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(56) Documents Cited:
GB 2372482 A **GB 2356847 A**
GB 2276592 A **WO 2000/009060 A1**
FR 002598362 A **US 5137413 A**
US 4792274 A

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(54) Abstract Title: **Vehicle ramp device**

(57) A ramp device for a vehicle includes a ramp section and a floor section and is capable of adjustment between a closed position where said ramp section is stored on the vehicle and said floor section forms part of the internal floor of the vehicle, and an open position where said ramp section is moved such that one end lies adjacent the vehicle supporting surface, and said floor section is substantially in line with the ramp section. Part of the internal floor of the vehicle thus forms part of the ramp device, allowing the ramp to have a more acute angle to the vehicle supporting surface.

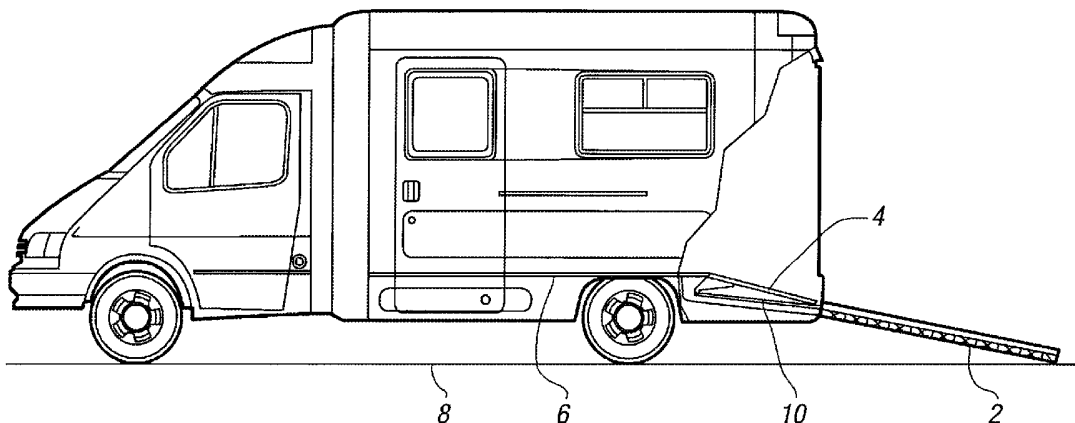


FIG. 2

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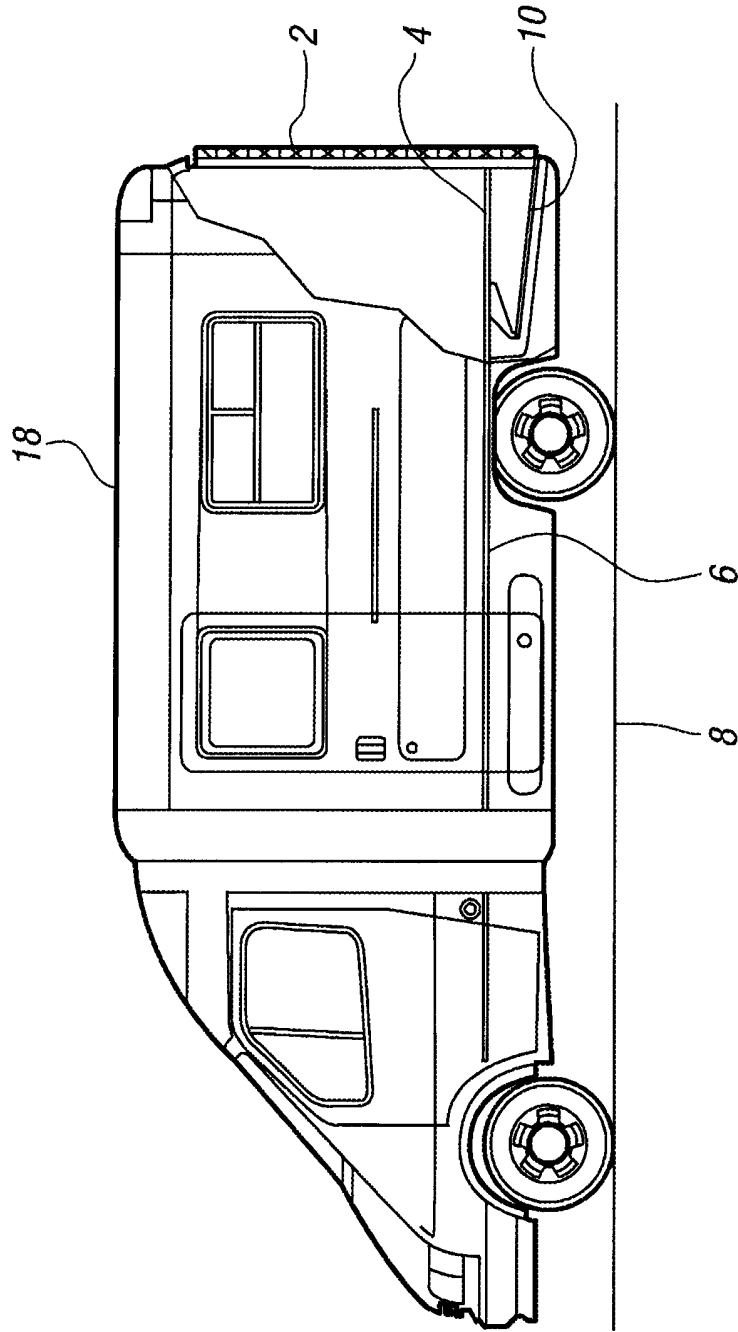


FIG. 1

04 43 05

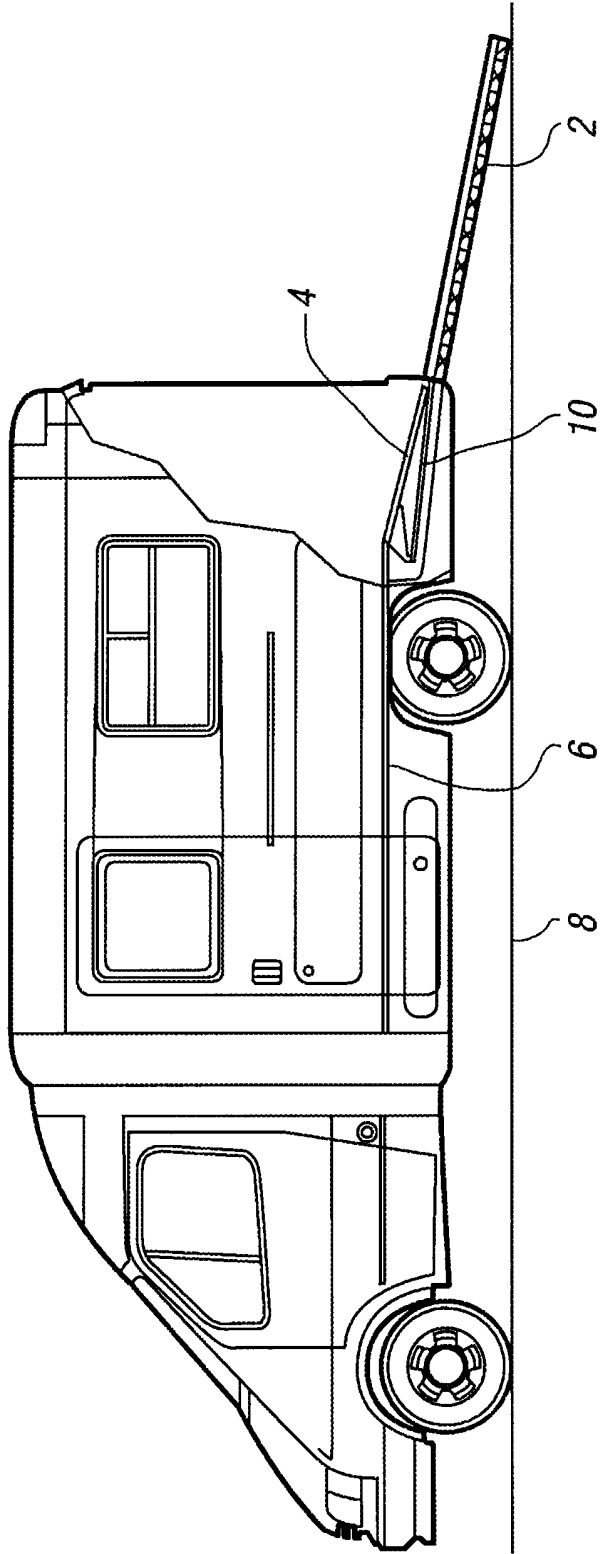


FIG. 2

04 48 05

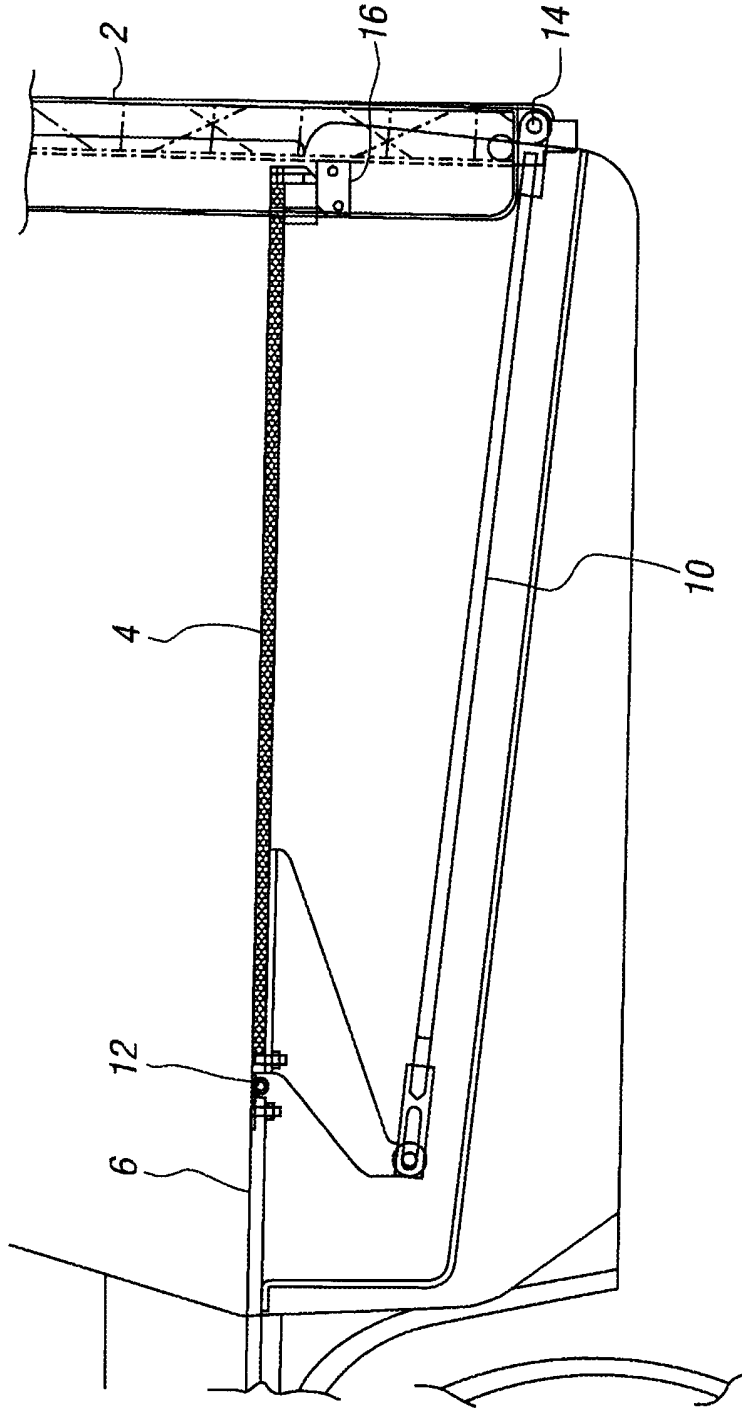
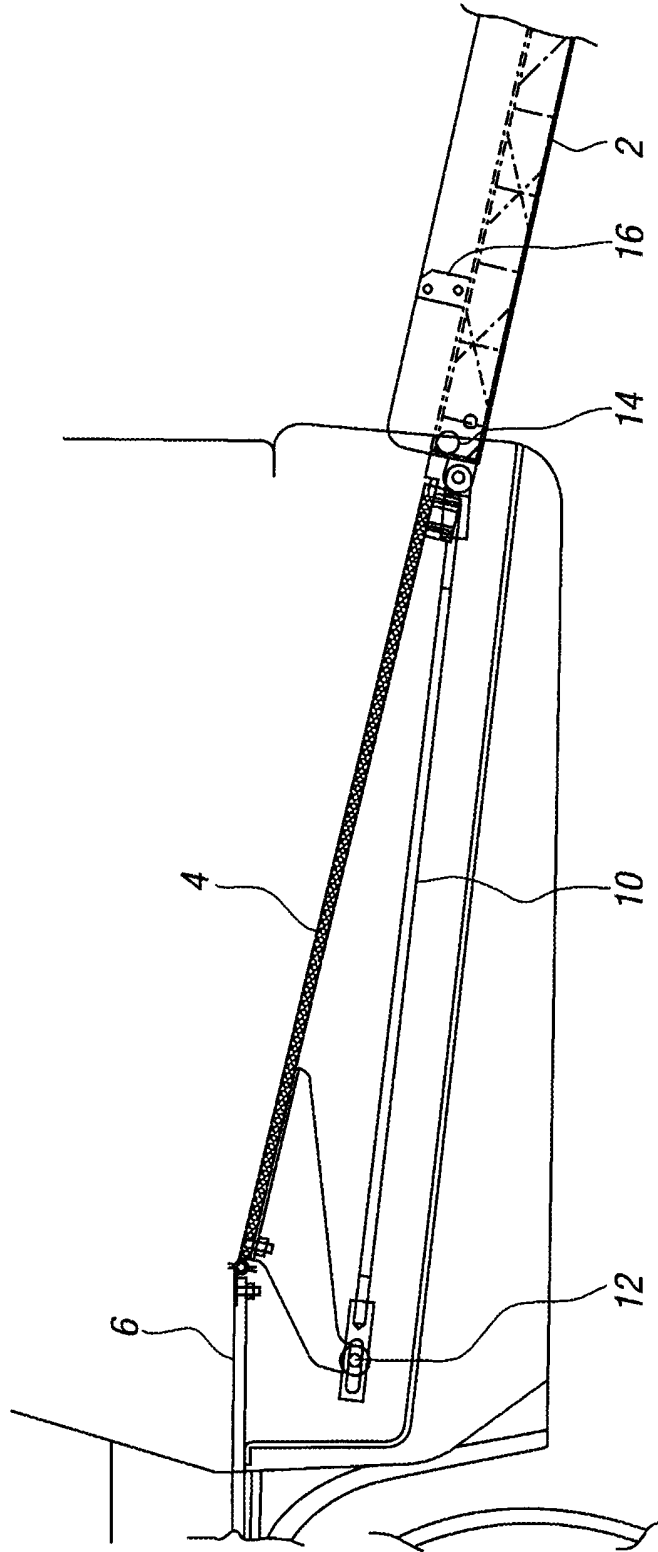


FIG. 3

44 43 05

4/5



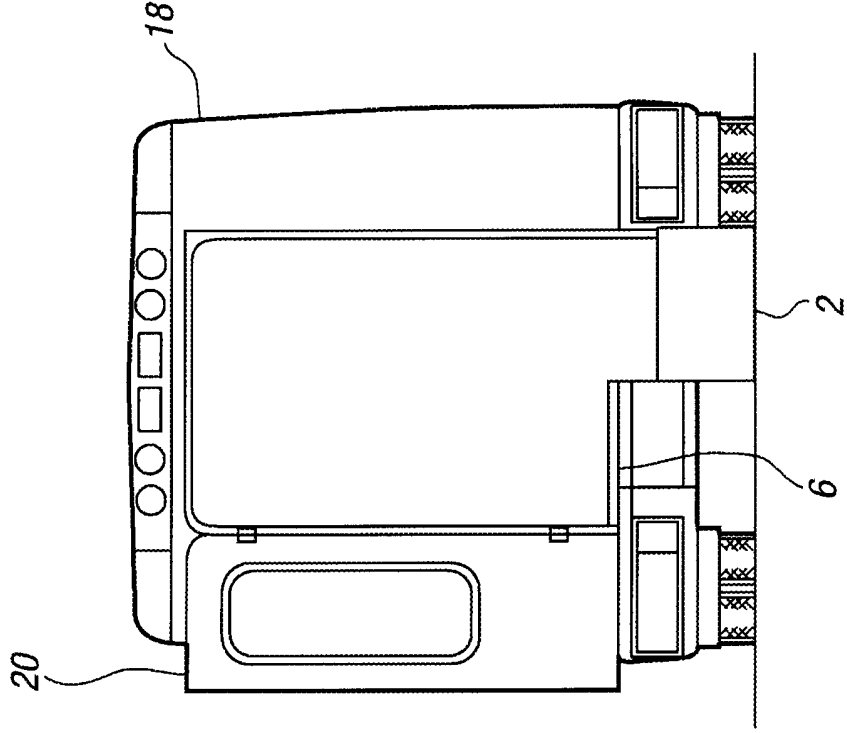


FIG. 6

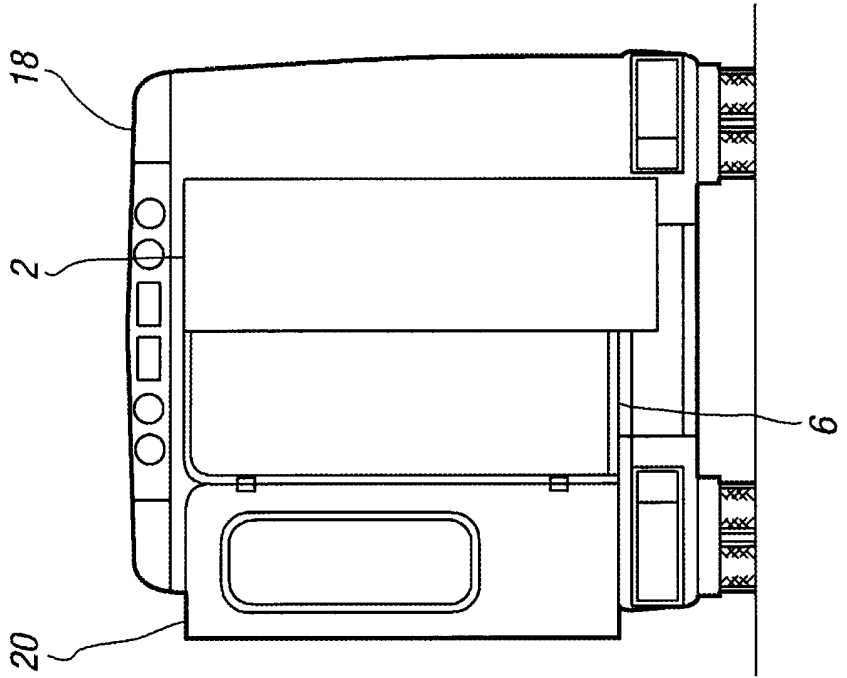


FIG. 5

Ramp Device

The invention to which this application relates is a ramp device suitable, although not exclusively, for the rear of a vehicle such as an ambulance.

Although the following description refers almost exclusively to use of ramp device for an ambulance, it will be appreciated by persons skilled in the art that the present invention can be used with other vehicles.

It is known to provide access ramps or lifts for vehicles, for example GB 2372482 discloses a platform lift suitable for an ambulance which can pivot to form the rear door of the vehicle. The lift has a lowered position to allow easy access for a trolley for example, a raised position where one end of the lift is raised, forming a ramp from the ground to the interior of the ambulance, and a closed position where the lift is pivoted to form the rear door of the ambulance.

In this example, undesirable delays can often occur if the ramp has to be lowered to enable a patient to be loaded onto the ambulance as the angle of the ramp in the raised position may be too high to facilitate the same. This angle should also be minimised for health and safety reasons. However, the minimum angle of the ramp while maintaining continuity with the inner floor of the vehicle is restricted by the length of the door and the height of the inner floor from the ground. Rear wheel drive vehicles in particular tend to have a higher inner floor relative to the ground than front-wheel drive vehicles. A further problem is that a kick plate provided to cover gaps between the floor and ramp can trap material as it is not wholly continuous with the vehicle floor.



The aim of the present invention is to provide a ramp device in a form which allows improved access to a vehicle.

In a first aspect of the invention, there is provided a ramp device for a vehicle, said ramp device capable of adjustment between a closed position where said ramp device is stored on the vehicle and an open position where said ramp device is moved such that one end lies adjacent the vehicle supporting surface, and wherein said device includes a ramp section and a floor section which together form an angled ramp in the open position.

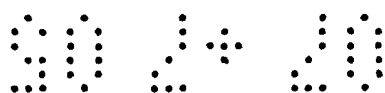
In one embodiment, in the closed position the floor section forms part of the internal floor of the vehicle, and in the open position the floor and ramp sections are substantially in line.

Preferably the ramp section forms part of and/or is in substantially the same plane as the back or side wall of the vehicle, when in the closed position.

The vehicle can thereby be provided with a ramp device partially formed from one of the rear doors. Together, the ramp section and the floor section form a longer ramp than disclosed in the prior art allowing the ramp to have a more acute angle to the vehicle supporting surface. This allows loading of the vehicle to be easier and safer.

Preferably the floor section is in substantially the same plane as the internal floor of the vehicle when the device is in the closed position.

Preferably the floor section is of a similar width to that of the ramp section.



Alternatively the floor section extends between the internal walls of the vehicle.

In one embodiment the ramp device can be retrofitted to a vehicle to replace a conventional rear door.

In one embodiment the vehicle can be used for emergency services, for example an ambulance.

Preferably, the device can be provided with hydraulic means for adjustment between open and closed positions.

Typically the hydraulic means are connected to the ramp section and the floor section to allow simultaneous movement of the same.

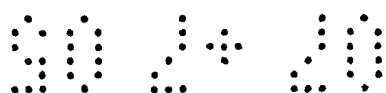
Typically the floor section can be pivotally connected to the internal floor of the vehicle at a point at or adjacent the internal floor of the vehicle.

Preferably the ramp section can be pivotally connected to the rear of the vehicle at a point lower than the internal floor of the vehicle.

Preferably the ramp section can be provided with a support to engage and support the floor section when the ramp device is in a closed position.

Preferably the vehicle can be provided with access means adjacent the ramp device which is uninhibited by the same.

Typically in use, a user operates the ramp device such that the ramp section is pivoted at the lower end connected to the vehicle, from a position where the ramp section is substantially



vertical, to a position where the ramp section forms an acute angle with the supporting surface. Preferably at the same time, the floor section is pivoted at the front end connected to the vehicle, from a position where the floor section is substantially horizontal, to a position where the floor section is substantially in line with the ramp section.

In a second aspect of the invention, there is provided a vehicle with an internal space bounded by at least walls and a floor, said floor including an adjustable floor section connected to a ramp section, such that said ramp section can be adjusted from a closed position in which the ramp section is in a substantially vertical plane, to an open position where one end of the ramp section is on or adjacent the vehicle supporting surface, and wherein said floor section is adjusted to form a ramp with said ramp section in the open position.

In one embodiment, when in the closed position, the ramp section forms part of the walls of the internal space.

In a third aspect of the invention, there is provided a vehicle with an internal space bounded by at least walls and a floor, said vehicle including a ramp device having a ramp section which can be adjusted from a closed position to an open position where one end of the ramp section is adjacent the vehicle supporting surface, and wherein said floor includes at least one floor section which is substantially in line with said ramp section at least when in the open position.

In one embodiment the floor section is permanently sloped or can be selectively moved to a sloped position.

In one embodiment, the floor section is provided of a similar width to that of the ramp section.



In an alternative embodiment two or more floor sections are provided which are narrower than the ramp section, and are wide enough to accept the wheels and/or legs of a trolley. Thus the floor is substantially continuous within the vehicle, with narrow sloping tracks therein to allow a trolley to be loaded.

Specific embodiments of the invention are now described wherein:-

Figure 1 illustrates a side view of a vehicle with a ramp device in the closed position.

Figure 2 illustrates a side view of a vehicle with a ramp device in the open position.

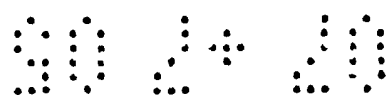
Figure 3 illustrates a more detailed side view of a vehicle with a ramp device in the closed position.

Figure 4 illustrates a more detailed side view of a vehicle with a ramp device in the open position.

Figure 5 illustrates a rear view of a vehicle with a ramp device in the closed position.

Figure 6 illustrates a rear view of a vehicle with a ramp device in the open position.

With reference to Figure 1, there is illustrated a vehicle with a ramp device including a ramp section 2 and a floor section 4. When the ramp device is in the closed position as illustrated, the ramp section 2 is substantially vertical and engages with the vehicle body 18 and the adjacent door, and the floor section 4 is



in substantially the same plane as the adjacent vehicle floor 6, thereby effectively forming part of the vehicle floor 6.

Referring to Figure 2, there is illustrated a vehicle with a ramp device in the open position. The ramp section 2 is pivotally connected to the vehicle, at a point lower than the vehicle floor 6, such that one end of the ramp section 2 can be lowered to the ground 8. The floor section 4 is also pivotally connected to the vehicle floor 6, such that one end can be lowered to a level such that the floor section 4 and ramp section 2 are continuous. Hydraulic means 10 are provided to adjust the device between open and closed positions.

As the ramp provided by the ramp device in the open position is longer than that which would be provided by a ramp section alone, the angle is shallower and it is therefore safer and easier to load the vehicle.

Referring to Figures 3-4, the ramp device is shown in more detail, indicating the floor section pivot point 12 and the ramp section pivot point 14. The ramp section may also be provided with a floor support 16 to help support the floor section 4 when the ramp device is in a closed position.

Referring to Figures 5-6, the ramp device is shown in relation to the vehicle body 18 and the adjacent door 20, which allows access to the vehicle when open, irrespective of the ramp device position.

In use, as a user lowers the ramp section 2 around pivot point 14 from a vertical position to a position in contact with and at an angle to the support surface, the hydraulic means 10 causes one end of the floor section 4 to lower, pivoting about pivot



point 12, such that the floor section 4 is brought into line with the ramp 2 section to form a continuous ramp.

As a user raises the ramp section 2 back into the upright position, the end of the floor section 4 is also raised such that the floor section 4 is brought into line and forms a continuous section of the floor of the vehicle.

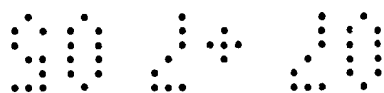
Alternatively the floor section can be provided as a fixed ramp (not shown) which would be cheaper and easier to manufacture. Further alternatively, the floor of the vehicle could be provided with two narrow sloping sections or tracks disposed therein (not shown) to allow a trolley to be loaded onto an ambulance, the legs passing along the sloping tracks in the floor into the internal space of the ambulance. The floor of the vehicle is substantially continuous as the tracks are narrow. Of course in this example the trolley would need to be able to pass over the edge of the ambulance floor, to allow the legs to enter the sloping tracks when loading the trolley.

It will be appreciated by persons skilled in the art that the present invention also includes further additional modifications made to the device which does not effect the overall functioning of the device, such as the provision of decoration, a fabric or plastic covering to provide improved aesthetic appearance, and/or the like.

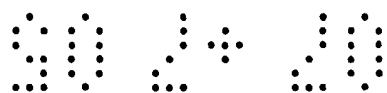


Claims

1. A ramp device for a vehicle, said ramp device capable of adjustment between a closed position where said ramp device is stored on the vehicle and an open position where said ramp device is moved such that one end lies adjacent the vehicle supporting surface, and wherein said device includes a ramp section and a floor section which together form an angled ramp in the open position.
2. A ramp device according to claim 1 wherein, in the closed position the floor section forms part of the internal floor of the vehicle, and in the open position the floor section and ramp section are substantially in line.
3. A ramp device according to claim 1 wherein the ramp section forms part of and/or is in substantially the same plane as the back or side wall of the vehicle.
4. A ramp device according to claim 1 wherein the ramp section forms one of the rear doors of the vehicle.
5. A ramp device according to claim 2 wherein the floor section is in substantially the same plane as the internal floor of the vehicle when the device is in the closed position.
6. A ramp device according to claim 1 wherein the floor section is substantially the same width as the ramp section.
7. A ramp device according to claim 1 wherein the floor section extends between the internal walls of the vehicle.



8. A ramp device according to claim 1 wherein the ramp device can be retrofitted to a vehicle to replace a conventional rear door.
9. A ramp device according to claim 1 wherein the vehicle is an ambulance or can be used for emergency services.
10. A ramp device according to claim 1 wherein hydraulic means are provided for adjustment of the ramp section and/or the floor section between open and closed positions.
11. A ramp device according to claim 10 wherein the hydraulic means are connected to the ramp section and the floor section to allow simultaneous movement of the same.
12. A ramp device according to claim 2 wherein the floor section is pivotally connected to the internal floor of the vehicle at a point at or adjacent the internal floor of the vehicle.
13. A ramp device according to claim 2 wherein the ramp section is pivotally connected to the rear of the vehicle at a point lower than the internal floor of the vehicle.
14. A ramp device according to claim 1 wherein the ramp section is provided with a support to engage and support the floor section when the ramp device is in a closed position.
15. A ramp device according to claim 1 wherein the vehicle is provided with access means adjacent the ramp device which is uninhibited by the same.



16. A vehicle with an internal space bounded by at least walls and a floor, said floor including an adjustable floor section connected to a ramp section, such that said ramp section can be adjusted from a closed position in which the ramp section is in a substantially vertical plane, to an open position where one end of the ramp section is on or adjacent the vehicle supporting surface, and wherein said floor section is adjusted to form a ramp with said ramp section in the open position.
17. A vehicle according to claim 16 wherein, when in the closed position, the ramp section forms part of the walls of the internal space.
18. A vehicle with an internal space bounded by at least walls and a floor, said vehicle including a ramp device having a ramp section which can be adjusted from a closed position to an open position where one end of the ramp section is adjacent the vehicle supporting surface, and wherein said floor includes at least one floor section which is substantially in line with said ramp section at least when in the open position.
19. A vehicle according to claim 18 wherein one floor section is provided and is substantially the same width as the ramp section.
20. A vehicle according to claim 18 wherein two or more floor sections are provided in the form of tracks to allow the wheels and/or legs of a trolley to pass therealong.





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Application No: GB0513260.0

Examiner: Mr Dave McMunn

Claims searched: 1-20

Date of search: 12 August 2005

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	1-8,10-12,16-19	US 4792274 A ✓ COCKRAM. See Figs & note hydraulic embodiment at column 7
X,Y	X:1,3-6,8-10,15-18 Y:8-10,15	GB 2372482 A ✓ RUMSEY & BOATWRIGHT. Note ramp portion 24 & floor portion 25
X,Y	X:1-3,6,13,18,19 Y:8-10,15,20	US 5137413 A ✓ RESSLER. See Figs
X,Y	X:1-3,6,7,13,18,19 Y:8-10,15,20	FR 2598362 A ✓ GRUAU CONSTRUCTEUR. See Figs & English abstract
X,Y	X:1-3,13,18,19 Y:8-10,15,20	WO 00/09060 A1 ✓ MAUBACH. See Figs & note English abstract
X	1,2,5,6,10-15,18	GB 2356847 A ✓ PASSENGER LIFT SERVICES. Note ramp & moving floor sections
Y	20	GB 2276592 A ✓ L T I ltd. Note separate tracks.

Categories:

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

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :



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Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

A61G; B60P

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

WPI, EPODOC