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(56) Documents Cited

**EP 0590237 A1 US 5318341 A US 5310247 A
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(58) Field of Search

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(54) Dual vehicle seat with belt attachment beam

(57) A dual seat assembly for vehicles which provides diagonal three point seat belt harnesses on both seats. A load bearing centre beam 100 is attached to the leg framework and extends upwardly between the seats, providing at least one seat belt anchoring point at an upper end thereof. The beam may include a receptacle for installing a retractor reel for inertia reel type belts beneath the seat, and a belt guide cavity for conveying the seat belt between reel and the anchoring point. The dual seat assembly may provide completely integrated seat belts requiring no anchoring points on the vehicle other than those normally provided for the seat leg framework. The belt attachment at the upper end of the seat may be a known type of D-ring.

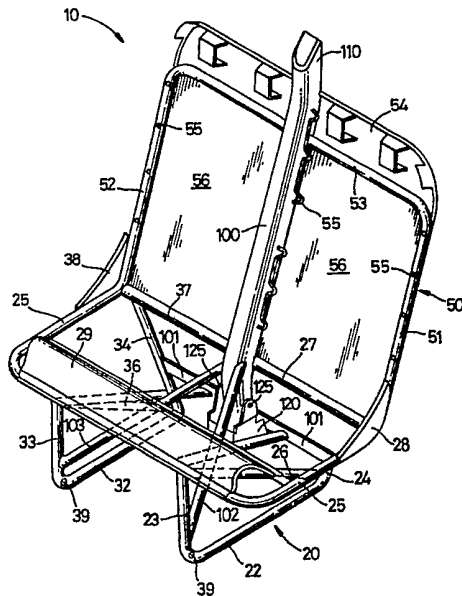


Fig.1

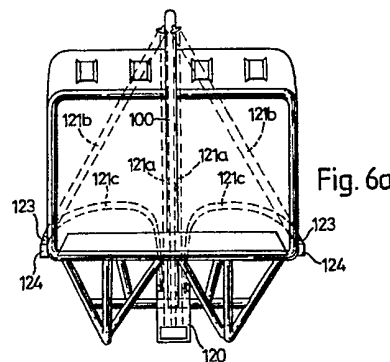


Fig. 6a

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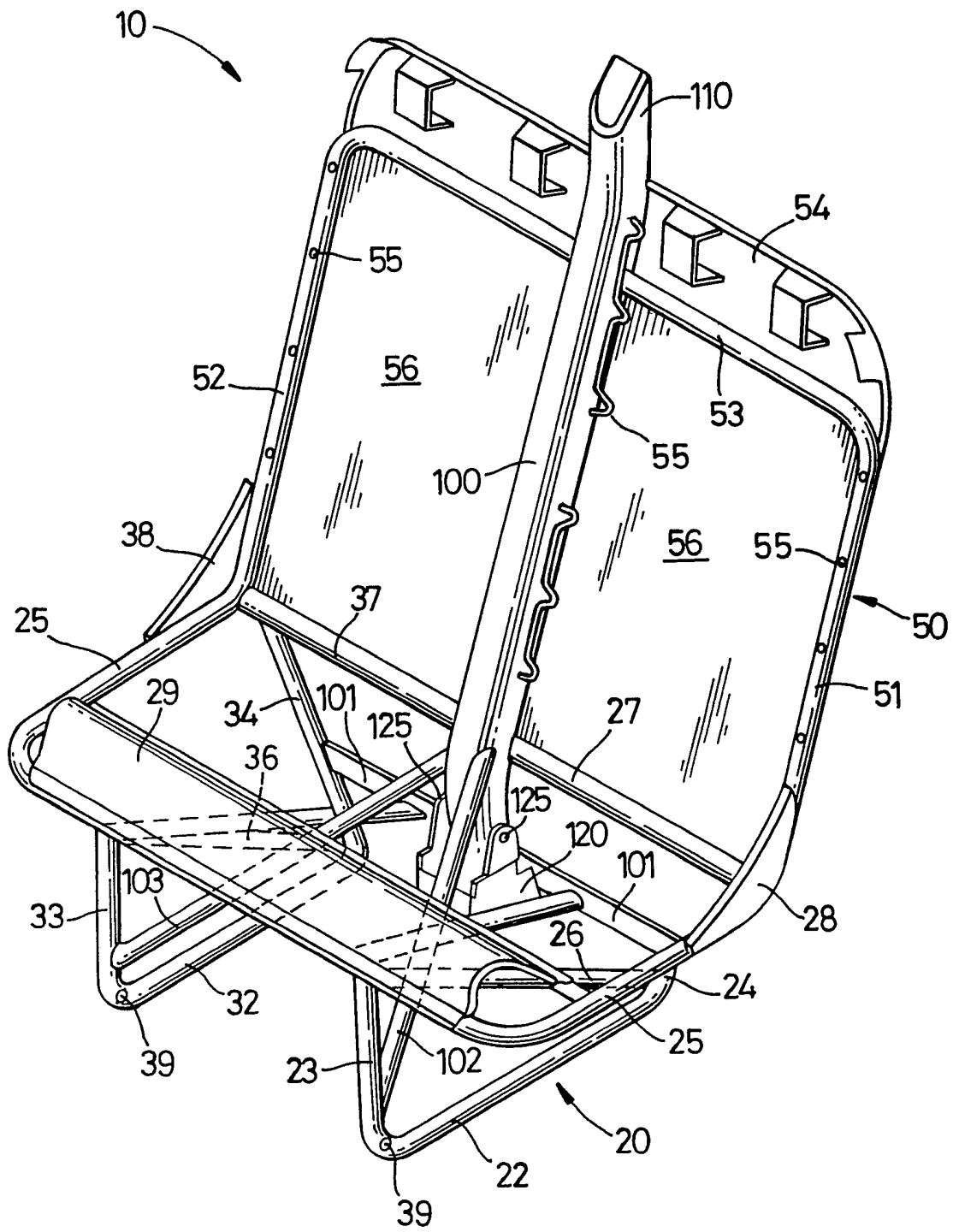


Fig. 1

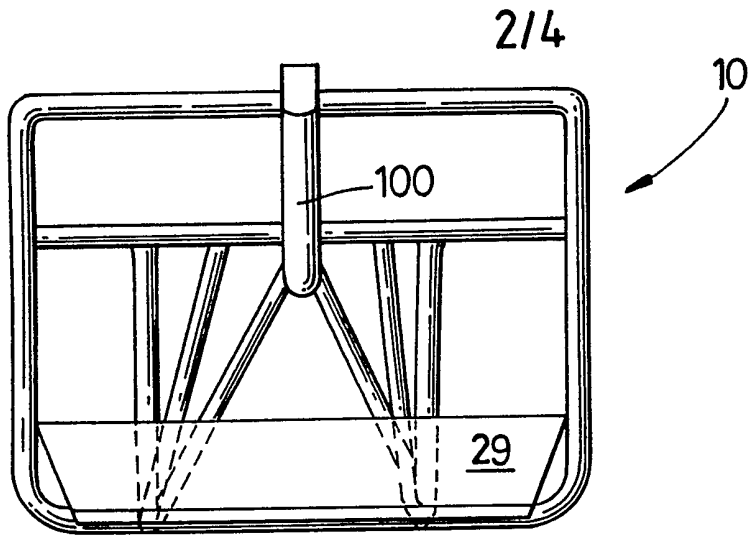


Fig. 2

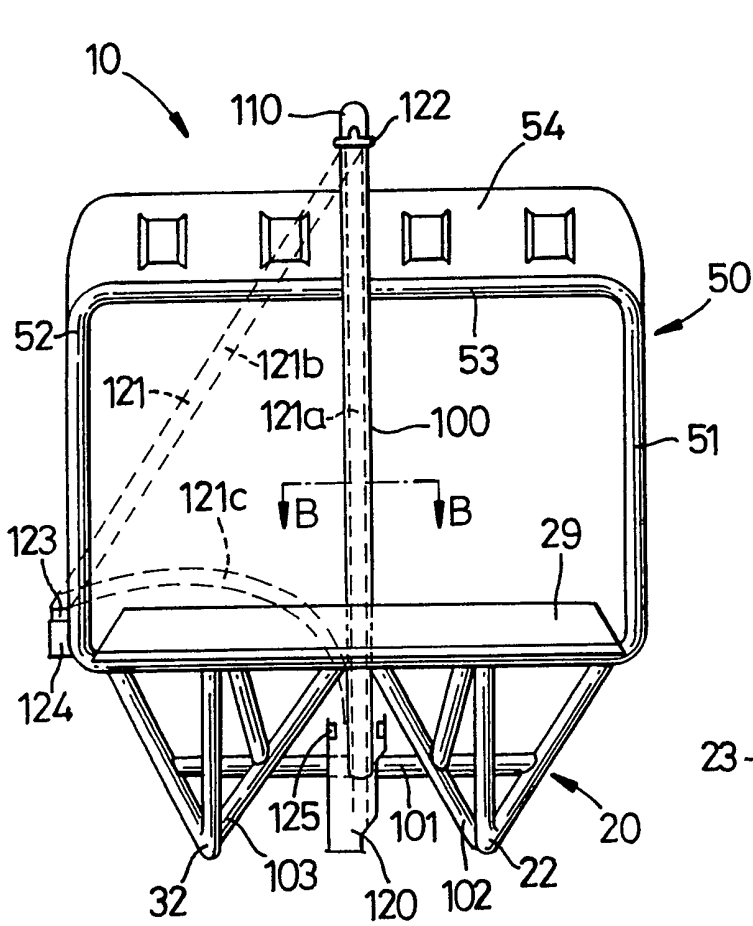


Fig. 3

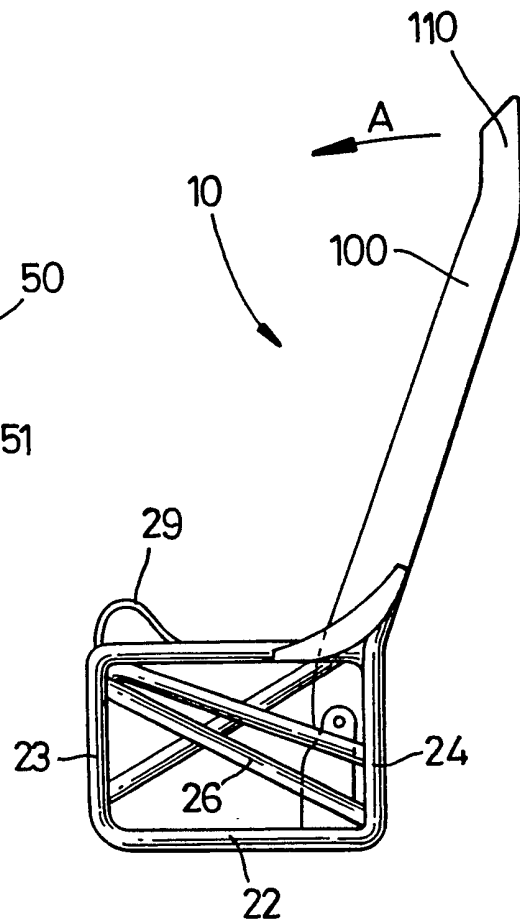


Fig. 4

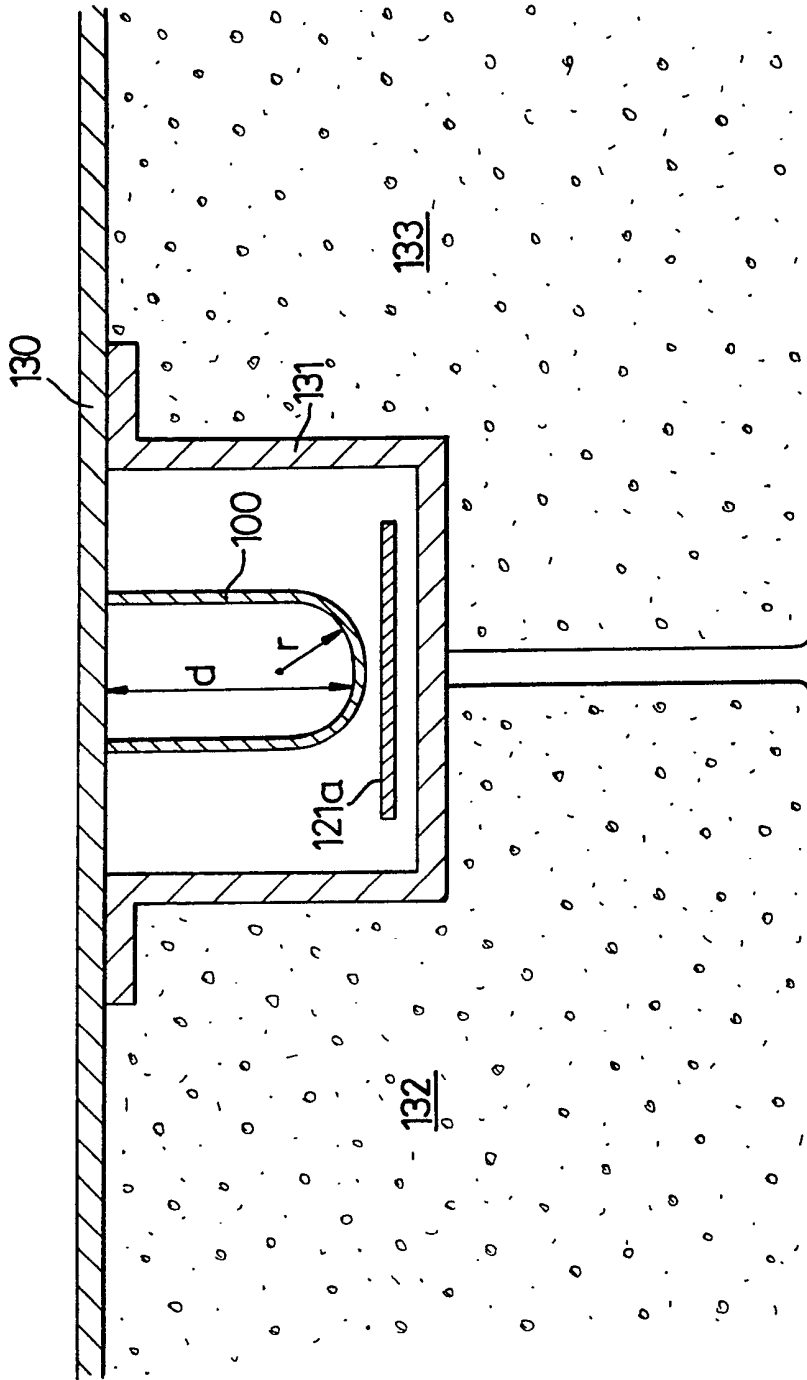
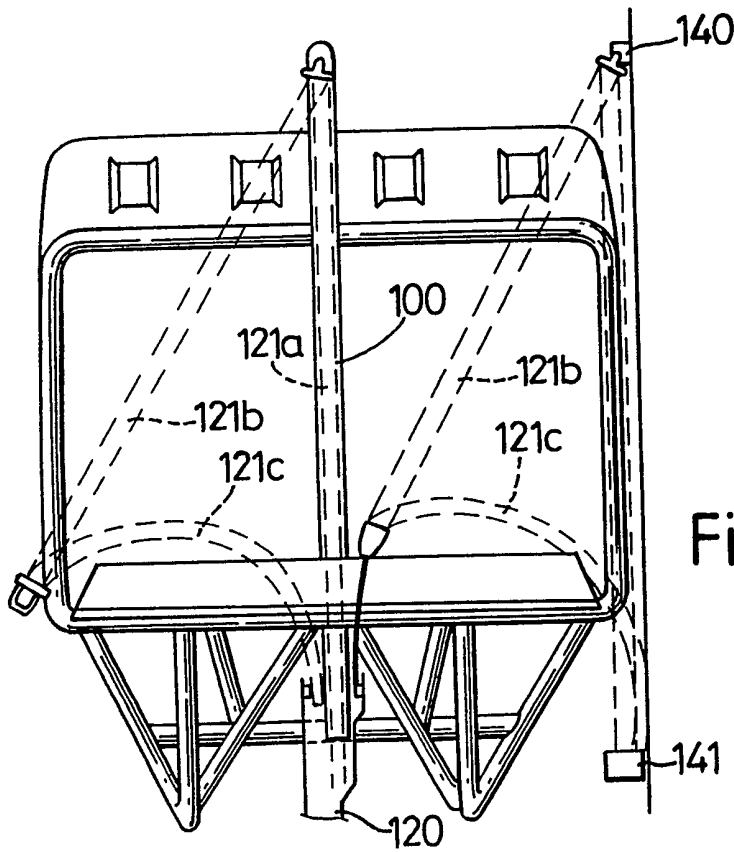
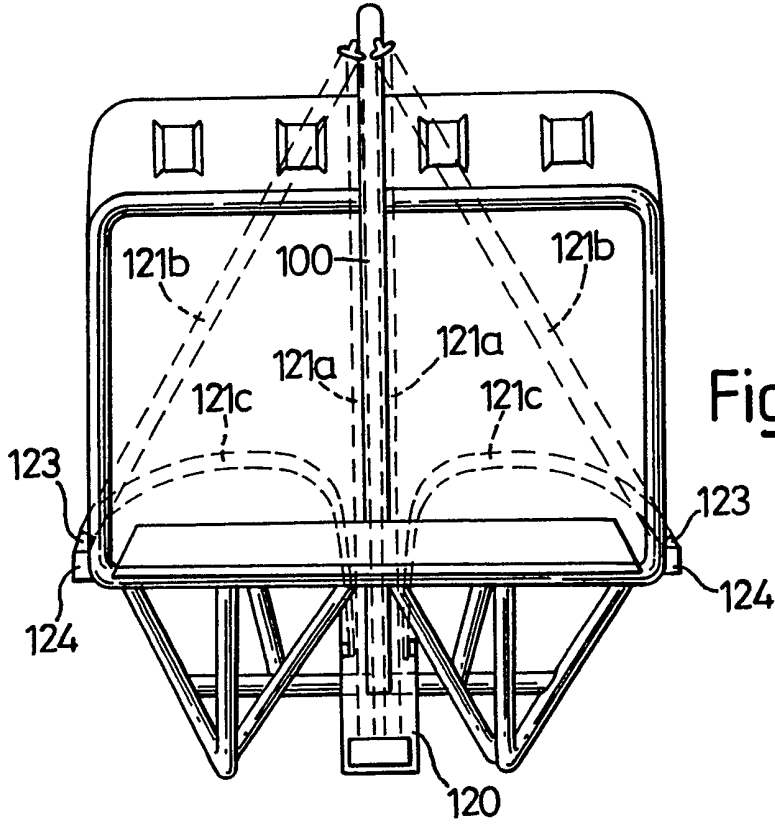


Fig. 5



DUAL SEAT HARNESS

The present invention relates to vehicle seating, and in particular to vehicle seating which incorporates seat belt anchoring points integrally formed
5 therein.

Vehicle seat belt systems are conventionally mounted on the vehicle structure, but recently systems have been developed where a number of the anchoring points have been provided on the seat itself. One motivation for
10 achieving this is that the seat belt anchoring points may be maintained in fixed relationship to the occupant of the seat, regardless of the seat position where, for example, the seat may slide forward and backward within the vehicle.

Where the lower two anchoring points of a typical three point diagonal
15 harness type seat belt are attached to the seat frame, the loading which would be applied to these points during deceleration of the vehicle is readily passed to the lower seat frame and thereby to the rails fixing the seat to the floor of the vehicle.

20 A motivation for providing the upper anchoring point of a typical three point harness to the seat back is where the seat backs are of the folding variety, for example, in estate or hatchback vehicles where the seat belt is stowed within the seat back itself and thus does not obstruct folding the seat back flat. The loading which is applied to this upper anchoring point during deceleration
25 of the vehicle is usually transferred to the vehicle body by virtue of the proximity of engagement means locking the seat back to the vehicle body at each outer and upper edge of the seat.

30 However, it has been recognised that a number of seating arrangements arise where the upper anchoring point or points cannot be readily provided by

way of the vehicle body. In particular, in some commercial vehicles such as buses, coaches and vans, it is commonplace to have a dual seat arrangement where an upper anchoring point for at least one of seats has, hitherto, not been provided. In many cases, the outermost seat of the dual seat arrangement (adjacent to the body of the vehicle) is provided with a three point diagonal harness with the upper anchoring point attached to the vehicle door pillar, but the inner seat (in the centre of the vehicle) is only provided with only a two point, or "lap" harness.

10 It has also been recognised that it would be desirable to provide three point diagonal harnesses to, for example, coach and bus seating. In this instance, the inner seats of each dual seat never have an available upper anchoring point on the vehicle body, not being adjacent to a vehicle wall. Furthermore, the outer seats adjacent to the vehicle wall often cannot be provided with an upper anchoring point to the vehicle body since they coincide with windows and window frames. In any event, such anchoring points cannot usually be provided without extensive redesign of the coach body, and are not readily retrofitted to existing vehicles.

20 It is an object of the present invention to provide a three point harness arrangement for the inner seat of a dual seat assembly.

25 It is a further object of the present invention to provide a three point harness arrangement integrally mounted within a dual seat assembly in order that no additional anchoring points are required other than those provided for the seat itself.

It is a further object of the present invention to provide a structural member for supporting a seat belt upper anchoring point and a seat belt

retractor reel which may be retrofitted to existing seating not providing seat belts.

In accordance with the present invention there is provided a seat assembly for a vehicle comprising:

at least two seats integrally formed within said assembly, each seat including a seat base frame and a seat back frame;

a load bearing centre beam extending in a generally upward direction substantially parallel to the seat back frames and positioned between the seat back frames;

a seat belt upper anchoring point mounted on an upper end of the load bearing centre beam, proximal to a top edge of each adjacent seat back frame.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows a perspective view of a dual seat assembly according to the present invention;

Figure 2 shows a plan view of the seat of figure 1;

Figure 3 shows a front view of the seat of figure 1;

Figure 4 shows a side view of the seat of figure 1;

Figure 5 shows a cross-sectional view of the centre beam of figure 1 with protective cover and upholstery; and

Figures 6a and 6b show diagrammatic views of two seat belt configurations of the present invention.

With reference to figure 1, an exemplary arrangement of a seat assembly in accordance with the present invention is shown, without upholstery for clarity. The seat assembly comprises two seats formed by a seat base frame and a seat back frame.

The seat base frame 20 comprises a pair of legs 22,32 with forward pillars 23,33 extending substantially upwardly, and rear pillars 24,34 extending diagonally upwardly and outwardly to connect with a seat squab frame 25. For structural rigidity, diagonal braces 26,36 may be provided to connect the upper ends of the forward pillars 23,33 to the lower ends of rear pillars 24,34. The rear part of the seat squab frame 25 is formed by a cross bars 27,37. Reinforcement brackets 28,38 are preferably attached to the corners formed between seat back frame 50 and seat base frame 25, and may also be used as fixing structures for seat belt anchoring points to be described hereinafter.

10

An anti-submarining pan 29 as well known in the art may be provided attached to the forward edge of the seat squab frame 25.

Where it is desirable for the entire seat assembly to be able to tip forward, suitable tipping pivot points 39 can be provided for pivotally coupling the seat base frame 20 to a suitable receptacle (not shown) on the vehicle floor. Suitable locking means well known in the art (not shown) would also then be provided.

The seat back frame 50 comprises two upwardly extending side members 51,52, and an upper cross bar 53. Where head restraints are to be fitted to the seat assembly 10, a suitable bracket assembly 54 is provided. The seat back frame 50 also provides trim wire fixing points 55. The seat back frame may also have a seat back cover plate 56 affixed thereto behind the seat.

25

A load bearing centre beam 100 is incorporated into the seat back frame 50 and the seat base frame 20. In a presently preferred embodiment, the centre beam 100 is formed as a substantially "U" shaped channel with its long axis substantially parallel to the contour of the seat back frame. The centre beam 100 extends down beyond the level of the plane of the seat squab frame 25 and

30

is anchored in position by: a) a tie bar 101 which extends across from rear pillar 24 to rear pillar 34; and b) first and second cross braces 102,103 which extend from the lower ends of forward pillars 23,33 to intercept the centre beam 100 at a position approximately level with the seat squab frame cross bars 27,37.

It will be readily apparent that the load bearing centre beam 100 transmits any forward loading forces on the upper end 110 (as indicated by the direction of arrow A in figure 4) through to the leg portions 22,32 coupled to the floor via the arrangement of first and second cross braces 102,103 and tie bar 101. Any sideways component of force applied to the upper end 110 of centre beam 100 is also resisted by the diagonal arrangement of cross braces 102,103.

Upper end 110 of the centre beam 100 extends above the seat back frame upper cross bar 53 preferably such that it extends not substantially higher than the upper surfaces of any upholstered head restraints to be attached to the seat, thereby lying between the head restraints. The upper end 110 provides an upper anchoring point for a three point seat belt harness. In a presently preferred embodiment, the seat assembly 10 carries an inertia reel type retractable belt, the reel for which (not shown) is located in housing 120. With reference to figure 3, the seat belt webbing 121 (shown in dashed outline) then extends upwards (portion 121a) in front of centre beam 100 to the upper end 110 where it passes through a "D" ring 122 well known in the art. The webbing 121 then extends diagonally downward (diagonal portion 121b) to pass through a buckle 123 which is engaged with a female connector 124 well known in the art. The lap portion 121c of the belt then crosses the seat and is fixed to the housing 120 at an appropriate belt anchorage point 125.

The upward portion 121a of the belt webbing will preferably be covered with a protective "U" shaped housing manufactured from plastics or other suitable material placed over the centre beam 100 prior to upholstery being added to the seat assembly. A cross sectional diagram showing an exemplary arrangement of a housing 131, and suitable upholstery, on line B-B of figure 3 is shown in figure 5. Centre beam 100 has a seat back cover plate 130 attached thereto. Belt webbing 121a passes upward parallel to and in front of the curved front of the centre beam 100, and "U" shaped housing 131 covers the belt and centre beam, being attached to the seat back cover plate with suitable fixing means. Upholstery in the form of left and right cushions 132,133 then conceal the "U" shaped housing 131.

The presently described seat assembly supports a plurality of seat belt configurations, shown diagrammatically with reference to figures 6a and 6b. In figure 6a, a symmetrical dual diagonal harness arrangement is shown where the upper anchorage points of both left and right seat belts are provided by the centre beam 100. Female connectors 124 are provided for buckles 123 on both sides of the seat assembly, and dual retractor reels are mounted in housing 120. In figure 6b, the left hand seat belt uses the centre beam 100 to provide the upper anchorage point in similar manner to figure 6a, but the right hand seat belt uses a traditional door pillar anchorage point 140 and the retractor reel 141 may be provided on or within the door pillar. It will be understood that such an arrangement as that shown in figure 6b would be reversed where the door pillar anchorage point 140 were on the left hand side of the seat assembly as viewed.

It will be understood that a number of modifications can be made to the embodiments described in order to suit the invention to different circumstances. For example, separate seat back frames for the left and right hand seats may be independently connected to the seat base frame 20 in the case where

reclining seat backs or forward tipping squabs are required. In this case, the load bearing centre beam 100 may be provided independent of one or other of the two seat back frames, or even independent of both.

5 The seat back frame made be adapted to be of the forward tipping type, independent of the seat base frame which remains in position on the floor of the vehicle. In this embodiment, the centre beam 100 is also adapted to tip forward. This is achieved by hinging the beam 100 on a pivot point passing through the centre beam at the upper ends of first and second cross braces
10 102,103 (ie. the first and second cross braces 102,103 would be pivotally attached to the centre beam 100). A latching mechanism (not shown) is then provided to stay the lower end of centre beam 100 in engagement with tie bar 101 until the latch mechanism is released, enabling the centre beam to pivot forwards.

15

 The centre beam can be constructed from any suitable metal or metal alloy by pressed sheet construction techniques. In a preferred embodiment, the necessary structural integrity is achieved using 2mm thickness steel sheet pressed into the "U" section with a radius of curvature r (figure 5) at the closed
20 end of the "U" of 13mm, and a channel depth d (figure 5) of 60mm. Alternative materials such as plastics can also be used.

 In a further embodiment, existing seating such as that found in coaches and buses may be retrofitted with seat belts by provision of a centre beam which may be attached to the existing seating. Such a beam 100 may be bolted
25 to the existing seat back frame from behind, and provided with cross braces 102,103 and tie bar 101 to the existing leg structure.

It will be understood that the seat assembly of figure 1 is entirely compatible with mounting onto slides or runners for forward/backward position adjustment.

5 In a further embodiment, the upper end 110 of centre beam 100 may be a telescopic section mounted within the centre beam. Using techniques known in the art, the telescopic section may be retractable and extendable on a ratchet mechanism to allow the D ring 122 mounted thereon to be varied in height to suit individual users.

10

In a still further embodiment, the seat belt webbing 121 may be fed through the centre beam 100 from the reel housing 120 to emerge from the top at a suitable point.

15

In a still further embodiment, the centre beam may be provided with anchorage points intermediate between the upper and lower ends suitable for the attachment of child seats.

20

It will be understood that the centre beam can also be used to provide two anchorage points for a full four-point seat belt harness, with appropriate anchorage points being provided on the other sides of the seat by the vehicle body, or a further beam providing structural rigidity to the edges of the seat.

25

It will also be understood that for seat assemblies comprising more than two seats, such as those found at the rear of a coach, a number of centre beams 100 may be provided on the seat assembly in between each individual seat.

CLAIMS

1. A seat assembly for a vehicle comprising:
at least two seats integrally formed within said assembly, each seat
5 including a seat base frame and a seat back frame;
a load bearing centre beam extending in a generally upward direction
substantially parallel to the seat back frames and positioned between the seat
back frames;
a seat belt upper anchoring point mounted on an upper end of the load
10 bearing centre beam, proximal to a top edge of each adjacent seat back frame.
2. A seat assembly according to claim 1 further including a seat belt
retractor reel mounted on a lower portion of the centre beam.
- 15 3. A seat assembly according to claim 2 wherein the upper anchoring point
comprises belt guide means.
4. A seat assembly according to claim 1, claim 2 or claim 3 further
including a seat belt lap anchoring point mounted on a lower portion of the
20 centre beam.
5. A seat assembly according to any preceding claim wherein the load
bearing centre beam supports two upper anchoring points at an upper end
thereof, and two lap anchoring points mounted on a lower portion thereof.
25
6. A seat assembly according to claim 3 wherein the load bearing centre
beam further includes an upwardly extendable member upon which the belt
guide means is supported, the member being lockable in a plurality of height
positions.

7. A seat assembly according to any preceding claim further comprising anchoring means coupled to an intermediate portion of the centre beam adapted to attach a child seat thereto.

5 8. A seat assembly according to claim 1 further including a cover channel mounted over the centre beam and extending longitudinally with the centre beam, forming a cavity between the cover channel and the centre beam adapted to enclose seat belt webbing.

10 9. A seat assembly according to claim 1 wherein the centre beam includes an inner cavity adapted to enclose seat belt webbing.

10. A dual seat assembly comprising:

a seat base frame for supporting a seat cushion;

15 a seat back frame comprising a peripheral outer member adapted to support a seat back cushion, and a load bearing centre beam extending generally upwardly within the seat back frame;

a leg structure coupled to the seat base frame and the load bearing centre beam, and including means for attachment to a vehicle floor; and

20 a seat belt anchoring point attached to an upper portion of the centre beam.

11. A dual seat assembly according to claim 10 further comprising a seat belt anchoring point attached to a lower portion of the centre beam, and a seat
25 belt retractor reel mounted on the lower portion of the centre beam.

12. A load bearing centre beam for attachment to a dual seat assembly, the centre beam including:

attachment means, at a first end of the beam, for attaching the beam to a leg assembly of a dual seat to transmit loading forces on the beam to the leg assembly;

a seat belt anchoring point attached to the first end of the beam;

5 a seat belt anchoring point attached to a second end of the beam, opposite to the first end.

11. A load bearing centre beam according to claim 12 wherein the attachment means includes a first stay coupled to the first end of the beam and
10 a second stay coupled to the beam at a predetermined distance above the first end intermediate said first and second ends.



12

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Claims searched: 1-11

Examiner: John Wilson
Date of search: 7 March 1995

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.N): A4L[LABG LBEJ LBES LSB LSHA]
Int CI (Ed.6): B60N 2/44; B60R 22/26
Other: -----

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|--|--------------------|
| Y,E | EP0590237A1 Douglas Lomason - whole document - note col.10 ll. 50-55 | 1,10,12 at least |
| Y,E | US5318341 Griswold et al - whole document | 1,10,12 at least |
| Y,E | US5310247 Fujimori et al - whole document | 1,10,12 at least |
| Y | US5246271 Boisset - whole document | 1,10,12 at least |

| | | | |
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