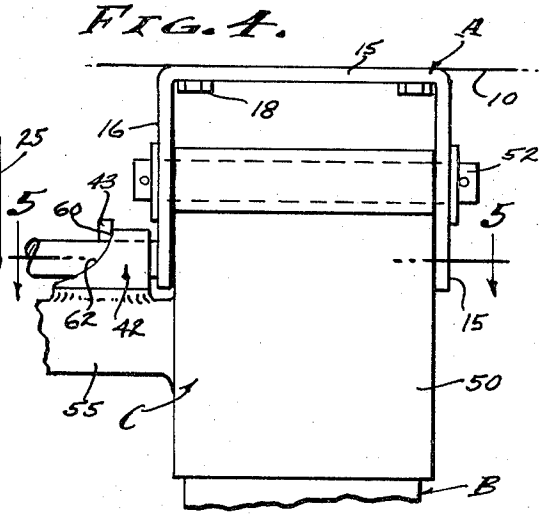


FIG. 4.



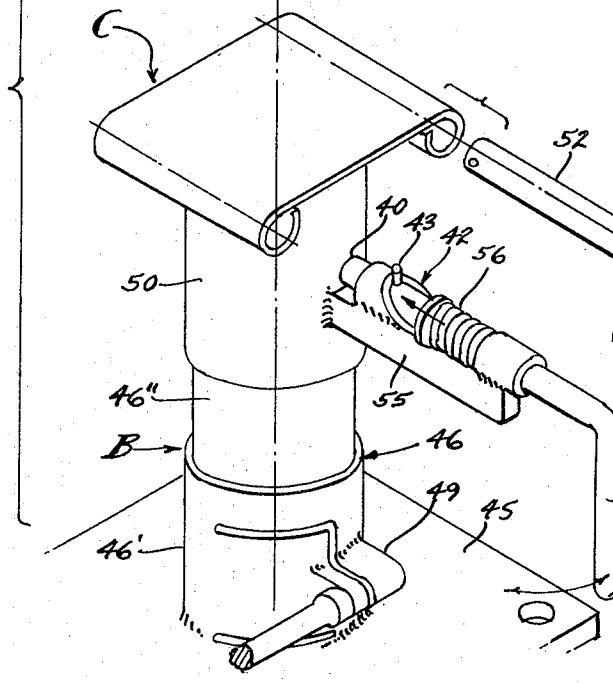


FIG. 5.

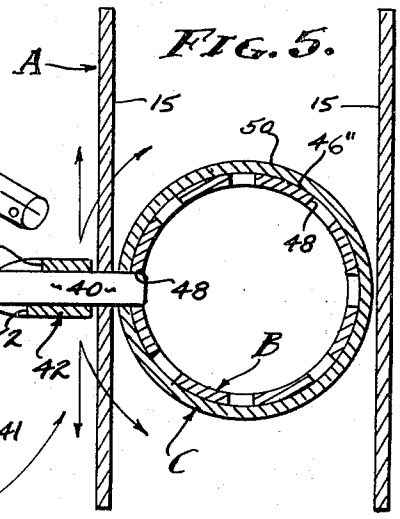


FIG. 6.

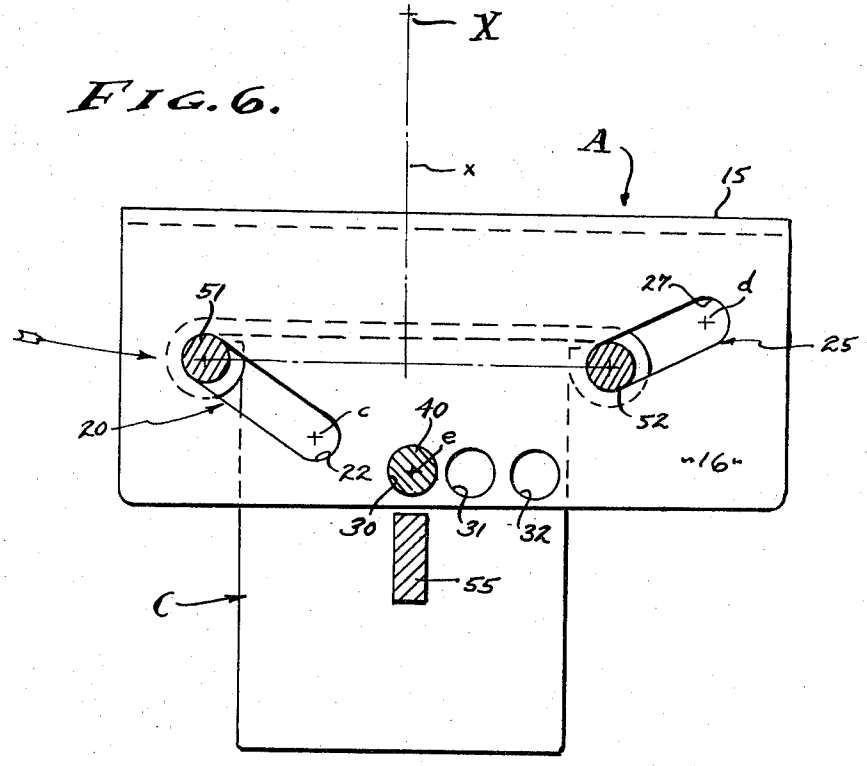

X
x
A
15
51
27
d
25
20
c
40
e
22
52
16
30
31
32
55
C

FIG. 7.

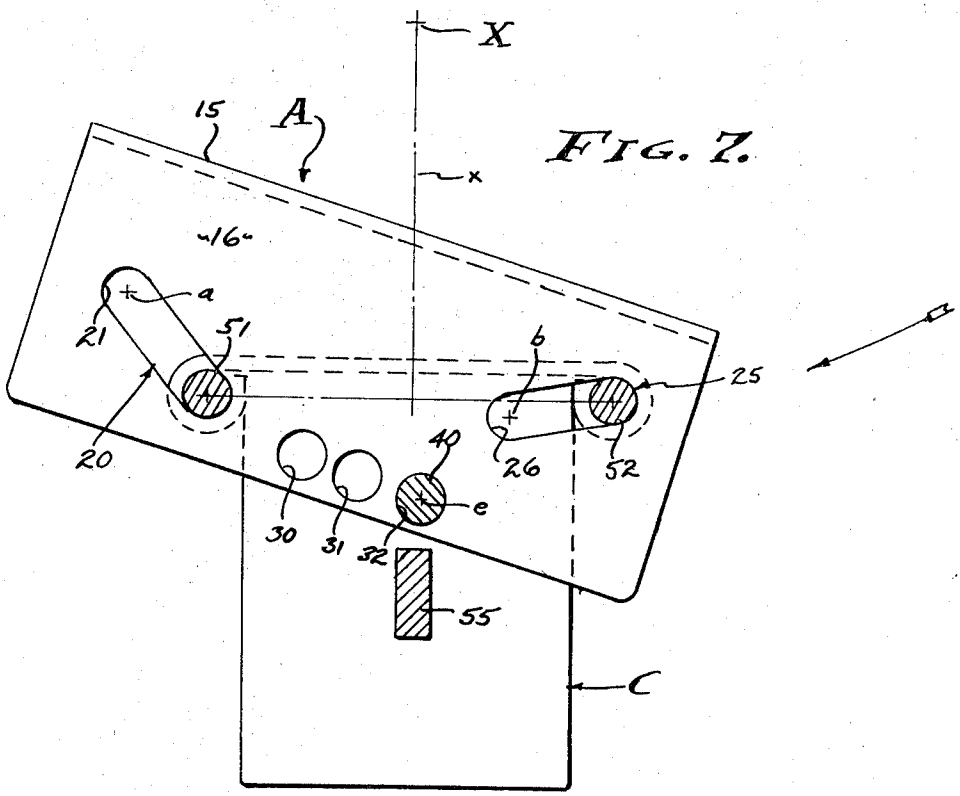

X
15
A
x
16
a
21
51
b
25
20
40
26
52
e
30
31
32
55
C

FIG. 8.

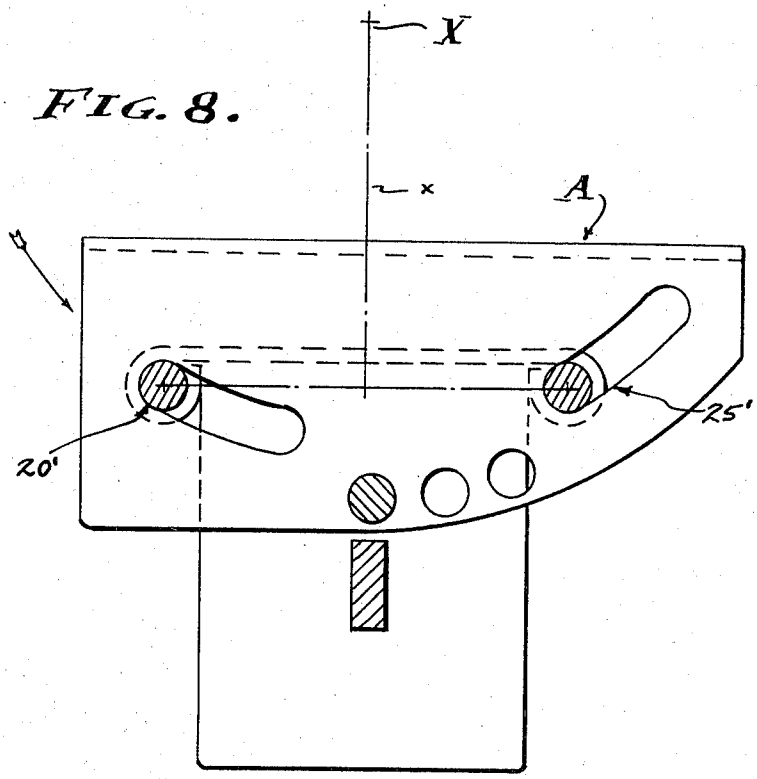
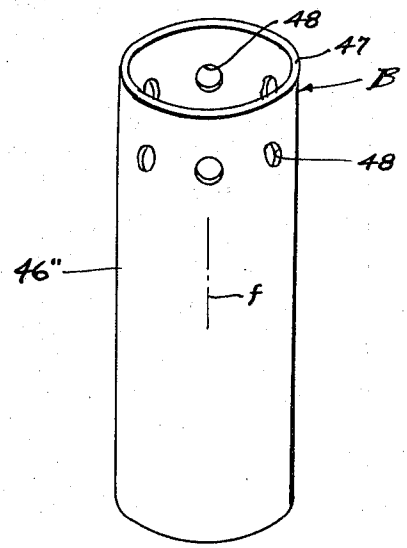


FIG. 9.



ADJUSTABLY POSITIONABLE SEAT SUPPORT

BACKGROUND

Mobile living requires innovations in the usual furnishings of vehicular housing, in that seating must be adaptable to traveling as well as to living arrangements. Reference is made to "motor homes" or "camping cruisers," as they are presently referred to, wherein the front seating in the passenger compartment must be adaptable to both the driving and living functions. That is, both the driver and front seat passenger or passengers are to be seated so as to face forward while traveling, while the same seating is to be adjustable so as to face rearward when not traveling and used for lounging. The general location of the seating is to be fixed while the directional disposition and inclination is to be selectively adjustable. Structural integrity is required for withstanding inertial forces during travel, with sufficient safety factor, and for taking the normal abuse involved as lounge seating. In other words, severe accelerations and decelerations are involved when traveling, always subject to accidents, and there is always the normal possibility of overloading the seats on occasion. Generally therefore, it is an object of this invention to provide hardware for seating of the character referred to, that is versitile in its adaptability to accommodate the driver and/or passengers and to accommodate lounging occupants, all within the vehicle compartment in which it is installed. With the present invention, the seats per se can vary widely and are mounted by said hardware to be employed as circumstances require.

The passenger and lounge compartments of motor homes and the like are considerably more spacious than the passenger compartments of the usual passenger car, and a characteristic feature of motor home layout is to utilize space to a maximum degree. In other words, space is at a premium, while an ordinary home-type lounge chair tends to be bulky although comfortable by virtue of its size and upholstery. It is an object therefore, to provide hardware for the support of moderately large upholstered seating, adapting it to use as vehicular seating and home type lounge seating, as desired. With the present invention, the hardware is selectively adjustable to dispose the rotational orientation as well as inclination to best suit the functional purposes desired.

Hardware of the type under consideration is subject to being over stressed while space for adequate leverage is limited. Reference is made to the heft of pivots and lock devices as required by such mechanisms because of the forces that are developed therein. Most often, the forces involved in adjustably inclining seats are relatively small but they are magnified by the moment arms involved therein about fixed points.

Therefore and in accordance with the present invention, it is an object to establish a direct application of mechanical forces about a remote pivotal axis at a radius of substantial magnitude and all to the end that applied forces are reduced accordingly. Consequently, the structure need not be over designed and normal sized pivots and lock devices make for a rugged and durable construction.

It is another object of this invention to provide an adjustably positionable seat support of the character referred to with manually accessible controls that are practical and convenient. There is a single control means provided for both rotation and inclination, a

control having a normal locked position with respect to both adjustment functions and separate positioning for each function respectively. The control is biased to lock and is positioned when operated allowing the said person to shift the seat into the desired position for relocking.

DRAWINGS

The various objects and features of this invention will be fully understood from the following detailed description of the typical preferred form and application thereof, throughout which description reference is made to the accompanying drawings, in which:

FIGS. **1** and **2** are side elevations of typical motor home seating involvng the adjustably positionable seat of the present invention, FIG. **1** showing a normal erect positioning and FIG. **2** showing a fully declined position.

FIG. **3** is an exploded perspective view of the hardward involved in the support shown in FIGS. **1** and **2.**

FIG. **4** is an enlarged transverse sectional view taken as indicated by line **4—4** on FIG. **1.**

FIG. **5** is a plan section taken as indicated by line **5—5** on FIG. **4.**

FIGS. **6** and **7** are enlarged detailed views showing the adjustably inclined portion of the hardware, FIG. **6** corresponding to the position thereof in FIG. **1** and FIG. **7** corresponding to the position thereof shown in FIG. **2.**

FIG. **8** is a modified form of the present invention similar to FIG. **6,** and

FIG. **9** is a perspective view of one of the elements included in the base portion of the hardware, as shown in FIG. **3.**

PREFERRED EMBODIMENT

The adjustably positionable seat support is a fabrication that involves generally, an adapter A, a base B, a carrier C, and a control means D selectively releasing the carrier from either the base or both the base and adapter. The adapter A and carrier C have cooperative features establishing a metacenter X above and beyond the pivotal connections thereof and relative to which the parts A and C slide and simultaneously revolve. The revolvement of adapter A adapts to the inclination desired and the control means D is at a means radius *x* from the metacenter X to releasably engage with two parts A and C. Further, the control means D is supported by the carrier C at said mean radius *x* and is engageable through the adapter for inclined adjustment and into the base for rotative adjustment.

The adapter A mounts to and supports the underside **10** of the seat S, which is any style or configuration as circumstances require. As shown, the seat S has a flat planar underside **10** superimposed by an upholstered cushion **11,** there being an upholstered back **12** projecting normally therefrom. The cushion **11** and back **12** are structurally integral while presenting the underside **10** for common support. Essentially, the seat S is a unit to be adjustably supported, to be adjusted as to inclination and to be adjusted as to rotation. Thus, in accordance with the present invention the seal S is adjustably positioned as to inclination and as to rotation.

Referring now to the adapter A, this part of the device or hardward involves a support plate **15** to which the underside **10** is fastened, and depending parallel flanges **16** upon which the plate **15** and attached seat

S slideably pivots. The plate **15** is a flat planar element with mounting holes **17** for securement by means of screw fasteners **18** of the like into the underside **10** of seat S. The plate has a pair of opposite and parallel depending flanges **16** in which there are complementary declined and inclined guide means **20** and **25.** The parallel flanges **16** are spaced transversely to receive the upper portion of the carrier C which operates therebetween, the declined guide means **20** being foremost and the inclined guide means **25** being rearmost. That is, the laterally spaced guide means **20** and **25** are spaced fore and aft, and they are essentially cam openings. The front terminal ends **21** and **26** of the two slots terminate on spaced axes *a* and *b* in a common plane parallel with the plane of plate **15** and the underside **10.** The rear terminal end **22** and **27** of the two slots terminate in axes *c* and *d* in separate planes parallel to and spaced below and above the aforementioned common plane of spaced axes *a* and *b*. That is, as the guide means **20** and **25** extend rearwardly they decline and incline respectively being effectively equi-distant in their extent. In practice, the guide means **20** and **25** are in the form of slots with front and rear terminal end *a* and *b*, and *c* and *d*, respectively.

Referring to the modified form shown in FIG. **8,** the guide means **20'** and **25'** are arcuate slots and curved about an exact metacenter X; and wherein the adjustment openings in the adapter A' are located on a radius common to a radius from the said metacenter. However, and in accordance with the present invention, the guide means **20** and **25,** are straight slots between the extremities **21** and **26,** and **22** and **27** thereof, and all to the end that the metacenter X migrates so as to move the control pin of means D in a substantially straight line, as later described. That is, there is a series of two or more spaced adjacent openings in a flange **16** located in a sequence with respect to adapter A, and in sequentially positionable in a single horizontal plane with respect to carrier C and base B.

In practice, the angular declination of the foremost slot **20** is greater (for example 34°) than the inclination of the rearmost slot **25** (for example 27°), in which case a control opening **30** in flange **16** midway between axes *a* and *b* represents a normal position and is disposed at or near a transverse metacentric plane. A series of control openings, including openings **31** and **32,** extend rearwardly, and in the case illustrated an axis disposed on a horizontal plane parallel to the underside **10.** The transverse metacentric plane is verrtically disposed and the sequential control openings **30–32** are brought into alignment therewith by the guiding cam action of guide means **20** and **25.** Although the straight slots are imperfect so as cause a vertical migration of the metacenter X, said migration is so slight that the control opening **30–32** are adapted receive control pin **40** on a fixed horizontally disposed axis *e* normal to a rotatable axis *f* midway between the flanges **16,** all as shown in FIGS. **6, 7** and **9.** Further, the control openings in base B are on axes that are coplanar and all of which is advantageous.

Referring now to the base B, there is a deck flange **34** from which there is a vertically projecting cylindrical column **46.** The top terminal end **47** of the base is in a bearing plane normal to the vertical axis *f* of rotation, there being a circumferential series of rotational lock openings **48** in a horizontal plane coincidental with the axis of the aforementioned control pin **40.** Vertical adjustment is obtained by providing a sectional column **46** and by securing telescopically related slideable section **46'** and **46''** with clamp means **49** fixing one to the other. Thus, the base B is extensibly adjustable in order to place the height of the seat as may be required.

Referring now to the carrier C, there is a sleeve **50** of right cylinder form engageable over the column **46,** and there is a header fixed thereto in a plane normal to the axis of rotation to bear upon the end **47.** Spaced pivot tubes are disposed on fore and aft parallel axes preferably formed out of the header that is welded to the sleeve, and said tubes are disposed on axes spaced the same as axes *a* and *b* or *c* and *d*. To this end, therefore, there are guide pins **51** and **52** engaged through the pivot tubes and adjacent the flanges **16,** to slideably and rotatably engage in the guide means slots therein.

FIGS. **6** and **7** show the extreme adjusted positions of the seat support corresponding to FIGS. **1** and **2.** Note particularly that there is little change in the metacentric height to X and that the height of control pin **40** is essentially constant. Therefore, it is possible to provide the control means D which operates in one horizontal plane coincidental with the axis of control pin **40.** Accordingly, the control means D involves the pin **40** disposed on an axis by a lateral extension **55** of the means C. The pin **40** is biased toward the adapter A and base B by a spring **56,** and in accordance with the invention there is a cam means restricting the projection of pin **40.** The pin **40** is in the nature of a bolt with a lever **41** to rotate the same, there being a cam **42** and a follower **43** to control the depth of projection of the pin **40** into the adapter A and/or the base B. In practice, the carrier C engages over and thereby encompasses the base B and its circumferential series of lock openings **48;** and the adapter A engages over and thereby embraces the carrier C shiftable in a plane to align with the control pin **40** and lock openings **48** brought into alignment therewith. Thus, the control pin **40** is retractably biased through said openings **30–31** and **48.** And, in accordance with this invention, the cam **42** has a low center point **60** that permits full projection of pin **40,** a moderately sloped counter clockwise incline **61** that retracts the pin **40** only from base B and a severely sloped clockwise incline **62** that retracts the pin from both the base and the adapter A.

From the foregoing it will be seen that we have provided a new and useful adjustably positionable seat support adapted to be used in connection with the construction of motor homes and camping cruisers and the like. The seat support is incrementally adjustable both as to rotation and as to inclination, by the use of a single manual control. The displaced and elevated metacenter places the pivotal point beyond the pivotal axes of the supporting pins and thereby substantially increases the leverage, whereby the structure is inherently strong and is capable of withstanding severe acceleration and deceleration and any expected abuse.

Having described only a typical preferred form and application of our invention, we do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to ourselves any modifications or variations that may appear to those skilled in the art.

I claim:

1. An adjustably positionable seat support including, an adapter for supporting engagement with the underside of the seat and having spaced fore and aft elongated guide means, the foremost guide means being de-

clined and the rearmost guide means being inclined, the forward extremities of said fore and aft guide means being in a plane normal to a line projecting from a point therebetween and extending through and beyond the underside of the seat to a metacenter above the seat, and a supportable carrier with fore and aft pivots slideably engageble in said fore and aft guide means and spaced to move to and from the forward extremities of said guide means respectively whereby fore and aft motion of the adapter causes rotation thereof about said metacenter.

2. The adjustably positionable seat support as set forth in claim **1,** wherein said fore and aft guide means are slots respectively, and wherein the said pivots are pins rotatably and slideably engageable in the slots.

3. The adjustably positionable seat support as set forth in claim **1,** wherein said fore and aft guide means are arcuate slots curved about said metacenter respectively, and wherein the said pivots are pins rotatably and slideably engageable in the arcuate slots.

4. The adjustably positionable seat support as set forth in claim **1,** wherein said fore and aft guide means are straight slots disposed normal to said metacenter respectively, and wherein the said pivots are pins rotatably and slideably engageable in the slots.

5. The adjustably positionable seat support as set forth in claim **1,** wherein the adapter has opposite side flanges depending from the underside of the seat cushion, wherein said fore and aft guide means comprise complementary pairs of slots in the opposite side flanges respectively, and wherein the said pivots are pins disposed on transverse axes rotatably and slideably engageable in the complementary pairs of slots respectively.

6. The adjustably positionable seat support as set forth in claim **1,** wherein the adapter has opposite side flanges depending from the underside of the seat cushion, wherein said fore and aft guide means comprise complementary pairs of arcuate slots curved about said metacenter and in the opposite side flanges respectively, and wherein the said pivots are pins disposed on transverse axes rotatably and slideably engageable in the complementary pairs of arcuate slots respectively.

7. The adjustably positionable seat support as set forth in claim **1,** wherein the adapter has opposite side flanges depending from the underside of the seat cushion, wherein said fore and aft guide means comprise complementary pairs of straight slots disposed normal to said metacenter and in opposite side flanges respectively, and wherein the said pivots are pins disposed on transverse axes rotatably and slideably engageable in the complementary pairs of slots respectively.

8. An adjustably positionable and controlled seat support including, an adapter for supporting engagement with the underside of the seat and having spaced fore and aft elongated guide means, the foremost guide means being declined and the rearmost guide means being inclined, the forward extremities of the said fore and aft guide means being in a plane normal to a line projecting from a point therebetween and extending through and beyond the underside of the seat to a metacenter above the seat, a supportable carrier with fore and aft pivots slideably engageable in said fore and aft guide means and spaced to move to and from the forward extremities of said guide means respectively, and control means determining the fore and aft positioning of the adapter relative to the carrier, whereby fore and aft motion of the adapter causes rotation thereof about said metacenter arrested by said control means.

9. The adjustably positionable and controlled seat support as set forth in claim **8,** wherein the control means comprises a manually releasable pin disengageably connecting the adapter and carrier stopping said relative fore and aft motion.

10. The adjustably positionable and controlled seat support as set forth in claim **8,** wherein the control means comprises a manually positionable pin shiftably carried by the carrier and disengageable with the adapter stopping said relative fore and aft motion.

11. The adjustably positionable and controlled seat support as set forth in claim **8,** wherein the control means comprises a manually positionable pin shiftably carried by the carrier and disengageable with a series of stop openings in the adapter stopping relative fore and aft motion.

12. The adjustably positionable and controlled seat support as set forth in claim **8,** wherein said fore and aft guide means are arcuate slots curved about said metacenter respectively, wherein the said pivotal pins are to rotatably and slideably engageable in the slots, and wherein the control means comprises a manually positionable pin shiftably carried by the carrier and disengageable with an arcuate series of stops in a line curved about said metacenter stopping said relative fore and aft motion.

13. The adjustably positionable and controlled seat support as set forth in claim **8,** wherein said fore and aft guide means are straight slots disposed normal to said metacenter respectively, and wherein the control means comprises a manually positionable pin shiftably carried by the carrier and engageable with a straight series of stop openings in the adapter stopping said relative fore and aft motion.

14. The adjustably positionable and controlled seat support as set forth in claim **8,** wherein the adapter has opposite side flanges depending from the underside of the seat cushion, wherein said fore and aft guide means comprise complementary pairs of slots in the opposite side flanges respectively, wherein the said pivots are pins disposed on transverse axes rotatably and slideably engageable in the complementary pairs of slots respectively, and wherein the control means comprises a manually positionable pin shiftably carried by the carrier and disengageable with the adapter stopping said fore and aft motion.

15. A selectively retractible and inclinable seat support including, a columnar supporting base of right cylinder form disposed on a vertical axis, an adapter for supporting engagement with the underside of the seat and having opposite side flanges depending from the underside of the seat and complementary pairs of spaced fore and aft elongated guide means in the opposite side flanges respectively, the foremost guide means being declined and the rearmost guide means being inclined, the forward extremities of said fore and aft guide means being in a plane normal to a line projecting from a point therebetween and extending through and beyond the underside of the seat to a metacenter, a carrier rotatably supported upon the first mentioned base and with fore and aft pivots slideably engageable in said fore and aft guide means and spaced to move to and from the forward extremities of said guide means respectively, and control means determining the posi-

tioning of the adapter relative to the carrier and base, whereby fore and aft motion of the adapter causes rotation thereof about the metacenter.

16. The selectively rotatable and inclinable seat support as set forth in claim **15,** wherein the said fore and aft guide means are straight slots declined and inclined at substantially 30° in each instance, and wherein the said pivots are pins rotatably and slideably engageable in the slots.

17. The selectively rotatable and inclinable seat support as set forth in claim **15,** wherein the said fore and aft guide means are straight slots declined at substantially 34° and inclined at substantially 37° respectively, and wherein the said pivots are pins rotatably and slideably engageable in the slots.

18. The selectively rotatable and inclinable seat support as set forth in claim **15,** wherein the control means is a bolt disengageably projected through at least one stop opening in the adapter and through at least one stop opening in the base.

19. The selectively rotatable and inclinable seat support as set forth in claim **15,** wherein the control means is a bolt disengageably projected through at least one stop opening in the adapter and through at least one aligned stop opening in the base, there being means retracting the bolt from the base stop opening while maintaining bolt engagement through the adapter stop opening.

20. The selectively rotatable and inclinable seat support as set forth in claim **15,** wherein the control means is a bolt disengageably projected through at least one stop opening in the adapter and through at least one aligned stop opening in the base, there being means retracting the bolt from both the base and adapter stop openings.

21. The selectively rotatable and inclinable seat support as set forth in claim **15,** wherein the control means is a bolt disengageably projected through at least one stop opening in the adapter and through at least one aligned stop opening in the base, there being cam means with a minor incline retracting the bolt from the base stop opening and with a major incline retracting the bolt from both the base and adapter stop openings.

22. The selectively rotatable and inclinable seat support as set forth in claim **15,** wherein the control means is a bolt disengageably projected through at least one stop opening in the adapter and through at least one aligned stop opening in the base, there being a reversely positionable cam means with a minor incline retracting the bolt from the base stop opening and with a major incline retracting the bolt from both the base and adapter stop openings.

* * * * *