United States Patent [19]

Barecki

[11] E **Re. 29,271**

[45] Reissued **June 21, 1977**

[54] **CANTILEVERED SEAT FOR MOTORCOACH VEHICLES OR THE LIKE**

[75] Inventor: **Chester J. Barecki,** Grand Rapids, Mich.

[73] Assignee: **American Seating Company,** Grand Rapids, Mich.

[22] Filed: **Jan. 30, 1976**

[21] Appl. No.: **653,742**

Related U.S. Patent Documents

Reissue of:

[64] Patent No.: **3,897,974**
Issued: **Aug. 5, 1975**
Appl. No.: **380,753**
Filed: **July 19, 1973**

U.S. Applications:

[63] Continuation-in-part of Ser. No. 211,423, Dec. 23, 1971, Pat. No. 3,747,979.

[52] **U.S. Cl.** **297/451;** 296/63; 297/216; 297/232; 297/243

[51] **Int. Cl.²** **A47C 7/02; B60N 1/02**

[58] **Field of Search** ..... 297/147, 216, 232, 240, 297/349, 445, 450–452; 296/63, 64; 5/81 R

[56] **References Cited**

UNITED STATES PATENTS

3,241,884	3/1966	Thatcher et al.	297/451
3,275,283	9/1966	Rauch	297/349
3,619,006	11/1971	Barecki	297/450
3,625,565	12/1971	Barecki	297/451
3,628,829	12/1971	Heilig	297/217
3,694,830	10/1972	Koller	5/81
3,747,979	7/1973	Barecki	297/451
3,762,766	10/1973	Barecki	297/217

FOREIGN PATENTS OR APPLICATIONS

1,198,987	7/1970	United Kingdom

Primary Examiner—James C. Mitchell
Attorney, Agent, or Firm—Price, Heneveld, Huizenga & Cooper

[57] **ABSTRACT**

A multi-passenger seat is supported by a lower cantilever frame which comprises a horizontal seat frame and an inclined arcuate truss support frame. The horizontal seat frame includes two elongated horizontal stretcher members attached at one end to the wall of a vehicle and at least two cross frame members interconnecting the stretcher members at laterally spaced locations. The inclined arcuate truss support frame is located beneath the horizontal seat frame; and it includes fore and aft inclined arcuate frame members rigidly attached at their upper ends to the stretcher tubes respectively at locations preferably on the aisle side of the transverse center of the horizontal seat frame. The inclined arcuate support frame members extend downwardly from the seat frame and preferably they converge toward each other. They are connected to the wall at locations above the floor of the vehicle. Preferably, the attachment means for attaching the seat to the vehicle wall are adjustable to achieve proper horizontal alignment of the seat. A housing surrounds the inclined arcuate support frame members and the area between the inclined members and the horizontal seat frame to house a heater and air conditioner blower and a radio-announcement speaker.

34 Claims, 13 Drawing Figures

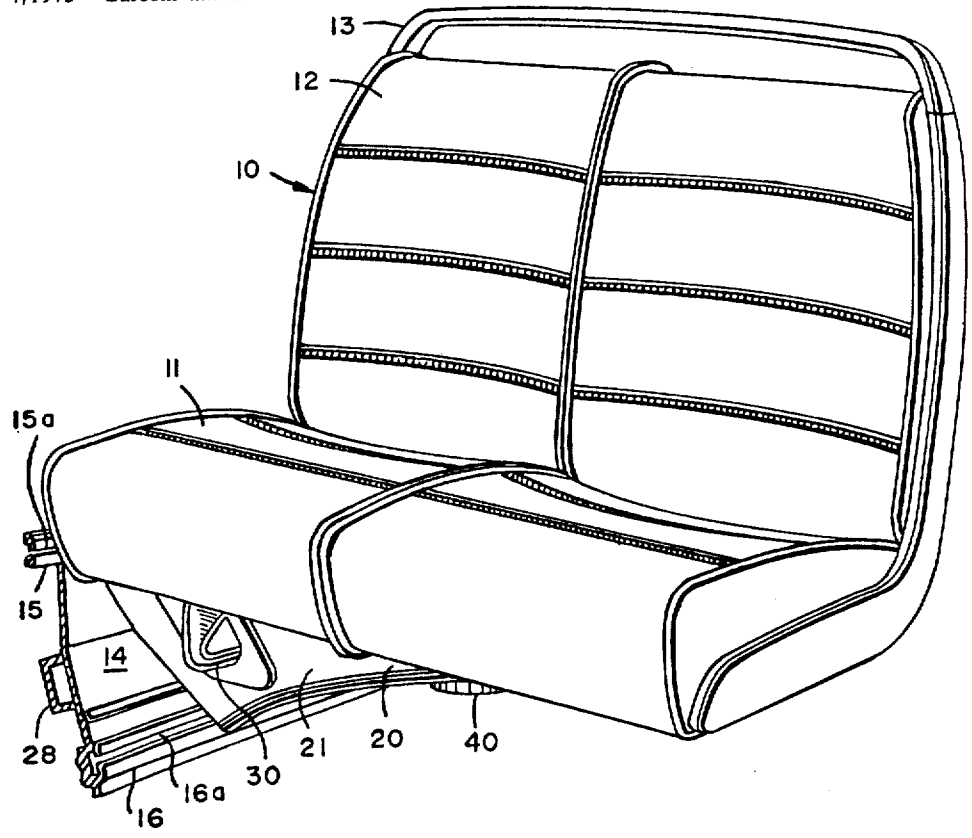
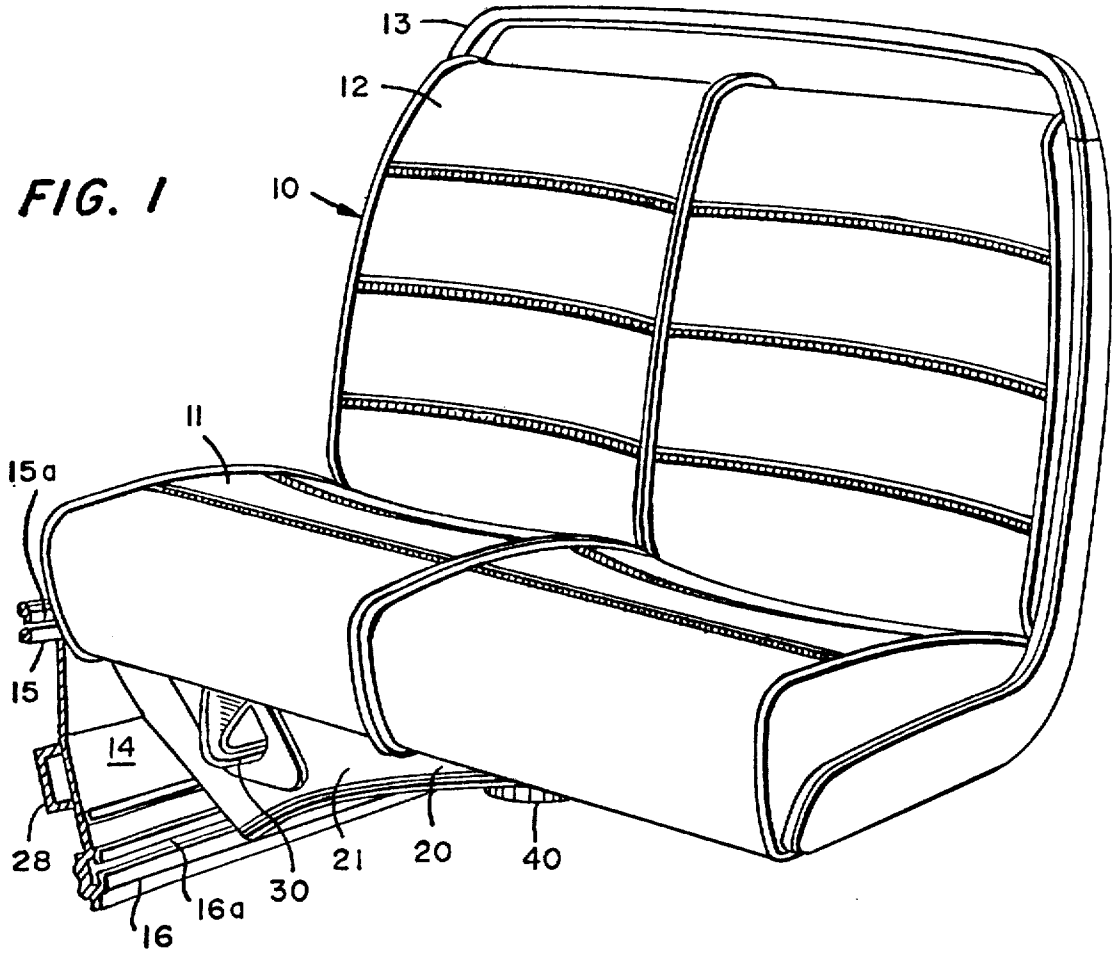


FIG. 1


13
12
10
11
15a
15
14
28
16
16a
30
21
20
40

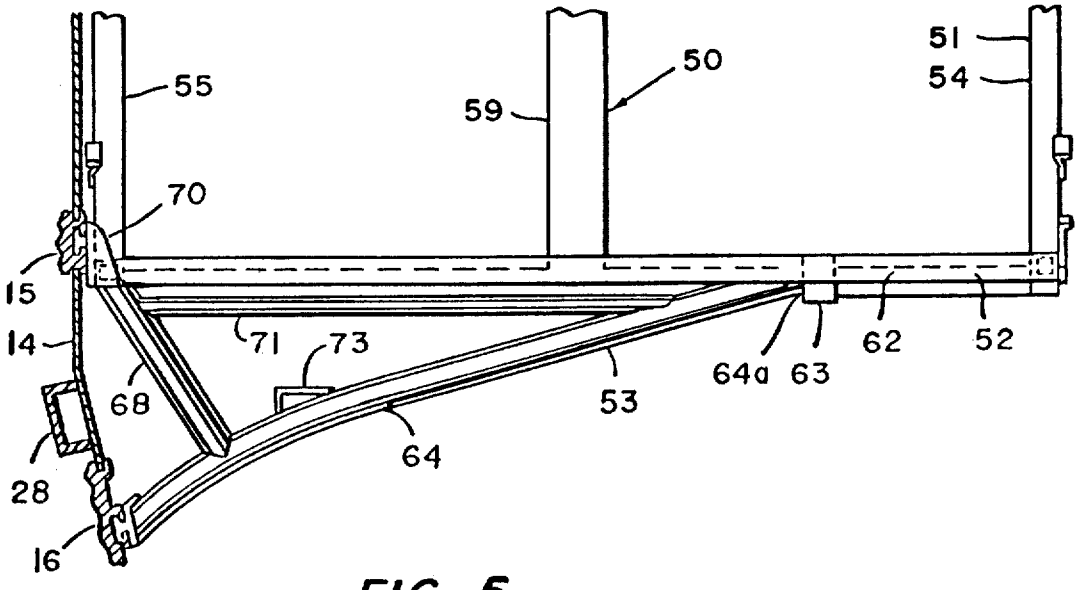

55
59
50
51
54
70
15
14
71
73
62
52
68
53
64a
63
64
28
16

FIG. 5

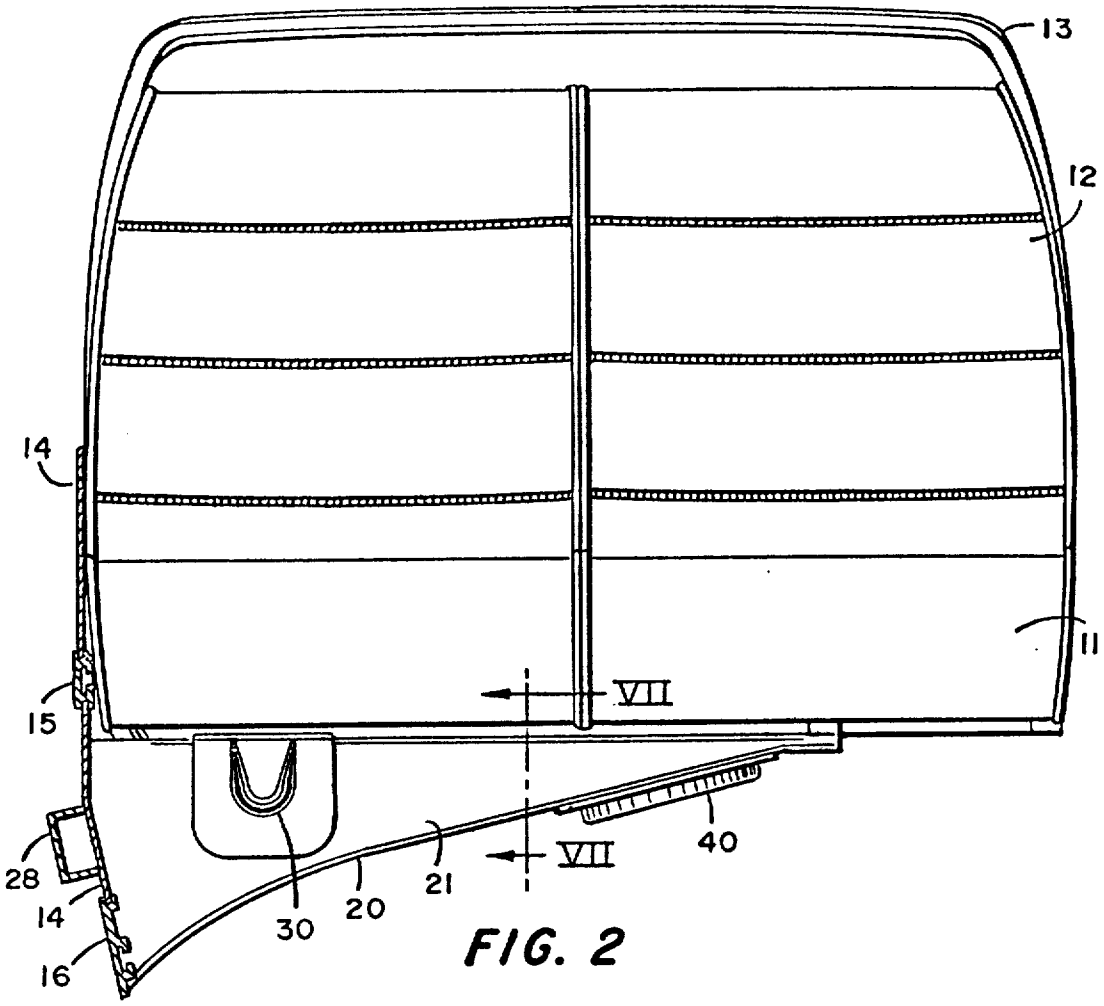

13
12
14
11
15
VII
VII
28
14
16
30
20
21
40

FIG. 2

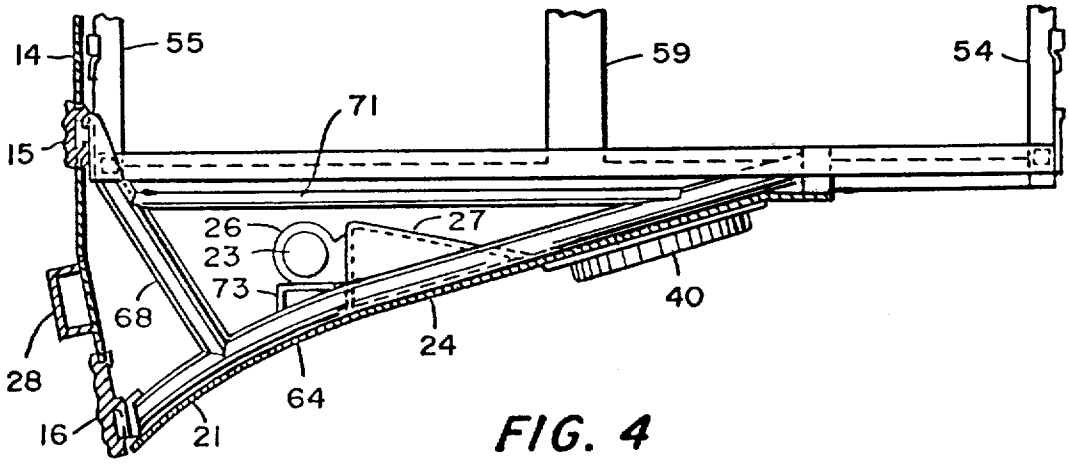
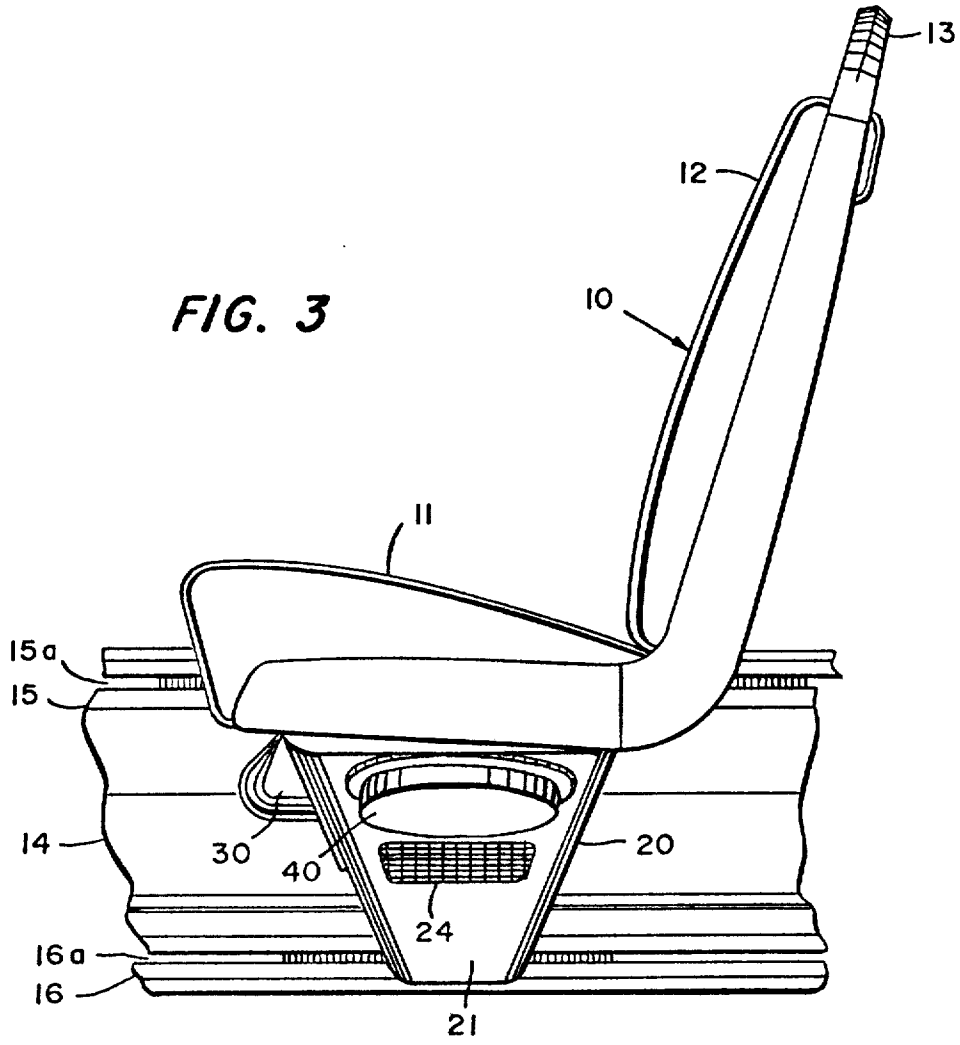

14
55
59
54
71
15
26
27
23
73
68
40
24
28
64
16
21

FIG. 4

FIG. 3



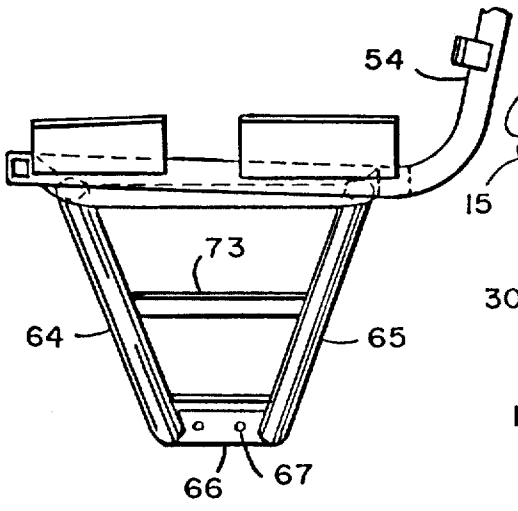


FIG. 6

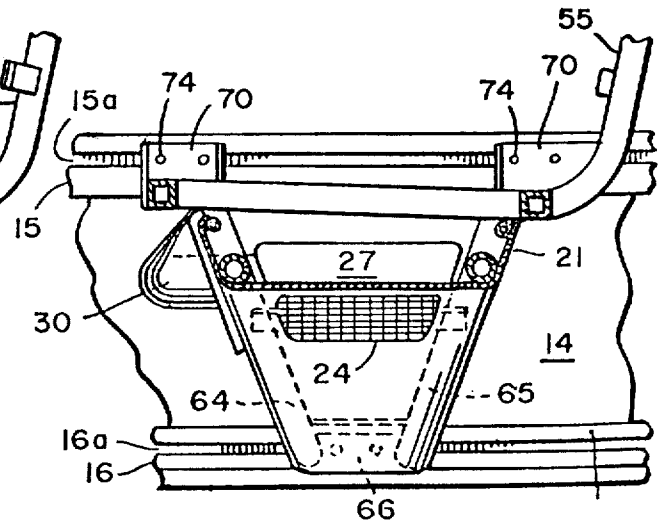
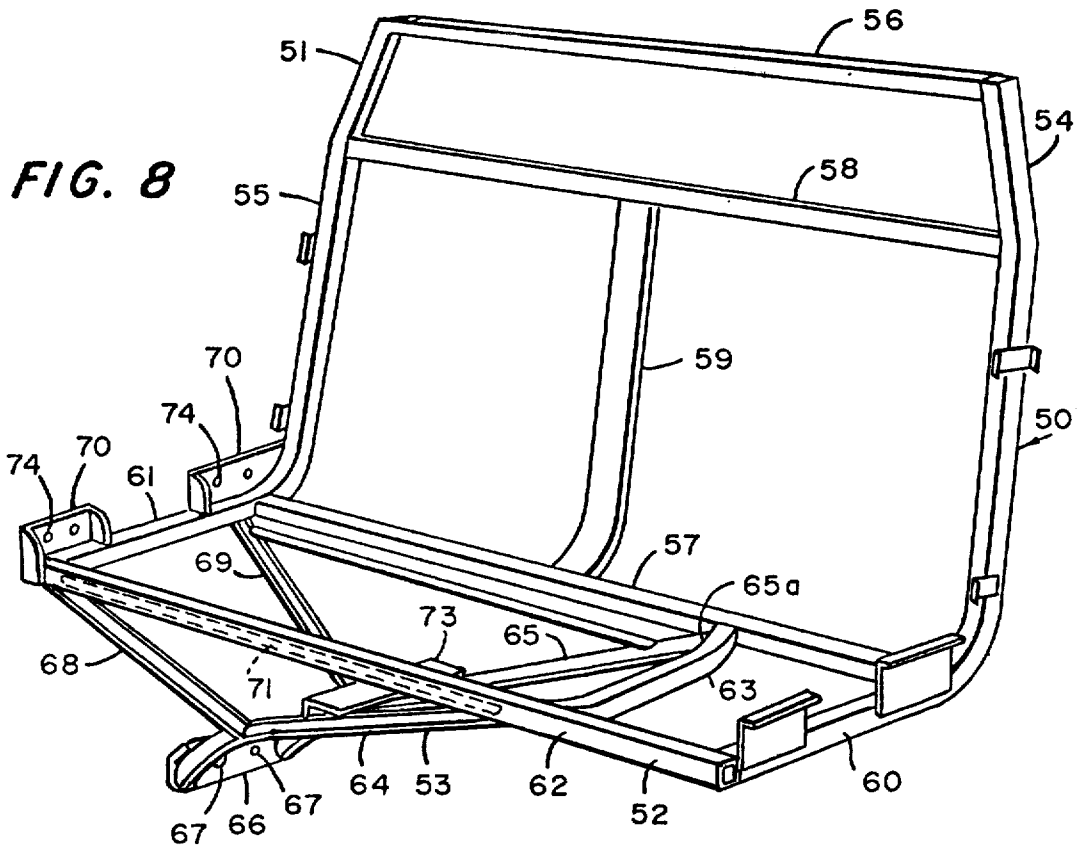
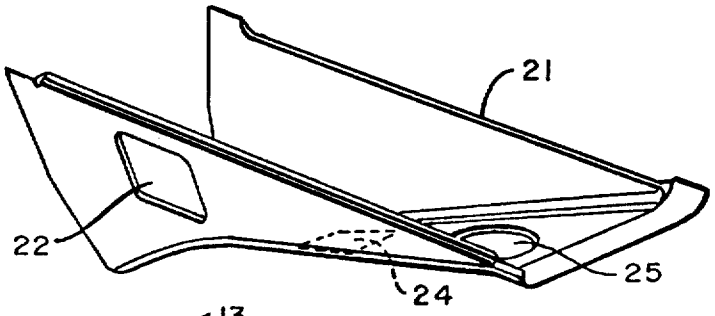


FIG. 7

FIG. 8


56
51
54
58
55
59
70
74
50
74
70
61
57
69
65a
73
65
68
71
63
64
53
62
60
67
66
67
52


21
22
25
24

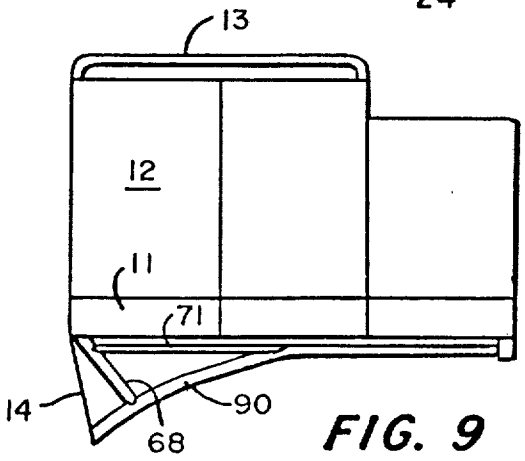

13
12
11
71
14
90
68

FIG. 9

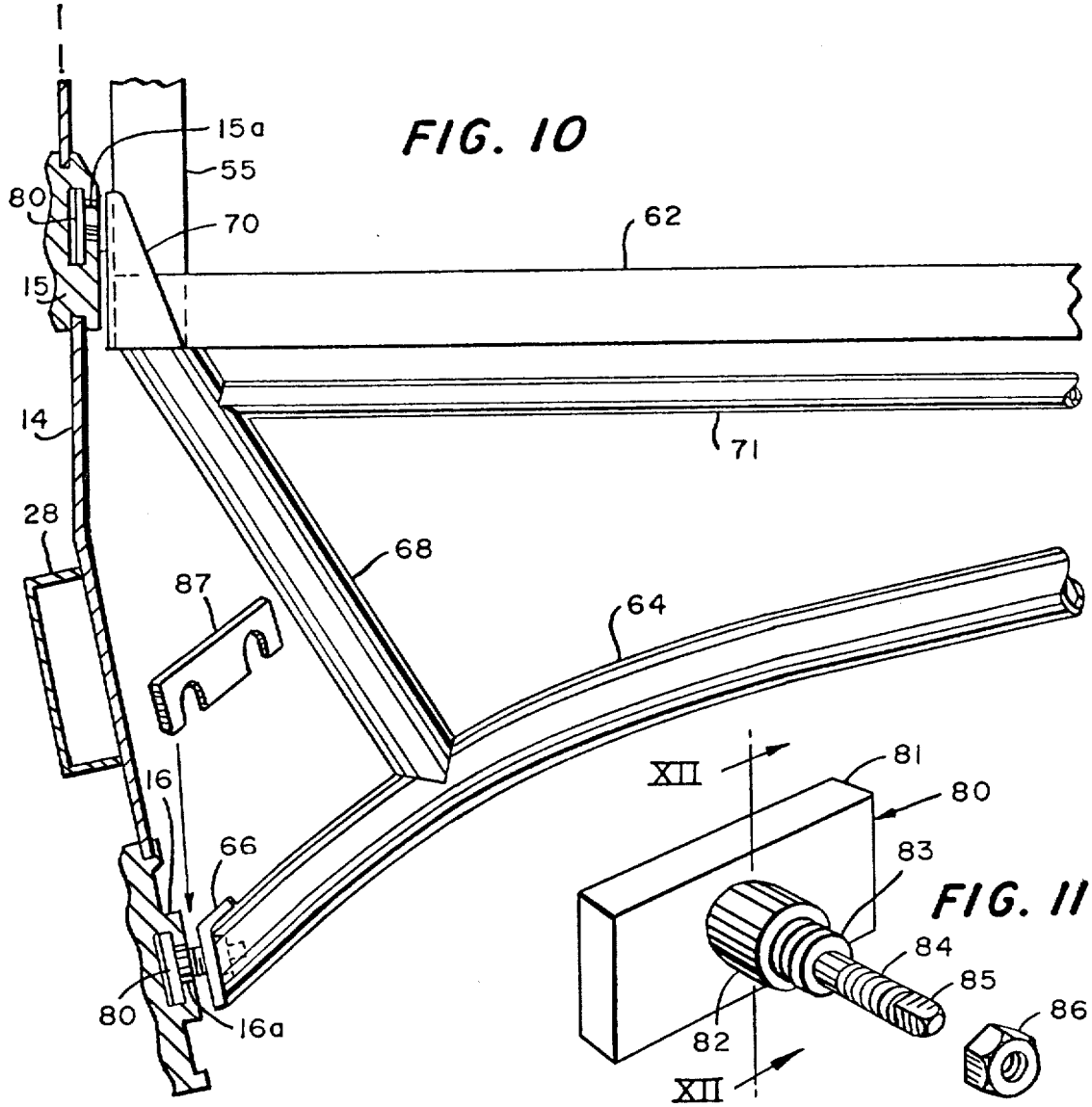


FIG. 10

FIG. 11

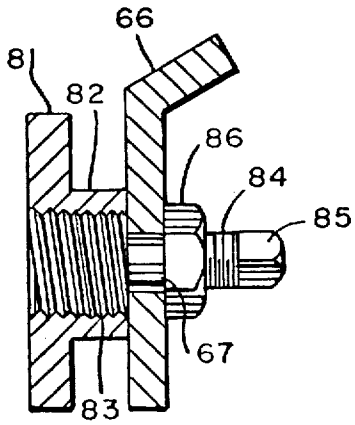


FIG. 12

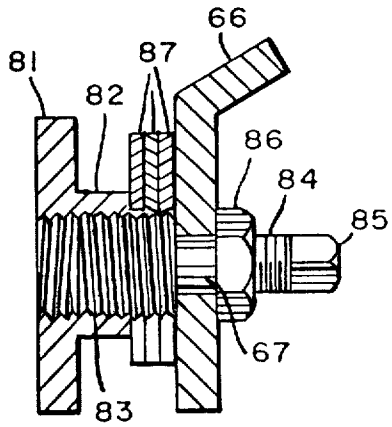


FIG. 13

CANTILEVERED SEAT FOR MOTORCOACH VEHICLES OR THE LIKE

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

CROSS-REFERENCE TO RELATED APPLICATION

This is a continuation-in-part of pending application Ser. No. 211,423, filed in the U.S. Patent Office on Dec. 23, 1971, and entitled CANTILEVERED SEAT FOR MOTORCOACH VEHICLES AND THE LIKE, now U.S. Pat. No. 3,747,979 the disclosure of which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

The present invention relates to seating; and more particularly, it relates to structure for cantilevering a multi-passenger seat from the side wall of a motorcoach, train coach or similar transportation vehicle without a supporting connection to the floor. The term "motorcoach seating" is intended to include all types of transportation seating including city service, trains, surburban, and reclining coach seats, characterized in that each seat is intended to hold two persons, one near the wall and one near the aisle of the vehicle.

It has become desirable from the viewpoint of maintenance, to provide seating of the cantilever type, supported entirely from the wall of the vehicle. This type of seat eliminates the usual obstructions connecting the seat to the floor, such as legs, pedestals, or aisle end bases which are usually found supporting the seat at or near the aisle end.

As mentioned, one of the primary advantages of a cantilever-type seat is the ease of cleaning the vehicle with a gang-type sweeper cleaning the entire width of the vehicle in a single sweep, thereby substantially reducing the time and cost of cleaning. There are, however, other advantages to cantilever seats, including a more pleasant and neater appearance, greater facility of ingress and egress by passengers in the seats, elimination of stumbling hazards that legs or bases may contribute to passengers walking down a narrow aisle or exiting from the seat, and ease of retrieving articles from beneath the seats. The latter advantage stems from the fact that an unobstructed view of the floor area is provided, and the available light shines on the unobstructed area. Further, depending upon the seat structure, there may be more room for storage of luggage, etc., beneath a cantilevered seat as well as an increased area for the legs of the passengers located behind the seat.

There are problems, however, in achieving a cantilever seat which has all of the advantages mentioned above yet which is sturdy over the extended period of rugged use expected of a motorcoach seat and which does not become hazardous in the event of a crash. Perhaps the more important of these two considerations is that of safety. In the event of a crash, the seat structure and its attachment to the vehicle wall must be such that the seat does not become detached from the wall either upon crash impact or upon being impacted by a passenger, for example, from the seat behind. If a seat does become detached from the wall, it adds additional energy and momentum to break loose adjacent seats which, in turn, if broken loose, still further increase the danger to passengers. Adjacent seats which are rigidly mounted so as to remain in place in the event of a crash become, in effect, safety barriers to define a critical zone or compartment in which a passenger is restrained from adding to crash momentum and, at the same time, which projects a passenger against the danger of flying objects.

SUMMARY OF THE INVENTION

The present invention achieves all of the advantages of a cantilever seat while achieving substantial crash integrity. That is, in the event of a crash, seats constructed according to the present invention are flexible enough not to impart a substantial amount of energy to an occupant in the case of a crash or to come detached if struck by a passenger but they also act to provide a compartment to hold a passenger in a safety zone, protected against flying objects and against gathering impact momentum himself.

Seating constructed according to the present invention comprises a lower cantilever frame including a horizontal seat frame and an inclined arcuate truss support frame. The seat frame has two elongated stretcher members attached at one end to the wall of a vehicle and extending outwardly thereof. Preferably, at least two cross frame members interconnect the stretcher members at laterally spaced locations. The truss frame is located beneath the seat frame and it acts as a truss not only to hold the seat frame in its horizontal position, but also to enhance its resistance to twisting relative to the wall in the event that it is struck by a loose object in a crash.

The truss frame includes fore and aft inclined arcuate frame members rigidly attached at their upper ends to the stretcher members respectively at locations preferably toward the aisle side of the transverse center of the seat frame. The inclined arcuate truss frame members extend and curve downwardly from the seat frame, and preferably they converge toward each other. They are connected to the wall at spaced locations above the floor of a vehicle.

Preferably, the attachment means for attaching the seat to the vehicle wall are adjustable to achieve proper horizontal adjustment of the seat.

A stress analysis of a cantilever frame constructed according to the present invention indicates that it is a substantial improvement, from a safety standpoint, from certain two-passenger seats which have been suggested in the past. Bending in the horizontal seat frame members is minimized by attaching the upper ends of the inclined arcuate support frame members toward the aisle end of the transverse center of the seat. Further, twisting about a vertical axis (that is, away from the wall) is minimized because of the truss effect produced by the inclined arcuate support frame members. It has been found that each member of the structure contributes to bearing the load and resisting bending or twisting, thereby yielding a safer and more durable structure and providing one which has a high degree of crash integrity.

In a further aspect of the present invention, a housing surrounds the inclined arcuate truss frame members and the area between these members and the horizontal seat frame to house a heater and air conditioner blower and an audio radio-announcement speaker. Preferably, the housing is made of plastic, fiberglass,

sheet metal or the like and the lower end conforms to the curvature of the arcuate truss frame members.

Other features and advantages of the present invention will be apparent to persons skilled in the art from the following detailed description of preferred embodiments accompanied by the attached drawing wherein identical reference numerals will refer to like parts in the various views.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front perspective view taken from the aisle of a two-passenger seat constructed according to the present invention and attached to a wall section shown in fragmentary form;

FIG. **2** is a front elevational view of the seat shown in FIG. **1**;

FIG. **3** is an aisle end elevational view of the seat of FIG. **1**;

FIG. **4** is a front cross-sectional view of the inclined arcuate truss frame and housing of the seat of FIG. **1**;

FIG. **5** is a front elevational view of the lower frame of the seat of FIG. **1**;

FIG. **6** is an aisle end elevational view of the lower frame of the seat of FIG. **1**;

FIG. **7** is a cross-sectional side view of the lower frame and truss frame housing of the seat of FIG. **1**, taken along the plane VII—VII of FIG. **2**;

FIG. **8** is a front perspective view taken from the aisle of the frame of the seat of FIG. **1**, with the inclined arcuate truss frame housing exploded below;

FIG. **9** is a schematic front elevational view of a three-passenger seat constructed according to the present invention;

FIG. **10** is a fragmentary front elevational view of the truss frame and wall attachment means of the seat of FIG. **1**;

FIG. **11** is a view of a wall attachment means for seats constructed according to the present invention;

FIG. **12** is a side cross-sectional view of the wall attachment means of FIG. **11**, taken along the plane XII—XII of FIG. **11**; and

FIG. **13** is a side cross-sectional view similar to FIG. **12** only with the wall attachment means in an extended position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings in more detail, FIGS. **1–3** are, respectively, an aisle front perspective view, a front elevational view and an aisle side elevational view of an upholstered cushioned two-passenger cantilever seat **10** constructed according to the present invention. As shown, seat **10** includes a seat portion **11** and a back portion **12**. A grab rail **13** is provided along the top of back portion **12**. Although seat **10** is shown as cushioned and upholstered, it will be obvious that the upholstered cushions can be replaced with more durable economical finishing materials such as plastic or fiberglass seat shells or vinyl-coated sheet metal and the like.

Seat **10** is supported by means of a lower cantilever frame **20** which is enclosed by a housing **21** to house a heater-air conditioner blower behind blower cover **30** with an air outlet **24** and an audio radio-announcement speaker **40** for broadcasting music, street announcements, tour programs and the like. Seat **10** is attached to the vehicle wall **14** by attachment means including an upper track **15** and a lower track **16**. It will be observed that the aisle side of seat **10** is free of attachment and that there is no attachment to the floor of the vehicle beneath seat **10**.

The structural frame **50** of seat **10** is most clearly shown in FIGS. **5** and **8**, housing **21** being shown exploded below frame **50** in FIG. **8**. Structural frame **50** includes a generally vertical back portion **51**, a generally horizontal seat portion **52**, and a cantilever frame portion **53**. For maximum strength and rigidity, the frame components are preferably tubular steel, although other structural members may be utilized.

The back frame portion **51** includes cross frame means aisle side rail **54**, and wall side rail **55**, and horizontal top stretcher member **56** at the top of back portion **51**, bottom horizontal stretcher **57** at the base of back portion **51**, and intermediate horizontal stretcher **58** between top stretcher **56** and bottom stretcher **57**. A central vertical cross member **59** connects stretcher members **57** and **58** at approximately their midpoints to provide more rigid structural integrity to back portion **51**.

Seat portion **52** includes cross frame means aisle side rail **60** and wall side rail **61**, and horizontal stretcher members **62** at the front and **57** at the rear of seat portion **52**. A cross member **63** connects stretcher members **57** and **62** at the aisle side of their midpoints to add structural rigidity to the seat portion **52**.

Cantilever frame **53** includes an inclined arcuate truss frame having two inclined arcuate frame members **64** and **65** welded or otherwise connected at their upper ends to cross member **63** adjacent the two horizontal stretcher members **57** and **62** of seat frame **52** at **64a** and **65a**, respectively. Inclined arcuate frame members **64** and **65** curve downwardly and preferably converge toward each other in the direction of the wall (FIG. **6**) where the lower end of each is connected to a horizontal mounting bar or strap **66**. The curving or upward bowing and the convergence of inclined members **64** and **65** allows a maximum of leg and foot room for the passengers sitting in seat **10** as well as in the seat behind it. Bar **66** has bolt holes **67** therein for attaching bar **66** to lower attachment track **16** at the lower portion of the vehicle wall. Alternatively, bar **66** can be made as two pads at the end of each of the inclined members **64** and **65**. Brace struts **68** and **69** are welded or otherwise connected between inclined arcuate members **64** and **65**, respectively, and wall side rail **61** to absorb some of the stress on inclined members **64** and **65**. Preferably, struts **68** and **69** are connected to inclined arcuate members **64** and **65** at the point of maximum curvature thereof.

The upper ends of inclined arcuate members **64** and **65** are connected to cross member **63** at **64a** and **65a**, respectively, beyond the midpoint of horizontal stretcher members **62** and **57** toward the aisle. The exact location of these connections may be varied depending on the load requirements of the seat. As the connection is made nearer the wall, less obstruction from the inclined arcuate truss frame of cantilever frame **53** results, thereby achieving greater leg room and easier access under the seat for cleaning, etc. However, as the connection is located nearer the aisle, greater support strength is achieved. It has generally been found that in two-passenger seats, the optimum location for the connection of the upper ends of the inclined arcuate members of the truss frame is at least at the midpoint and preferably on the aisle side of the

midpoint of the horizontal seat frame stretcher members.

A pair of wall mounting brackets **70** with mounting holes **74** are provided on the seat side rail member **61** for mounting seat **10** to upper attachment track **15** on the wall of the vehicle (FIGS. **7** and **8**). Further, cantilever frame **53** includes housing mounting members **71** and **72** which extend horizontally between strut **68** and inclined member **64**, and strut **69** and inclined member **65**, respectively, for attaching housing **21** around cantilever frame **53** beneath seat frame **52**. Cantilever frame **53** also includes a blower mounting bracket **73** extending between inclined arcuate frame members **64** and **65** for mounting the heater-air conditioner blower motor within housing **21**.

Housing **21** is designed to surround cantilever frame **53** beneath seat frame **52** with the lower portion thereof conforming to the curvature of the inclined arcuate truss frame members **64** and **65**. On the front of housing **21**, an opening **22** is provided for access to the blower motor and mechanism **23**, which is covered by blower cover **30**. An air outlet opening **24** and a speaker-receiving opening **25** are provided on the underside wall of housing **21**.

Referring to FIG. **4**, the blower motor **23** is mounted on mounting bracket **73** within blower housing **26** which is in communication with air duct **27** which leads to air outlet **24**. Air duct **27** is provided to directionalize the air flow from blower **23** and to prevent heated air from coming into contact with speaker **40**. Although heating coils can be provided within blower housing **26**, it is preferred to provide heated or air conditioned air to blower **26** from a remote heating and air conditioning source in the vehicle via duct work in the vehicle walls such as, for example, air duct **28**.

The means for attaching seat **10** to attachment tracks **15** and **16** on vehicle wall **14** are most clearly shown in FIGS. **10–13**. Although conventional bolts can be utilized to make the attachment through holes **74** in brackets **70** and holes **67** in bar **66**, it is preferred that the attachment means be adjustable to permit horizontal adjustment of seat **10** when it is being mounted. Accordingly, it is preferred that an adjustable attachment means **80** be utilized. Attachment means **80** consists of a rectangular plate slide **81** which slides along the inside groove of the attachment track **15** or **16**. Plate slide **81** has a width smaller and a length greater than the channel openings **15a** and **16a** in tracks **15** and **16** so that it can be inserted with the width thereof parallel to openings **15a** and **16a** and then rotated 90° to secure it in the tracks. An internally threaded barrel projection **82** extends out of plate slide **81** and threadably receives an externally threaded shoulder bolt **83** which includes a stepped-down diameter externally threaded portion **84**, the end of which includes a square head **85** to permit adjustment with a socket wrench or the like. A nut **86** is used to secure attachment bracket **70** or bar **66** to the attachment means **80**.

In mounting seat **10** to the vehicle wall, the requisite number of attachment means **80** are secured in attachment tracks **15** and **16** by inserting plate slides **81** into the track channels by aligning the width thereof with the channel track opening and then rotating the plate slides **81** 90° so that the plate slides **81** cannot be pulled out of the track channels. Seat **10** is then lifted into position and the threaded portions **84** of the shoulder bolts **83** of the attachment means **80** are passed through holes **67** in bar **66** and holes **74** in mounting brackets **70**. The nuts **86** are then threaded onto the threaded portion **84** of the bolts **83** and tightened to secure the mounting of seat **10**. One of such completed attachments is shown in FIG. **12**. The horizontal alignment of seat **10** is then checked. If seat **10** is sloping downwardly toward the aisle, outward adjustments of the attachment means **80** in lower track **16** are made by loosening nuts **86** and unscrewing shoulder bolts **83** from barrel projections **82** until seat **10** is raised to proper horizontal alignment. The nuts **86** are then tightened. To avoid any chance of rattles in the attachment means and to rigidify the attachment in the adjusted position, it is preferred that shims **87** be inserted between the seat mounting bracket, e.g., bar **66**, and barrel projections **82** to fill the space therebetween prior to making the final tightening adjustment of nuts **86**, as shown in FIGS. **10** and **13**.

In the event that horizontal seat **10** is out of horizontal alignment because of being inclined upwardly toward the aisle, an outward adjustment of the attachment means **80** in upper track **15** is made in the same fashion as discussed above. As will be appreciated, the attachment means **80** can be readjusted after the seat has been in use in the event it has been jarred out of alignment.

Referring now to FIG. **9**, a schematic front elevation view of a three-passenger seat is shown. The construction of such a three-passenger seat is similar to the construction of the two-passenger seat shown in FIG. **1**, except that the inclined arcuate truss frame members **64** and **65** of seat **10** of FIG. **1** have been replaced with longer inclined arcuate truss frame members **90**, the aisle ends of which extend beneath the third seating position adjacent the aisle. The additional length of inclined arcuate truss frame members **90** provides the additional requisite support for the load of the third seating position adjacent the aisle. Depending upon the strength of the structural frame components, in the case of a three-passenger seat, it may be preferred to employ one or more diagonal struts across portions of the back frame to relieve some of the stress on the aisle ends of inclined arcuate truss frame members **90**. The use of such back diagonal struts is disclosed in my copending, coassigned application filed on even date herewith entitled CANTILEVERED SEAT FOR MOTOR-COACH VEHICLES OR THE LIKE.

While preferred embodiments of the invention have been described and illustrated, it will be obvious to those skilled in the art that various changes and modifications can be made without departing from the spirit of the present invention. Accordingly, the scope of the present invention is deemed to be limited only by the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a multi-passenger seat for a vehicle, the combination comprising: a horizontal seat frame having two elongated horizontal stretcher members and cross frame means interconnecting said stretcher members at laterally spaced locations to form a rigid structure; an inclined arcuate truss frame located beneath said horizontal stretcher members and including [forward and rear] *an* inclined arcuate truss frame [members] *means* rigidly attached at [their] *its* upper [ends] *end* adjacent said stretcher members [respectively] and inclined downwardly from said [attachments] *attachment*; the curvature of said truss frame [mem-

bers] *means* being upwardly toward said horizontal seat frame thereby providing by said arcuate shape less underseat obstruction from the inclined truss [member] *means* and a resultant greater leg and foot room; and means for mounting the wall ends of said stretcher members and the lower [ends] *end* of said inclined arcuate truss frame [members] *means* to the wall of said vehicle at a location above the floor, said seat being characterized in there being no connection between said seat and the floor of the vehicle.

2. The combination of claim 1 further comprising first and second wall mounted track members connected respectively to the wall ends of said horizontal stretcher members and extending respectively forwardly and rearwardly of the forward and rear stretcher members, each track member including means providing grooves adapted to receive attachment means for securing said seat to said wall of said vehicle.

3. The combination of claim 1 which further comprises a housing surrounding said inclined arcuate truss frame [members and the area between said truss frame members] *means* and said horizontal seat frame.

4. The combination of claim 3 wherein said housing houses a heater-air conditioner blower motor.

5. The combination of claim 4 wherein said housing further houses an audio speaker.

6. The combination according to claim 3 wherein the lower portion of said housing conforms to the contour of said inclined arcuate truss frame [members] *means*.

7. The seat of claim 1 in which brace members are connected to [each of] said arcuate truss frame [members] *means* intermediate the ends thereof; said brace members extending from said truss frame [members] *means* to said horizontal seat frame and being connected thereto.

8. The combination according to claim 1 wherein said means for mounting the wall ends of said stretcher members and the lower ends of said inclined arcuate truss frame [members] *means* to the wall of said vehicle are adjustable.

9. The combination according to claim 8 wherein each of said adjustable mounting means includes an attachment means comprising a first portion adapted to be attached to said wall and having an internally threaded barrel projection extending away from said wall, an externally threaded shoulder bolt threadably received within said internally threaded barrel projection, said shoulder bolt including a stepped-down diameter externally threaded portion being adapted to be received within a mounting hole on the wall side of said seat and rigidly connected through said hole by said nut means.

10. A combination according to claim 9 further comprising first and second track members connected respectively to the wall of said vehicle each of said track members being adapted to receive and retain said first portion of at least one of said attachment means.

11. The combination of claim 10 wherein each of said track members includes an internal groove in communication with a channel opening; and wherein said first portion of said attachment means is a generally rectangular plate having a width less than the width of said channel opening and a length greater than the width of said channel opening whereby said first portion can be secured within said track groove by aligning the width of said first portion with the width of said channel opening so that said first portion can be passed into said groove and thereafter rotating said first portion 90° to prevent said first portion from being withdrawn out of said track groove.

12. A cantilever frame for a vehicle comprising a horizontal seat frame including two elongated stretcher members and at least two cross frame members interconnecting said stretcher members at locations adjacent the aisle and wall ends thereof to form a rigid structure; an inclined arcuate truss frame including [first and second] *an* arcuate truss frame [members] *means* rigidly connected at [their] *its* upper [ends] *end* adjacent said stretcher members of said horizontal frame at *a* [locations] *location* toward the aisle end of the transverse center thereof and being inclined and curved downwardly from [their respective attachments] *its attachment* adjacent said horizontal stretcher members; and mounting means connected with the lower [ends] *end* of said truss frame [members] *means* and providing attachment means holes for securing the same to said wall; and first and second bracket means connected respectively to the wall ends of said stretcher members and providing attachment means holes for securing the same to said wall.

13. The combination of claim 12 further comprising first and second wall mounted track members connected respectively to the wall ends of said horizontal stretcher members and extending respectively forwardly and rearwardly of the forward and rear stretcher members, each track member including means providing grooves adapted to receive attachment means for securing said seat to said wall of said vehicle.

14. The combination of claim 12 wherein said inclined arcuate truss frame [members are] *means is* connected to *an* associated stretcher [members] *member* at *a* [locations] *location* toward the aisle side of the transverse center thereof to enhance resistance of said seat frame to bending and to twisting about a vertical axis.

15. The combination according to claim 12 wherein said means for mounting the wall ends of said stretcher members and the lower [ends] *end* of said inclined arcuate truss frame [members] *means* to the wall of said vehicle are adjustable.

16. The combination according to claim 15 wherein each of said adjustable mounting means includes an attachment means comprising a first portion adapted to be attached to said wall and having an internally threaded barrel projection extending away from said wall; an externally threaded shoulder bolt threadably received within said internally threaded barrel projection, said shoulder bolt including a stepped-down diameter externally threaded portion being adapted to be received within a mounting hole on the wall side of said seat and rigidly connected through said hole by said nut means.

17. A combination according to claim 16 further comprising first and second track members connected respectively to the wall of said vehicle each of said track members being adapted to receive and retain said first portion of at least one of said attachment means.

18. The combination of claim 17 wherein each of said track members includes an internal groove in communication with a channel opening; and wherein said first portion of said attachment means is a generally

rectangular plate having a width less than the width of said channel opening and a length greater than the width of said channel opening whereby said first portion can be secured within said track groove by aligning the width of said first portion with the width of said channel opening so that said first portion can be passed into said groove, and thereafter rotating said first portion 90° to prevent said first portion from being withdrawn out of said track groove.

19. In a multi-passenger seat for a vehicle, the combination comprising: a horizontal seat frame; an inclined arcuate truss frame located beneath said seat frame and including an inclined arcuate truss frame means rigidly attached at its upper end to said seat frame and inclined downwardly from said seat frame attachment; the curvature of said truss frame means being upwardly toward said horizontal seat frame thereby providing by said arcuate shape less underseat obstruction from the inclined truss means and a resultant greater leg and foot room; and means for mounting the wall ends of said frame and the lower end of said inclined arcuate truss frame means to the wall of said vehicle at a location above the floor; said seat being characterized in there being no connection between said seat and the floor of the vehicle.

20. The combination of claim 1 in which the inclined truss frame means comprises forward and rear arcuate truss frame members.

21. The cantilever frame of claim 12 in which the inclined truss frame means includes first and second arcuate truss frame members.

22. The cantilever frame of claim 19 in which the inclined truss frame means includes forward and rear arcuate truss frame members.

23. In a multi-passenger seat for a vehicle, the combination comprising:

a horizontal seat frame having a wall end and an aisle end said seat being elongated in a direction extending from said wall and aisle ends;

an inclined truss means located beneath said frame and including an inclined truss member rigidly attached at its upper end to said frame between said wall and aisle ends and inclined downwardly from said attachment toward said wall end; and

means for mounting said wall end of said frame and the lower end of said inclined truss member to the wall of said vehicle at a location above the floor whereby said seat is characterized in there being no connection between said seat and the floor of the vehicle.

24. The combination of claim 23 wherein said mounting means includes an upper elongated, longitudinal mounting member extending longitudinally fore and aft of the vehicle for mounting the wall end of said frame, and a lower elongated, longitudinal mounting member extending longitudinally fore and aft of the vehicle for mounting the lower end of said inclined truss frame means to the wall of said vehicle at a location above the floor.

25. The combination of claim 24 wherein said upper and lower mounting members are concealed by the wall on the other side from said seat.

26. The combination of claim 24 wherein said mounting means comprise elongated track channels and generally elongated plates slides for sliding along said track channels, the longitudinal lengths of said plate slides being longer than the transverse widths of said track channels.

27. The combination of claim 23 wherein each of said mounting means further comprises an internally threaded barrel projection coupled to and extending from a plate mounted to said wall and an externally threaded shoulder bolt threadably received within said internally threaded barrel projection and adjustable longitudinally within said barrel projection, said shoulder bolt including a stepped-down diameter externally threaded portion being adapted to be received within a mounting hole on the wall side of said seat and rigidly connected through said hole by nut means.

28. The combination of claim 27 wherein said mounting means further comprises a shim inserted between and abutting against the end of one of said barrel projections and the wall end of said frame and a shim inserted between and abutting against one of said barrel projections and the lower end of said inclined truss frame member, for reducing rattles in said seat and rigidifying the attachment of said seat in an adjusted position.

29. In a multi-passenger seat for a vehicle, the combination comprising: a horizontal seat frame having an aisle end and a wall end with elongated horizontal stretcher members extending from said aisle end to said wall end and cross frame means interconnecting said stretcher members at laterally spaced locations to form a rigid structure; an inclined truss frame located beneath said horizontal stretcher members and including an inclined truss frame member rigidly attached at its upper end between said aisle and wall ends to said frame and inclined downwardly from said attachment toward said wall end; and means for mounting the wall end of said frame and the lower end of said inclined arcuate truss frame member to the wall of said vehicle at a location above the floor whereby said seat is characterized in there being no connection between said seat and the floor of the vehicle.

30. The combination of claim 29 wherein said mounting means includes an upper, elongated longitudinal mounting member extending longitudinally fore and aft of the vehicle for coupling to the wall ends of said frame and extending forwardly and rearwardly of the forward and rear stretcher members, and a lower elongated, longitudinal mounting member extending longitudinally along the vehicle for mounting the lower end of said inclined truss frame means to the wall of said vehicle at a location above the floor.

31. The combination of claim 30 wherein said upper and lower mounting members are concealed by the wall on the other side from said seat.

32. The combination of claim 30 wherein said mounting means includes elongated track channels and generally elongated plate slides for sliding along said track channels, the longitudinal lengths of said plate slides being longer than the transverse width of said elongated track channels.

33. The combination of claim 29 wherein each of said mounting means further comprises an internally threaded barrel projection coupled to and extending from a plate and an externally threaded shoulder bolt threadably received within said internally threaded barrel projection and adjustable longitudinally within said barrel projection, said shoulder bolt including a stepped-down diameter externally threaded portion being adapted to be received within a mounting hole on the wall side of said seat and rigidly connected through said hole by nut means.

34. The combination of claim 33 wherein said mounting means further comprises a shim inserted between and abutting against the end of one of said barrel projections and the wall end of said frame and a shim inserted between and abutting against one of said barrel projections and the lower end of said inclined truss frame member, for reducing rattles in said seat and rigidifying the attachment of said seat in an adjusted position.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. RE. 29,271 Dated June 21, 1977

Inventor(s) Chester J. Barecki

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

The term of this patent subsequent to July 24, 1990, has been disclaimed.

Signed and Sealed this

Thirteenth Day of September 1977

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

LUTRELLE F. PARKER
Acting Commissioner of Patents and Trademarks