Title: CONVEYOR BELT CARGO CARRYING AND TRANSFERING DEVICE FOR VEHICLES

Abstract: A cargo carrying device (12) for a vehicle (10) is provided. The device (12) includes a conveyor belt (22) having a width substantially equal to a width of a cargo carrying area of the vehicle (10). The conveyor belt (22) has a first end attached to a first roller (16) and a second opposite end attached to a second roller (18). Upon installation to the vehicle (10), the first roller (16) is located substantially at a rear end of the vehicle (10) and the second roller (18) is located forward of the first roller (16) substantially at an opposite end of the cargo carrying area of the vehicle (10), such that at least a portion of the conveyor belt (22) substantially covers the cargo carrying area. Selective rotation of the first and/or second roller (16, 18) operatively causes the conveyor belt (22) to move towards or away from the rear end of the vehicle (10) to facilitate loading or unloading of cargo to/from the cargo carrying area at the rear end.
CONVEYOR BELT CARGO CARRYING AND TRANSFÉRING DEVICE FOR VEHICLES

FIELD OF THE INVENTION

The present invention relates to a cargo carrying device for vehicles.

BACKGROUND TO THE INVENTION

Manually loading and unloading cargo to and from vehicles, eg. truck beds, is a time consuming and physically demanding exercise. When loading a truck bed, not only must the cargo, eg a box, be lifted onto the truck bed, but it must also be physically moved along the truck bed. Similarly, when unloading a truck bed, the cargo must first be physically moved to the rear of the truck bed before it can be lifted off the truck bed.

In commercial loading docks, conveyor devices are often used to assist in loading cargo onto and from truck beds. Such conveyor devices are usually fixed or mobile conveyors at the dock which can be arranged to have one end protrude over the truck bed. However, even with such conveyors, the cargo needs to be physically moved along the truck bed to and from the conveyor. Furthermore, such conveyor devices are rarely found outside of commercial loading docks.

It is an object of the present invention to provide a cargo carrying device which reduces the physical exertion required to load or unload cargo to/from a vehicle in any location.

SUMMARY OF THE INVENTION

According to the present invention there is provided a cargo carrying device for a vehicle, said device including:

- a conveyor belt having a width substantially equal to a width of a cargo carrying area of said vehicle, said conveyor belt having a first end attached to a first roller and a second opposite end attached to a second roller, wherein, upon installation to said vehicle, said first roller is located substantially at a rear end of said vehicle and said second roller is located forward of said first roller substantially at an opposite end of the cargo carrying area of said vehicle, such that at least a portion of said conveyor belt substantially covers said cargo carrying area, wherein selective rotation of said first and/or second roller causes said conveyor belt to move towards or away from said rear end of said vehicle to facilitate loading or unloading of cargo to/from said cargo carrying area at said rear end.
The present invention advantageously provides embodiments which remove the need to manually move cargo along a cargo carrying area of a vehicle, thereby facilitating ease of loading and unloading cargo to/from the vehicle at any time.

5 BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the present invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a side view of a vehicle incorporating cargo carrying device;
Fig. 2 is a plan view of the vehicle of Fig. 1; and
Fig. 3 is a perspective view a cargo carrying device.

DESCRIPTION OF PREFERRED EMBODIMENT

The present invention lends itself to many different implementations, as will be apparent to those skilled in the art. The following example is intended purely to illustrate one possible implementation.

Fig. 1 shows a vehicle 10 incorporating a preferred form of the cargo carrying device 12. The vehicle 10 shown is a utility vehicle of the type normally having a rear load tray, being the area of the vehicle where cargo is normally carried. As can be seen in Fig. 1, the normally present rear load tray has been replaced by the cargo carrying device 12, which is installed on the vehicle's rear chassis 14. As shown in Fig. 2, the cargo carrying device 12 takes up substantially the same width as the cargo carrying area of vehicle 10.

Turning to Fig. 3, there is shown the cargo carrying device 12 in isolation. The device 12 includes two rollers 16, 18 rotatably mounted within and at opposing ends of a frame 20. A conveyor belt 22 is shown extending between the rollers 16, 18. The conveyor belt 22 includes a first end securely attached to roller 16 and a second opposing end securely attached to roller 18. It will be appreciated that the belt 22 can be attached to the rollers by any suitable means. The conveyor belt has a width extending substantially across the entire width of the frame 20. Ideally, the belt has a minimum length of approximately twice the length of the frame 20.

The frame 20 is open-topped thereby exposing the surface of the conveyor belt 22 to allow cargo to be placed thereon. Ideally, beneath the belt 22 and
between the rollers 16, 18 are located a number of support members 24 to support the belt 22 when cargo is loaded onto its surface.

Turning to Fig. 1, when the device 12 is installed on the vehicle 10, roller 16 is located at the rear of the vehicle, where cargo is normally loaded onto and unloaded from the conveyor belt 22. It will be appreciated that by rotating roller 16 clockwise, in relation to the perspective of Fig. 1, the conveyor belt will wrap around roller 16 and cargo loaded on the surface of the belt 22 will move in the direction of roller 16 towards the rear of the vehicle 10. Similarly, by rotating roller 18 anticlockwise the belt 22 will be caused to move in the opposite direction and, hence, cargo will move away from the rear of the vehicle 10. Ideally, the rollers 16, 18 are adapted to be selectively connected to a motor or the like, such as an electric or hydraulic motor, in order to drive the respective roller and cause the belt to move in the desired direction. In this manner, a person need not exert any manual force in moving cargo along the device 12. Where an electric motor is used, then, as will be appreciated, electric control means, such as a control panel, could be provided with the device. As will be appreciated, such electric control could come in varying degrees of sophistication, from simple forward/reverse control to variable speed control to the inclusion of safety cutoff features, which prevent the device operating while the vehicle is in motion.

Conceivably, the rollers could be driven by manual means, for example by providing a handle at the end of the rollers which can be turned by hand. If it is anticipated that the device is to carry fairly light loads, then such manual means may be directly connected to the roller in order to manually rotate the roller. Alternatively, where considerably heavier loads are anticipated, whereby manual force may be insufficient to directly rotate the roller, the manual means could be connected to the roller by way of a gear mechanism to increase the torque provided to the roller. Either way, the manual force that would need to be exerted would be conceivably less exerting than having to lift and move cargo along the device.

By having the conveyor belt 22 extend substantially across the entire width of the device 12, it is ensured that all the cargo loaded onto the device 12 is moved when the belt 22 is moved.
It will be appreciated that the conveyor belt should be formed of sufficiently strong and durable material to support practical weights of cargo. Practical tests have found that Kevlar meets the requirements for an ideal material. However, it is anticipated that other materials may be suitable depending upon the intended usage.

While the present invention has been described with reference to a specific embodiment, it will be appreciated that various modifications and changes could be made without departing from the scope of the invention. For example, while the previous description referred to a utility vehicle, it is anticipated that the device could be installed on other vehicles having cargo carrying areas, such as vans, trucks etc. The device could be incorporated onto a vehicle during its manufacture or could be retrofitted to an existing vehicle.

It is anticipated, that some vehicle chasses may have structures which would allow the rollers to be installed directly onto the chassis and the chassis structure providing self-support for the conveyor belt. In which case, there may be no need for the frame 20 and support members 24.
CLAIMS:

1. A cargo carrying device for a vehicle, said device including:
   a conveyor belt having a width substantially equal to a width of a cargo carrying area of said vehicle, said conveyor belt having a first end attached to a first roller and a second opposite end attached to a second roller, wherein, upon installation to said vehicle, said first roller is located substantially at a rear end of said vehicle and said second roller is located forward of said first roller substantially at an opposite end of said cargo carrying area of said vehicle, such that at least a portion of said conveyor belt substantially covers said cargo carrying area, wherein selective rotation of said first and/or second roller causes said conveyor belt to move towards or away from said rear end of said vehicle to facilitate loading or unloading of cargo to/from said cargo carrying area at said rear end.

2. The device according to claim 1, including a frame within which said rollers and conveyor belt are housed, said frame having an open top to allow cargo to be placed on said conveyor belt.

3. The device according to claim 1 or 2, including a plurality of belt support members arranged between said first and second rollers.

4. The device according to any one of claims 1 to 3, wherein said first and second rollers are each adapted to be connected to a motor-powered drive means to facilitate said selective rotation.

5. The device according to any one of claims 1 to 4, wherein said device is adapted to be retrofitted to a vehicle.

6. A vehicle incorporating a cargo carrying device according to any one of claims 1 to 4.

7. A cargo carrying device for a vehicle substantially as herein described with reference to any of the accompanying drawings.
8. A vehicle incorporating a cargo carrying device substantially as herein described with reference to any of the accompanying drawings.
A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. B60P 1/36 (2006.01) B65G 15/28 (2006.01) B65G 67/24 (2006.01) B60P 1/38 (2006.01)
B65G 67/08 (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)

DWPI: IPC- B60P 1/-, B65G/1- and keywords like CONVEYOR, BELT, CONTINUOUS, UNLOAD, LOAD, TRUCK, VEHICLE and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 6702542 B1 (CHANCE et al) 09 March 2004 See whole document</td>
<td>1-8</td>
</tr>
<tr>
<td>X</td>
<td>FR 2669869 A1 (PIQUE BELTRA) 05 June 1992 See whole document</td>
<td>1-8</td>
</tr>
<tr>
<td>X</td>
<td>US 5902900 A (YOUNG et al) 11 May 1999 See whole document</td>
<td>1-8</td>
</tr>
</tbody>
</table>

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

* Special categories of cited documents:

'A' document defining the general state of the art which is not considered to be of particular relevance

'E' earlier application or patent but published on or after the international filing date

'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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

'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

'K' document member of the same patent family

Date of the actual completion of the international search
04 December 2006

Date of mailing of the international search report
14 DEC 2006

Name and mailing address of the ISA/AU
AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustralia.gov.au
Facsimile No. (02) 6285 3929

Authorized officer

ADRIANO GIACOBETTI
Telephone No: (02) 6283 2579

Form PCT/ISA/210 (second sheet) (April 2005)
## DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>GB 1155855 A (PIQUE BELTRA et al) 25 June 1969</td>
<td>1-8</td>
</tr>
<tr>
<td>X</td>
<td>SU 1622194 A (GOL DZRETDZIALIZIR0V ANNOE RROE (SU)) 23 January 1991</td>
<td>1-8</td>
</tr>
<tr>
<td></td>
<td>(Also published as - Derwent Abstract Accession No. 91-286815/99, Class Q15, SU 1622194 A (CONS TECHN SPEC BUR) 23 January 1991)</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>BE 829426 A (LEGRAS PERE &amp; FILS) 15 September 1975</td>
<td>1-8</td>
</tr>
<tr>
<td>X</td>
<td>DE 3434102 A (SCHUECHEN ROBERT ERICH (DE)) 20 March 1986</td>
<td>1-8</td>
</tr>
<tr>
<td>X</td>
<td>DE 3901 895 A (KLOCKNER P GMBH) 26 July 1990</td>
<td>1-8</td>
</tr>
<tr>
<td>X</td>
<td>EP 0173936 B1 (FUDICKAR METALL GGMBH (DE)) 12 March 1986</td>
<td>1-8</td>
</tr>
<tr>
<td>X</td>
<td>GB 2191755 A (TERUO KASHIHARA) 23 December 1987</td>
<td>1-8</td>
</tr>
</tbody>
</table>
This Annex lists the known "A" publication level 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.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>US</strong> 6702542</td>
<td></td>
</tr>
<tr>
<td>FR 2669869</td>
<td>ES 2026814</td>
</tr>
<tr>
<td><strong>US</strong> 5902090</td>
<td></td>
</tr>
<tr>
<td><strong>GB</strong> 1155855</td>
<td>ES 315237</td>
</tr>
<tr>
<td><strong>SU</strong> 1622194</td>
<td></td>
</tr>
<tr>
<td><strong>BE</strong> 829426</td>
<td>FR 2272882</td>
</tr>
<tr>
<td><strong>DE</strong> 3434102</td>
<td>BE 903250</td>
</tr>
<tr>
<td><strong>DE</strong> 3901895</td>
<td>EP 0379909</td>
</tr>
<tr>
<td><strong>EP</strong> 0173936</td>
<td>DE 3432764</td>
</tr>
<tr>
<td><strong>GB</strong> 2191755</td>
<td>DE 3634135</td>
</tr>
</tbody>
</table>

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