Title: DRIVER INTERFACE ASSEMBLY

Abstract: A driver interface assembly (10) is provided comprising a controller element (15) mounted to a body (16) which forms an integral part of an armrest (11) associated with a driver's seat (12). The body is rotatable with respect to the armrest between two positions: (a) an operating position, in which the controller element is exposed for operation thereof, and (b) a stowed position in which the controller element is concealed from use. The body remains substantially within the profile of the armrest when in both the operating position and the stowed position. The volume occupied by the armrest (11) can therefore be exploited to mount and stow a controller element (15). This is particularly advantageous in a working environment where space is at a premium.
DRIVER INTERFACE ASSEMBLY

The invention relates to a driver interface and in particular, but not exclusively, a driver interface operable by the driver of a utility vehicle.

Utility vehicles typically require many interfaces to allow the driver thereof to operate the various functions of the vehicle together with any attached implements. For example, the driver of a tractor having a front loader may be required to simultaneously control the speed and direction of the tractor and operate the numerous spool valves associated with the various controls of the loader. The latter in particular is traditionally controlled by the means of levers, both two-way linear levers and those in the form of 4-way joysticks for example.

It is an object of the invention to provide a driver interface which is easily accessible to the driver but does not hinder easy access to other driver interfaces. It is another object of the invention to provide a driver interface that delivers improved safety in operation.

Thus, in accordance with the invention there is provided a driver interface assembly comprising a controller element mounted to a body which forms an integral part of an armrest associated with a driver's seat, the body being rotatable with respect to the armrest between an operating position, in which the controller element is exposed for operation thereof, and a stowed position in which the controller element is concealed from use, wherein the body remains substantially within the profile of the armrest when in both the operating position and the stowed position.

The invention makes use of the available surface in the cab by providing a controller element on the armrest whilst also optimising the use of that space by stowing the controller element when not in use. Furthermore, the safety of the vehicle operation is improved by reducing the risk of accidental operation of the controller element caused by unintended contact from the drivers arm for example.

Advantageously, the body substantially conforms with the profile of the arm rest when in both positions. Therefore, the only ergonomic difference between the two positions presented to the driver is the presence or absence of the controller element.

Preferably, the body is positioned at the forward end of the armrest. Advantageously, this positions the controller element in the most ergonomically friendly place for the driver to operate.
In a preferred embodiment the body is rotatable around a transverse axis with respect to an elongate axis of the armrest. The body may be mounted and supported between two integral extensions of the armrest allowing rotational movement therebetween around the transverse axis. Advantageously, the integral extensions of the armrest can provide reliable and sturdy support for the mounting of the body by attaching to pivot points located on the axis of rotation on both sides of the body. The extensions may also provide ducting for any electrical leads to the controller element required for the operation thereof.

In another preferred embodiment the controller element takes the form of a lever which is at least operable in a linear motion either side of a central position. For increased functionality the lever may be a joystick that is operable in a plurality of directions away from the central position. The lever may control the actuation of hydraulic rams on an attached front loader for example.

Alternatively, the controller element could be a button or a bank of buttons.

The body preferably rotates from the operating position to the stowed position through an angle greater than 90°, preferably still greater than 180°, and preferably even still around 270°. The lever may be located within the outline of the armrest when in the stowed position. Advantageously, by stowing the lever within the profile of the armrest, the lever is rendered inoperable thereby preventing any accidental operation thereof.

The lever may be located in a cooperating depression which is moulded into the underside of the armrest when in the stowed position. This increases the concealment of the lever and the associated advantages thereof as well as providing a more sturdy arrangement in which the stowed lever is better supported.

When in the stowed position the exposed surface of the body preferably forms an extension of the armrest. This improves the concealment of the controller element whilst making the implementation of an assembly in accordance with the invention more ergonomically friendly for the driver.

To reduce the risk of unintended activation of the controller element when moving the body from one position to another, preferably the controller element is only operable when the
body is in the operating position. Therefore, the controller element is deactivated once the body is moved away from the operating position.

Further advantages will become apparent from the following description of specific embodiments with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a driver's seat in a utility vehicle fitted with a driver interface assembly in accordance with one embodiment of the invention showing the body in an operating position;

Figures 2 and 3 are perspective views of the driver interface assembly of Figure 1 showing the body thereof in intermediate positions between the operating position and the stowed position;

Figure 4 is a perspective view of the driver interface assembly of Figure 1 showing the body thereof in the stowed position;

Figure 5 is a perspective view of the underside of the driver interface assembly of Figure 1 showing the body thereof in the stowed position;

Figure 6 is a perspective view of the driver interface assembly of Figure 1 showing the body thereof in exploded form; and,

Figure 7 is a perspective view of the driver interface assembly of Figure 1 showing the detail of the body thereof.

With reference to the figures a driver interface assembly, referenced generally at 10, is mounted to an arm rest 11 of a driver's seat 12. The driver's seat 12 is of a known configuration and comprises suspension means 13 and a mounting plate 14. Although not critical to the scope of the invention, seat 12 in this example is fixed to the floor tray of a tractor cab (not shown). However it will be appreciate that the driver's seat 12 may be implemented in any utility vehicle.

The driver interface assembly 10 comprises a joystick 15 mounted to a body 16 which forms an integral part of the arm rest 11. In this embodiment, joystick 15 serves to control actuation of various hydraulic rams on an attached front loader (not shown). The joystick 15 is moveable in a longitudinal direction either side of the central position shown, and in a
transverse direction to the left and right of the central position. It will be appreciated by the skilled person that the joystick 15 can serve to control any controllable function of the utility vehicle, or any implement attached thereto, which lends itself to being controlled by a joystick. For example the longitudinal displacement of the joystick could instead be employed to control the forward speed of the vehicle.

In accordance with the invention, the body 16 to which the joystick 15 is attached is rotatable between an operating position as shown in Figure 1 to a stowed position as shown in Figures 4 and 5. When in the operable position the joystick 15 is exposed for operation by the driver. Whereas when in the stowed position the joystick 15 is concealed from use thereby preventing any accidental actuation of the joystick 15 by movement of the driver's arms for example.

The body 16 pivots around two attachment points (Figures 6 and 7) on the inside edges of integral extensions 17 of the arm rest 11. In effect, the integral extensions 17 and an inside edge 18, provided by the main arm rest 11, provide walls which define a cavity in which the body 16 is located. The attachment points are simply provided by hollow spindles 22 which turn within a respective recess 23 located in the inside faces of the integral extensions 17. Electrical leads 24 for joystick sensing means pass through the hollow spindles 22 and through integral ducting provided inside the armrest 11. The leads 24 may then extend to the main dashboard control unit of the vehicle through the inside of the arm rest 11 and down the rear of the seat 12.

In an alternative embodiment, the sensing means for the controller element may communicate with the dashboard control unit via a wireless link such as a Bluetooth enabled link for example.

The body 16 is held in the operating position as shown in Figure 1 by releasable locking means (not shown) which take the form of a sprung pin (not shown) inserted through the inside edge of the arm rest 11 adjacent the driver which can be withdrawn by the driver when necessary.

The body can rotate on its transverse axis through 270° into the stowed position as shown in Figures 4 and 5. A cooperating depression 19 formed in the underside of the arm rest 11 receives the stowed joystick as shown in Figure 5. Furthermore when in the stowed position the exposed surface of the body 20 forms an extension of the arm rest on its upper face.
Advantageously by stowing the joystick 15 in accordance with the invention the arm rest 11 can be still raised into an upright position by a pivoting movement around connection 21 in a known manner.

Although the described embodiment employs a joystick 15 which is moveable in a plurality of directions away from the central position, it is envisaged that a simple linear 2-way lever can instead be used without deviating from the scope of the invention.

In summary therefore, there is provided a driver interface assembly comprising a controller element mounted to a body which forms an integral part of an armrest associated with a driver's seat. The body is rotatable with respect to the armrest between two positions: (a) an operating position, in which the controller element is exposed for operation thereof, and (b) a stowed position in which the controller element is concealed from use. The volume occupied by the armrest can be exploited to mount and stow a control element. This is particularly advantageous in a working environment where space is at a premium.
CLAIMS

1. A driver interface assembly comprising a controller element mounted to a body which forms an integral part of an armrest associated with a driver's seat, the body being rotatable with respect to the armrest between an operating position, in which the controller element is exposed for operation thereof, and a stowed position in which the controller element is concealed from use, wherein the body remains substantially within the profile of the armrest when in both the operating position and the stowed position.

2. An assembly according to Claim 1, wherein the body is positioned at the forward end of the armrest.

3. An assembly according to Claim 1 or 2, wherein the body is rotatable around a transverse axis with respect to an elongate axis of the armrest.

4. An assembly according to Claim 3, wherein the body is mounted and supported between two integral extensions of the armrest allowing rotational movement therebetween around the transverse axis.

5. An assembly according to any preceding claim, wherein the controller element is a lever at least operable in a linear motion either side of a central position.

6. An assembly according to Claim 5, wherein the lever is a joystick operable in a plurality of directions away from the central position.

7. An assembly according to Claim 5 or 6, wherein the body rotates from the operating position to the stowed position through 270° so that the lever is located within the outline of the armrest when in the stowed position.

8. An assembly according to Claim 7, wherein the lever is located in a cooperating depression which is moulded into the underside of the armrest when in the stowed position.

9. An assembly according to Claim 7 or 8, wherein when in the stowed position the exposed surface of the body forms an extension of the armrest.

10. An assembly according to any preceding claim, wherein the controller element is only operable when the body is in the operating position.
11. A utility vehicle comprising a driver interface assembly according to any preceding claim.

12. A driver interface assembly constructed and arranged substantially as hereinbefore described with reference to, and as shown in the accompanying Figures.
**INTERNATIONAL SEARCH REPORT**

**International application No**
PCT/EP2009/052296

**A. CLASSIFICATION OF SUBJECT MATTER**

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<th>Category</th>
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<td>X</td>
<td>DE 10 2005 036624 A1 (VOLKSWAGEN AG [DE]) 8 February 2007 (2007-02-08) paragraph [0025]; figure 7</td>
<td>1-6,10,11</td>
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<td>A</td>
<td>FR 2 391 871 A (KEIPER RECARO GMBH CO [FR]) 22 December 1978 (1978-12-22) page 5, line 14 - page 9, line 18; figures 1,2,4</td>
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<td>A</td>
<td>EP 0 537 718 A (FIAT AUTO SPA [IT]) 21 April 1993 (1993-04-21) claim 1; figures 1,2</td>
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**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)
B60N G05G HOIH B64D

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

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

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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**Further documents are listed in the continuation of Box C**

**See patent family annex**

**Date of the actual completion of the international search**

8 May 2009

**Date of mailing of the international search report**

25/05/2009

**Name and mailing address of the ISA/ European Patent Office, P B 5818 Patentlaan 2 NL - 2280 HV Rijswijk**

Tel (+31-70) 340-2040, Fax (+31-70) 340-3016

**Authorized officer**

Lotz, Kl aus-Dieter
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INTERNATIONAL SEARCH REPORT

Box No. II  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III  Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☑ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☑ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☑ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.
This International Searching Authority found multiple (groups of) inventions in this International application, as follows:

1. claims: 1-4, 7-11

   A driver interface assembly comprising a controller element mounted to a body which forms an integral part of an armrest related to the integration of the body within the armrest.

2. claims: 5, 6

   A driver interface assembly comprising a controller element mounted to a body which forms an integral part of an armrest related to the particular choice of the controller element.
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