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(54) Title: A DESK FOR USE IN A VEHICLE

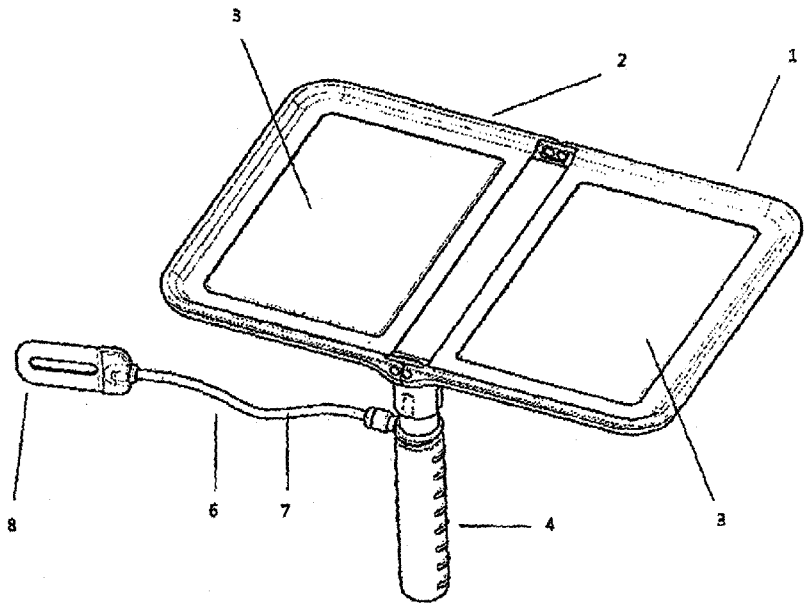

Fig 1a

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(57) Abstract: A desk for use in a vehicle, comprising: a substantially planar work surface and a support leg. The support leg is arranged substantially perpendicular to the work surface and is located adjacent to a side edge of the work surface. The support leg is pivotally connected to the work surface, such that the leg rotates on a first plane between a first position substantially perpendicular to the work surface and a second position substantially parallel to the work surface.

A DESK FOR USE IN A VEHICLE

TECHNICAL FIELD

This invention relates to a desk which is configured for use in a vehicle. The desk is configured to be removable from the vehicle, conveniently stored within the vehicle and able to be engaged with elements of the vehicle when desired in order to provide a work station or surface within the vehicle.

BACKGROUND TO THE INVENTION

Many people perform work tasks whilst travelling between various locations during a working day or week. These include for example sales people, contractors, builders, surveyors, truck drivers and delivery service people.

These people often undertake a significant amount of work in, or around their vehicle, especially in adverse weather conditions or when the vehicle may provide a more comfortable seating alternative.

When working in a vehicle, a workers comfort and ability to perform tasks can be greatly enhanced by the presence of a flat stable surface, preferably positioned next to the driver's seat. This may allow the worker to use a laptop computer, write notes, read maps or other business related documents or provide a tray for food and beverages.

To provide such a working surface, a wide number of desks for use in vehicles have previously been developed. These however, all have significant disadvantages.

One major disadvantage of currently available vehicle desks is that they are often heavy and awkward to install and position within the vehicle.

Another substantial disadvantage of currently available vehicle desks is the conventional arrangement where a desk is positioned over and supported by the passenger seat of the vehicle. This results in the desk occupying significant room in the vehicle and disabling the passenger seat from accommodating a passenger.

An example of such a desk is United States patent no. 4,909,159 (US '159) which discloses a support table for a laptop computer which is positioned on the front seat of a vehicle. The support table has a horizontal support surface which is supported by a frame, with a pair of rear legs which rest on the passenger seat of the vehicle and a pair of front legs which are adjustable and extend downward to rest on the foot well of the vehicle. Whilst the support table disclosed in US '159 does provide a flat surface to work on, the table is excessively bulky and when deployed in the vehicle, occupies the entire passenger seat. Furthermore, given its size, the support table is also likely to be difficult to install or remove from the vehicle, or manoeuvre within the vehicle. This is not desirable, as in many cases a vehicle will be used for both work and family, requiring the vehicle desk to be removed from the vehicle frequently.

Another example of a previous solution is provided in United States patent no. 5,973,917 which discloses a portable work station for use in motor vehicles. The workstation comprises a large, box-like cabinet, which also occupies the entire passenger seat when positioned in the vehicle. The workstation provides a computer tray which can be used to work from and an enclosed volume which can be used store a laptop computer or other business or work materials. The workstation also includes a pair of buckles or securing means which can be used to secure the unit to the front seat of the vehicle. Alternatively, the computer tray may be attached to an articulated cantilever system which projects out when the lid of the container is opened. The workstation disclosed has a similar disadvantage to that previously discussed, wherein when in use, it prevents the

passenger seat from accommodating a passenger. Also, the workstation is of a substantial size, making it heavy and difficult to manoeuvre.

There are a wide range of similar vehicle desks, all of which are positioned on and supported by the passenger seat of the vehicle. Further examples of these are: United States patent no. 5560676, United States patent application no. 20060091169, United States patent application no. 20080083351 and United States patent no. 5505139.

Each of the desks or work stations disclosed in these patents and patent applications are inconveniently dimensioned and when installed into a vehicle, occupy the entire passenger seat of the vehicle.

Given the large size of each of the prior art desks and work stations, they are also likely to be excessively heavy, also proving difficult to manoeuvre in and out of the vehicle.

Furthermore, many of the currently available solutions do not extend substantially towards the driver's seat. This can make working on the work surface uncomfortable and cause back or neck problems if the driver has to rotate their body towards the passenger seat for considerable periods of time.

A further problem associated with working or travelling in a vehicle for an extended period of time relate to eating in a vehicle. In these instances the absence of a table or tray can allow food and drink to collect on the driver's clothes or within the upholstery of the vehicle's interior; both of which proving unhygienic and unpleasant.

It would be beneficial to provide a desk for use in a vehicle which overcame the problems associated with the above products. In particular, it would be of advantage to have an improved desk available for use in a vehicle which could be collapsed or otherwise have its volume decreased to assist storage

of the desk in the vehicle when not in use. It would also be of advantage to have a desk which could be readily converted to support and retain work materials, food or any other items as required within a vehicle.

SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a desk for use in a vehicle, the desk comprising a substantially planar work surface and a support leg, the leg being arranged substantially perpendicular to the work surface and wherein the support leg is pivotally connected to the work surface, such that the leg rotates on a first plane between being perpendicular and parallel to the work surface and wherein the pivot between the support leg and the work surface is arranged on a line of symmetry of the work surface and adjacent to an edge of the work surface.

According to another aspect of the invention, the work surface comprises at least two work sections, each being pivotally connected to a spine, such that each work section is rotatable towards one another. Preferably in this embodiment, the support leg is also pivotally connected to the spine. Furthermore, it is preferable that the work sections rotate on a second plane that is substantially perpendicular to the first plane. Optionally, the pivot is also rotatable on a third plane perpendicular to the first plane and preferably the third plane is perpendicular to the first plane and second plane.

In another embodiment, the support leg is connected to a retention means, the retention means comprising a deformable element and a buckle, the buckle being adapted to connect to a seat-belt holster, wherein the deformable element is connected at a first end to the support leg and connected at a second end to the buckle.

According to another aspect, the desk also includes at least one locking means, configured to lock the rotational position of the work sections in relation to one another. Preferably the locking means comprises at least one tab housed in a first complimentary groove in a first work section and a second complimentary groove being arranged in alignment in an opposing, second work section, such that when the opposing work sections are rotated to form a substantially continuous planar work surface, the tab is slid along the first groove to also be housed within the second groove, preventing the work sections from rotating.

In another embodiment, an opposing surface to the work surface comprises a padded region.

According to the preferred embodiment, the support leg is adjustable in length. Preferably such a support leg is telescopic, comprising at least two cylindrical, hollow sections configured to slide within one another. In this embodiment, the desk also includes a locking mechanism to prevent the sections of the support leg from sliding within one another.

According to an alternative embodiment, the desk includes at least one support stand, each stand being pivotally connected to the work surface such that the stand can rotate between being substantially parallel to the work surface and substantially perpendicular. In this embodiment, it is preferable that each support stand is arranged on an opposing surface to the work surface. Alternatively, where the work surface is rectangular or square, each support stand is arranged adjacent to a corner of the work surface. Furthermore, it is preferable that each support stand is adjustable in length.

In another preferred embodiment, the desk has an adjustable strap connected at opposing sides of the work surface and adapted to extend across the work surface. Preferably the strap comprises two releasably connectable sections, which preferably are formed by a Velcro region.

Ina preferred embodiment, at least a region of the work surface has a high friction co-efficient, preferably this region including a rubber compound element or other similar elastomeric layer.

In this specification, unless the context clearly indicates otherwise, the term "comprising" has the non-exclusive meaning of the word, in the sense of "including at least" rather than the exclusive meaning in the sense of "consisting only of". The same applies with corresponding grammatical changes to other forms of the word such as "comprise", "comprises" and so on.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1a is a perspective view of a preferred embodiment of the invention, configured for use;

Figure 1b is a perspective view of the underside of the embodiment shown in figure 1a, having the support leg folded to be parallel with the work surface;

Figure 1c is a perspective view of the embodiment shown in the previous figures with both work section folded to be substantially parallel with each other.

Figure 2a is a perspective view of the cabin of a vehicle with the invention attached and deployed;

Figure 2b is a perspective view of the cabin shown in Figure 2a with the invention in a stowed arrangement;

Figure 3a is a perspective view of an alternative preferred embodiment of the invention;

Figure 3b is a top view of the embodiment shown in the previous figure;

Figure 3c is an exploded view of the embodiment shown in the previous two figures;

Figure 4 is a rear detail view of the embodiment shown in the previous three figures;

Figure 5 is a rear view of the embodiment shown in Figures 3-4;

Figures 6a – 6b are perspective views of the embodiment shown in in Figures 3 - 5;

Figure 7 is a perspective view of an alternative embodiment of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention is adapted to provide a desk for use in a vehicle, which includes a cabin with at least two seats and preferably a central console separating the two seats. Reference in general throughout the specification will be made to the present invention being used in relation to cars, although those skilled in the art should appreciate that the present invention may also be used with any vehicle which incorporates at least one seat and a central console or similar component within the vehicle.

The adaptable and compact nature of the present invention, in combination with its numerous stabilisation and comfort increasing features, offers a number of significant advantages over previous vehicle desk solutions. For example, the present invention is substantially lighter and easier to manipulate within a vehicle cabin. The invention is also foldable and able to be made more compact than previous solutions to be conveniently stored.

The invention may also be adjusted to suit a wide range of user and environmental requirements, including supporting the desk against and attaching to various components of a vehicle's interior.

In a preferred embodiment, the desk comprises a work surface and at least one engagement projection, or support leg, arranged to be substantially perpendicular to the work surface and locate the desk relative to the vehicle when the desk is in its in-use configuration, where the leg can be wedged between a seat of the vehicle and a vehicle central console to locate the desk relative to the vehicle. Wedging the projection between a seat and the central console provides an effective frictional engagement of the desk to the vehicle and thereby acts to hold or locate the desk in place when it is to be used.

In such an embodiment, the support leg also preferably has a deformable sheath surrounding and affixed to the leg in order to avoid causing damage to the interior of the vehicle when wedged between a seat and the central console. Optionally a range of removable deformable sheaths may be provided having a range of thicknesses to allow a user to adjust the padding around the support leg according to the distance between the seat and the central console in the vehicle. Preferably such a sheath is made from a foam material or rubber compound.

In one embodiment, an engagement projection may be formed by a tapering leg, with the width of this leg being at its greatest adjacent to the work surface of the desk. Tapering of a support leg allows the desk to be used with a wide range and number of vehicles having various configurations of central consoles and seats. Such a leg may be pushed downwards into a gap between a seat and central console until it firmly holds the desk in place.

In a preferred embodiment the desk has a single support leg only, however those skilled in the art will appreciate that providing a plurality of support

legs is within the scope of the invention. In such embodiments the single leg is located substantially along a central line of symmetry of the work surface and adjacent to an edge of the work surface. By providing a single support leg in such an arrangement, this allows the desk to be pivoted or turned about the axis of the leg, allowing the desk to overlap or be moved away from a seat in the vehicle, whilst minimising the encroachment of the desk within the space below the desk, allowing this space to be used for other objects or users.

According to one preferred aspect of the invention, a work surface is provided by a single flat sheet of material, providing a simple and robust design that minimises the number of moving parts and components used. However in other embodiments the invention may be provided with a collapsible work surface, comprising at least two work sections rotatable on the same plane towards one another to collapse the surface and decrease its size for storage.

In some embodiments which include collapsible work surfaces, the desk may include a locking means for each pivot or connection of a work section to another work section. A locking means can be employed to lock the work sections in an arrangement parallel to and aligned with one another to form a substantially flat work surface. In a preferred embodiment a locking means may be formed by a sliding tab or bar located within a channel in the underside of the desk. This bar or tab may extend to span across two work sections to hold these work sections parallel to one another when the desk is in use. The extension of this tab or bar across the underside of two work sections thereby prevents these work sections being pivoted towards each other.

In a preferred embodiment the working surface may have a non-slip surface over substantially all, or a portion of, the surface. This allows notebooks, PDA's, maps etc to be gripped on the surface when the vehicle is in motion.

It should be appreciated that the desk of the present invention has been developed for use by the driver of a vehicle when the vehicle is stationary. Although the working surface can remain in the in use position during motion of the vehicle it should be appreciated that use at this time is not intended due to safety issues.

Figures 1a – 1c illustrates a desk (1) as provided in accordance with a preferred embodiment of the invention. Figures 1a, 1b and 1c show perspective, rear and side views of a desk respectively, in various stages of deployment. In Figure 1a the desk is illustrated in a deployed arrangement, ready to be used in a vehicle, in Figure 1b the desk is shown partially transformed between deployed and storage configurations, and Figure 2c shows the desk in its storage configuration.

As illustrated by the drawings, the desk provides a substantially flat work surface (2) formed from at least two pivotably connected work sections (3), able to rotate on a first plane towards each other. Each work section preferably has a lip extending upwards from the work surface, arranged around the perimeter of each section to retain spilt food or liquids. The desk (1) also includes a support leg (4) which is pivotably connected to the work sections (3) in a perpendicular plane to that which the work sections rotate on. As can be seen in Figure 1a, when deployed, the two work sections are rotated from the main body to form a substantially flat work surface (2) and the support leg (4) is pivoted on a perpendicular plane from the work sections to form a right angle to the work surface (2) when the desk is in its in-use configuration. Conversely, when the desk is in its storage configuration as shown in Figure 1c, both work surfaces are pivoted to lie to be substantially parallel and the support leg (4) is pivoted to also be substantially parallel to the collapsed work sections (3) of the desk.

In an alternative embodiment (not shown), the support leg (4) may be provided as a discrete part that is removable from the work sections (3). When the work sections are rotated in relation to each other and form a flat surface, the support leg is attached by engaging a boss or similar such

projection within a recess in each work section, to rotatably lock each section and provide structure to the desk. In such an embodiment, when the desk is stored, the support leg is disengaged from each work section and the work sections folded towards each other, providing two discrete and compact components.

In a further alternative embodiment (not shown), the support leg (4) may be permanently attached to a work section (3) in a substantially perpendicular orientation to the substantial, flat surface of the section. In such an embodiment, the work sections may also be rotated towards and away from each other to deploy and store the desk, wherein when rotated so that the work section forms a substantially flat surface, a side surface of each work section rests on an adjacent surface of the other section to provide the necessary structural support for the desk.

In any of these embodiments at least one of the work sections (3) may include a cup holder (not shown), being a recessed portion or an aperture having radially extending deformable flaps to retain a beverage bottle or cup within the aperture.

Also as shown with respect to Figures 1b and 1c a padded region (9) is provided to the underside of each work section (3). The padding improves the comfort of a user employing the desk disposed directly on their lap. This can also provide thermal insulation from hot articles such as food or laptop computers placed on the upper surface of the desk.

The desk (1) is preferably coated, or at least a region of the work surface (2) with a non-slip material such as an elastomer or rubber compound. The desk (1) also includes a pair of locking means (5) as shown in Figures 1b and 1c. In the embodiments shown, each of the locking means (5) is formed from a bar or tab which is located within a channel which runs across the undersides of both the work sections (3) shown. This tab or bar can be slid along the channel provided to fix the rotational position of each

work section in relation to the central body and support leg (4), shown in Figure 1b, locking the work sections in a deployed configuration.

Figures 1a - 1b also show a stabilization structure (6) which includes a ductile or resilient extension bar (7), preferably being a length of copper wire enclosed in a plastic sleeve, and an engagement buckle (8) adapted for insertion into the locking holster of a conventional vehicle seat belt retention mechanism. The buckle (8) can be engaged with the holster of a seat belt and in combination with the extension bar (7), stabilize the table against vibrations or accidental collisions when the desk is in use.

As can be seen from Figure 1c the resilient extension bar (7) can be adapted to lie substantially parallel to an adjacent work section when the desk is arranged in the storage configuration shown. In this configuration the engagement buckle (8) and the majority of the extension bar (7) may be disposed or located within a pocket formed within the padded region (9) disposed on the underside of the work section (3).

Figure 2a illustrates a desk (1) in accordance with the previous figures, shown in a deployed state in a vehicle providing a substantially flat work surface (2), whereas Figure 2b shows the same desk in a stored configuration.

In Figure 2a the support leg (4), is pivoted to be substantially perpendicular to the work surface (2) and wedged between the passenger seat and the central console of the vehicle to positively and firmly engage the desk in place. Furthermore, the cylindrical form of the support leg (4) allows the entire work surface to be rotated towards the occupant of the driver's seat if required. The support leg (4) may also be rotatably connected to the work surface (2) to assist rotation of the surface.

Figure 2b shows the desk in a storage configuration having the support leg (4) arranged to be substantially parallel to the collapsed work sections (3)

where due to the substantially flat profile of the desk, the desk can be stored between the central console and passenger seat of the vehicle.

Figures 3a – 3c show an alternative preferred embodiment of the invention, having a flat work surface (2), being a single work section (3), and an alternative support leg arrangement, being a telescopic leg (10) pivotally connected to the work section such that the leg (10) is rotatable to be substantially perpendicular to the work surface (2). Preferably, the pivot between the leg (10) and the work section (3) is arranged adjacent to an edge of the section and substantially on an axis of symmetry of the section, providing balanced support to the work section and optimising the usable space underneath the work surface.

Figure 3c shows an exploded view of the embodiment, illustrating the components of the telescopic leg (10). The leg is formed from at least two and preferably three tubular sections, labelled as 101-103, which may slide within one another to extend or retract the leg, allowing the height of the work surface (2) to be adjusted in relation to the seats or other interior features of the vehicle. The leg also includes a deformable actuator (104) fixed within a housing in the work section (3) which when depressed by a user, allows the sections of the leg to slide within each other and when released, locks the sections such that the length of the leg may not be further adjusted. The locking function is preferably provided by at least one boss arranged on the actuator, fitting within at least one aperture, arranged within a section.

In Figure 4 an alternative aspect of the invention is illustrated, having an additional support leg, being an extension leg (11). At least one extension leg is arranged on the underside of the work section (3) and pivotally connected, such that each leg can be rotated to be substantially perpendicular to the work surface (2) and provide additional support to the support leg (4) or telescopic leg (10). The extension leg is preferably arranged in a corner of the underside of the work section to provide support in regions which may deflect the most when in use, however its location is

not limited to this and it may be positioned at any position on the surface. The extension leg is also able to be adjusted in length having an inner section that slides within an outer section, in order to optimise the contact of the leg with a component of the interior of the vehicle.

Figure 5 shows an underside view of the desk configured for storage, illustrating the telescopic leg (10) and the extension leg (11) folded towards the work surface (2) and being substantially parallel with it.

Figure 6a – 6b show perspective views of the desk configured for use in a vehicle, having both the telescopic leg (10) and extension leg (11) pivoted away from the work surface (2) to be substantially perpendicular with the surface. Figure 6a illustrates a first configuration where both legs (10, 11) are configured to be at the shortest length possible for each and Figure 6b illustrates an alternative configuration where both legs are configured to be at an extended position.

Figure 7 illustrates a further alternative embodiment having an extendable strap (12) arranged across the work surface (2) to retain items, such as documents, to the work surface of the desk. The strap is adjustable in length and preferably in two parts, each part being releasably fixed to the other. Preferably each part of the strap has a hook and loop fastening system, such as Velcro® portion to enable rapid attachment and release of the strap over the working surface of the desk.

INDUSTRIAL APPLICABILITY

The present invention has industrial applicability for use in vehicles.

CLAIMS:

1. A desk for use in a vehicle, comprising:

a substantially planar work surface; and

a support leg, arranged substantially perpendicular to the work surface and located adjacent to a side edge of the work surface;

wherein the support leg is pivotally connected to the work surface, such that the leg rotates on a first plane between a first position substantially perpendicular to the work surface and a second position substantially parallel to the work surface.

2. A desk for use in a vehicle in accordance with claim 1 wherein the work surface comprises at least two work sections, each pivotally connected to a spine, such that each work section is rotatable towards one another.

3. A desk for use in a vehicle in accordance with claim 2 wherein the support leg is pivotally connected to the spine.

4. A desk for use in a vehicle in accordance with claim 3 wherein the work sections rotate on a second plane that is substantially perpendicular to the first plane.

5. A desk for use in a vehicle in accordance with claim 4 wherein the pivot is also rotatable on a third plane perpendicular to the first plane.

6. A desk for use in a vehicle in accordance with claim 5 wherein the third plane is perpendicular to the first plane and second plane.

7. A desk for use in a vehicle in accordance with claim 1 wherein the support leg is connected to a retention means, the retention means comprising a deformable element and a buckle, the buckle being adapted to connect to a seat-belt holster, wherein the deformable element is connected at a first end to the support leg and connected at a second end to the buckle.

8. A desk for use in a vehicle in accordance with claim 2 which includes at least one locking means, configured to lock the rotational position of the work sections in relation to one another.

9. A desk for use in a vehicle in accordance with claim 8 wherein the locking means comprises at least one tab housed in a first complimentary groove in a first work section and a second complimentary groove being arranged in alignment in an opposing, second work section, such that when the opposing work sections are rotated to form a substantially continuous planar work surface, the tab is slid along the first groove to also be housed within the second groove, preventing the work sections from rotating.

10. A desk for use in a vehicle in accordance with claim 1 wherein an opposing surface to the work surface comprises a padded region.

11. A desk for use in a vehicle in accordance with claim 1 wherein the support leg is adjustable in length.

12. A desk for use in a vehicle in accordance with claim 1 wherein the support leg is telescopic, comprising at least two cylindrical, hollow sections configured to slide within one another.

13. A desk for use in a vehicle in accordance with claim 12 which includes a locking mechanism to prevent the sections from sliding within one another.

14. A desk for use in a vehicle in accordance with claim 1 which includes at least one support stand, each stand being pivotally connected to the work surface such that the stand can rotate between being substantially parallel to the work surface and substantially perpendicular to the work surface.

15. A desk for use in a vehicle in accordance with claim 14 wherein each support stand is arranged on an opposing surface to the work surface.

16. A desk for use in a vehicle in accordance with claim 14 wherein the work surface is substantially rectangular or square and each support stand is arranged adjacent to a corner of the work surface.

17. A desk for use in a vehicle in accordance with claim 14 wherein each support stand is adjustable in length.

18. A desk for use in a vehicle in accordance with claim 1 which includes an adjustable strap connected at opposing sides of the work surface and adapted to extend across the work surface.

19. A desk for use in a vehicle in accordance with claim 18 wherein the strap comprises two releasably connectable sections.

20. A desk for use in a vehicle in accordance with claim 18 in which each section has a region including a hook and loop fastening system.

21. A desk for use in a vehicle in accordance with claim 1 wherein at least a region of the work surface has a high friction co-efficient.

22. A desk for use in a vehicle in accordance with claim 21 in which the region includes a rubber compound element.

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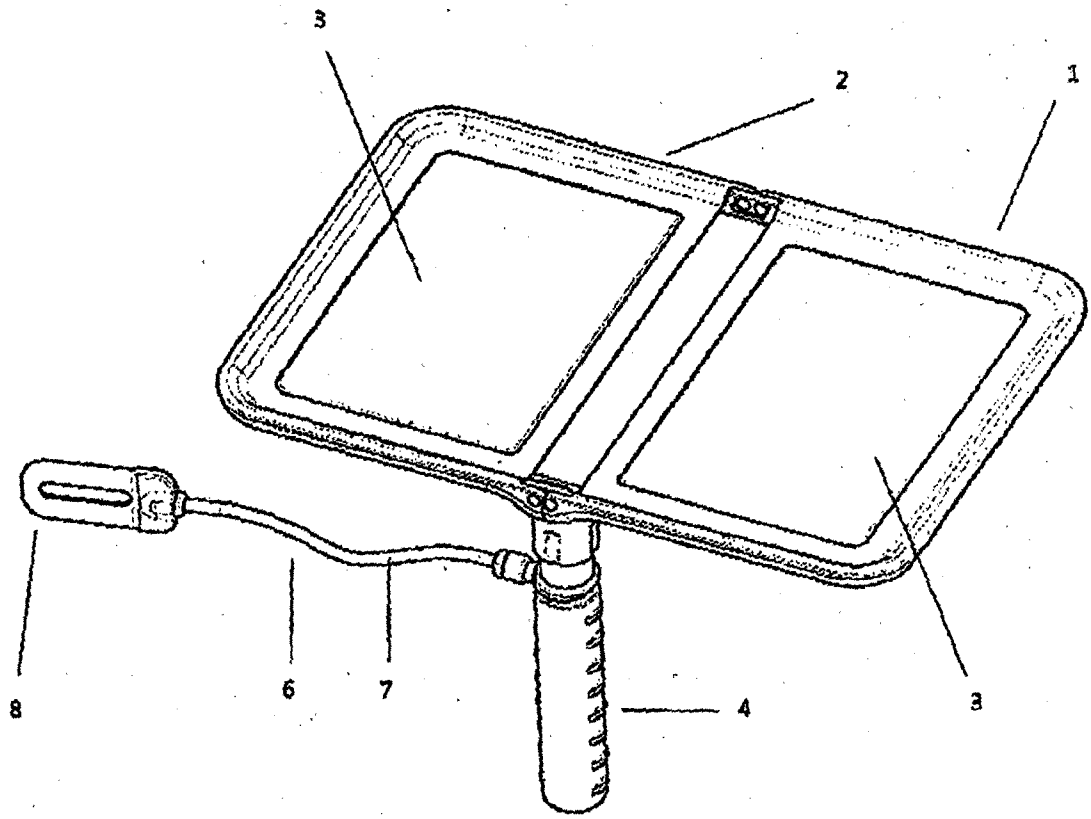

Fig 1a

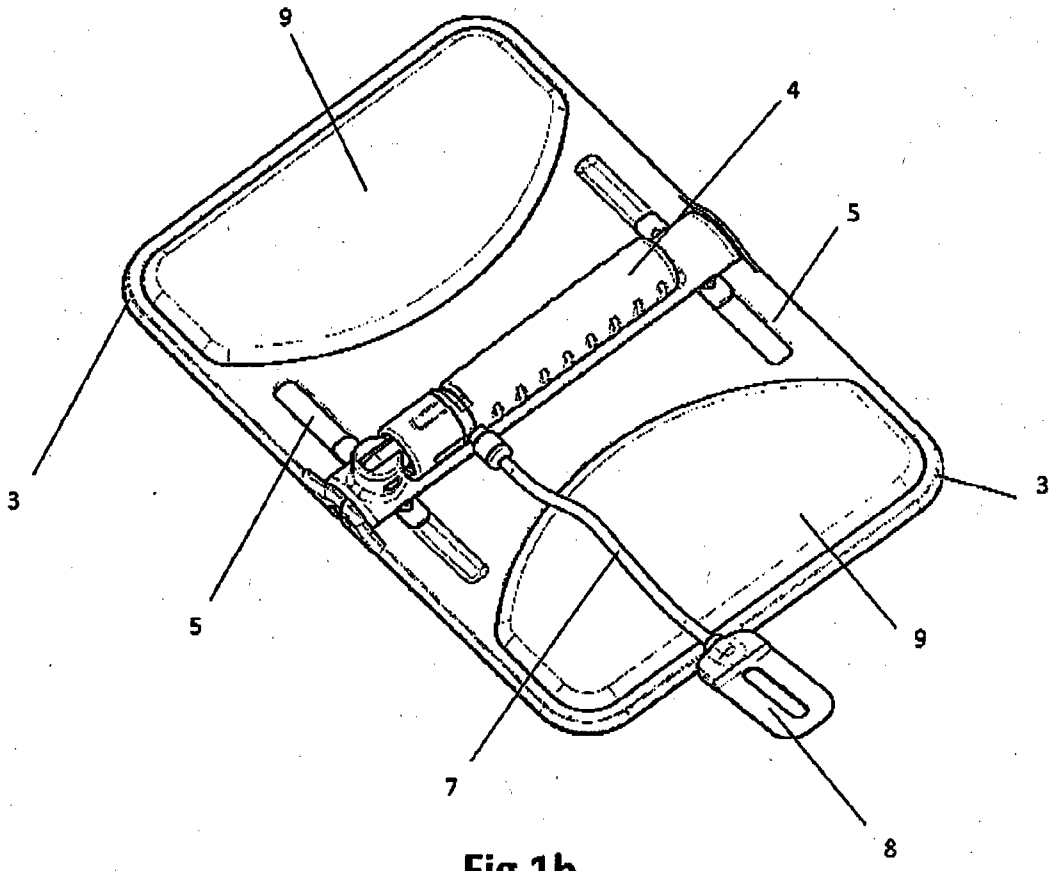

Fig 1b

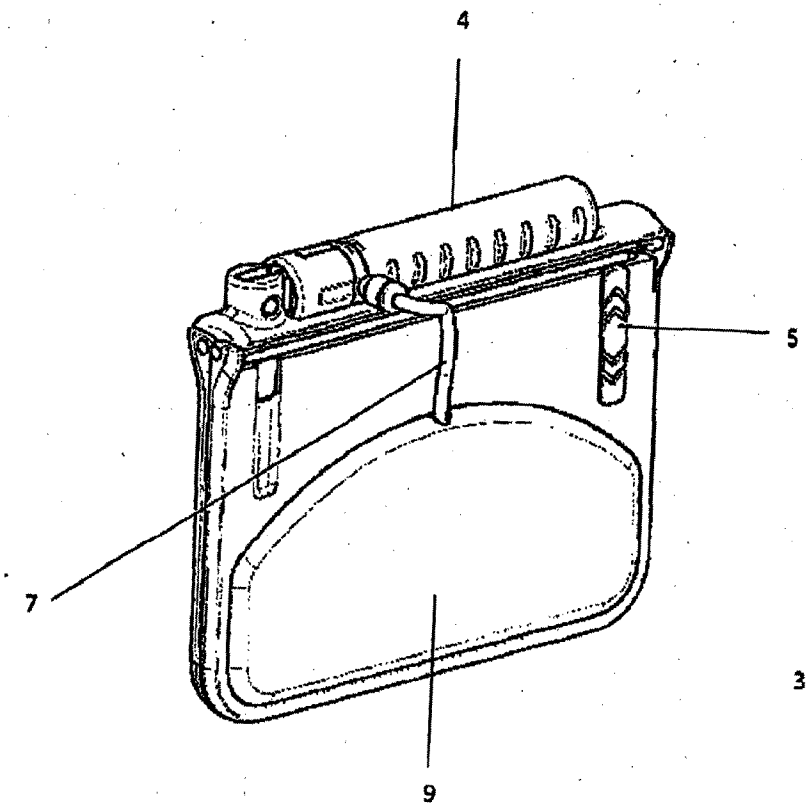

Fig 1c

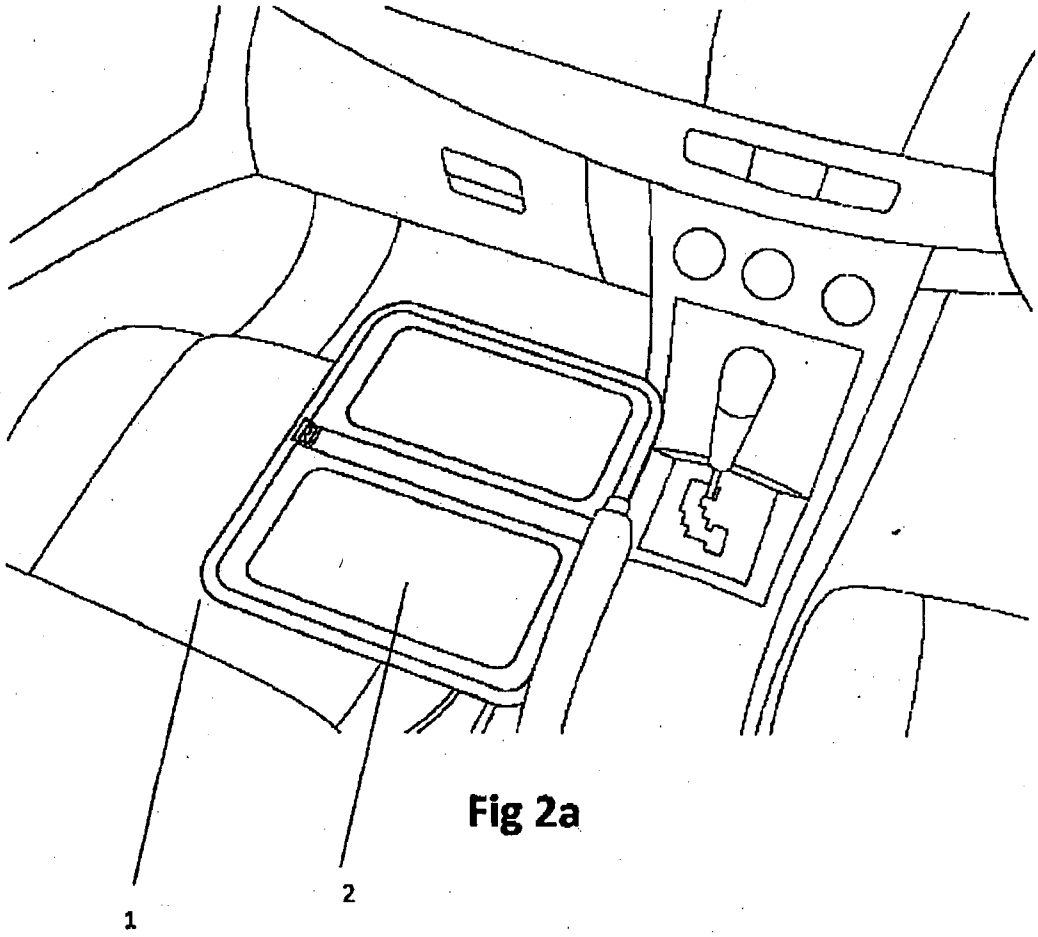

Fig 2a

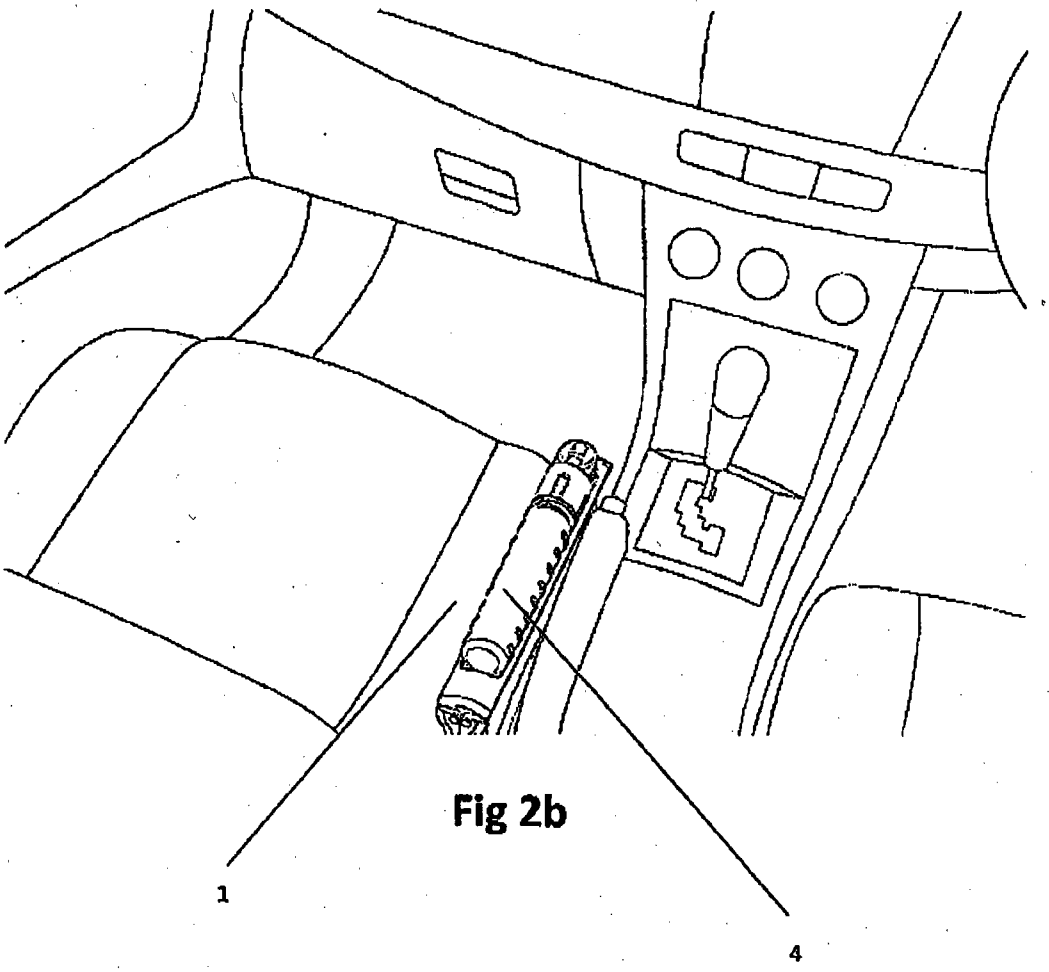

Fig 2b

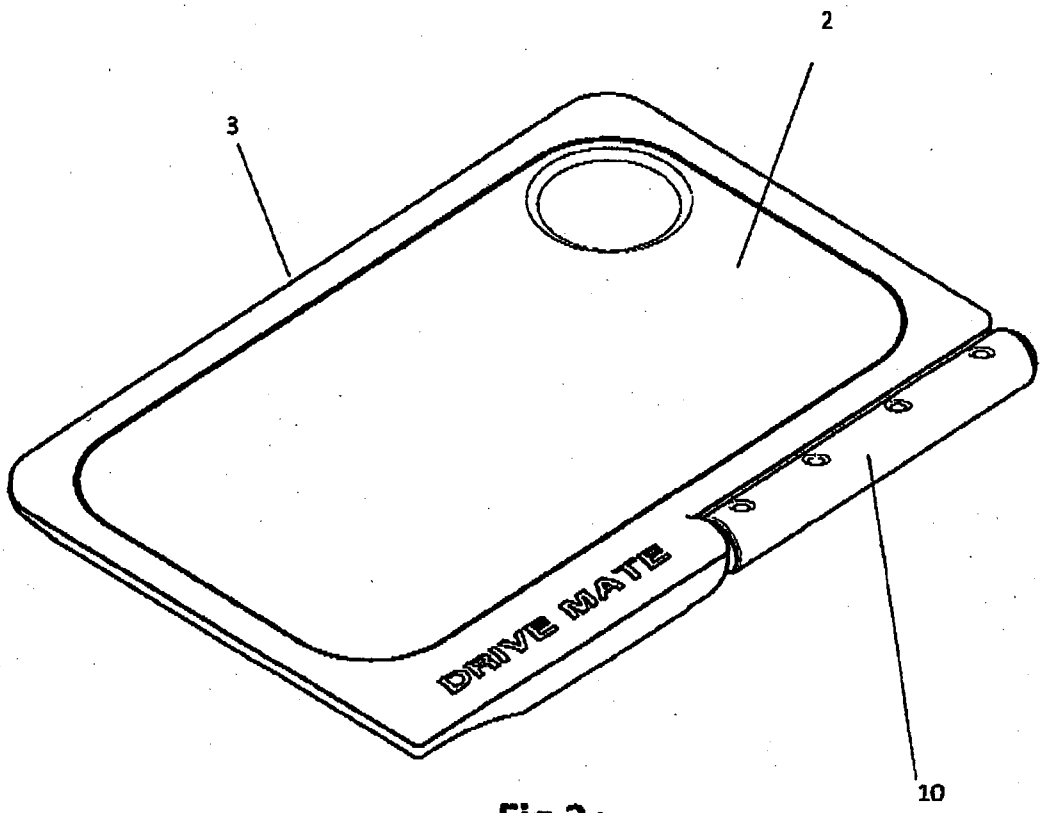

Fig 3a

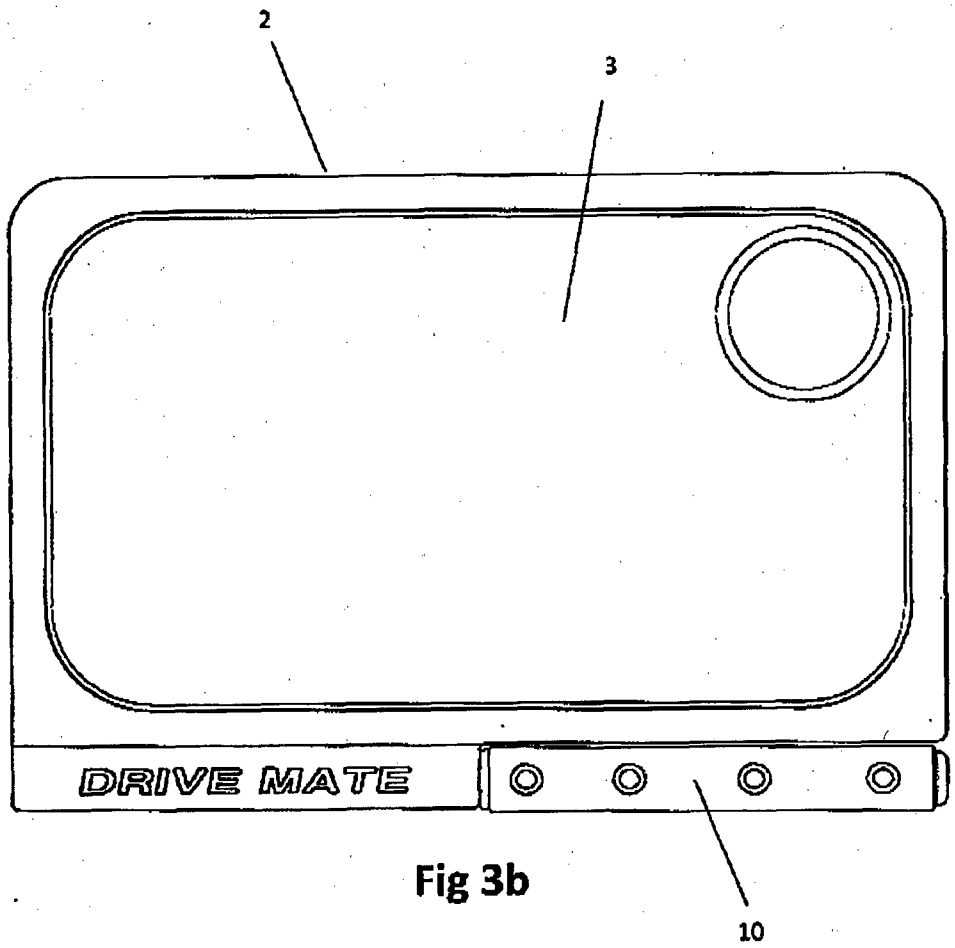

Fig 3b

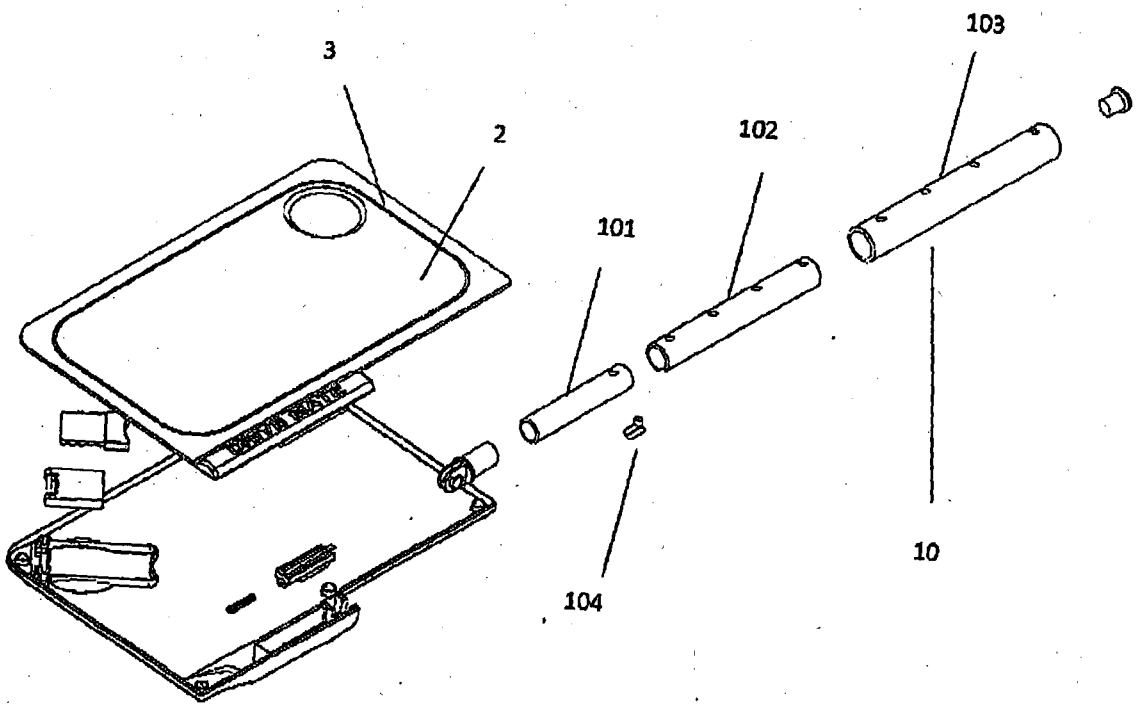

Fig 3c

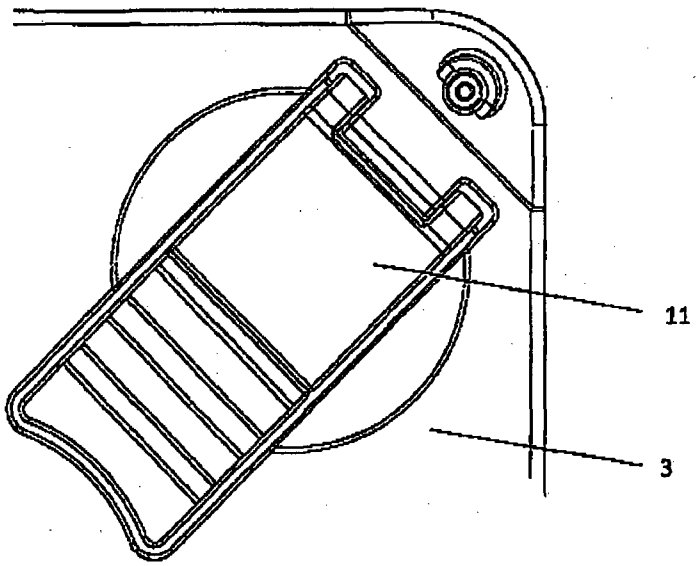

Fig 4

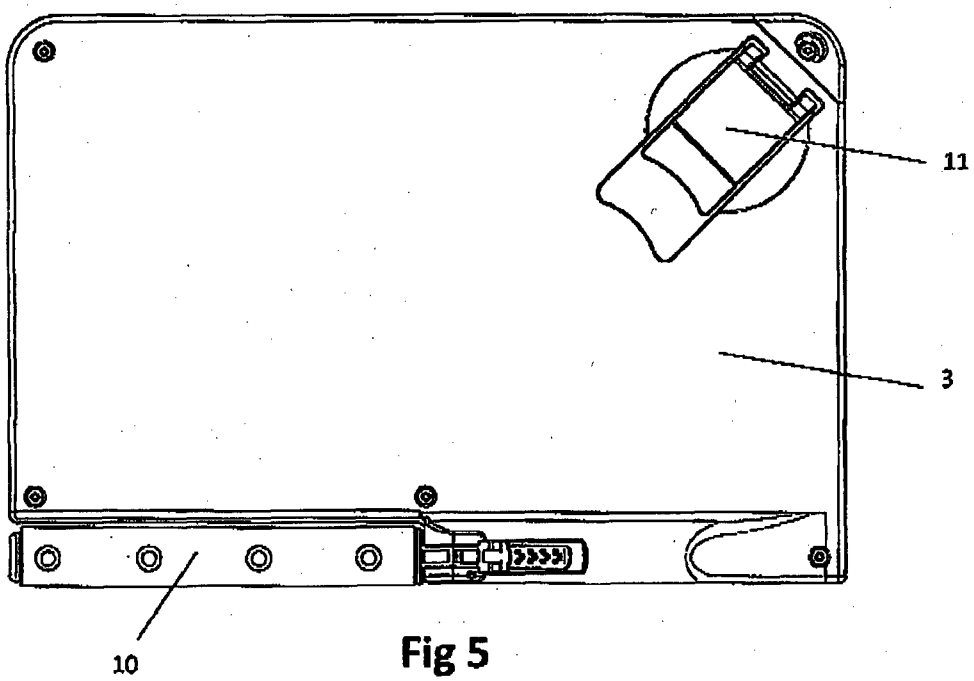

Fig 5

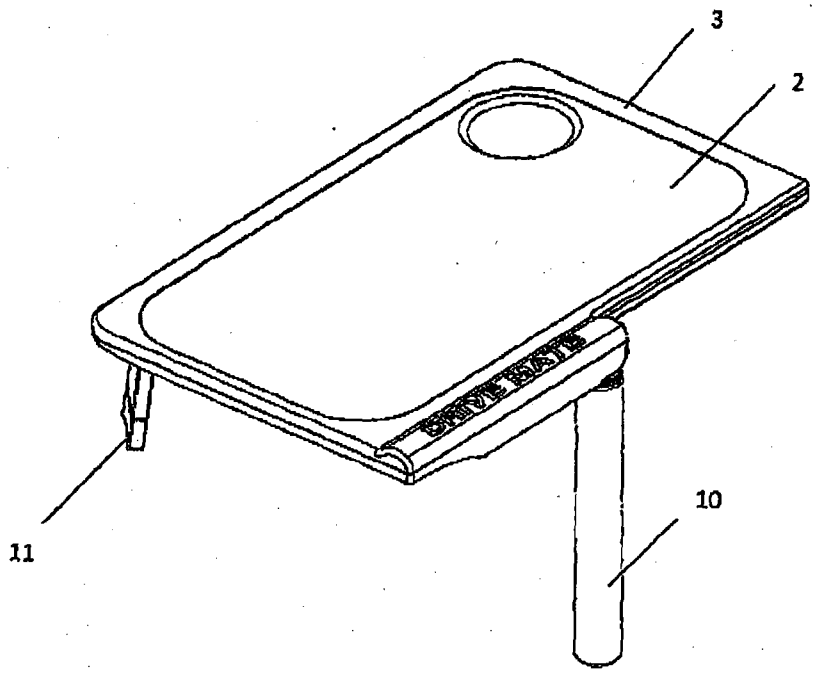

Fig 6a

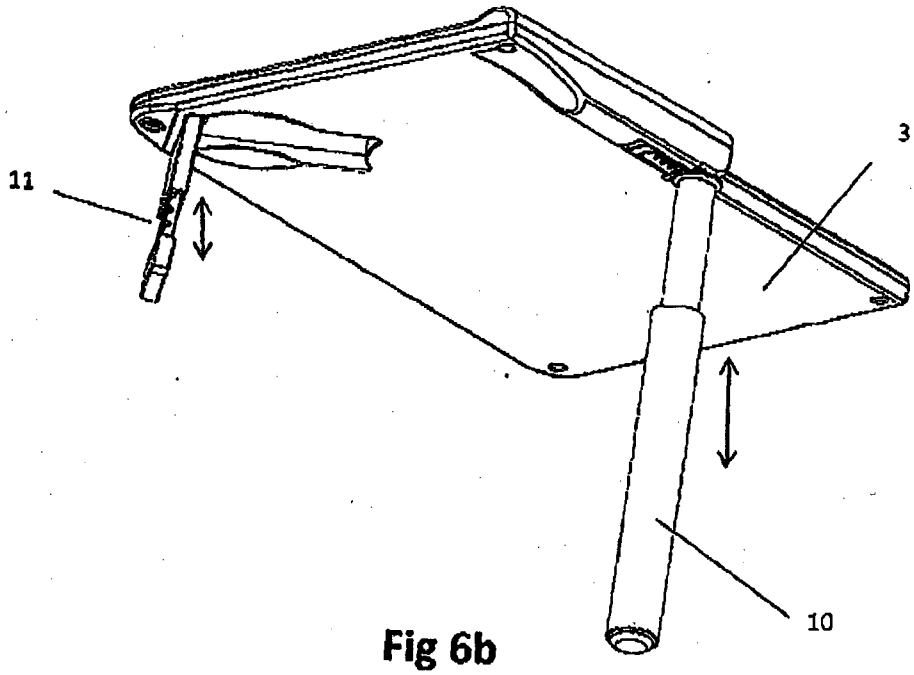

Fig 6b

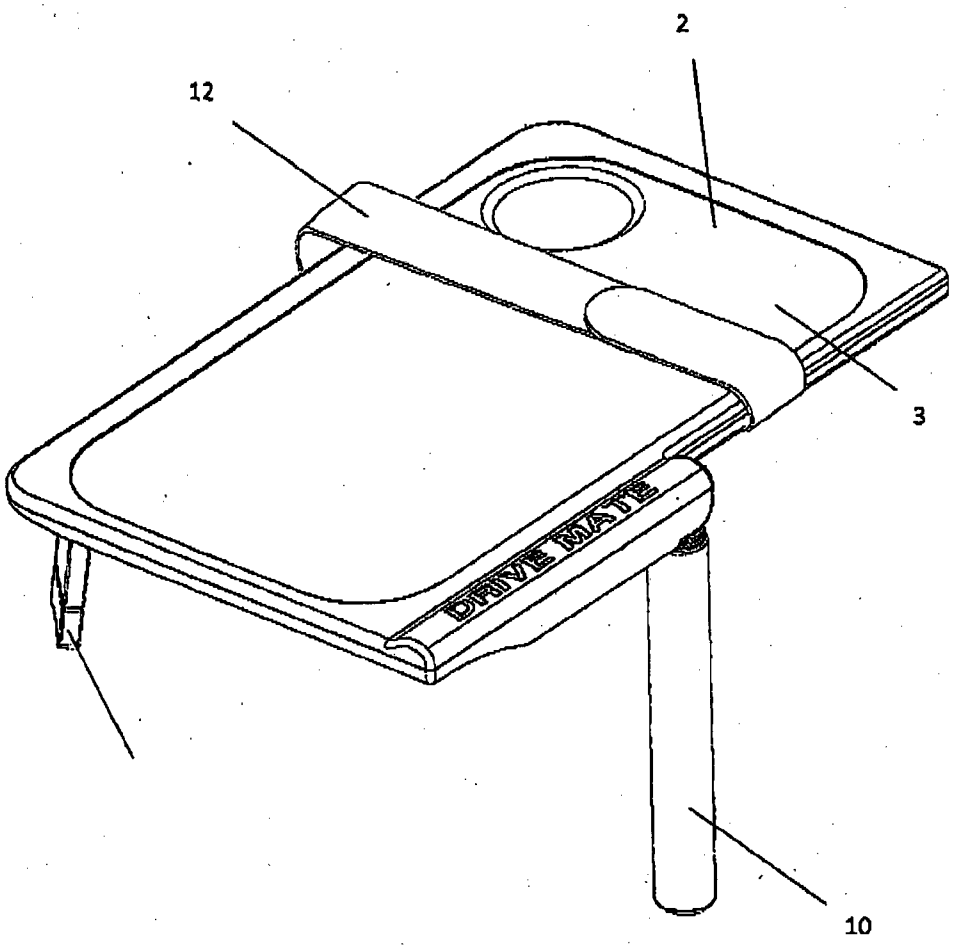

Fig 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2012/000736

A. CLASSIFICATION OF SUBJECT MATTER

A47B 31/06 (2006.01) B60N 3/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, IPC/ECLA Marks B60N3/00, A47B37/00, A47B23/00, A47B 31/06 and Keywords: Vehicle, Boat, Aircraft, Truck, Fold, Collapse, Stow, Compact, Reduce, Pivot, Swivel, Move, Rotate, Articulate, Leg, Member, Support, Arm, Adjust, Telescopic, Vary and like terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 October 2012	22 October 2012
Name and mailing address of the ISA/AU	**Authorised officer**
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustralia.gov.au Facsimile No.: +61 2 6283 7999	Ross Whyley AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262832135

INTERNATIONAL SEARCH REPORT C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		International application No. **PCT/AU2012/000736**
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6347590 B1 (D'ANNUNZIO et al) 19 February 2002 Abstract, Figures 1-4, Column 2 Line 40 - Column 3 Line 5	1-6, 8, 10-13, 18-22
X	US 2002/0003361 A1 (DUERR et al) 10 January 2002 Abstract, Figures 1-5, Paragraphs [0024] to [0049]	1, 10-13, 18-22
A	US 4852499 A (OZOLS) 01 August 1989 Whole Document	

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/AU2012/000736**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/s Cited in Search Report		**Patent Family Member/s**	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**
US 6347590 B1	19 Feb 2002	US 6347590 B1	19 Feb 2002
US 2002/0003361 A1	10 Jan 2002	DE 10026561 A1	06 Dec 2001
		EP 1160125 A2	05 Dec 2001
		US 2002003361 A1	10 Jan 2002
		US 6793281 B2	21 Sep 2004
US 4852499 A	01 Aug 1989	US 4852499 A	01 Aug 1989

End of Annex

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.