

WO 2009/082292 A1

A clip device, a system for attachment of conduits comprising said clip device as well as a heavy vehicle comprising said clip device and/or system.

TECHNICAL FIELD

The invention relates to a clip device for a heavy vehicle according to the preamble of
5 claim 1, and a system for attachment of conduits to a heavy vehicle frame according to the preamble of claim 14.

The invention is applicable on heavy vehicles, in particular trucks. The invention is, however, not restricted to trucks, but may also be used for example in wheel loaders,
10 articulated haulers, excavators, and buses.

BACKGROUND OF THE INVENTION

In the field of heavy motor vehicles, such as a truck in the form of a rigid or a semi-tractor, it is necessary to arrange bundles of conduits along the frame side of the vehicle. These
15 conduits can be arranged between for example the cabin, the drive unit and the chassis of the vehicle. The conduits can be for example electrical cables for supplying electrical devices with electric current from a battery arranged in the vehicle or for transferring of control signals to different components.

20 A truck is also usually provided with other types of conduit, such as water tubes, hydraulic hoses and similar, i.e. conduits for liquids which are also necessary in order to provide certain functions in the vehicle. A further type of conduit is conduits for pneumatic components which can be used for example for feeding compressed air to an air suspension system, wheel brakes or any other pneumatic-controlled equipment.

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Consequently, there is a need for arranging bundles of conduits of various types at the frame side of the truck. These conduits are to be routed in certain ways in each individual vehicle according to specifications related to the type of equipment which is arranged in the vehicle. However, due to variations which occur in the specifications of each given
30 vehicle, for example regarding the choice of engine and transmission, vehicle dimensions, the number of wheel axles, the design of the driver's cabin etc., a very large number of combinations of equipment will be the result. This implies that it can be many alternatives for routing the bundles between the different associated components in the vehicle. The

large number of conduits and the large number of different combinations of conduits are problematic, since the routing and suspension of the bundles require a time-consuming and costly wiring and mounting procedure. Accordingly, the procedure for mounting the conduits will increase the costs of the vehicle.

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SUMMARY OF THE INVENTION

An object of the invention is to provide a clip device for a heavy vehicle of the kind as mentioned in the introduction herein, by which clip device a cost-effective solution for suspension of conduits extending between different units in a heavy vehicle can be
10 obtained.

This object is achieved by a clip device for a heavy vehicle according to claim 1.

By the provision of a clip device for a heavy vehicle, which clip device has a first leg and a
15 *second leg for clamping the device onto a flange of a heavy vehicle frame rail, and the clip device is adapted to be retained by means of internal spring force of the clip device when the first and second legs are situated on opposite sides of the flange and abut the flange during influence of said internal spring force, wherein the clip device further comprises a means for suspension of at least one conduit, and the first leg has a means for*
20 *engagement with a transition zone between the flange and a further portion of the heavy vehicle frame rail, the procedure for mounting conduits to the frame of a vehicle can be simplified.*

By the use of the clip device according to the invention the clip device can be mounted
25 without bolts or making holes in the frame, since the clip device is retained on the flange by the spring force of the clip device itself. The elimination of bolts is also advantageous since it will decrease the weight and assembling costs.

In addition, the engagement means for engagement with the transition zone between the
30 flange and a further portion, preferably a web of the frame rail implies that the spring force of the clip device can be decreased compared to other already known clip devices, since the engagement between the clip device and the flange will also contribute to retain the clip device in desired position on the flange. This is important because too high spring force would make it more difficult to arrange the clip device on the flange. Furthermore,
35 the contact force between the clip device and the flange is not allowed to exceed a certain

value because otherwise there will be damage to the surface of the flange. Any damage to the varnish of the flange, which in turn can lead to corrosion and other problems, has to be avoided.

- 5 According to another aspect of the invention a system for attachment of conduits to a heavy vehicle frame according to claim 14 is provided.

The system comprises a heavy vehicle frame rail having a web and a flange, and a clip device according to the invention, wherein the clip device is adapted to be arranged on
10 the flange such that substantially the entire first leg is situated on the flange side of a geometrical plane defined by the main extension of an outer surface of the web. This implies that the clip device can be positioned in any position along the rail and moved along the rail to a desired position without interfering with other components arranged on the outside of the web.

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Usually a heavy vehicle frame rail is a U-beam arranged such that the flanges are directed inwardly and the outer surface of the vertical web forms the outer lateral limiting surface of the current frame side. Since there are many components to be arranged on the outside of the frame side of a truck, a clip device which occupies space at the outside
20 of the web, i.e. extends beyond the geometrical plane defined by the web surface, can only be arranged at certain predetermined positions which are free from other components.

The system according to the invention makes the routing of conduits more flexible
25 because the conduits or cables can be prepared in bundles with cable ties or tie wraps and coupling means for connection to the clip devices. This can for example be accomplished by the sub-supplier of conduits. Thereafter, the bundle of conduits can be coupled to a number of clip devices and finally the clip devices provided with the conduits are clamped on the flange. In this way, the position of each clip device is determined by
30 the current conduit bundle rather than by any free space available on the frame side because the clip device according to the invention will not interfere with other components and can be arranged in any desired position along the frame rail.

The invention also relates to a heavy vehicle comprising a clip device and/or system
35 according to the invention.

Further advantages and advantageous features of the invention are disclosed in the following description and in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

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With reference to the appended drawings, below follows a more detailed description of embodiments of the invention cited as examples.

In the drawings:

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Fig. 1a is a perspective view of a clip device according to the invention arranged on a flange of a heavy vehicle frame rail,

Fig. 1b is a view corresponding to Fig. 1 where the conduits have been attached to the clip device by means of a snap coupling,

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Fig. 1c is a perspective view of an alternative embodiment of the clip device according to the invention,

20 Fig. 2a is a cross section view of the clip device and the heavy vehicle frame rail in Fig. 1,

Fig. 2b is an enlarged view of the transition zone between the flange and a web of the heavy vehicle frame rail, and

25 Fig. 3 is a heavy vehicle provided with clip devices according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

In for example Figs. 1a and 1b a clip device for suspension of at least one conduit, and a system for attachment of conduits to a heavy vehicle frame are illustrated. Although a lot of examples of conduits used on trucks already are mentioned herein, it is stressed that the expression "conduit" is meant to comprise different kind of pipes and hoses for liquid as well as gas or gas mixtures, and cables and electrical wires for providing energy or transferring control signals to different components. Furthermore, one single clip device

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according to the invention can be used for suspension of one or more conduits, and preferably for suspension of several conduits arranged in a bundle.

The clip device 1 comprises a first leg 2 and a second leg 3 for clamping the clip device
5 onto a flange 4 of a heavy vehicle frame rail 5. The device 1 is retained at the flange 4 by means of internal or inherent spring force of the device. The first leg 2 and the second leg 3 are situated on opposite sides of the flange 4, and the first leg and the second leg about the flange during influence of said internal spring force of the clip device. The first and second legs are connected to each other, preferably by a curved portion 6 to be situated
10 at the outer edge 7 of the flange 4 when the clip device 1 is installed on the flange 4. The internal spring force can be achieved by means of the first leg 2 and/or the second leg 3 and/or any portion 6 which connects the first leg and the second leg to each other. Accordingly, if the first leg and the second leg are moved away from each other, i.e. are bent in opposite directions, the internal spring force acts to counteract such a movement.
15 The clip device can be designed with a gap between the first leg and the second leg when the clip device is in an unloaded condition or without a gap which implies that the first leg and the second leg has a contact point in an unloaded condition. The distance between the first and second legs is preferably adapted to the thickness of the flange.

20 The clip device 1 can be made of spring steel to obtain and maintain the desired configuration and spring characteristics. The stiffness and the resilient characteristics of the clip device can be achieved by means of the shape and the current material of the clip device. The clip device is preferably made of stainless high-tensile steel, although other materials with similar characteristics can be used. For example, in some applications the
25 clip device could be made by carbon fibre reinforced plastics. Thus, there is no need of any bolts or similar external means for clamping the clip device on the flange.

The first leg 2 is intended to be arranged at the outside 8 of the flange 4 and the second leg 3 is intended to be arranged at the inside 9 of the flange 4. The second leg 3 can have
30 a free end portion 10 with an extension in a direction substantially in perpendicular to the main extension direction of the first leg 2, where the second leg end portion 10 points away from the first leg 2, as illustrated in Figs. 1a and 1b. In another embodiment of the invention the second leg 3 has a free end portion 10c with an extension in a direction substantially in parallel to the main extension direction of the first leg 2, where the second
35 leg end portion 10c points in opposite direction to the first leg 2, as illustrated in Fig. 1c.

The shape and size of the second leg 3 can be adapted to the current free space inside the rail which in turn can be dependent on the frame type and/or components arranged on the inside of the frame rail.

- 5 The clip device 1 comprises a means 11 for suspension of at least one conduit 12. The suspension means 11 are preferably situated at the second leg 3 as illustrated in the figures. The suspension means 11 preferably comprises a component 13 having a first part 14 of a coupling in the form of a snap-in member for connection to a corresponding second part 15 of the coupling. The suspension means 11 illustrated in Figs. 1a and 1b
10 comprises said second part 15 of the coupling. The second part 15 of the coupling is arranged on a further component 16 provided with a tie wrap 17 for receiving said at least one conduit 12. Although such a snap-in coupling means is described herein, also other suspension means can be used. For example, the second leg end portion can be provided with a certain shape and/or an aperture or recess for receiving a tie wrap in order to
15 attach the conduit or conduits directly to the second leg end portion.

- In another embodiment of the clip device according to the invention the device is provided with two second leg end portions. For example, the second leg could be split into two second leg end portions corresponding to the end portions illustrated in Figs. 1a and 1c.
20 This implies that such a device is a combination of the embodiments in Figs. 1a and 1c. In this case each second leg end portion has an attachment point for receiving conduits. The upright second leg end portion (corresponding to Fig. 1a) can be provided with a snap coupling means as illustrated in Fig. 1a and the horizontal second leg end portion (corresponding to Fig. 1c) can be provided with an aperture for receiving a tie wrap and
25 attachment of conduits directly to the second leg end portion.

- As can be seen from Fig. 2a, in accordance with the invention the first leg 2 has a means 18 for engagement with a transition zone 19 between the flange 4 and a further portion 20 of the heavy vehicle frame rail 5. The flange 4 and the further portion 20 extend in
30 different directions. The transition zone 19 is the zone where the flange 4 changes into said further portion 20 and vice versa. In the illustrated embodiment, said further portion is the web 20 of the heavy vehicle frame rail 5, and the engagement means 18 is adapted for engagement with the transition zone 19 between the flange 4 and the web 20. The flange 4 and the web 20 are preferably angled 90° relative to each other. The
35 engagement means 18 counteracts movement of the clip device 1 away from the frame

rail 5 in the flange direction. Thereby the clip device 1 is retained on the flange by a combination of the internal spring force and the engagement between the device and the transition zone of the frame rail.

- 5 Since the transition zone 19 usually is a curved portion having a certain radius R the engagement means 18 comprises a curved portion of the first leg 2 adapted to engage the corresponding curved portion of the transition zone 19. Accordingly, the curved portion of the first leg has preferably an inner radius R adapted to engage an outer radius R of the transition zone. This inner radius is preferably approximately of the same size as the outer
10 radius R of the transition zone 19. The engagement means 18 is preferably arranged in a free end portion 21 of the first leg 2.

In order to increase the friction between the clip device and the frame rail an additional material layer can be arranged between the clip device 1 and the frame rail 5. For
15 example, a relatively thin rubber layer (not shown) can be arranged between the first leg 2 and the frame rail 5 so as to increase the friction and provide protection against corrosion. The rubber layer is preferably vulcanized on the clip device 1, on the first leg 2 for instance, although rubber or other materials could be arranged by alternative methods. Plastic layers or tapes arranged by means of an adhesive are also possible solutions. In
20 addition granules which can increase the friction can be contained in a tape to be arranged on the clip device. Of course such an additional layer of material can also be arranged on the frame rail if desired.

As an alternative or in combination with an additional layer of material, at least a portion of
25 a surface of the first leg can be subjected to a surface treatment to increase the friction coefficient thereof. The first leg of the clip device can be roughened by means of blasting or any similar method, by chemical treatment, etc.

In for example Figs. 1a, 2a and 2b, a system for attachment of conduits to a heavy vehicle
30 frame is also illustrated. The system comprises a heavy vehicle frame rail 5 in the form of a U-beam having a vertical web 20 and two laterally directed flanges 4. The clip device 1 is arranged on the lower flange such that substantially the entire first leg 2 is situated on the flange side 22 of a geometrical plane 23 which plane is defined by the main extension of an outer surface 24 of the web 20. In order to facilitate the mounting of the clip device 1
35 on the flange 4 and/or secure that substantially the entire first leg 2 is situated on the

flange side 22 of said geometrical plane, and not on the other side 25 thereof, the effective length L of the first leg 2 of the clip device 1 can be adapted to the length of the flange 4. In other words; the size and/or shape of the clip device 1 can be chosen such that the desired position of the clip device 1 can be reached more or less automatically
5 when the clip device 1 is pushed onto the flange 4 into its most inserted position. The shape of the first leg 2 of the clip device 1 can also be adapted to the shape of the flange 4 whereby it is possible to feel when the clip device 1 is in the intended position and to secure that the first leg 2 is kept on the flange side 22 of said geometrical plane 23. Usually the geometrical plane 23 is substantially vertical when the plane is defined by the
10 web 20 which normally is arranged vertical when the heavy vehicle frame rail 5 is installed in a heavy vehicle.

The shape of the first leg 2 can be adapted to the shape of the frame rail 5 such that along a major part of the length L of the first leg 2, the first leg 2 is in contact with the
15 frame rail 5 when the clip device 1 is installed on the frame rail. In addition to the fact that if the first leg follows the outer surface of the flange this enables a relatively compact solution, such an embodiment can also contribute to an increased friction between the flange 4 and the clip device 1. Furthermore, a major part of the surface of the first leg faced toward the frame rail is preferably in contact with the frame rail when the clip device
20 is installed on the frame rail.

In Fig. 3 a heavy vehicle 30 provided with clip devices 1 arranged on a frame rail 5 is illustrated. Conduits 12 are suspended by means of the clip devices 1.

25 It is stressed that all embodiments and features described with reference to the clip device herein can be used in the system according to the invention, and any embodiment or feature of the clip device described in context of the system is also applicable on the clip device according to the invention.

30 It is to be understood that the present invention is not limited to the embodiments described above and illustrated in the drawings; rather, the skilled person will recognize that many changes and modifications may be made within the scope of the appended claims. For example, if the frame is provided with an inner liner which implies that an additional frame rail is arranged inside the main frame rail, the gap between the first leg
35 and the second leg and/or the spring force characteristics of the clip device can be

modified in order to enabling clamping of the clip device over two flanges instead of one flange.

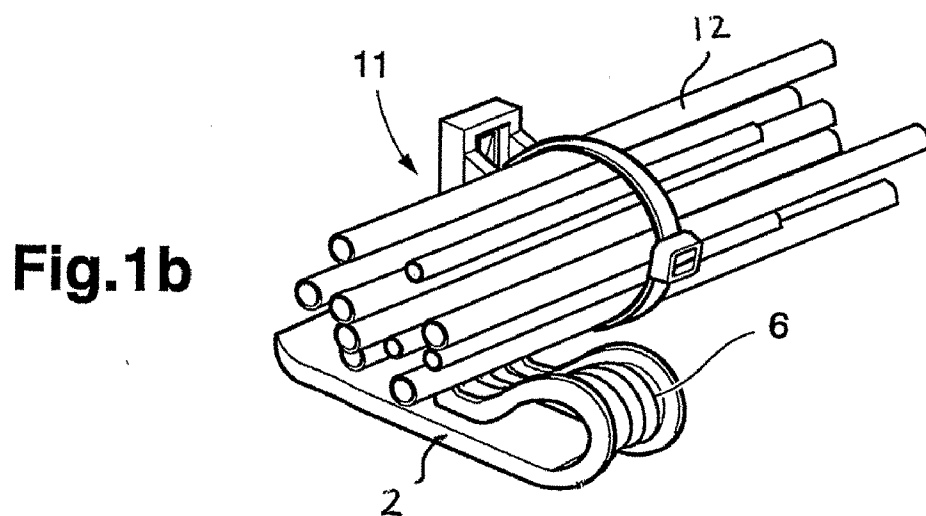
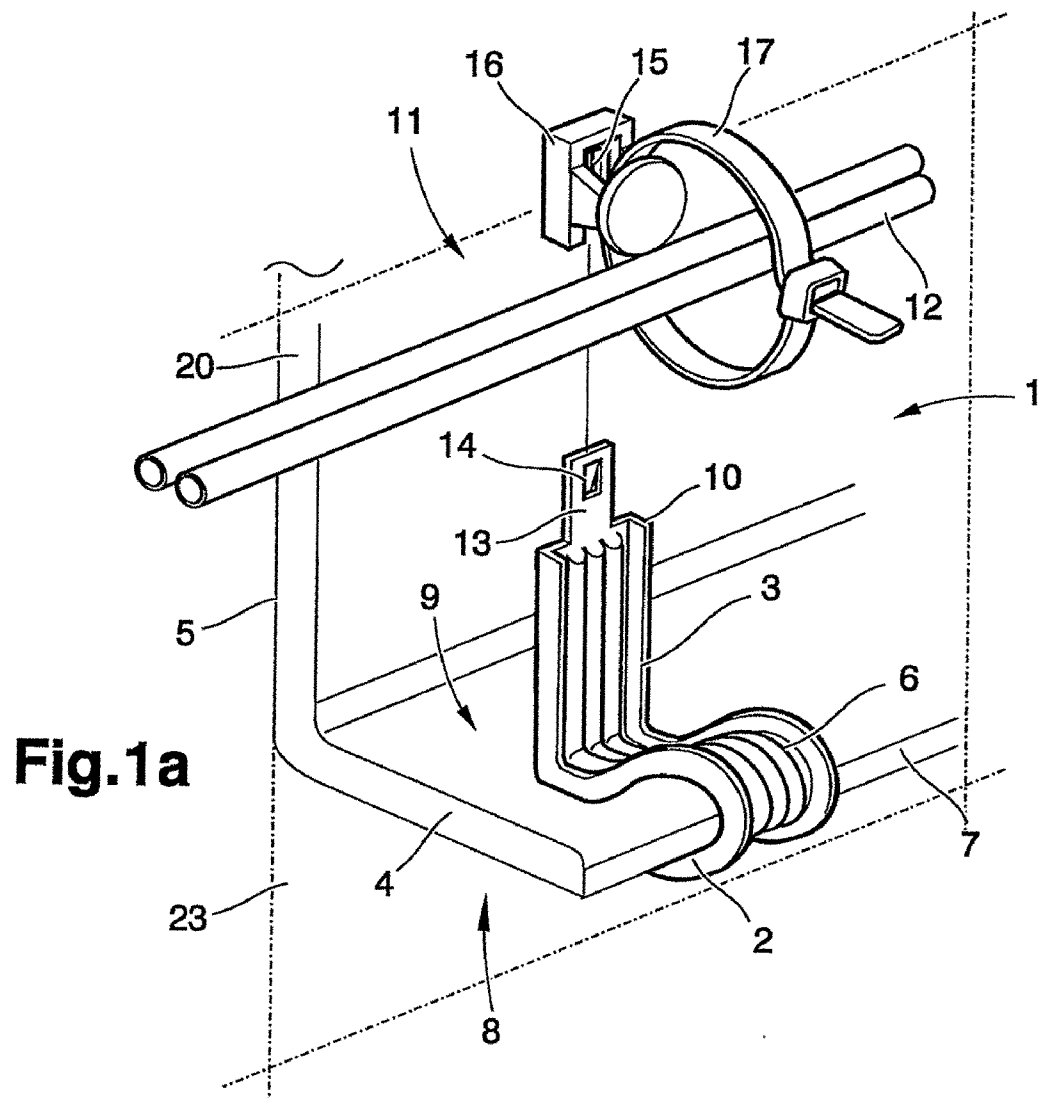
CLAIMS

1. A clip device (1) for a heavy vehicle, comprising a first leg (2) and a second leg (3) for clamping the device onto a flange (4) of a heavy vehicle frame rail (5), the clip device being adapted to be retained by means of internal spring force of the clip device when the first leg (2) and the second leg (3) are situated on opposite sides of the flange (4) and abut the flange during influence of said internal spring force, the clip device further comprising a means (11) for suspension of at least one conduit (12), **characterized in that** the first leg (2) has a means (18) for engagement with a transition zone (19) between the flange (4) and a further portion (20) of the heavy vehicle frame rail (5).
2. A device according to claim 1, **characterized in that** said engagement means (18) is adapted for engagement with the transition zone (19) between the flange (4) and said further portion being a web (20) of the heavy vehicle frame rail (5).
3. A device according to claim 1 or 2, **characterized in that** said engagement means (18) comprises a curved portion of the first leg (2) adapted to engage a corresponding curved portion of the transition zone (19).
4. A device according to any preceding claim, **characterized in that** said engagement means (18) is arranged in a free end portion (21) of the first leg (2).
5. A device according to any preceding claim, **characterized in that** at least a portion of a surface of the first leg has been subjected to a surface treatment to increase the friction coefficient thereof for increasing the friction between the first leg and the flange.
6. A device according to claim 5, **characterized in that** said surface of the first leg has been roughened.
7. A device according to any preceding claim, **characterized in that** the device comprises a layer of material arranged on the first leg for increasing the friction between the first leg and the flange.

8. A device according to claim 7, **characterized in that** the device comprises a layer of rubber or plastic arranged on the first leg for increasing the friction.
- 5 9. A device according to any preceding claim, **characterized in that** the suspension means (11) are situated at the second leg (3).
- 10 10. A device according to any preceding claim, **characterized in that** the second leg (3) has a free end portion (10) with an extension in a direction substantially in perpendicular to the main extension direction of the first leg (2), said second leg end portion (10) pointing away from the first leg (2).
- 15 11. A device according to any of claims 1-10, **characterized in that** the second leg (3) has a free end portion (10c) with an extension in a direction substantially in parallel to the main extension direction of the first leg (2), said second leg end portion (10c) pointing in opposite direction to the first leg (2).
- 20 12. A device according to any preceding claim, **characterized in that** the suspension means (11) comprises a component (13) having a first part (14) of a coupling in the form of a snap-in member for connection to a corresponding second part (15) of the coupling.
- 25 13. A device according to claim 12, **characterized in that** the suspension means (11) comprises said second part (15) of the coupling, said second part (15) of the coupling being arranged on a component (16) provided with a tie wrap (17) for receiving said at least one conduit (12).
- 30 14. A system for attachment of conduits (12) to a heavy vehicle frame, comprising a heavy vehicle frame rail (5) having a web (20) and a flange (4), and a clip device (1) according to any of claims 1-13, wherein the clip device is adapted to be arranged on the flange (4) such that substantially the entire first leg (2) is situated on the flange side (22) of a geometrical plane (23) defined by the main extension of an outer surface (24) of the web (20).

15. A system according to claim 14, wherein the effective length (L) of the first leg (2) of the clip device (1) is adapted to the length of the flange (4) so as to secure that the first leg (2) is situated on the flange side (22) of said geometrical plane (23).
- 5 16. A system according to claim 14 or 15, wherein the shape of the first leg (2) of the clip device (1) is adapted to the shape of the flange (4) so as to secure that the first leg is situated on the flange side (22) of said geometrical plane (23).
- 10 17. A system according to any of claims 14-16, wherein the geometrical plane (23) is intended to be substantially vertical when the heavy vehicle frame rail (5) is installed in a heavy vehicle (30).
- 15 18. A system according to any of claims 14-17, **characterized in that** the shape of the first leg (2) is adapted to the shape of the frame rail (5) such that along a major part of the length (L) of the first leg (2), the first leg is in contact with the frame rail (5) when the clip device (1) is installed on the frame rail (5).
- 20 19. A system according to any of claims 14-18, **characterized in that** a major part of the surface of the first leg (2) faced toward the frame rail (5) is in contact with the frame rail when the clip device (1) is installed on the frame rail (5).
- 25 20. A system according to any of claims 14-19, wherein the system comprises a layer of material arranged between the first leg and the flange for increasing the friction between the heavy vehicle frame rail and the clip device.
21. A heavy vehicle (30) comprising a clip device according to any of claims 1-13.
22. A heavy vehicle (30) comprising a system according to any of claims 14-20.

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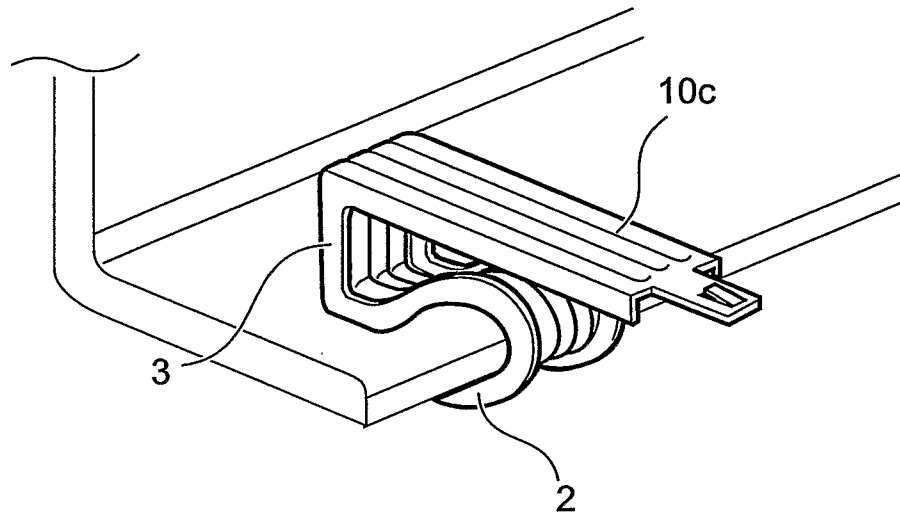


Fig.1c

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Fig.2a

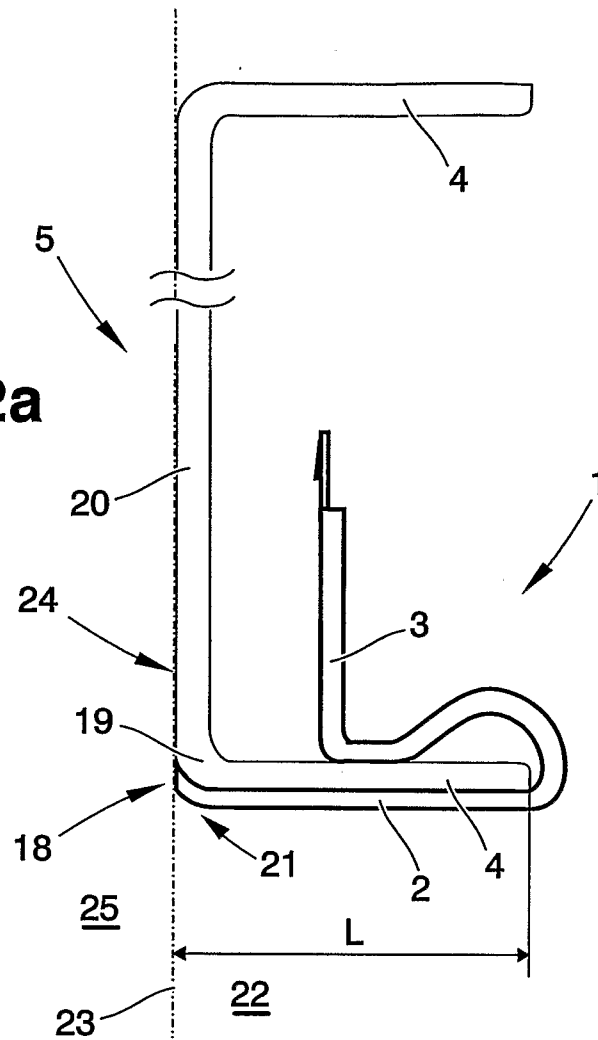
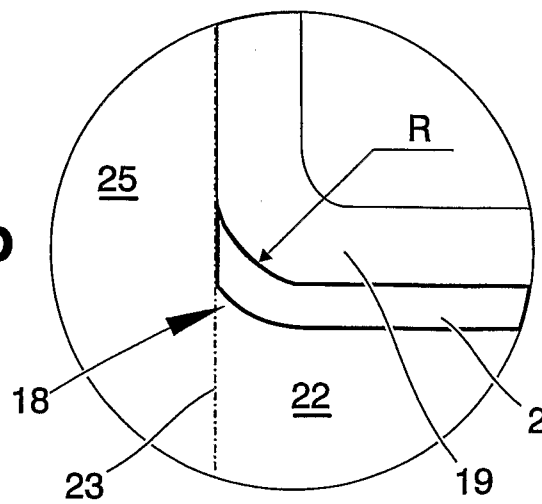


Fig.2b



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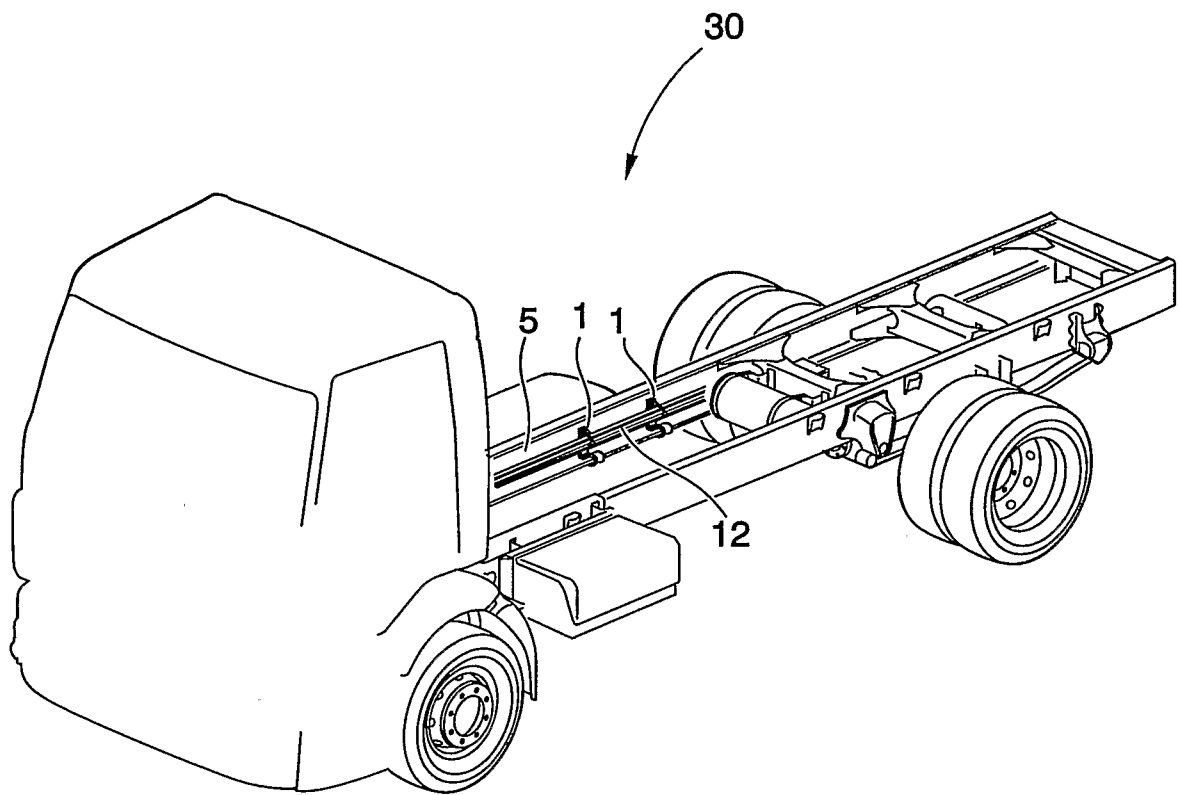


Fig.3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2007/001167

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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)

IPC: F16L, B60R

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

SE,DK,FI,NO classes as above

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

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,Y	US 5308033 A (NEELY, JR.), 3 May 1994 (03.05.1994), whole document --	1-22
Y	GB 582682 A (UNITED-CARR FASTENER CORPORATION), 25 November 1946 (25.11.1946), page 1, line 73 - line 98, figure 9 --	12-13
Y	GB 2122248 A (FORD MOTOR COMPANY LIMITED), 11 January 1984 (11.01.1984), whole document -- -----	14-20,22

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

27 August 2008

Date of mailing of the international search report

02-09-2008

Name and mailing address of the ISA/

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International patent classification (IPC)**F16L 3/24 (2006.01)****Download your patent documents at www.prv.se**

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Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/06/2008

International application No.

PCT/SE2007/001167

US	5308033	A	03/05/1994	NONE
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GB	582682	A	25/11/1946	NONE
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				FR	2529268	A,B	30/12/1983
				GB	8315560	D	00/00/0000
				US	4527759	A	09/07/1985