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(71) Applicant *(for all designated States except US)*: **Thule Sweden AB** [SE/SE]; Box 69, S-330 33 Hillerstorp (SE).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **ANDERSSON, Joakim** [SE/SE]; Ågatan 119, S-334 32 Anderstorp (SE). **LUNDGREN, Anders** [SE/SE]; Aspvägen 5, S-514 70 Grimsås (SE). **NILVIUS, Anders** [SE/SE]; Norra Torpgatan 7, S-331 35 Värnamo (SE). **LUNDSTRÖM, Camilla** [SE/SE]; Zenit Design Group AB, Industrigatan 4, S-212 14 Malmö (SE). **RITTFELDT, Mårten** [SE/SE]; Zenit Design Group AB, Industrigatan 4, S-212 14 Malmö (SE).

(74) Agent: **Valea AB**; Lindholmspiren 5, S-417 56 Göteborg (SE).

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(54) **Title**: CORD RETRACTOR FOR A LOAD CARRIER

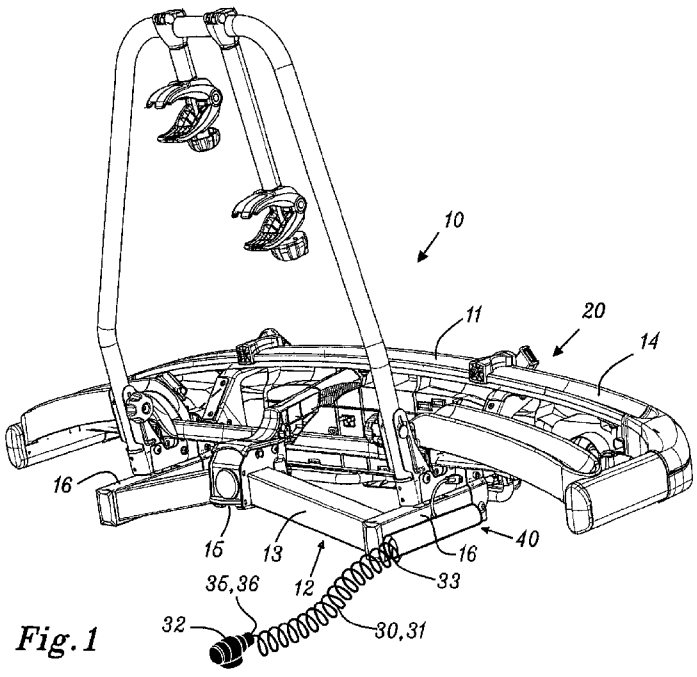

Fig. 1

(57) **Abstract**: The present invention relates to a load carrier (10) adapted to be mounted on a vehicle, the load carrier (10) comprises a frame structure (13, 14) comprising a connection member (15) connectable to the vehicle. The load carrier (10) optionally comprises a protective housing (40) adapted to receive and cover at least parts of a cord (31, 38) which is adapted to extend between the load carrier and the vehicle. The cord has a retracted position and an extracted position. At least parts the cord (31, 38) is adapted to be retracted into the protective housing (40) to the retracted position using a retraction force, the retraction force is imparted by a retraction member (50, 51) or by the cord (31, 38).

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CORD RETRACTOR FOR A LOAD CARRIER

TECHNICAL FIELD

The present invention relates to a load carrier for a vehicle, such as a bicycle carrier, which is attachable to the rear of the vehicle. The load carrier comprises a retractable and extractable cord adapted to extend between the vehicle and the load carrier.

BACKGROUND OF THE INVENTION

Load carriers, such a bicycle carriers, are often attachable to a tow bar of a vehicle. As such they generally tend to obstruct the rear lights, such as the brake lights and the flash indication lights. To overcome this, the more sophisticated load carriers has rear lights which are intended to complement or replace the function of the vehicles own rear lights. To power the lights of the load carriers an electrical cord is connected to the vehicle. There are however drawbacks with the load carriers of today. The cord is required to be of a minimum length as the load carrier is adapted to vehicles of different sizes and the plug contact of the vehicle can be positioned at different locations. One such solution is described in the European patent application no. EP 2,186,684 A1.

SUMMARY OF THE DISCLOSURE

If the cord between a load carrier and a vehicle is long, the cord can be dragged on the ground during use of the load carrier, or if the cord is winded up around parts of the load carrier, the cord can be pinched or crushed between various parts of the load carrier. Parts of the cord could also be positioned on the ground when not in use subjected to moisture, dirt and a corroding environment.

The present disclosure is directed to a load carrier adapted to be mounted on a vehicle, the load carrier comprises a frame structure comprising a connection member connectable to the vehicle, a load carrier surface for carrying a load, a cord having a retracted position and an extracted position and which is connectable to the vehicle so that the cord extends between the vehicle and the load carrier. The cord is adapted to be retracted, optionally continuously retracted, using a retraction force. The retraction force is

imparted by a retraction member or by the cord. As such the cord can be maintained stretched and is less exposed to the surrounding environment of the vehicle, such as dirt on the ground or grabble from a road. It further enables the cord to be retracted while connecting the cord to the vehicle, without further operation steps by the user.

The load carrier optionally comprises a protective housing adapted to cover at least parts of the cord when the cord is in the retracted position and in that at least parts the cord is adapted to be retracted into the protective housing using a retraction force. The retraction force is imparted by a retraction member or by the cord.

This provides for a load carrier having a cord which can be protected by the protective housing during use by being retracted after the cord has been mounted to the vehicle. The cord can be maintained stretched and is less exposed to the surrounding environment of the vehicle, such as grabble from the road. Further, the cord is subjected to a reduced risk of being dragged on the ground or being crushed or pinched.

An efficient way of protecting the cord is to use the frame of the load carrier. In one embodiment, the protective housing is at least partly, or fully, formed by the frame of the load carrier. The protective housing could be formed by a void defined by all or some of the side walls of the frame, or chambers within the frame. This provides for a strong protective housing which does not involve additional attached protective housing structures to the frame.

According to an aspect of the invention, the protective housing is arranged on the frame of the load carrier. For example, the protective housing could be welded or attached using screws, bolts or the like to the frame. This enables an end user to attach the protective housing.

The frame of the load carrier can comprise a first and a second frame member. The first frame member is adapted to be attached to the vehicle, e.g. to a tow bar, via a connection member for example, and the second frame member can be displaceably arranged to the first frame member. This enables the second frame member to be displaced with respect to the first frame member, e.g. to gain access to the trunk of a car if the load carrier is mounted on the tow bar of a car. The second frame member advantageously comprises the load carrying surface. The load carrying surface could be arranged directly on the

second frame member or provided by a third member arranged on the second frame member, i.e. indirectly on the second frame member. For example, if the load carrier is a bicycle carrier, the second frame member could comprise at least one bicycle holder which are arranged on, attached to, or integrated with the second frame member.

According to an aspect of the invention, the first and/or the second frame member can comprise the protective housing. In an embodiment, the protective housing is arranged on, or in, the first frame member. This can be good as the first frame member is generally closer to the vehicle than the second frame member. Optionally, the protective housing can be arranged on, or in, the second frame member. Optionally, the protective housing can be arranged on, or in, both the first and the second frame members.

The protective housing can be sufficiently large to receive the full length of the cord, or optionally large enough to receive only parts of the cord. The protective housing could also be adapted to receive the full length of the cord and a plug contact, or a hook member, attached at one end of the cord.

According to an aspect of the invention, the cord extends from the inside of the protective housing to the outside of the protective housing. Optionally, the cord extends from the outside, to the inside, and back to the outside of the protective housing. The cord could further have a point of origin from the inside of the protective housing and thus be attached at an attachment point inside the protective housing. Such attachment point could be displaceable, e.g. on a conducting rail.

The load carrier can be mounted at the rear of a vehicle. For example, the connection member can be adapted to be mounted on a tow bar of the vehicle. Optionally it can be mounted directly to the rear end of the vehicle, usually using parts of the vehicle's chassi or vehicle body.

The cord can be in an extracted and retracted position. In the retracted position, parts of the cord, or the whole length of the cord, is arranged inside of the protective housing. The retraction force imparted to the cord could be enabled by the form of the cord, e.g. if the cord has a spiral form, the spiral form of the cord imparts the retraction force to the cord.

A retraction member can be arranged to impart the retraction force to the cord, especially when the cord is in an extracted position. If the cord is winded up around a hub, the retraction member could be adapted to impart a rotating motion to the hub, thus imparting a retraction force to the cord, when the cord is in an extracted position. The retraction member could be a biasing member, spring member or an elastic member, e.g. manufactured from an elastic polymer such as synthetic or natural rubber.

The cord can be an electrical cord, e.g. of a sheath/core configuration or it can be a safety cord, such as a steel cord, steel wire or the like.

According to an aspect, the present invention relates to a load carrier adapted to be mounted on a vehicle, the load carrier comprises a frame structure comprising a connection member connectable to the vehicle. The load carrier comprises a protective housing adapted to receive and cover at least parts of a cord which is intended to extend between the load carrier and the vehicle. The cord has a retracted position and an extracted position. At least parts the cord is adapted to be retracted into the protective housing to the retracted position using a retraction force, the retraction force is imparted by a retraction member or by the cord.

By the term "mounted on a vehicle" is hereby meant that the load carrier does not use any ground support but the load is fully supported and indirectly carried by a part, or parts, of the vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention will be described in greater detail with reference to the accompanying figures in which;
figure 1 shows a load carrier in the form of a bicycle carrier with a protective housing arranged on parts of the frame structure of the load carrier and a retractable cord;
figure 2 shows the load carrier in figure 1 with a protective housing arranged on parts of the frame structure of the load carrier and a retractable cord retractable around a hub and;
figure 3 shows parts of a frame structure for a load carrier, such as a bicycle carrier, with a retractable cord, the protective housing is formed by parts of the frame structure.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 shows a load carrier 10 in the form of a tow bar mountable bicycle carrier 11, hereafter referred to only as the bicycle carrier 11. The bicycle carrier 11 is adapted to carry one or two bicycles (not shown) after being mounted to a tow bar (not shown) of a vehicle such as a car (not shown). Other examples of embodiments of the invention could be bag carriers, luggage carriers, box carriers, wheel chair carriers, ski carriers.

The bicycle carrier 11 comprises a frame structure 12. The frame structure 12 comprises a first and a second frame member 13, 14. The first frame member 13 comprises a connection member 15 adapted to be connected to the tow bar. The second frame member 14 comprises a load carrier surface 20 adapted to carry a load, in this case one or two bicycles. The second frame member 14 is displaceably connected to the first frame member 13 thus enabling the second frame member 14 to be displaced with respect to the first frame member 13 for providing access to a rear trunk of the vehicle for example. The second frame member 14 is pivotally connected to the first frame member 13 but can as an option be displaceable along an arc-shaped path or pivoted aside for example.

The connection member 15 is adapted to encompass the ball of a tow bar in a known manner and will thus not be described further herein.

The load carrier 10 can comprise electrical components, e.g. in the form of brake lights and/or flashing indicator lights. This is advantageous as the load carrier, when mounted at the back of a vehicle, can obstruct the brake lights and the flashing indicator lights of the vehicle. License plate illumination lights can also be provided on the load carrier 10. The load carrier 10, e.g. bicycle carrier 11, comprises at least one electrical component in the shown embodiment. The electrical component could be a connection site such as a socket, such as a brake light socket, it could be the lamp itself or any other device using electricity as a power source. Other electrical components could be an electrical motor, e.g. for displacing the second frame member or for lifting a load to the load surface, a charging station or the like. The electrical component can be arranged on the first frame member 13 and/or the second frame member 14, advantageously the second frame member 14.

To transfer electrical power, the bicycle carrier 11 comprises at least one electricity transferring member 30, in the shown embodiment in the form of an electricity cord 31.

The electricity cord 31 comprises a first and a second end 32, 33. The first end 32 comprises a connection member 35 in the form of a plug contact 36. The connection member 35, in this case the plug contact 36, is adapted to be connected to a corresponding plug contact on the vehicle. The second end is arranged to the bicycle carrier 11 and adapted to directly or indirectly transfer electricity to the electrical component such as a socket, or the like.

As shown in figures 1-2, the load carrier 10, in the shown embodiment the bicycle carrier 11, comprises a protective housing 40 into which the electricity transferring member 30 can be at least partly retracted. In the shown embodiment, the electricity cord 31 is retracted by means of the spiral shape of the electricity cord 31 which imparts a retraction force to the electricity cord 31. In other embodiments a separate retraction member can be used to impart the retraction force to the electricity cord 31.

When the plug contact 36 is not in use, the whole electricity cord 31 or at least parts of the electricity cord 31 is arranged inside of the protective housing 40. The protective housing 40 protects the electricity cord 31 from dirt, wear and tear. When the plug contact 36 is connected to a vehicle, the retraction force at least temporarily retracts parts of the electricity cord 31, so that the electricity cord 31 is substantially stretched between the protective housing 40 and the corresponding plug contact of the vehicle. Optionally, the retraction force can be temporarily disabled using a lock mechanism or similar afte the electricity cord 31 has been retracted to its stretched state.

Figure 2 shows an embodiment in which the electricity cord 31 is winded up on a roll 41. The roll 41 has a rotateable hub which the electricity cord 31 can be retracted and extracted from. In this case the electricity cord 31 is advantageously straight, i.e. no spiral form.

Figure 3 shows parts of a bicycle carrier 11 as shown in figures 1-2, but the embodiment is applicable on any load carrier. The frame structure 12, in this case the first frame member 13, comprises at least one hollow part, in the shown embodiment a bar 16. The hollow part is a part of the frame structure 12 which is adapted to impart rigidity to the frame or to another part of the frame structure 12. The hollow bar 16 is formed by walls 17, 18, 19, 20 defining a protective housing 40. In the embodiment in figure 3, the protective housing 40 is formed by a bar of the first frame member 13. It should be noted

that a similar or identical solution could be arranged on the second frame member 14. Of course both the first and the second frame members 13, 14 could be arranged with a protective housing as described herein. Furthermore, the protective housing could be formed by both the first and the second frame members 13, 14.

A retraction member 50 in the form of an elastic member 51 imparts a retraction force, i.e. a pulling force, to retract the electricity cord 31 into the protective housing 40. The retraction member 50 has a first and a second end 52, 53. The first end 52 of the retraction member comprises a wheel like member enabling the cord 31 to run smoothly during the extracting and retracting motion.

The retraction force acting on the electricity cord 31 can be acting continuously on the electricity cord 31 or momentarily. For example, the 41 shown in figure 2 could have a lock mechanism which can lock the electricity cord 31 from retraction.

According to an aspect of the invention, the cord described above is a safety cord adapted to secure the load carrier to the vehicle. In cases of an accident, such as a collision or if the load carrier accidentally disconnects from the vehicle, the safety cord is adapted to secure the load carrier to the vehicle. An example of a safety cord is shown as a steel cord 37 in figure 2. This is illustrated as a dashed steel cord 37 in figure 2 which extends into the protective housing 40. The retraction member and the protective housing, the frame structure, the load carrier and any other feature as described herein with respect to the electrical cord 31 is also applicable to a safety cord.

The steel cord 37 can be arranged with a hook member 38, which in this embodiment is a spring safety hook.

The cord can thus be an electricity cord with a sheat core configuration or a metal cord, such as a wire.

CLAIMS

1. A load carrier (10) adapted to be mounted on a vehicle, said load carrier (10) comprises
a frame structure (13, 14) comprising a connection member (15) for connecting said frame structure (13, 14) to said vehicle,
a load carrier surface for carrying a load,
a cord (31, 38) which is connectable to said vehicle so that said cord (31, 38) extends between said vehicle and said load carrier (20),
characterized in that
said cord (31, 38) has a retracted position and an extracted position, and in that at least parts of said cord (31) is adapted to be retracted using a retraction force, said retraction force is imparted by a retraction member (50, 51) or by said cord (31, 38).

2. The load carrier according to claim 1, wherein said frame structure (13, 14) comprises a protective housing (40) adapted to cover at least parts of said cord (31, 38) when said cord (31, 38) is in said retracted position.

3. The load carrier according to claim 2, wherein said protective housing (40) is formed by said frame structure (13, 14) of said load carrier (10).

4. The load carrier according to claim 3, wherein said frame structure (13, 14) of said load carrier (10) comprises a void (16) having side walls (17, 18, 19, 20), said void (16) defines said protective housing (40).

5. The load carrier according to claim 2, wherein said protective housing (40) is separately arranged on said frame structure (13, 14) of said load carrier (10).

6. The load carrier according to any of the receding claims, wherein said frame structure (13, 14) of said load carrier (10) comprises a first and a second frame member (13, 14), said first frame member (13) being adapted to be attached to said vehicle and wherein said second frame member (14) is displaceably arranged to said first frame member (13).

7. The load carrier according to claim 6, wherein said second frame member (14) comprises said load carrier surface for carrying a load.

8. The load carrier according to claim 6 or 7, wherein said first frame member (13) comprises said protective housing (40).

9. The load carrier according to claim 6 or 7, wherein said second frame member (14) comprises said protective housing.

10. The load carrier according to any of the claims 2-9, wherein said protective housing (40) is adapted to receive the full length of said cord (31, 38).

11. The load carrier according to any of the any of the claims 2-10, wherein said cord (31, 38) comprises a first and a second end (32, 33), wherein said first end (32) is attached at an attachment point inside said protective housing (40).

12. The load carrier according to any preceding claims, wherein said cord (31) is an electricity cord (31) adapted for transfer of electricity from said vehicle to at least one electrical component of said load carrier (10).

13. The load carrier according to any of the preceding claims, wherein said connection member (15) is adapted to be mounted on a tow bar on said vehicle.

14. The load carrier according to any of the preceding claims, wherein said retraction force is imparted to said cord (31, 38) via a rectraction member (50, 51, 40, 41).

15. The load carrier according to claim 14, wherein said retraction member (50, 51, 40, 41) is a biasing member, spring member or an elastic retraction member (51).

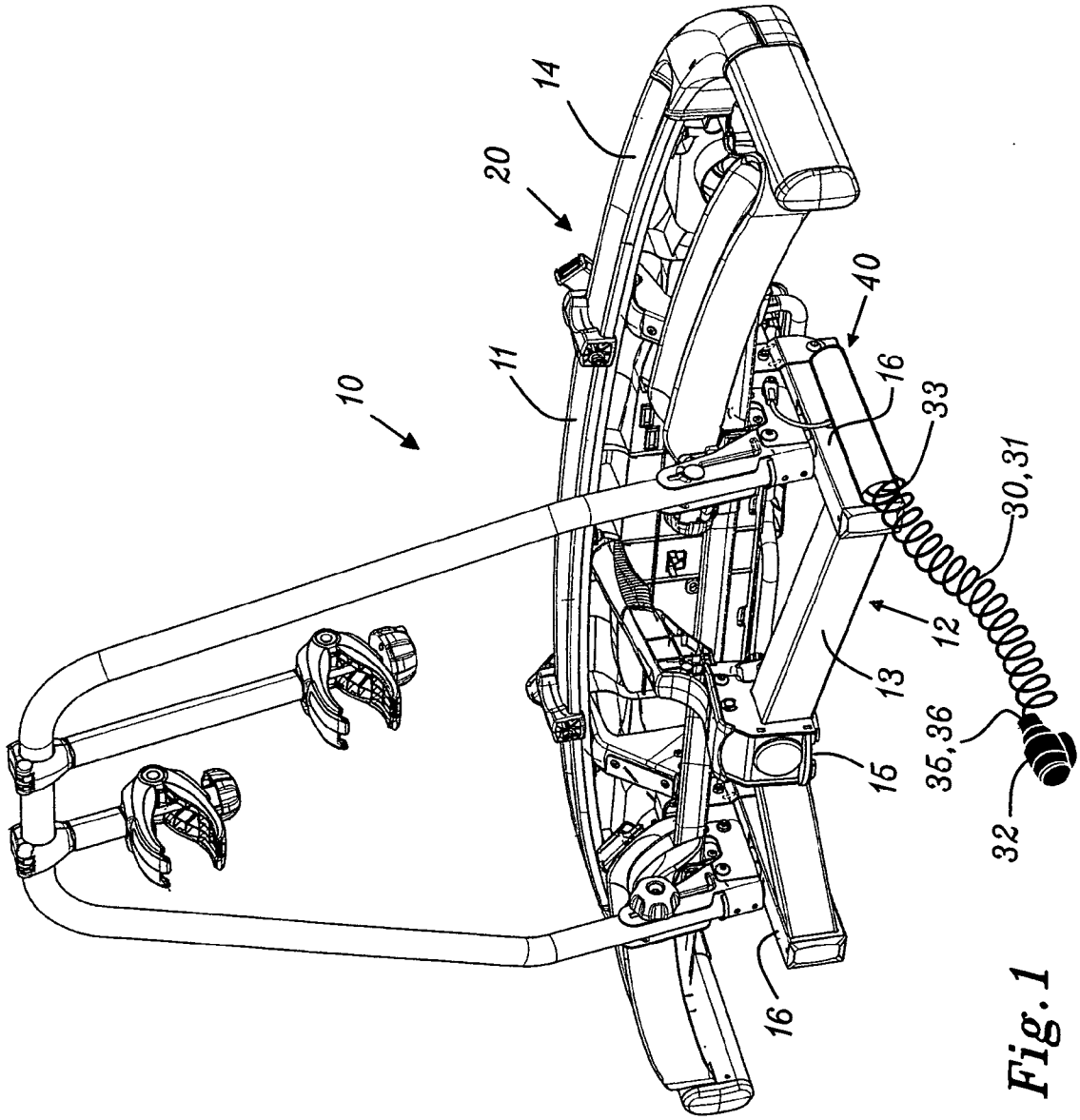

Fig. 1

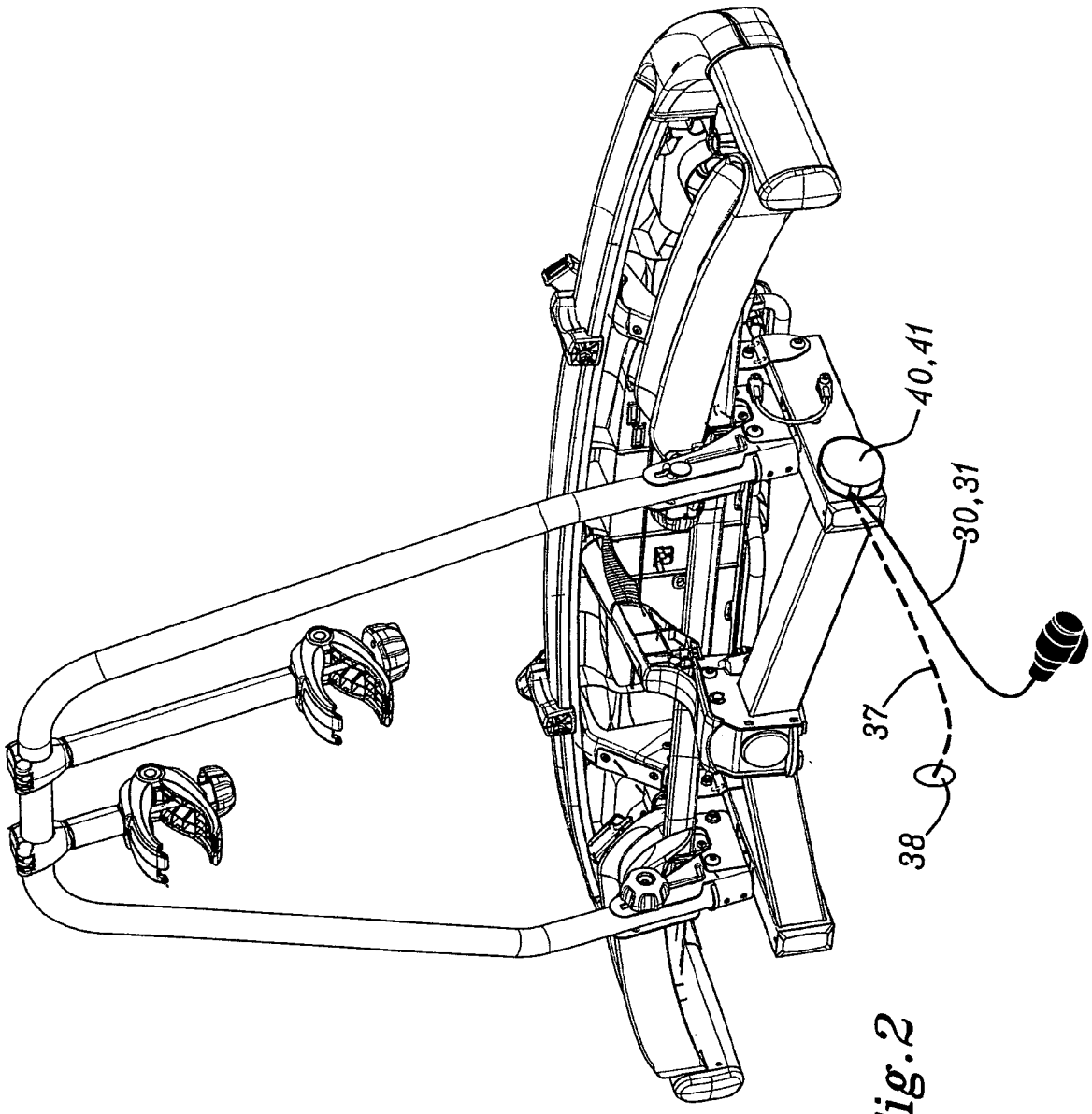

Fig.2

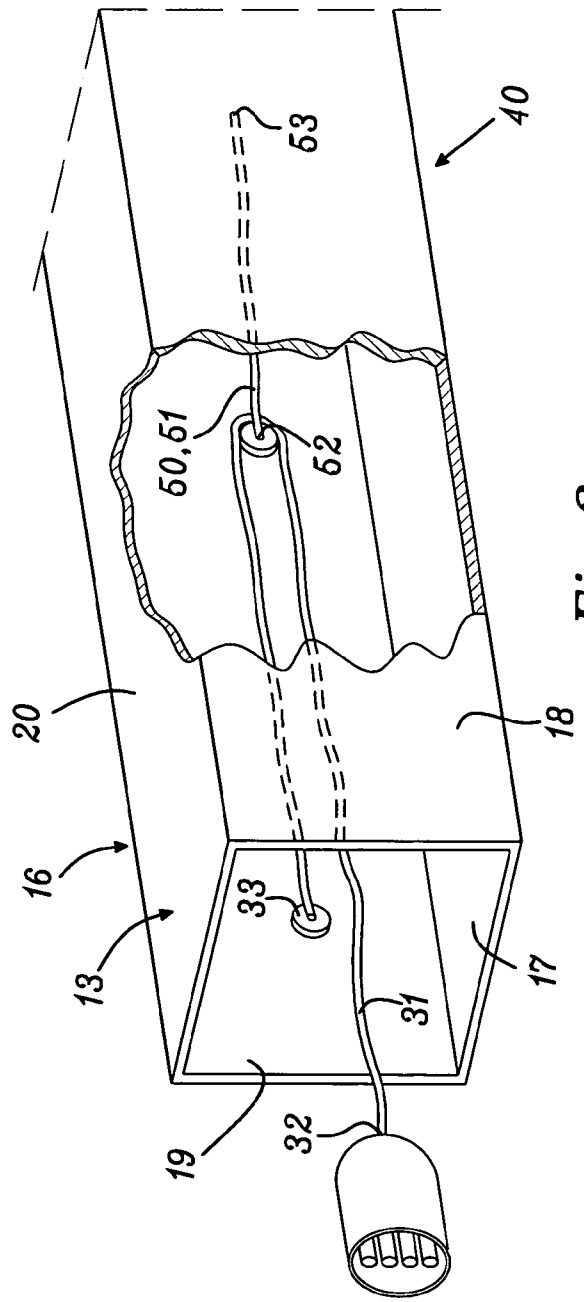

Fig.3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/052018

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60R9/06 B60R9/10
ADD.

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)
B60R

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 practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 386 514 B1 (RAY JOHN D [US]) 14 May 2002 (2002-05-14) column 3, lines 29-46 column 4, lines 42-60; figures 1-3	1-15
X	US 5 967 734 A (LIU JIMMY [US]) 19 October 1999 (1999-10-19) column 3, lines 57-63; figures 1,2,3	1-15
A	EP 2 186 684 A1 (WESTFALIA AUTOMOTIVE GMBH [DE]) 19 May 2010 (2010-05-19) cited in the application the whole document	1-15

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
7 December 2011	14/12/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Cãlãmar, George

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2011/052018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6386514 B1	14-05-2002	NONE	
US 5967734 A	19-10-1999	NONE	
EP 2186684 A1	19-05-2010	DE 102008057181 A1	20-05-2010
		EP 2186684 A1	19-05-2010