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(51) INT CL<sup>7</sup>:  
**A47C 27/10**

(52) UK CL (Edition W ):  
**A4L LABA LBRG L111 L112**

(56) Documents Cited:  
**US 5715548 A** **US 20030041378 A1**

(58) Field of Search:  
UK CL (Edition W ) **A4L**  
INT CL<sup>7</sup> **A47C**  
Other: **EPODOC, WPI, JAPIO**

(54) Abstract Title: **Air chair**

(57) An adjustable chair comprises a chair frame 10 having an upper portion 12 pivotable about and supported by a wheelable lower portion 14. The upper portion 12 has an adjustable footrest 22 and backrest 28. A chair body 32 has a hinged support member 34 which rests in a flexible foam chair base. The flexible foam chair base is supported by the upper portion 12 of the chair frame 10. The chair body 32 comprises a plurality of inflatable air cushions 46, transversely disposed in three groups 46A 46B 46C, one on each of the footrest portion 42, the backrest portion 40 and the seat portion 38 of the chair body 32, the groups 46A 46B 46C being separated by transverse upholstery bounding walls 50, which also define the top of the backrest portion. Inflation and deflation manifolds are coupled to the cells 46A 46B 46C, the seat body 32 and the manifolds enclosed within a sealed foam envelope, and the whole contained within a covering of upholstery material 44.

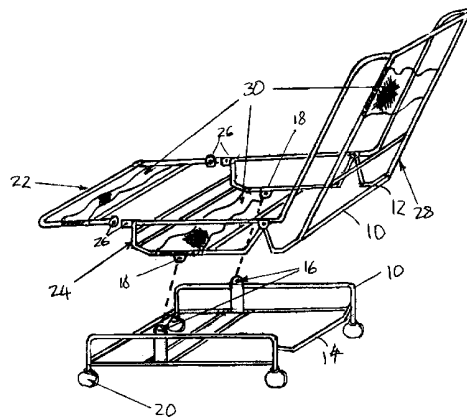


FIGURE 1

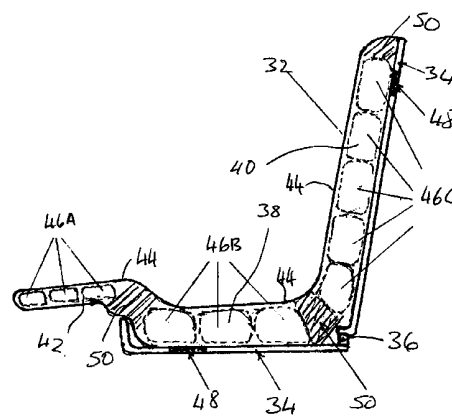


FIGURE 2

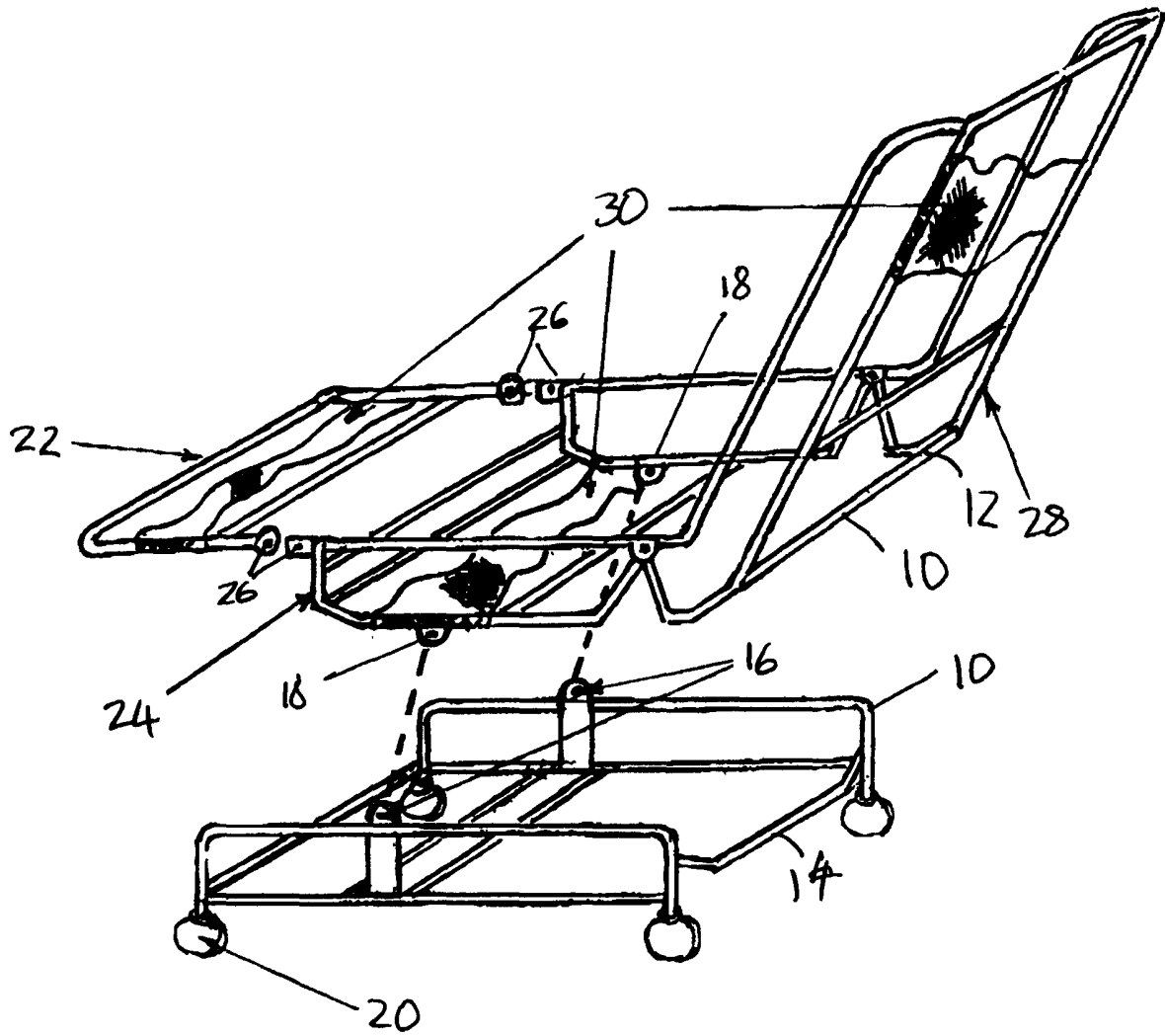


FIGURE 1

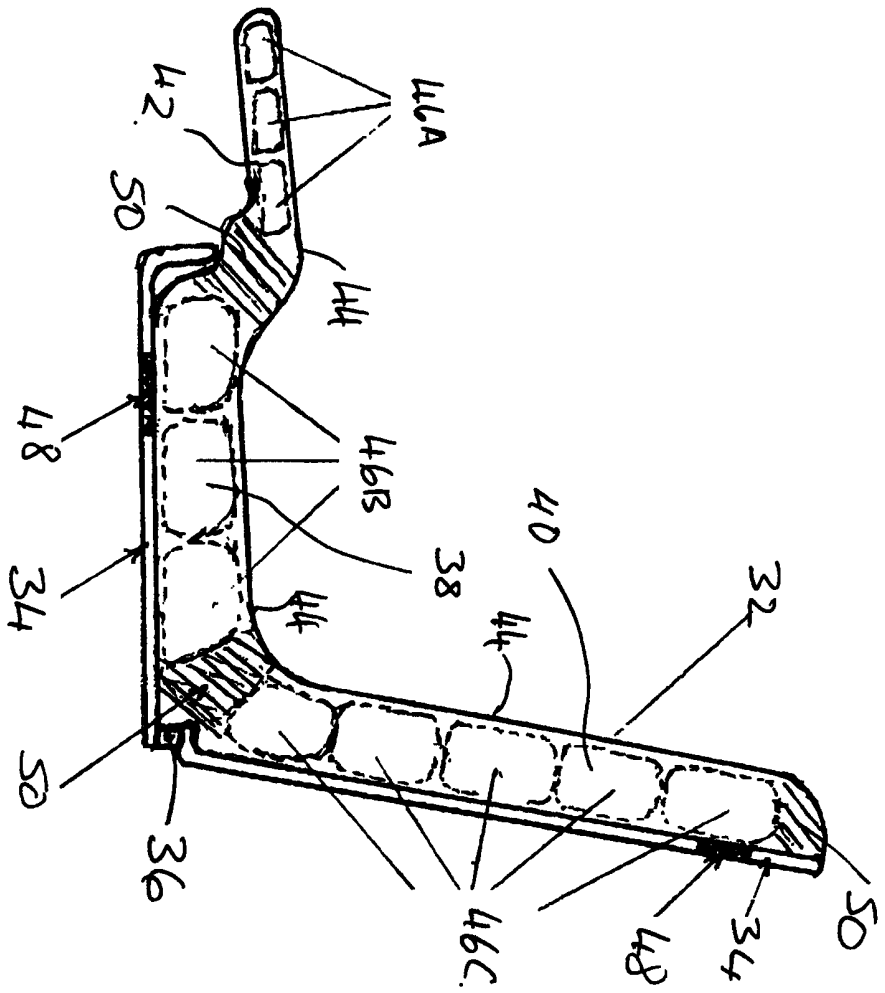


FIGURE 2

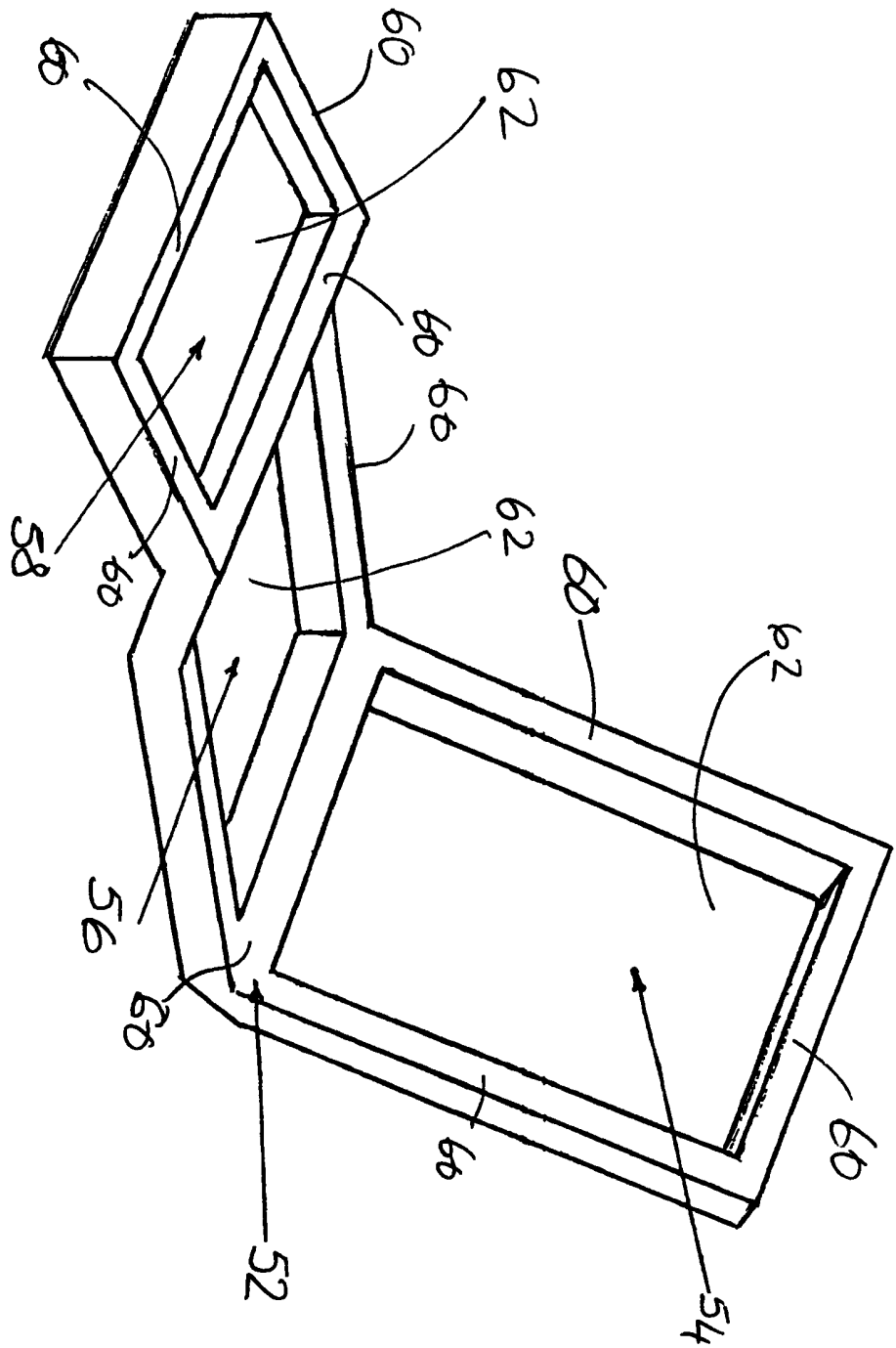


FIGURE 3

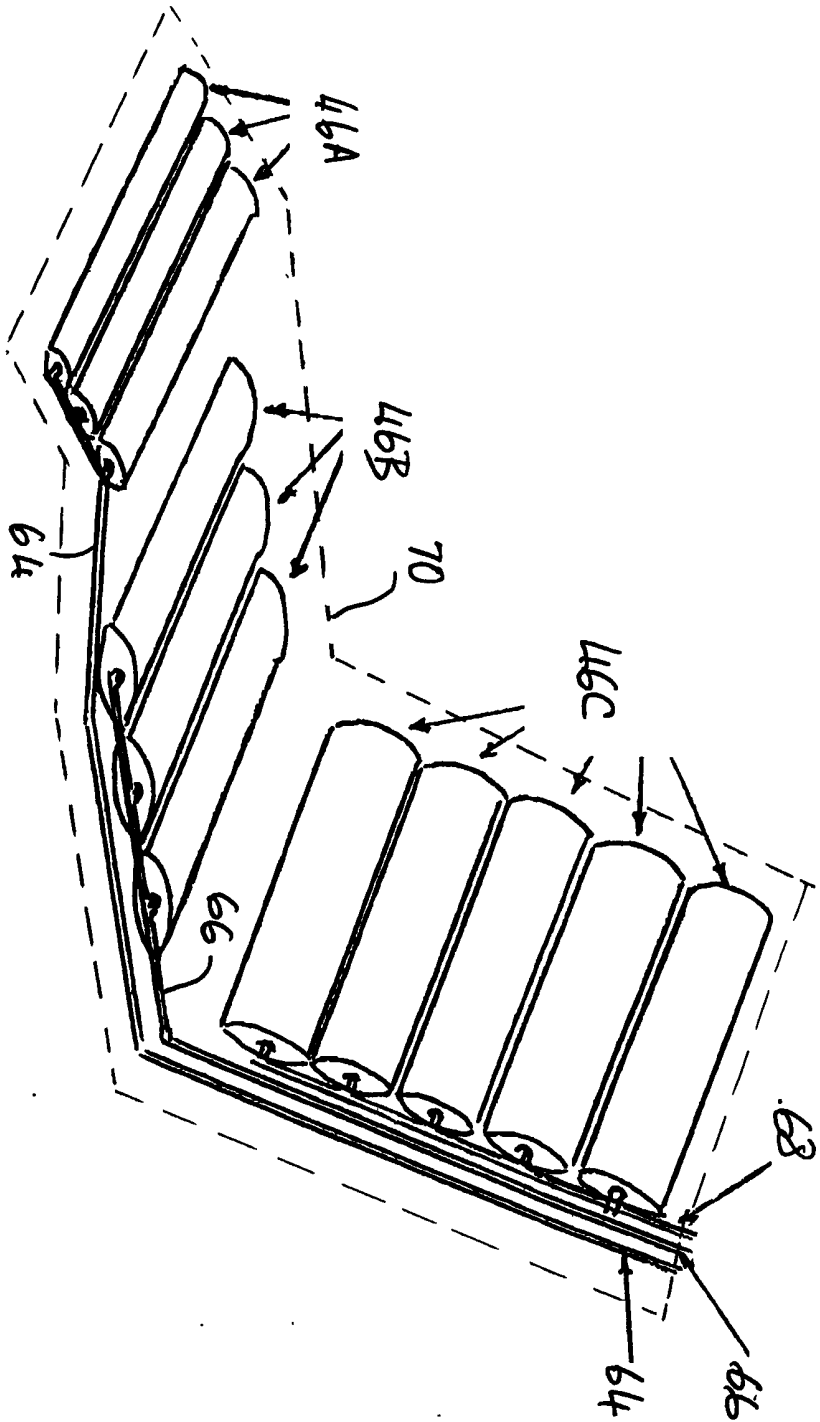


FIGURE 4

Air Chair

The present invention relates to seating for individuals who are sick, injured, invalids, or chronically or temporarily immobilised.  
5 The invention particularly relates to seating where the pressure beneath the seated individual can be controlled across the range of pressure points or areas of the individual on the seating. The invention further relates to seating which enables the seated individual to be moved around and which also allows the posture of  
10 the seated individual to be adjusted.

Chairs have been proposed for use in rest homes, hospitals and for use with the ambulance service where water filled cushions are provided, partially filled to maximum capacity, to control the  
15 pressure beneath the seated individual to avoid bedsores and other discomforts. These chairs also have the ability to be adjusted to alter the posture of the seated individual to be anywhere between a virtually recumbent position to a fully upright, seated position. Such chairs, with their water filled cushions, have the disadvantage  
20 of being particularly heavy to move and very inconvenient if a water filled cushion should spring a leak. The additional weight also imposes a need for the attitude adjustment means, incorporated in the chair, to be unnecessarily robust and heavy. The present invention seeks to provide a chair which avoids all unnecessary  
25 weight, and which does not become wet or damp should a cushion spring a leak.

Prior art chairs require sheets of fabric or of other sheet material to be stretched and fixed, in several pieces, onto a chair frame,  
30 increasing the complexity of the construction of a chair and adding to its cost. Further, the proximity of the chair frame to water filled cushions means that there is a far higher risk of a cushion being punctured or made leaky by attrition with the chair frame than might otherwise exist. The present invention seeks to provide a  
35 chair whose construction is simplified, at the same time reducing and virtually eliminating the risk of puncture or attritional leaks.

According to a first aspect, the present invention consists in a chair comprising; a chair frame; a foam chair base; and a chair body; said chair base being operative to fit into and be supported by said chair frame; and said chair base being operative to receive and hold said chair body.

According to another aspect, the present invention consists in a chair comprising; an adjustable chair frame; a flexible foam chair base; and a flexible chair body; said flexible chair base being operative to fit into and be supported by said adjustable chair frame; said flexible chair base being flexible to conform with adjustment of said adjustable chair frame; said flexible chair base being operative to receive and hold said flexible chair body; and said flexible chair body being flexible to conform to flexible chair base.

The invention further provides that the adjustable chair frame can comprises an adjustable footrest portion.

The invention further provides that the adjustable chair frame can comprises an adjustable backrest portion.

The invention further provides that the adjustable chair frame can comprises an adjustable seat portion.

The invention further provides that the flexible chair body can comprises a footrest portion.

The invention further provides that the flexible chair body can comprises a backrest portion.

The invention further provides that the flexible chair body can comprises a seat portion.

The invention further provides that the chair base can be in the form of an oblong trough and that the chair body can be held within the oblong trough.

The invention further provides that the chair frame can comprises one or more sheets of material to support the chair base.

5 The invention further provides that the chair frame can comprise a lower portion and an upper portion, said upper portion being operative to support said chair base; said lower portion being operative to support said upper portion; and said lower portion and  
10 said upper portion being co-operative to allow said upper portion to be pivoted and fixed in any one of a plurality of desired positions.

The invention further provides that the lower portion of the chair frame can comprise wheels to permit movement of the chair upon the ground.

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The invention further provides that the chair body can comprise a plurality of cells, that the cells can be made from impermeable material, and that the cells can be inflated by gas or air.

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The invention further provides that cells lie left to right in the seat body.

25 The invention further provides that the chair body can comprise a first set of one or more cells for the backrest portion, a second set of one or more cells for the seat portion, and a third set of cells for the footrest portion.

30 The invention further provides that the plurality of calls can be inflated by one or more interconnected manifolds.

35 The invention further provides that the air system of the chair body, being the cells and their means for inflation or deflation, can be insertable into a sealed foam envelope, and that the sealed envelope can be contained within upholstery.



The invention further provides that the chair body can be upholstered in a permeable material, covering the cells.

5 The invention is further explained, by way of example, by the following description, taken in conjunction with the appended drawings, in which:

10 Figure 1 is a projected and partially exploded view of the chair frame, according to one embodiment of the present invention.

Figure 2 is a side view of the chair body.

Figure 3 is a projected view of the chair base.

15 And

Figure 4 is a projected view showing the air cushions within the chair body, the outer covering being removed, and otherwise visible in Figure 2.

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Attention is drawn to Figure 1. A chair frame 10 comprises an upper portion 12 of the chair frame 10 and a lower portion 14 of the chair frame 10. The lower portion 14 comprises lower pivots 16 and the upper portion 12 has upper pivots 18 which co-join in pairs by means of a pivot and pin or of a screw threaded bolt and threaded hand wheel which can be tightened or loosened, to allow the upper portion 12 to be tilted and fixed with respect to the lower portion 14. The lower portion 14 comprises wheels in the preferred form of castors 20 which allow the entire chair frame 10 to be moved, with relative ease, along the ground.

30

The upper portion 12 comprises a footrest 22 which pivots about a first end portion of a seat 24 by means of pivots 26 which allow the angular adjustment and the fixing of the angle of the footrest 22 with respect to the seat 24. The upper portion 12 also comprises a backrest 28, pivoted about the second end portion of the seat 24 to be adjustable in angle and fixable in position with respect to the

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seat 24. The upper portion 12 also comprises sheets of material 30, stretched across the upper portion 12, intended to act as supports for a chair base to be placed upon the chair frame 10. The sheets of material are, for preference, elastically resilient PVC, although  
5 the sheets of material can equally be of any other substance, including canvas and metal plate.

The chair frame 10 can be adjusted from a fully upright seated position, through a semi-recumbent position (as shown) all the way  
10 to a fully recumbent position where the occupier is, effectively, in a bed.

Attention is next drawn to Figure 2, showing a cross sectional side view of the chair body 32.

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The chair body 32 comprises a support member 34, made in two parts with a support member hinge 36 to accommodate the adjustment of a seat portion 38 of the chair body 32 with respect to a backrest portion 40 of the chair body 32. The support member 32 adds support  
20 and rigidity to the seat portion 38 and to the backrest portion 40. A footrest portion 42 of the chair body 32 is not supported by the support member 34 but lies upon the footrest 22, as shown in Figure 1.

25 The chair body 32 is covered in upholstery material 44. The upholstery material 44 is preferably of a permeable nature to allow air and moisture to pass too and fro there through. The upholstery material 44 forms an outer cover for the chair body 32, and contains a plurality of air cells in the form of air cushions 46A 46B 46C,  
30 there being a group of footrest air cushions 44A in the footrest portion 42, a group of seat air cushions 46B in the seat portion 38, and a group of backrest air cushions 46C in the backrest portion 40. The support member 34 has detachable fitments 48, for example, made from VELCRO (TM), for removeably attaching the seat portion 38 and  
35 the backrest portion 40 to the support member 34. Upholstery pads 50, contained within the upholstery material 44, lie adjacent to, and are operative to separate and protect the groups of air cushions

46A 46B 46C, to define the top of the backrest portion 40, to provide flexible coupling between the backrest portion 40 and the seat portion 38, and to provide flexible coupling between the footrest portion 42 and the seat portion 38. The upholstery pads 50  
5 can be made of foam, or from any other suitable material.

Attention is next drawn to Figure 3, showing a projected view of the chair base 52.

10 The chair base 52 is constructed from foam polymer, such as expanded urea foam, which, for preference, can be moulded in a one piece, rapid and low cost operation. The chair base 52 comprises a backrest zone 54 for receiving and supporting the backrest portion 42 of the chair body 32, a seat zone 56 for receiving and supporting the seat  
15 portion 38 of the chair body 32, and a footrest zone 58 for receiving and supporting the footrest portion 42 of the chair body 32. In each zone 54 56 58 the relevant portion 38 40 42 of the chair body 32 is held within bounding walls 60 and rests upon base member 62.

20 The chair base 52 is held on the chair frame 10. The entire chair comprises the moveable chair frame 10, having wheels on the lower portion 14, and an upper portion 12, adjustable with respect to the lower portion 14, the chair base 52 held on the upper portion 12 of  
25 the chair frame 10, and the chair body 34, received and supported by the chair base 52. The bounding walls 60, containing the corresponding portions 38 40 42 of the chair body 32 in a series of abutting wells, each defined by the bounding walls 60 and the base members 62, prevent the chair body from moving with respect to the  
30 chair.

Attention is finally drawn to Figure 4, which shows a projected view showing the air cushions 46A 46B 46C within the chair body 32, the outer upholstery material 44 covering being removed, and otherwise  
35 visible in Figure 2.

Each air cushion 46A 46B 46C is of a generally cylindrical form, with the axis of each cylinder stretching from left to right across the chair body 32. The footrest air cushions 46A comprise a footrest manifold 64 by which all of the footrest air cushions 46A can be  
5 together inflated or deflated to enjoy a common pressure. The seat air cushions 46B comprise a seat manifold 66 by which all of the seat air cushions 46B can be together inflated or deflated to enjoy a common pressure. The backrest air cushions 46C comprise a  
10 backrest manifold 68 by which all of the backrest air cushions 46C can be together inflated or deflated to enjoy a common pressure.

The various manifolds 64 66 68 can be further subdivided so that different ones or different groups of the air cushions 46A 46B 46C can be at selectable states of inflation or pressure. There can be  
15 more or fewer air cushions 46A 46B 46C than the number shown on each seating element 38 40 42. The manifolds 64 66 68 can be combined so that all of the air cushions 46A 46B 46C can be inflated or deflated together. The manifolds 64 66 68 are shown as having a common access position above the backrest portion 40 of the chair body 32. It is  
20 to be appreciated that the manifolds 64 66 68 can have individual or otherwise grouped access points at other places on the chair portion 32.

As a further option, in all embodiments, the air system items 46A  
25 46B 46C 64 66 68 of the chair body 32, are, together, inserted into a sealed foam envelope 70, shown in broken line outline in Figure 4. The sealed envelope 70 can be contained within the upholstery material 44.

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**Claims**

1. A chair comprising; a chair frame; a foam chair base; and a chair body; said chair base being operative to fit into and be supported by said chair frame; and said chair base being operative to receive and hold said chair body.
2. A chair, according to claim 1, wherein said chair frame is adjustable and wherein said chair base is flexible, said flexible chair base being flexible to conform with adjustment of said adjustable chair frame.
3. A chair, according to claim 1 or claim 2, wherein said chair body is flexible, said flexible chair body being flexible to conform to chair base.
4. A chair, according to any one of the preceding claims, wherein said chair frame comprises an adjustable footrest portion.
5. A chair, according to any one of the preceding claims, wherein said chair frame comprises an adjustable backrest portion.
6. A chair, according to any one of the preceding claims, wherein said chair frame comprises an adjustable seat portion.
7. A chair, according to any one of the preceding claims, wherein said chair body comprises a footrest portion.
8. A chair, according to any one of the preceding claims, wherein said chair body comprises a backrest portion.
9. A chair, according to claim 8, wherein the edge of said backrest portion is provided by an edge defining upholstery pad.
10. A chair, according to any one of the preceding claims, wherein said chair body comprises a seat portion.

11. A chair, according to any one of the preceding claims, wherein said chair base is in the form of an oblong trough and wherein said chair body is fittable within said oblong trough.
- 5
12. A chair, according to any one of the preceding claims, wherein said chair frame comprises one or more sheets of material to support said chair base.
- 10
13. A chair, according to any one of the preceding claims, wherein said chair frame comprises a lower portion, wherein said chair frame also comprises an upper portion, wherein said upper portion is operative to support said chair base; wherein said lower portion is operative to support said upper portion; and wherein said lower
- 15
- portion and said upper portion are co-operative to allow said upper portion to be pivoted and fixed in any one of a plurality of desired positions.
14. A chair, according to claim 13, wherein said lower portion of
- 20
- said chair frame comprises two or more wheels to permit movement of the chair upon the ground.
15. A chair, according to any one of the preceding claims, wherein said chair body comprises a plurality of cells.
- 25
16. A chair, according to claim 15, wherein at least one of said plurality of cells is fabricated from impermeable material.
17. A chair, according to claim 15 or 16, wherein at least one of
- 30
- said plurality of cells is inflatable by gas or air.
18. A chair, according to claim 15, 16 or 17, wherein said plurality of cells are disposable left to right in said seat body.
- 35
19. A chair, according to claim 15, 16, 17 or 18, wherein said chair body comprises a first set of one or more cells for the backrest portion, a second set of one or more cells for the seat

portion, and a third set of one or more cells for the footrest portion.

20. A chair, according to claim 19, wherein said first set of cells  
5 is divided from said second set of cells by a first separating upholstery pad.

21. A chair, according to claim 19 or claim 20, wherein said second  
10 set of cells is divided from said first set of cells by a second separating upholstery pad.

22. A chair, according to claim 17, or according to any one of  
claims 18 or 21 when dependent upon claim 17, wherein said at least  
15 some of plurality of calls are inflatable via one or more interconnected manifolds.

23. A chair, according to any one of the preceding claims, wherein  
said chair body comprises a containing sealed foam envelope, said  
20 sealed envelope being contained within upholstery.

24. A chair, according to claim 23 when dependent upon claim 17,  
wherein said chair body comprises an air system, said air system  
comprising said plurality of inflatable cells and, and said air  
system further comprising means for inflation and deflation of said  
25 plurality of inflatable cells, said air system being insertable into said sealed foam envelope.

25. A chair, according to any one of the preceding claims, wherein  
said chair body is upholstered in permeable material.  
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26. A chair, according to any one of the preceding claims, wherein  
said chair base is fabricated from moulded foam polymer.

27. A chair, substantially as described and illustrated, with  
35 reference to the appended drawings.



INVESTOR IN PEOPLE

Application No: GB0307182.6

Examiner: Alex Swaffer

Claims searched: 1

Date of search: 26 July 2004

### Patents Act 1977: Search Report under Section 17

#### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular reference
X	1-11, 13-18, 22-26	US5715548 A (HILL-ROM): See figures 9, 28, 63 & 68, and column 84 lines 54-59 in particular.
X	1, 3, 7-10, 15-18, 26	US2003/0041378 A1 (DAVIS): See figures 2 & 4, and paragraph 0023.

#### Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application

#### Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>W</sup> :

A4L

Worldwide search of patent documents classified in the following areas of the IPC<sup>07</sup>

A47C

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI, JAPIO