

(21) Application No: 0615985.9
(22) Date of Filing: 11.08.2006
(30) Priority Data:
(31) 0526079 (32) 21.12.2005 (33) GB

(51) INT CL:
A47B 23/04 (2006.01) A47C 16/00 (2006.01)
B60N 3/00 (2006.01)
(52) UK CL (Edition X):
A4L LABA LAL L119 L150

(71) Applicant(s):
Gordon Blackwood Hamilton
The Old Masters House,
Brandeston Hall School, BRANDESTON,
Suffolk, IP13 7AH, United Kingdom

(56) Documents Cited:
GB 1501397 A GB 0724315 A
GB 0278104 A EP 0067211 A1
US 3828377 A US 3247811 A
US 3050355 A US 2601177 A
US 1403317 A US 20030172462 A1

(72) Inventor(s):
Gordon Blackwood Hamilton

(58) Field of Search:
UK CL (Edition X) A4L
INT CL A47B, A47C, B60N
Other: EPODOC, WPI

(74) Agent and/or Address for Service:
Dummett Copp
25 The Square, Martlesham Heath,
IPSWICH, Suffolk, IP5 3SL,
United Kingdom

(54) Abstract Title: **Portable rest**

(57) A portable support for seated travellers comprises an inclined rest surface (A,B) which provides direct support for the upper torso, the head and the arms of a seated person adopting a leaning forward position. The rest surface (A,B) can be flat, contoured or be formed from sections hinged together. The support device is stably supported so that it does not require counterbalancing by the user. The supports may be height adjustable legs (C,D) connected to the floor, the seat or both. Alternatively the supports may be linkages that allow the rest surface to be coupled to the occupied seat, the seat in front, or suspended from a ceiling. The rest surface may be adorned with padding or cushions. The support may collapse and be attached to a briefcase. The support could be an integral part of a piece of luggage. The inclined rest surface allows the traveller to adopt a comfortable sleeping position.

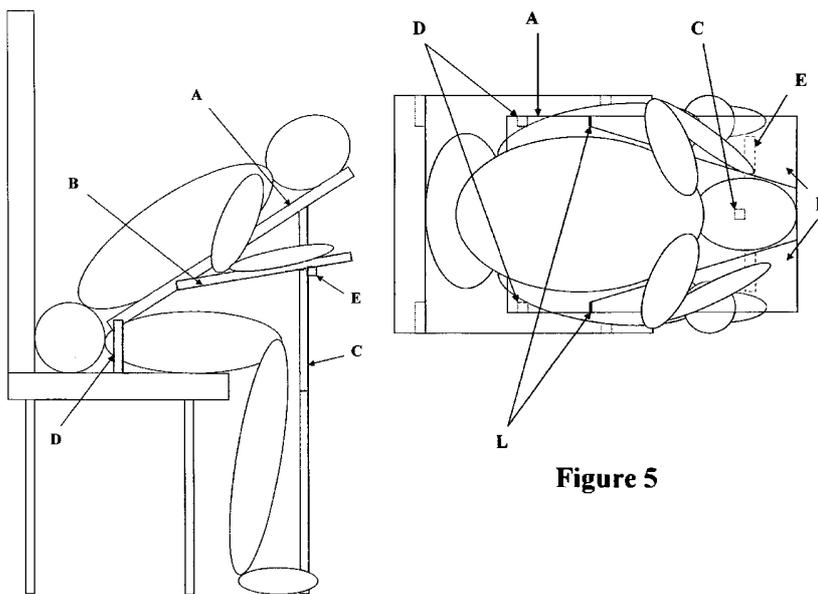


Figure 2

Figure 5

1 / 5

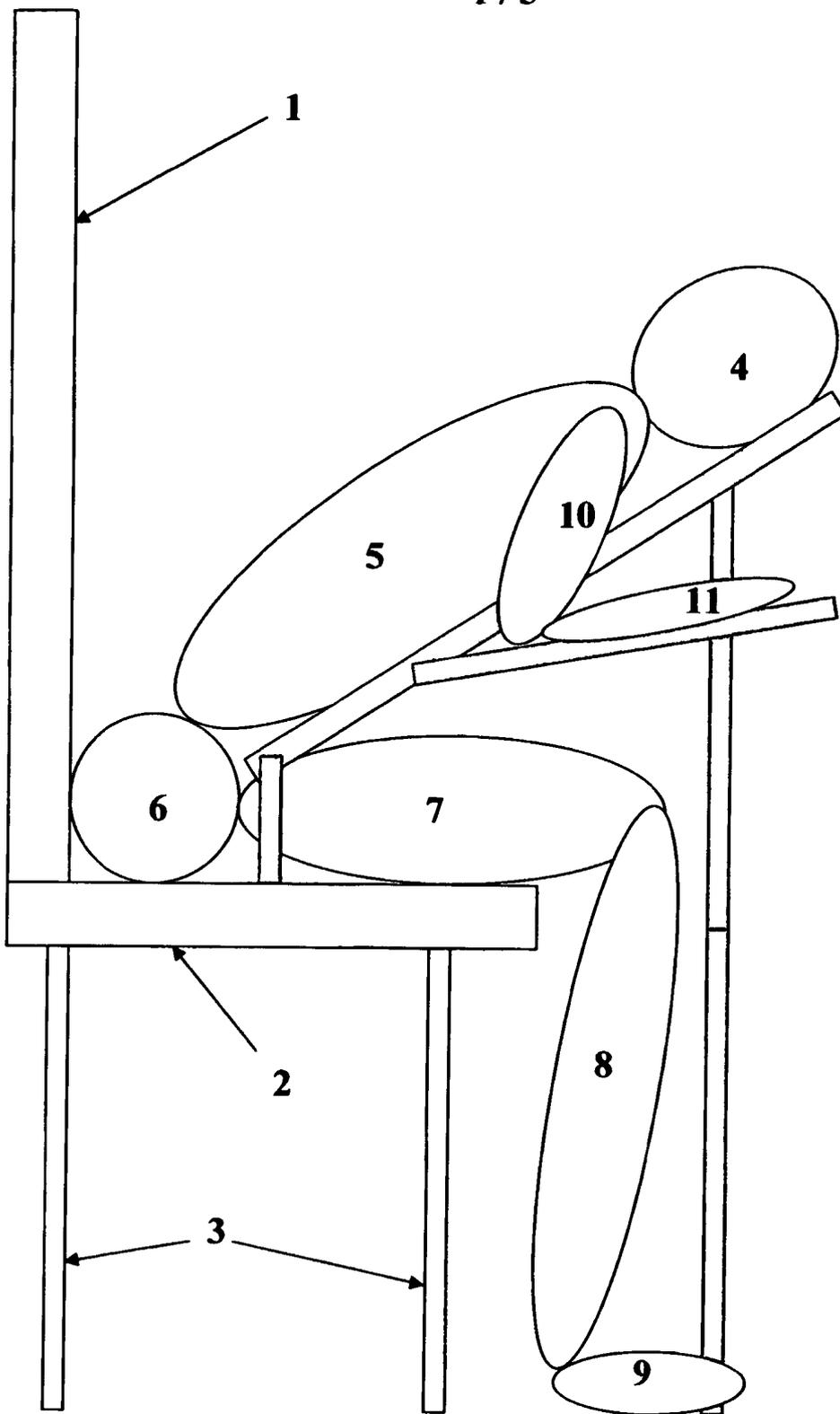


Figure 1

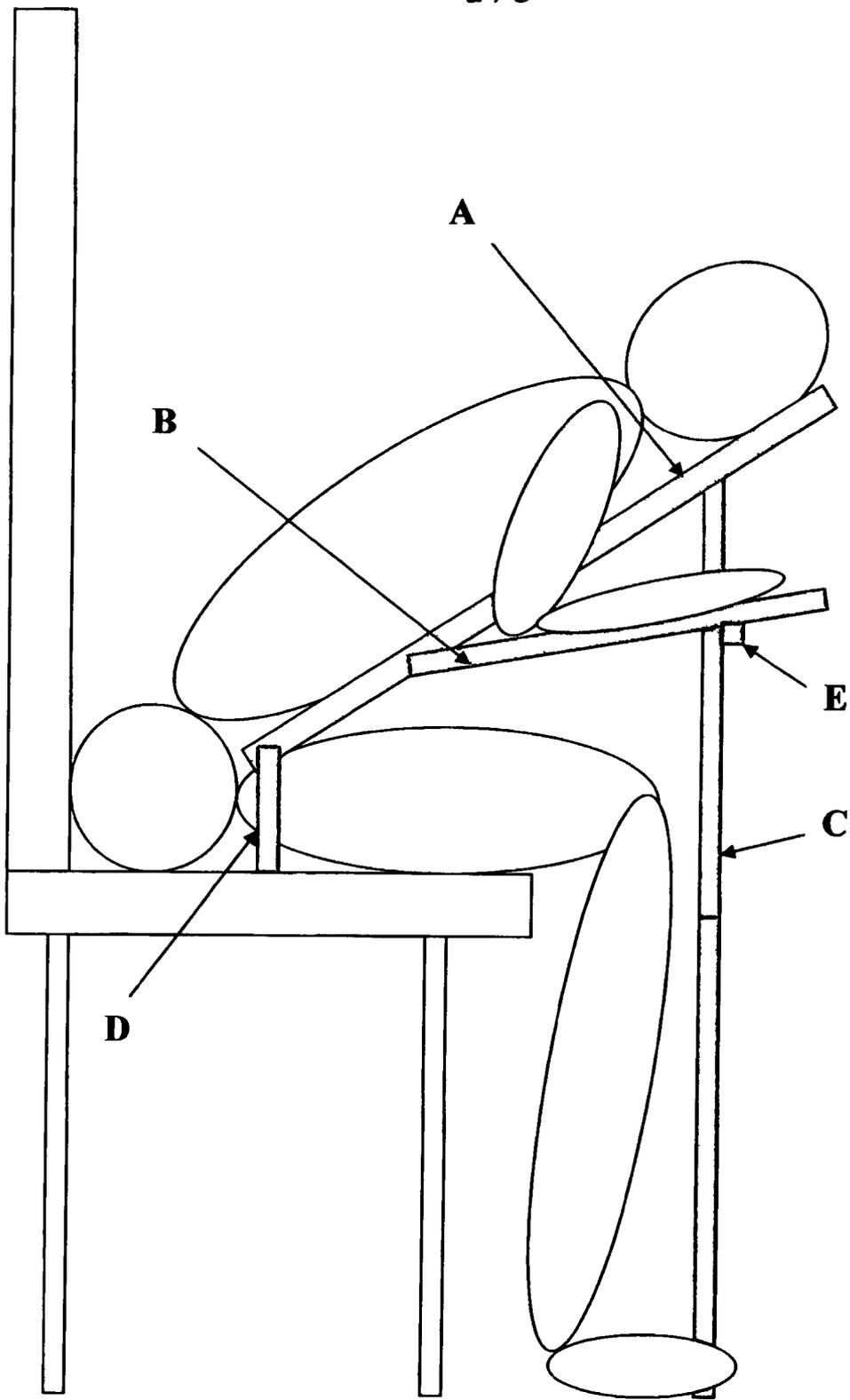


Figure 2

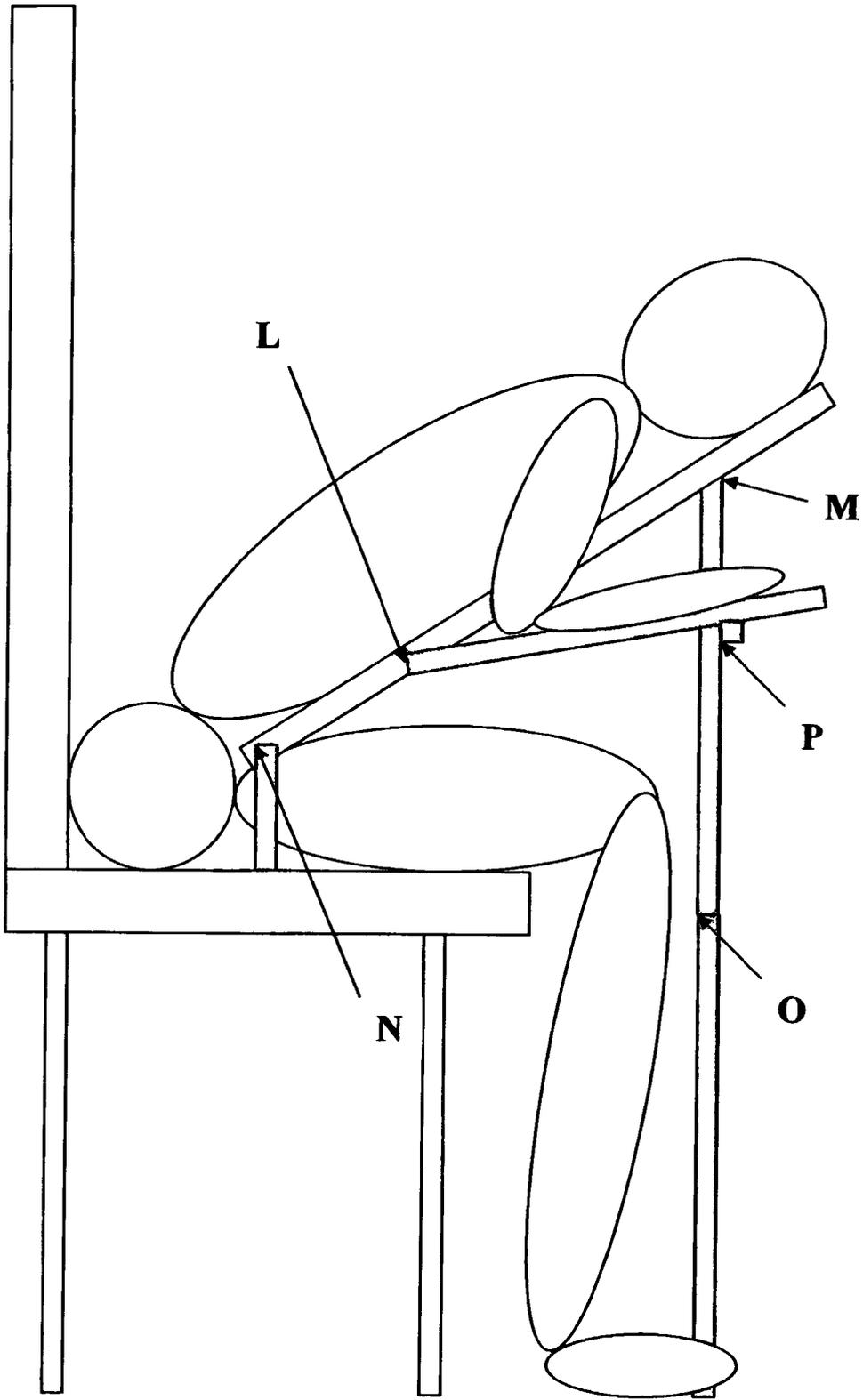


Figure 3

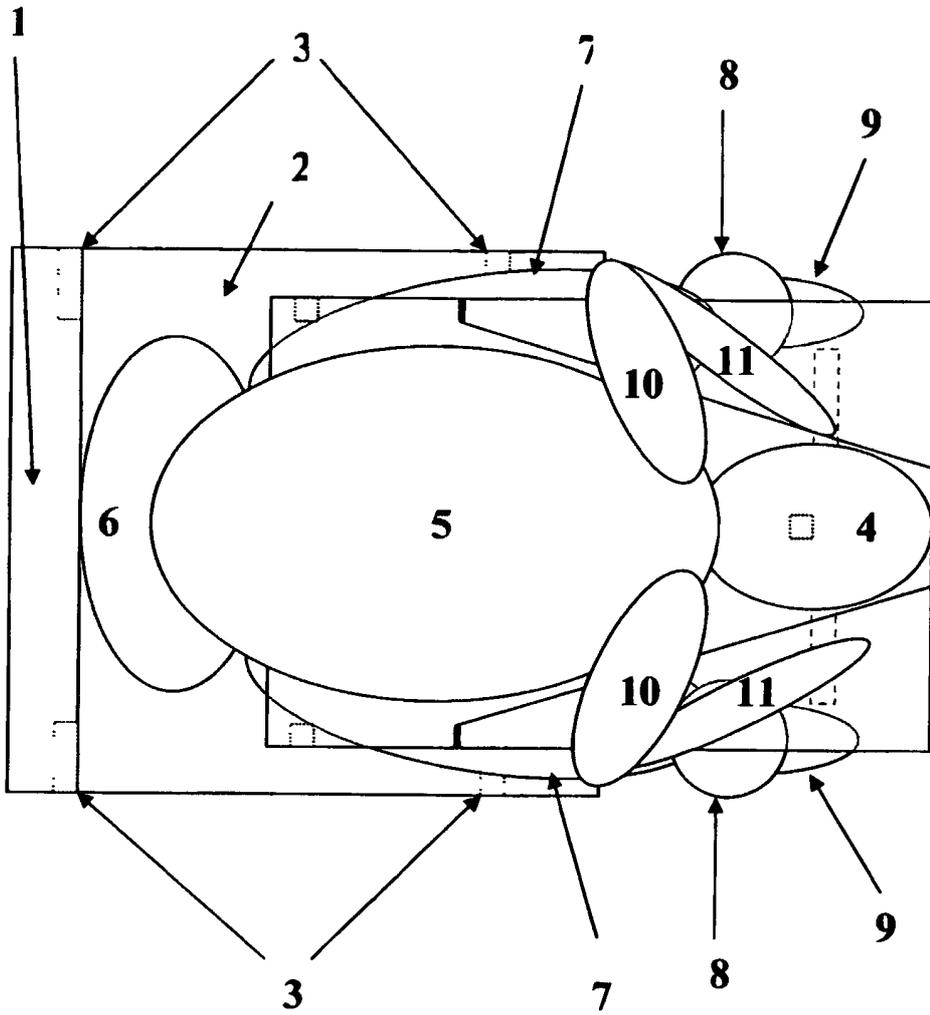


Figure 4

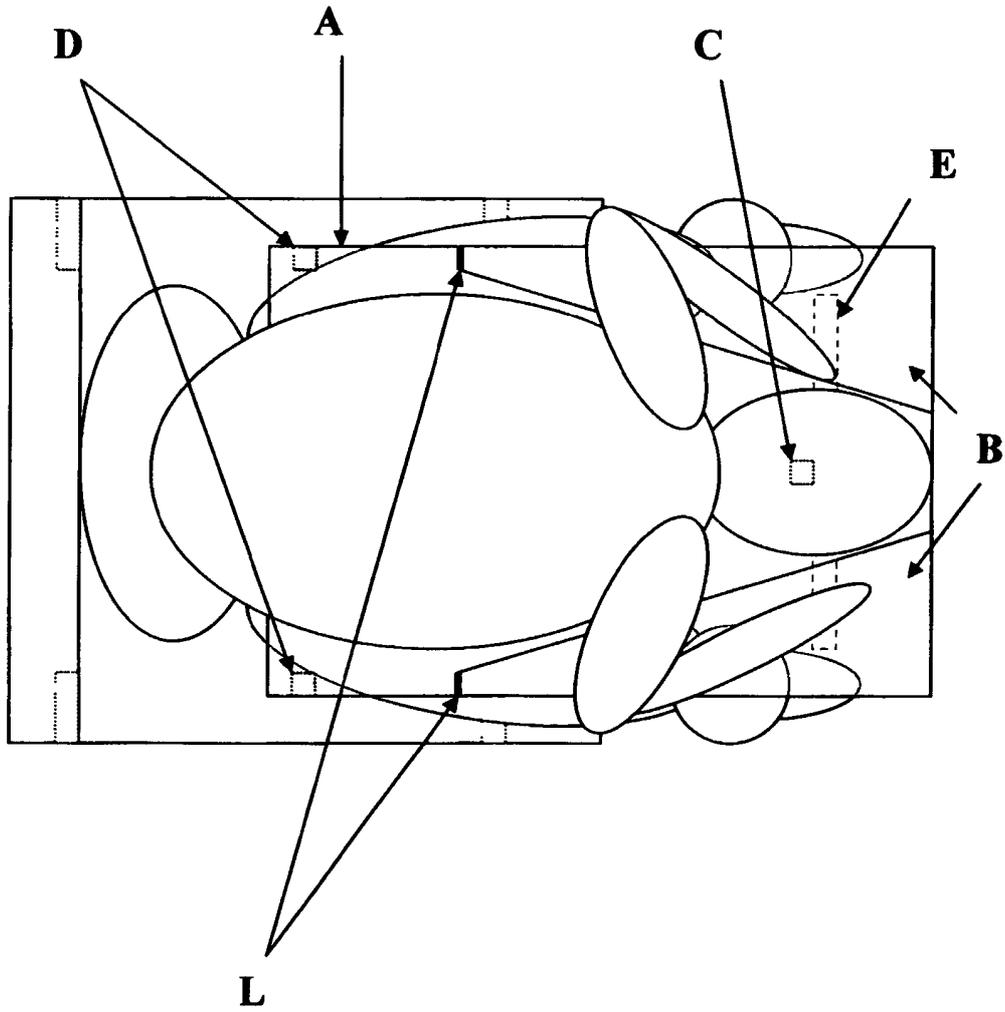


Figure 5

Traveller's Torso Rest Surface

1. The Invention

The invention relates to a device that will allow a passenger travelling, say, on an overnight journey, to sleep comfortably in a seated position by stably and directly supporting the weight of the upper torso (the largest and heaviest element of the body's parts). This state is achieved for the traveller by resting his/her upper torso forward onto an inclined, stably supported (i.e. primarily non-cantilevered) 'Torso Rest Surface', stretching from the waist to the head and, approximately, of shoulder width. The key element of the invention is that, by directly supporting the upper torso, it frees the following body elements: head, arms, lower torso, and thighs from bearing any transmitted weight from adjacent, or other body elements and leaves them to support only their own weight.

2. What the invention achieves

2.1. The Theory of Perfect Physical Rest (sleep)

In a seated position the ability of this device to directly support the upper torso area of the body, the largest and heaviest element of the body's parts, has a number of effects that simulate the ideal or optimum sleeping position; which is lying flat on a bed.

As illustration:

2.1.1. Resting (sleeping) on a bed

This is the universal solution to providing a sufficiently relaxed body position to allow for proper rest (sleep). The key distinction of the 'flat on a bed', ideal sleeping position is that:

X. Each body element in the horizontal resting position: head; arms; upper torso; lower torso (hips and buttocks); thighs; and lower leg, **supports only its own weight.**

Benefits ensuing are:

- a. Minimisation of stresses transmitted through joints and musculature.
- b. Minimisation of contact pressure between each body element and its supporting surface (the bed). Pressure is influenced by weight and the weight here is of the body element alone and is not materially influenced by the weight of adjacent body elements.

Compare this with the discomfort felt by sleeping in a non horizontal position (e.g. seated) where the key distinction of ideal sleeping (X. above) is missing.

2.1.2. Resting (sleeping) while seated (travelling)

The key distinction of non-horizontal sleeping is:

- Y.** Some body elements are required to support each other, wholly or partially.

Problems ensuing are:

- a. Additional weight stresses are transmitted through joints and musculature.
(e.g. muscles and spine transmit most of the weight of the head and arms to the upper torso and thence from the upper torso to the lower torso and thighs.)
- b. Additional contact pressure is created between some body elements and their supporting surfaces due to transmitted weight from adjacent body elements.
(e.g. the lower torso (hips and buttocks) and thighs carry the extra weight of the upper torso, head and arms which is translated into increased contact pressure between them and the supporting seat base.)

2.2. Unsatisfactory solutions

Various contortions can be adopted by the seated traveller to alleviate the stresses and strains:

- Leaning the head, upper torso, and arms against the seat back and head rests in various ways.
- Leaning the head, upper torso, and arms against the seat arms.
- Leaning the head, upper torso and arms on one's own thighs and knees.
- Leaning the head and/or shoulders and/or arms on the seat in front or some other support.

All of these methods involve weight transfer between body elements, caused by counterbalancing the elements of support e.g. upper torso to head; upper torso to arms; upper torso to lower torso, lower torso to seat, etc. This creates associated joint and musculature stresses. Consequently they do not satisfy the key distinction of the ideal sleeping position identified earlier (**X.** above): "Each body element...supports only its own weight".

None of these methods prevent the upper torso weight, the heaviest individual element of the human body, from bearing down on other body elements: head, arms, lower torso, and thighs and thereby increasing pressure on these body elements and transmitting support stresses through joints and musculature.

2.3. Summary of the 'Torso Rest Surface' solution

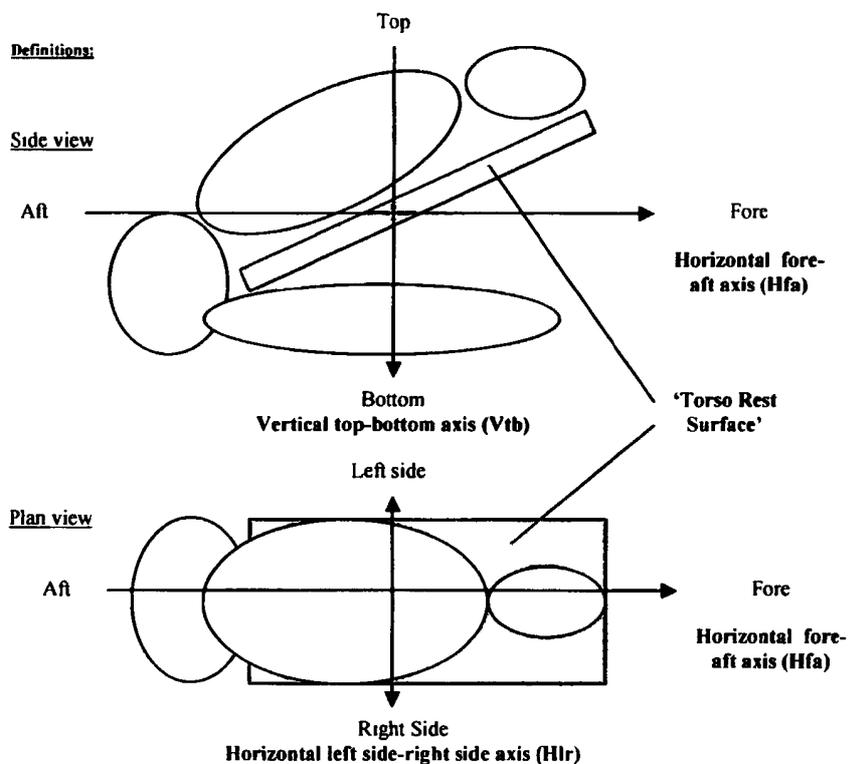
What it does:

The stably supported 'Torso Rest Surface', however, directly supports the weight of the upper torso, in a forward leaning, near horizontal resting

position, as lying flat in a bed in the ideal sleeping position would do, and thereby eliminates any transmitted joint and musculature stress between the upper torso and the head, the upper torso and the arms, and the upper torso and the lower torso, and also eliminates the upper torso weight supported by these body elements, and therefore the pressure borne, by the head, arms, lower torso (hips and buttocks), and thighs.

Why does this work (the theory of forces involved):

This can be appreciated by considering the ergonomics of a seated person with their upper torso, head and arms inclined forward towards their legs. The lines of force created by the weight of the upper torso, head and arms are:



1. straight down (along Vtb axis), the largest force by far
2. straight ahead (along Hfa axis), a much smaller and less significant force, and
3. from side to side (along Hlr axis), again a small force, made even more negligible by the natural balancing effect between the left side forces and right side forces.

For the 'Torso Rest Surface' to be effective all of these forces require support, but force 1 because it is the principal and most critical force, requires the strength of at least two separate, lightweight, non-cantilevered supports. This combination creates the necessary stability for the 'Torso Rest Surface' ensuring that no counterbalancing is required by the seated person.

How are the forces harnessed?

This is achieved by having at least two separate supports, one to the fore and one to the aft of the 'Torso rest Surface', principally supporting force 1, but incidentally supporting force 2.

Support for the side to side component of force, force 3, is also required but, being a small force, may not require a combination of supports as for forces 1 & 2, above. Hence one or both of the principal supports, outlined above, cantilevered along the left-right axis may suffice (e.g. the support, if a leg, could have an inverted T base running left to right).

Alternatively, if more than two supports are used the additional supports would be added to provide non-cantilevered support along the Hlr axis and, thereby, eliminate all cantilevered support. All three forces would therefore be accommodated by non-cantilevered supports providing for maximum lightweight strength and portability of the device.

3. How does the stably supported 'Torso Rest Surface' achieve the 'direct' support of the upper torso, head and arms of a user in a seated position?

The 'Torso Rest Surface' directly supports the weight of the upper torso, head and arms of a seated user because:

- it is stably supported which is to say it will stand (or be suspended) on its own supports and does not require the users body to counterbalance it.
- it is not cantilevered in the fore and aft plane (i.e. not cantilevered along the Hfa axis) i.e. at least one support is to the fore of the 'Torso Rest Surface' and at least one support is to the aft of the 'Torso Rest Surface'.
- the aft-most support(s) allow it to fit under the upper torso (from waist to head), achieved by utilising, for example, the occupied seat. This/these extreme aft-most support(s) ensure the centre of gravity of the upper torso, head and arms, projected downwards, is within the span(s) of the supports.
- the coefficient of static friction, between the torso and the surface, negates any down-slope pressure due to the small incline of the surface.

In short the 'Torso Rest Surface', by directly supporting the upper torso, allows the head, arms, lower torso and thighs to support only their own weight. A scenario which comes close to satisfying the key distinction of the ideal sleeping position identified earlier (X. above): "Each body element...supports only its own weight".

A defining feature of the 'Torso Rest Surface' is that for someone in a seated position, the direct support of the upper torso in a resting position by the 'Torso Rest Surface' largely eliminates weight transfer stresses between body elements thereby allowing each body element to support only its own weight.

4. How does the 'Torso Rest Surface' achieve lightweight portability?

The utility value of the traveller's 'Torso Rest Surface' is derived not just from its ability to deliver a strain free resting position but also from its lightweight portability.

This is achieved by using the two or more separate supports, as outlined elsewhere, resulting in minimal or zero cantilevering support for the main forces acting on the 'Torso Rest Surface'. The result is, therefore, simpler, lighter supports.

Further, the 'Torso Rest Surface' is designed to carry only the weight of the upper torso, head and arms, not the weight of the whole body. It is designed to be used by a normally seated person, which means a person whose lower body weight (lower torso (hips and buttocks) and legs) is supported by a seat. Thus the 'Torso Rest Surface' supports have to carry approximately between 60lbs and 130lbs rather than the full body weight of approximately between 110lbs and 220lbs that, say, the supports of a bed, chair or bench would be designed to carry.

Both these considerations permit the lightweight construction of the 'Torso Rest Surface' and its supports and, thereby, provide for the essential and unique convenience and practicality of the device.

5. Technical features of the invention

Summary: The device comprises a 'Torso Rest Surface' that is **stably supported** and made of **material** and **designed** as outlined below:

5.1. Supports:

The 'Torso Rest Surface' is **stably supported** by means of **two or more separate supports** which may be:

- a) Legs connecting the 'Torso Rest Surface' to the floor, or legs connecting the 'Torso Rest Surface' to the occupied seat, or a combination of both these (a free-standing 'Torso Rest Surface'). These legs may be capable of being folded and stowed in or against the body of the 'Torso Rest Surface' or being detachable and stowed in or against the body of the 'Torso Rest Surface'. The legs may be adjustable for length to set the height of the torso rest surface.
- b) Linkages between the 'Torso Rest Surface' and the occupied seat, or the roof, or the seat in front, or a combination of such linkages (a suspended 'Torso Rest Surface'). The linkages may be fixed or detachable and if detachable they may be stowed in or against the body of the 'Torso Rest Surface'.

For example, a fixed linkage might be a hinge to the seat in front allowing the 'Torso Rest Surface' to fold against it when not in use or a detachable link could be a hook to the seat in front or a hook and wire to the roof.

The linkages may be adjustable to set the height of the torso rest surface.

- c) A combination of leg(s) and linkage(s) as described in a) and b) respectively.

Stability and strength

The stability and strength required for the device to be effective in directly supporting the upper torso is achieved, as outlined above, by utilising two or more supports.

Primarily the supports should be arranged to ensure the 'Torso Rest Surface' is not cantilevered in the fore and aft plane, i.e. not cantilevered 'along' the Hfa axis (at least one support to the fore and one support to the aft of the 'Torso Rest Surface').

Secondarily, in the 3 or more support versions, the supports should be arranged to ensure the 'Torso Rest Surface' is not cantilevered in the side to side plane, along the Hlr axis (see drawings for example of a 3 support system).

In the 2 supports version the stability and strength is little compromised by providing for the very small side to side forces (along the Hlr axis) using a cantilevered footing on one of the primary supports.

Position of the 'Torso Rest Surface' in relation to the user

The supports must position the 'Torso Rest Surface' under the upper torso, head and arms of a user while he is sitting normally and getting maximum support for his lower torso (hips and buttocks) and legs from the seat.

Crucial to this positioning are the function of the aft support(s) which should be low enough to get the 'Torso Rest Surface' under the waist and close to the hips.

In this position the centre of gravity of the upper torso, head and arms, projected down through the 'Torso Rest Surface' is within the span or spans of the supports, providing for stability and total support.

Summary of support characteristics

Because of the ergonomics concerning a seated person leaning forward nearly all of the forces generated by the upper torso, head and arms are predominantly in a downward and forward direction, along the Vtb axis and the Hfa axis, hence the requirement for separate supports fore and aft for the 'Torso Rest Surface'. Meanwhile, the side to side forces, along the Hlr axis, generates much smaller forces, forces capable of being stabilised by lightweight, cantilevered means. Hence, in the two support embodiment, this would be the method used to provide lateral (side to side) stability. For example, if the two supports were legs then one or both might have an inverted "T" shaped foot or if the forward support was a hinge to the seat in front then that hinge might extend for the whole length of the leading edge of the 'Torso Rest Surface', thereby, providing lateral stability with this support.

In summary, the characteristics of the 2 or more support arrangements are:

Supports	Torso Rest Surface		
	Non-cantilevered in fore & aft plane (high stability for high forces)	Non-cantilevered in side to side plane (high stability for low forces)	Cantilevered in side to side plane (sufficient stability for low forces involved)
2 supports	✓		✓
3 supports	✓	✓	
4 or more	✓	✓	

In no case is the seated person required to counterbalance the device.

Additional factors concerning support characteristics

Strong, lightweight, low cost engineering – see section 4

5.2. Materials:

The **material** of the ‘Torso Rest Surface’ may be:

- a) Man-made or natural.
- b) Rigid, pliant or deformable.

For example, it could be constructed using lightweight metal, or injection moulded plastic, or canvas within a metal or plastic frame, or using an inflatable membrane, or a combination of these. The ‘Torso Rest Surface’ may be adorned with padding or cushions to facilitate comfort or, in a simpler form, left bare to allow the users to provide their own form of cushions.

5.3. Design:

The **design** of the ‘Torso Rest Surface’, in use, may be:

- a) One piece and flat, in its simplest form.
- b) One piece and contoured, to allow for the sympathetic, ergonomic positioning of the upper torso, head and arms in relation to one another.
- c) One piece and sectional. Like the flat or contoured design but comprising more than one section so that the tilting or suspended sections of the surface allow for the sympathetic, ergonomic positioning of the upper torso, head and arms in relation to one another (see drawings for an example of this).

To facilitate portability of the 'Torso Rest Surface' the 'in use' design specified above may be capable of being broken down into smaller connected or separate sections. For example, it may be designed to fold in half when not in use.

6. Objectives of invention

An object of this invention is to provide the traveller with a stably supported 'Torso Rest Surface' that substantially supports the weight of his/her upper torso and thereby eliminates or significantly reduces weight transfer from the upper torso to other body elements: head, arms, lower torso and thighs.

Another object of this invention is to provide the traveller with a lightweight, portable, supported 'Torso Rest Surface' for his/her upper torso, for use with any kind of seat.

Another object is to allow the lightweight, compact nature of the device to be exploited by incorporating the device into other useful artefacts of the traveller e.g. the side of a suitcase could be detached to form the 'Torso Rest Surface' or the moulded spine of a back-pack could be utilised as the 'Torso Rest Surface'.

A further objective is to exploit the incorporation of the 'Torso Rest Surface' into the design of passenger seating so that the 'Torso Rest Surface' folds/swings out of the occupied seat or the seat in front. In this embodiment of the invention the inclined 'Torso Rest Surface' would also play a positive role in passenger safety as a body restraint and support in the event of an accident.

7. Introduction to drawings

One manifestation of such a 'Traveller's Torso Rest Surface' design, in this case with three legs supporting, is shown in **FIGURES 1, 2, 3, 4, and 5**. This manifestation represents a free-standing, sectional, flat surface design, the main section of which supports the upper torso and two, subsidiary, side sections of which, towards the front, fold down to allow the arms to be positioned below the torso for comfort. There are two short folding legs at the rear (which may be adjustable for length) and one telescopic leg at the front.

The **FIGURES 1, 2 and 3** show the side view of a seat occupied by a passenger using this manifestation of the Traveller's Torso Rest Surface. **Figures 4 and 5** show a plan view, from above, of the same scenario.

FIGURES 1 and 4 - in the interests of clarity and to avoid confusion with the elements of the invention, **FIGURES 1 and 4** (plan view of 1) highlights the elements of the seat and the passenger only:

1 – Seat back.

2 – Seat base.

- 3 – Seat legs.
- 4 – Passenger's head.
- 5 – Passenger's upper torso.
- 6 – Passenger's lower torso (hips, pelvis).
- 7 – Passenger's thighs.
- 8 – Passenger's calves.
- 9 – Passenger's feet.
- 10 – Passenger's upper arm.
- 11 – Passenger's lower arm.

FIGURE 2 - highlights the structural elements of this manifestation of the invention:

- A – The torso rest surface.
- B – The fold down sections (one on each side) of the torso rest surface which positions the arms under the torso for comfort.
- C – The front leg (central) supporting the torso rest surface and by means of E (the cross piece for locating the arm positioners) locating the fold down sections B (the fold down arm positioners). This leg folds out of the body A (the torso rest surface) and is telescopic to reach the floor.
- D – The rear legs (one on each side) supporting the torso rest surface. These legs fold out of the body A (the torso rest surface) and rest on the seat base.
- E – a cross piece, attached to C (the front leg), that swivels from the vertical plane of C to the horizontal plane (forming a cross with C) thereby locating the fold down sections B (the fold down arm positioners) when in use.

FIGURE 3 - highlights the connections between the structural elements of this manifestation of the invention:

- L – A hinge allowing sections B (the fold down arm positioners) to fold flat against A (the torso rest surface).
- M – A hinge allowing C (the front leg) to fold flat against A (the torso rest surface).
- N – A hinge allowing D (the rear legs) to fold flat against A (the torso rest surface).
- O – A telescopic joint allowing C (the front leg) to adjust to the best height for supporting A (the torso rest surface) at the optimum incline. The telescopic joint also allows C (the front leg) to shorten sufficiently to allow it to fold flat against A (the torso rest surface).
- P – A swivel joint to allow E (the cross piece for locating the arm positioners) to rotate from the vertical to the horizontal when in use.

FIGURE 5, plan view – highlights, from the plan view perspective, some of the structural elements and connections of this manifestation of the invention:

A – The torso rest surface.

B – The fold down sections (one on each side) of the torso rest surface which positions the arms under the torso for comfort.

C – The front leg (central) supporting the torso rest surface and by means of E (the cross piece for locating the arm positioners) locating the fold down sections B (the fold down arm positioners). This leg folds out of the body A (the torso rest surface) and is telescopic to reach the floor.

D – The rear legs (one on each side) supporting the torso rest surface. These legs fold out of the body A (the torso rest surface) and rest on the seat base.

E – a cross piece, attached to C (the front leg), that swivels from the vertical plane of C to the horizontal plane (forming a cross with C) thereby locating the fold down sections B (the fold down arm positioners) when in use.

L – Hinges allowing sections B (the fold down arm positioners) to fold flat against A (the torso rest surface).

In this manifestation of the invention the Traveller's Torso Rest Surface takes the form of an inverted, shallow tray approximately 40-45 cm wide, 50-60 cm long and 2-3 cm deep. The top of the inverted 'tray' is the 'Torso Rest Surface'. Inside the inverted tray are the fold down elements of the two rear legs (D) and the front, telescopic leg (C) with crosspiece (E). Two integral sections of the 'tray', one on each side, are hinged and can fold down, at an angle to the main body of the 'tray' to form arm rests below the level of the upper torso.

In its folded form the tray-like Traveller's Torso Rest Surface could be attached to the side of a suitcase or large briefcase for ease of carriage or be an integral part of a bespoke piece of luggage.

When in use the legs are folded out and support the entire 'Torso Rest Surface'. The two rear legs rest on your seat on each side of your pelvis and the front leg rests on the floor.

8. Additional information

The above manifestation of the invention, along the lines of Claims 6 & 8, was chosen as the drawing because the straight line, sectional nature of the manifestation lent itself to clarity of illustration.

For information and to aid visualisation of the design possibilities of the invention an attempt will follow to describe another manifestation. This manifestation would incorporate a moulded, one piece 'Torso Rest Surface', along the lines of Claim 7. In a relatively simple moulded form this would be like an inverted, triangular, shallow basin (with blunt corners). The base of the triangle would span the hips to allow the short rear, adjustable legs to deploy (or perhaps a single central rear, adjustable leg with a lateral inverted 'T' foot to provide the secondary, and minimal, lateral stability in cantilevered form), and the point of the triangle would be towards the head and incorporate the forward extendable leg. The upper torso would be supported by the central body of the inverted basin (perhaps further moulded to fit the chest area better) and the ancillary arm positioner would be along the inverted lip of the basin (enlarged to arm like diameter).

Claims

1. A portable traveller's rest, the 'Torso Rest Surface', specially designed to support substantially all of the weight of the upper torso, the head and the arms of a normally seated person in a forward leaning, near-horizontal position comprising:
 - a support surface offering separate regions for the direct support for the upper torso, the head and the arms of a seated person, the surface being either flat, contoured or having a number of surfaces hinged together, and
 - two or more supports separately connected to the support surface to stably support the rest above the ground such that it does not require counterbalancing from the seated person,
 - wherein, in use, the two or more separate supports are arranged to maintain the supporting surface at an angle inclined to the horizontal with the edge of the support surface furthest from the seated person being higher than the edge of the support surface closest to the seated person.
 - wherein, in use, the position of the aft-most support(s) allow the 'Torso Rest Surface' to locate under the forward inclined upper torso, head and arms of a normally seated user such that the centre of gravity of the upper torso, head and arms, projected downwards, is within the span(s) of all the supports.
2. A device as claimed in Claim 1 where the 'Torso Rest Surface' is free standing and the stable supports are legs between the 'Torso Rest Surface' and the floor or the 'Torso Rest Surface' and the occupied seat or a combination of both.
3. A device as claimed in Claim 1 where the 'Torso Rest Surface' is suspended and the stable supports are linkages between the 'Torso Rest Surface' and the occupied seat, or the 'Torso Rest Surface' and the roof, or the 'Torso Rest Surface' and the seat in front, or any combination of these.
4. A device as claimed in Claim 2 and Claim 3 where the 'Torso Rest Surface' is stably supported by any combination of leg(s) (Claim 2) and linkage(s) (Claim 3).
5. A device as claimed in Claims 2-4 where the leg(s) and/or linkage(s) may be adjustable for length to allow the height of the 'Torso Rest Surface' to be adjusted.
6. A device as claimed in preceding claims where the 'Torso Rest Surface' is flat and provides upper torso support and ancillary support for head and arms on the same surface plane.
7. A device as claimed in claims 1, 2, 3, 4 and 5 where the 'Torso Rest Surface' is contoured to provide ergonomically appropriate shapes and planes primarily for upper torso support but also for the attendant ergonomic positioning of head and arms.

8. A device as claimed in previous claims where the 'Torso Rest Surface' is comprised of different sections, the main section being for upper torso support and the ancillary, fold out sections for ergonomic positioning of head and/or arms.
9. A device as claimed in preceding claims where the 'Torso Rest Surface' is adorned with padding or cushions to facilitate comfort.



Application No: GB0615985.9

Examiner: Barnaby Wright

Claims searched: 1-9

Date of search: 18 October 2006

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 relevance
X,Y	X: 1, 2, 4, 5, 6; Y: 7, 9	EP 0067211 A1 (SIMPSON) See whole document, especially Figures 1-7.
X,Y	X: 1, 2, 5, 6; Y: 7, 9	GB 0278104 A (CROW) See whole document, especially Figure 3, noting struts (8), telescopic supporting legs (e), and supporting surface (a).
X,Y	X: 1, 2, 6; Y: 7, 9	GB 1501397 A (TOWNSHEND) See whole document, especially Figures 1 & 2.
X,Y	X: 1, 2, 5, 6; Y: 7, 9	US 3247811 A (BAUDER) See whole document, especially Figures 1, 4 & 5.
X,Y	X: 1-6; Y: 7, 9	GB 0724315 A (MORISON) See whole document, noting bent support tubes (1) and leg(s) (6).
X,Y	X: 1-6; Y: 7, 9	US 1403317 A (GROSS) See whole document, especially Figure 1, noting adjustable leg (14) and linkage support (4).
X,Y	X: 1, 3, 5, 6; Y: 7, 9	US 3050355 A (HESS ET AL.) See whole document, especially Figures 1-3.
X,Y	X: 1-6; Y: 7, 9	US 2601177 A (SMULLEN) See whole document, especially Figures 1 & 2, noting supporting elements (44, 46) and foot supports (62, 64).
Y	7	US 3828377 A (FARY) See whole document.
Y	9	US 2003/0172462 A1 (HOGGATT ET AL.) See whole document, especially Figures 1-3, noting use of padding/cushions.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
---	---	---	---



For Innovation

15

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^X:

A4L

Worldwide search of patent documents classified in the following areas of the IPC

A47B; A47C; B60N

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

EPODOC, WPI