



- (51) International Patent Classification:
H02G 3/30 (2006.01) *F16L 3/137* (2006.01)
- (21) International Application Number:
PCT/SE2015/050659
- (22) International Filing Date:
8 June 2015 (08.06.2015)
- (25) Filing Language: Swedish
- (26) Publication Language: English
- (30) Priority Data:
1450740-4 16 June 2014 (16.06.2014) SE
- (71) Applicant: SCANIA CV AB [SE/SE]; S-151 87 Södertälje (SE).
- (72) Inventors: OHLSSON, Johan; Sjöstigen 28, S-141 72 Segeltorp (SE). JUNESAND, Erik; Förmansvägen 28, S-117 59 Stockholm (SE).
- (74) Agent: ELLIOT, Douglas; Scania CV AB, 151 87 Södertälje (SE).
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

- (54) Title: DEVICE FOR FIXING OF ELONGATE ELEMENTS AND METHOD FOR EFFECTING SUCH FIXING

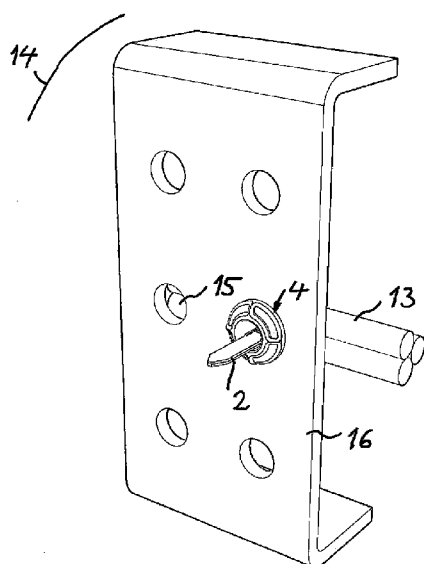


Fig 4

(57) Abstract: A device for fixing of elongate elements (13) of cable/pipe type to a chassis of a vehicle comprises an elongate flexible first part (2) configured to be passed round and tightly hold said elements, and means configured to fix the first part and therefore said elements to the chassis. These means comprise a second part configured to be inserted into a hole (15) which runs through a chassis section (16) of the vehicle (14) and to be lockable in the hole. The second part has means for fixing the first part, and elements held by the latter, to the second part and thus to the chassis upon locking of the second part (4) in a said hole.

Device for fixing of elongate elements and method for effecting such fixing

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TECHNICAL FIELD OF THE INVENTION AND PRIOR ART

The present invention relates to a device for fixing of elongate elements of cable/pipe type to a chassis of a vehicle, which device comprises at least one elongate flexible first part configured to be passed round and tightly hold said elements, and means configured to fix the first part and therefore said elements to the chassis, and a method for effecting such fixing.

15 The invention is not confined to any specific type of vehicle and it is only by way of examples that wheeled motor vehicles such as trucks or buses, motor vehicles which move on caterpillar tracks, and trailers are cited.

20 The elongate elements may for example take the form of cables to carry electric current or transmit signals, pipelines for water, hydraulic liquid and the like.

A device of this kind may be used to fix a single such elongate element or a plurality of such elongate elements in a bundle, which is the commonest case, by said first part being passed round the elements and holding them together fixed to the vehicle chassis.

For the purposes of exemplifying but in no way limiting the invention, it should be noted that there are existing devices of the kind defined in the introduction for fixing of elongate elements in the form of cables and pipes to a truck chassis, in which devices said means comprise various kinds of brackets or the like which are fastened to the chassis and to which said first part is fastened. These brackets may in certain cases take the form of a so-called cable ladder, and such brackets may for example be situated along the rear section of a truck chassis in order to lead cables and pipes along the chassis. The number of brackets which may be needed for said fixing may be relatively large, resulting in not insignificant weight and cost of such devices, normally one per bracket. Such brackets or the like may also at times obstruct other vehicle parts or their functions.

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SUMMARY OF THE INVENTION

The object of the present invention is to propose a device and a method of the kind defined in the introduction which are improved in at least some respect relative to previously known such devices and methods.

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This object is achieved as regards the device by proposing a device of the kind with the features set out in the characterising part of claim 1.

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Said means being provided with a second part configured to be inserted in a hole which runs through a section of the vehicle's chassis, and this second part being provided with means for fixing the first part to it, makes it possible for said elongate

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elements to be fixed to the vehicle chassis without using any brackets or the like, since the actual fixing is instead effected directly to said holed section of the chassis. This means that weight and costs may be saved while at the same time enabling
5 easy and quick fitting (fixing) of the elongate elements.

In one embodiment of the invention said second part is configured to be compressible by walls of a said hole during insertion therein, in order to be locked in said hole via potential
10 energy stored by the compression. This makes said second part quick and easy to lock in a said hole in a section of a chassis.

In a further development of the last-mentioned embodiment, said second part has portions which participate in defining its external
15 contour for insertion in a said hole and which are configured to be compressible by hole walls towards a centreline of said hole, with storage of potential energy. This makes it possible for said portions to be for example tongue-like, spring-like elements which are forced inwards towards said centreline during the
20 insertion of the second part in the hole and which thereby store potential energy.

Said second part may with advantage be made of plastic material.

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In another embodiment of the invention said second part has a head with a larger diameter than a said hole into which the second part is configured to be inserted, and the head is configured to serve as a stop device for the second part when
30 the latter is locked in a said hole and to abut against chassis

section portions surrounding said hole on the opposite side of said chassis section to the position of elongate elements held by the first part. The second part being thus configured in such a way as to resemble a short bolt, and said head being used as an anchor, results in an inexpensive simple device which occupies little space when in use.

In another embodiment of the invention the device has means configured to respond to tightening of the first part round said elements by automatically snapping into successive locking states as the first part is progressively tightened. To this end, the first part may have a striplike shape and may accordingly have a binding strap configuration with a plurality of transverse locking chambers following one another in its longitudinal direction and defining said successive locking states. This makes it easy and quick to effect the fixing and securing of the elements tightly to one another and to said chassis section. The first part is with advantage made of plastic material.

In another embodiment of the invention the two parts mentioned are integral, one end of the elongate flexible first part being connected to the second part, making the device easier to handle.

In a further development of the last-named embodiment, the second part has said means for snapping into corresponding means of the first part during the insertion of the first part through an aperture in the second part, led by its free end. This involves the free end of the first part being inserted back into the second part after it has been passed round the elements to which

it is to be fixed, in order to form round them a loop which is closed by tightening and said snapping-in.

In another embodiment of the invention said two parts are
5 separate items and the second part has portions for the first part
to be threaded round in order to fix it to the second part. In a
further development of this embodiment the first part has said
means for snapping into corresponding means on itself during
the insertion of one end of the first part through the first-
10 mentioned means during the formation of a loop surrounding said
elements. In this embodiment the first part is thus tightened in a
loop which is secured to the second part and therefore to the
chassis section by being threaded round portions of the second
part, and the first part is locked to itself in a tightened snapped-in
15 state.

In another embodiment of the invention said second part is
configured to be inserted in a hole in a frame of a vehicle
chassis. Fixing said elongate elements of cable/pipe type to a
20 vehicle chassis frame via holes in this frame makes fixing said
elements quick, easy and cost-advantageous.

The object according to the invention is achieved as regards the
method by proposing a method according to the independent
25 method claim. The advantages of one version of such a method
are indicated with sufficient clarity by the above description of
the device according to the invention.

The invention relates also to use of a device according to the invention for fixing elongate elements of cable/pipe type to a chassis of a vehicle, and a vehicle provided with such a device.

- 5 Further advantages and advantageous features of the invention are indicated by the description set out below.

BRIEF DESCRIPTION OF THE DRAWINGS

- 10 Embodiments of the invention cited as examples are described below with reference to the attached drawings, in which

Fig. 1 is a perspective view of a device according to a first embodiment of the invention in an inactive state.

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Fig. 2 is a perspective view, enlarged relative to Fig. 1, of part of the device according to Fig. 1,

- Fig. 3 and Fig. 4 are simplified perspective views illustrating the device according to Fig. 1 in an active fixed state,
- 20

Fig. 5 is a perspective view of part of a device according to a second embodiment of the invention,

- Fig. 6 is a perspective view of the device according to the second embodiment of the invention in an active state, and
- 25

Fig. 7 is a perspective view of the device according to Fig. 6 in an active fixed state.

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DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

A device 1 for fixing of elongate elements of cable/pipe type to a chassis of a vehicle according to a first embodiment of the invention will now be described with simultaneous reference to Figs. 1 and 2. The device has an elongate flexible first part in the form of a strip 2 shaped like a binding strap with a plurality of transverse locking chambers 3 following one another in its longitudinal direction.

The strip 2 is integral with a second part in the form of a pluglike part 4 by being connected to the latter at a first end 5. The pluglike part 4 is configured to be inserted in a hole which runs through a section of a vehicle chassis and to be lockable in the hole, and is accordingly configured to be compressible by walls of a said hole by being provided with portions 6 in the form of ridges which participate in defining its external contour for insertion in a said hole and which are configured to be compressible by hole walls towards a centreline of said hole, with storage of potential energy. Accordingly, these portions 6 of the pluglike part are made of plastic material which has this property, and the whole device 1 is here moulded as a single piece made of the same plastic material. The pluglike part 4 further has a head 7 with a larger diameter than a said hole into which the pluglike part is configured to be inserted. This head 7 is configured to serve as a stop device for the pluglike part when the latter is locked in a said hole and to abut, via surfaces 8 of the head, against chassis section portions which surround said

hole on the opposite side of said chassis section to the position of elongate elements held by the strip 2 (see also Fig. 4).

The pluglike part 4 has means in the form of locking chambers 9 for snapping into corresponding means in the form of the locking chambers 3 of the strip 2 during the insertion of the strip 2 through an aperture 10 in the pluglike part, led by a free other end 11 of the strip. Accordingly, the pluglike part 4 has a hole 12 running through it to the head 7 via the aperture 10.

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The function of the device depicted in Figs. 1 and 2 will now be explained with reference also to Figs. 3 and 4. When elongate elements of cable/pipe type 13 are to be fixed to a chassis of a vehicle 14, the strip 2 is inserted, led by its free end 11, through a hole 15 in a chassis section in the form of a frame 16, and through the pluglike part 4, with compression of the portions 6, until the surfaces 8 of the head abut against frame portions which surround the hole 15. The pluglike part 4 is thereby locked in the frame hole 15 and thus to the vehicle's chassis. The strip 2 is then passed round the elements 13 which are to be fixed and its free other end 11 is led back into, and is pulled through, the aperture 10 in the pluglike part 4, the loop thus formed being tightened round the elements 13 until they are held tightly together and with respect to the frame 16. In this situation, as illustrated in Figs. 3 and 4, the strip 2 holds the elements 13 by snap-in cooperation of the locking chambers 13 of the strip 2 with the locking chambers 9 of the pluglike part 4.

A device according to another embodiment of the invention is depicted in Figs. 5-7, and its parts which correspond to those of

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the first embodiment have the same reference numbers with an added apostrophe ('). In this embodiment the pluglike part 4' and the strip 2' are separate items and the pluglike part 4' has two apertures at its end 17' opposite to its head 7', for threading of the strip 2' round portions 18' inside the pluglike part, so that the two opposite ends of the strip protrude from the pluglike part at its end 17'. In this embodiment the strip 2' is provided with means 19' in the form of a strip section provided with locking chambers for snapping into corresponding means in the form of locking chambers of the strip itself during the passing of one end of the strip through the means 19', forming a loop surrounding the elements 13 which are to be fixed, as depicted in Fig. 6.

When elements 13 are to be fixed to a chassis section, here a frame 16, the pluglike part 4' is inserted in a hole 15 in the frame. In this situation, either the strip 2' has already been fitted in the pluglike part and is passed through the hole 15 before it or the strip is thereafter threaded into and back out of the pluglike part. Thereupon the strip 2' is passed round the elements 13 which are to be fixed and is tightened like a binding strap by cooperation of the snap-in means 19' with corresponding locking chambers of the strip like a binding strap. When the tightening has taken place, it is then possible, if necessary, for any surplus length of the strip which protrudes from the loop to be cut off, as also in the first embodiment.

The invention is of course in no way restricted to the embodiments described above, since numerous possibilities for modification thereof are likely to be obvious to one skilled in the

art without thereby deviating from the invention's scope such as is defined in the attached claims.

The expression "configured to be lockable in the hole" used to characterise the second part in claim 1 is to be interpreted broadly and covers also its only being locked by its cooperation with the first part, i.e. where for example it is a pluglike part it will be loose in the hole until the first part is tightened round said elements. It will however most commonly be advantageous that it can be locked in the hole already without such cooperation.

The device might have other means than said automatic snap-in means for locking the first part to remain in a fixed loop after tightening round said elements. Some clamping means might for example be applied to the part in this state, although the solution described above with said automatic snapping-in would perhaps be preferable.

Claims

1. A device for fixing of elongate elements (13) of cable/pipe type to a chassis of a vehicle (14), which device comprises at least one elongate flexible first part (2, 2') configured to be passed round and tightly hold said elements, and means configured to fix the first part and therefore said elements to the chassis, which means comprise a second part (4, 4') configured to be inserted into a hole (15) running through a chassis section (16) of the vehicle and to be lockable in the hole, which second part has means (9, 18') for fixing of said first part (2, 2') and therefore elements (13) held by it to the second part (4, 4') and therefore to the chassis upon locking of the second part in a said hole (15), **characterised** in that said second part (4, 4') has a head (7, 7') with a larger diameter than a said hole (15) into which the second part is configured to be inserted, and that the head (7, 7') is configured to serve as a stop device for said second part when the latter is locked in a said hole and to abut against chassis section portions which surround said hole on the opposite side of said chassis section to the position of elongate elements (13) held by the first part (2, 2').
2. A device according to claim 1, **characterised** in that said second part (4, 4') is configured to be compressible by walls of a said hole (15) during insertion therein in order to be locked in said hole via potential energy stored by the compression.

3. A device according to claim 2, **characterised** in that said second part (4, 4') has portions (6) which participate in defining its external contour for insertion in said hole and are configured to be compressible by hole walls towards a centreline of said hole, with storage of potential energy.
4. A device according to any one of the foregoing claims, **characterised** in that said second part (4, 4') is made of plastic material.
5. A device according to any one of the foregoing claims, **characterised** in that it has means (3, 9, 19') configured to react to tightening of the first part (2, 2') round said elements (13) by automatically snapping into successive locking states progressively as the first part is tightened.
6. A device according to any one of the foregoing claims, **characterised** in that the two said parts (2, 4) are integral with one end (5) of the elongate flexible first part (2) connected to the second part (4).
7. A device according to claims 5 and 6, **characterised** in that the second part (4) has said means (9) for snapping into corresponding means (3) of the first part (2) during the passing of the first part through an aperture (10) in the second part (4), led by its free end (11).
8. A device according to any one of claims 1-5, **characterised** in that said two parts (2', 4') are separate items and the

second part (4') has portions (18') for the first part (2') to be threaded round in order to fix it to the second part.

9. A device according to claims 5 and 8, **characterised** in that
5 the first part (2') has said means (19') for snapping into corresponding means on itself during the passing of one end of the first part (2') through first-mentioned means (19'), with the formation of a loop surrounding said elements (13).
- 10 10. A device according to any one of the foregoing claims, **characterised** in that the first part (2, 2') has a striplike shape.
11. A device according to claims 5 and 10, **characterised** in that
15 the first part (2, 2') is shaped like a binding strap with a plurality of transverse locking chambers (3) which follow one another in its longitudinal direction.
12. A device according to any one of the foregoing claims,
20 **characterised** in that the first part (2, 2') is made of plastic material.
13. A device according to any one of the foregoing claims, **characterised** in that said second part (4, 4') is configured
25 to be inserted into a hole (15) in a frame (16) of a vehicle chassis.
14. Use of a device according to any one of claims 1-13 to fix
30 elongate elements (13) of cable/pipe type to a chassis of a vehicle (14).

15. A vehicle **characterised** in that it is provided with a device
(1) according to any one of claims 1-13 and that it is a
wheeled motor vehicle, e.g. a truck or bus, a motor vehicle
5 which moves on caterpillar tracks, or a trailer.

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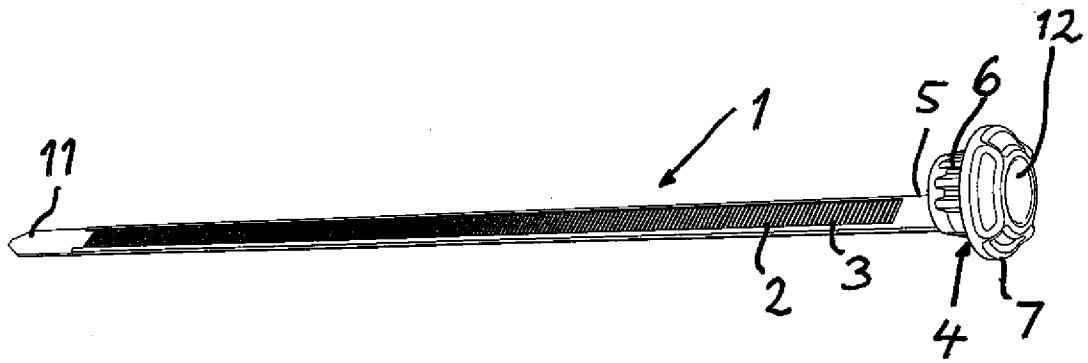


Fig 1

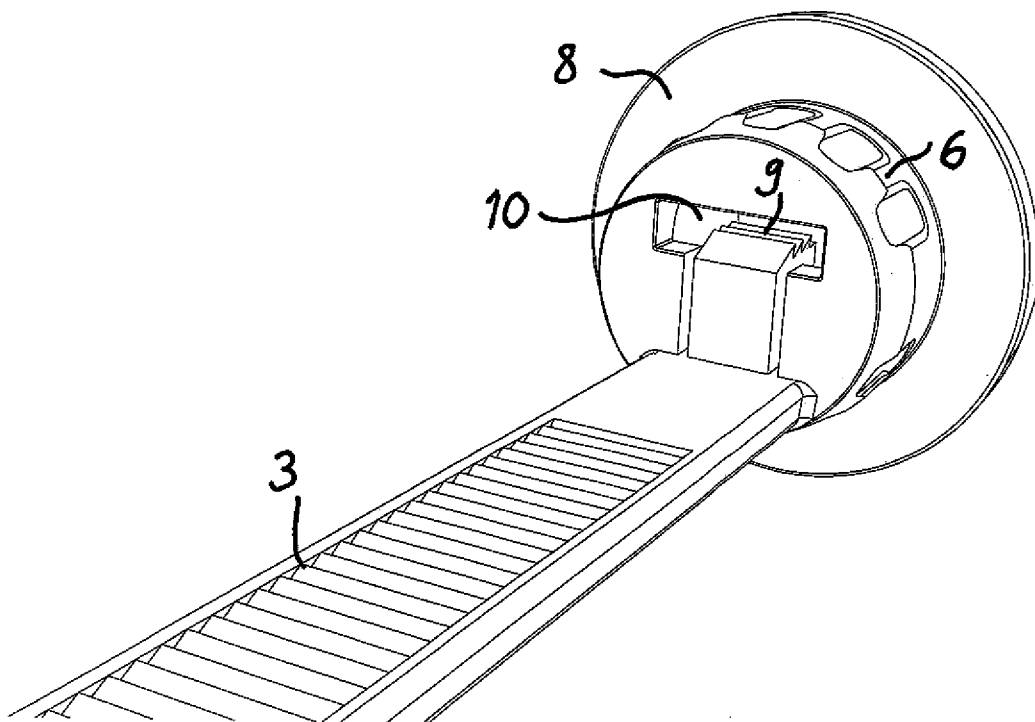
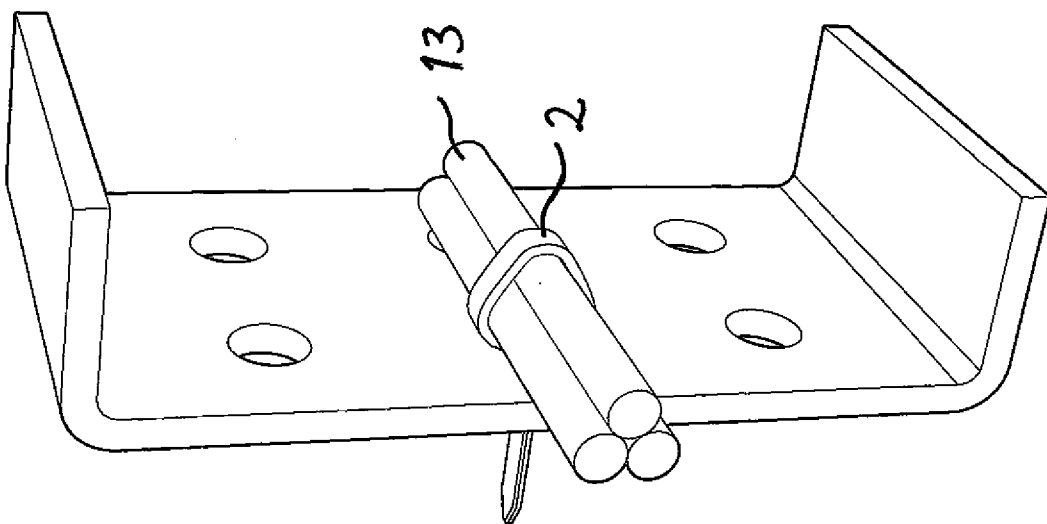
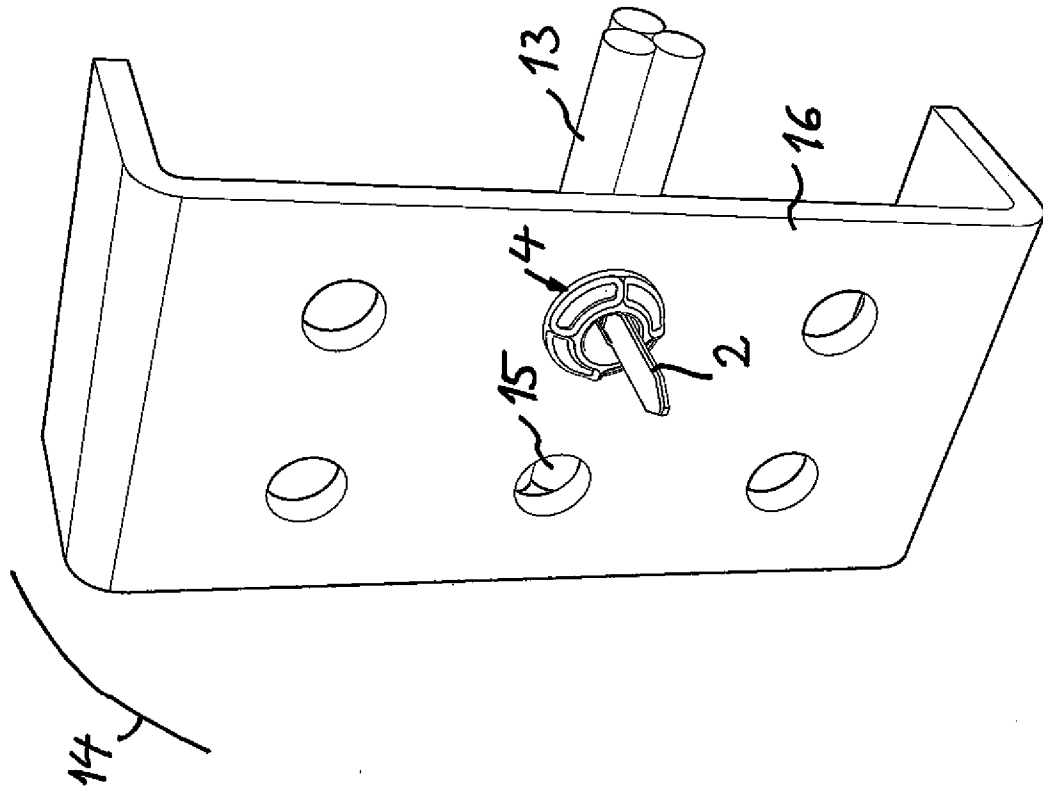


Fig 2

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3/4

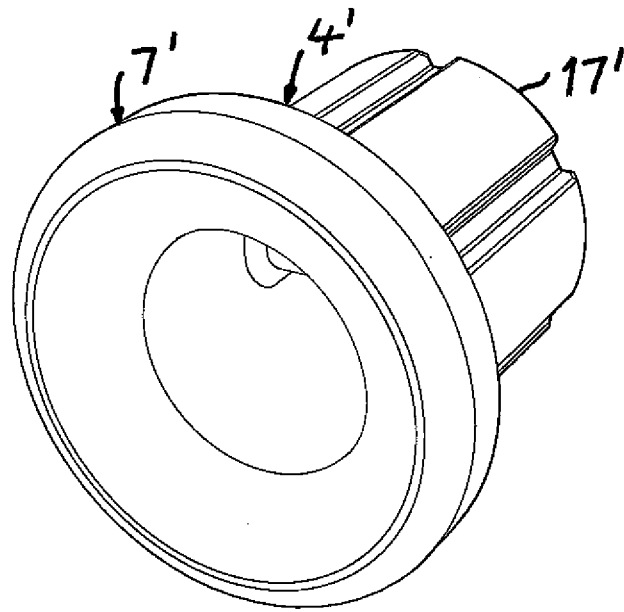


Fig 5

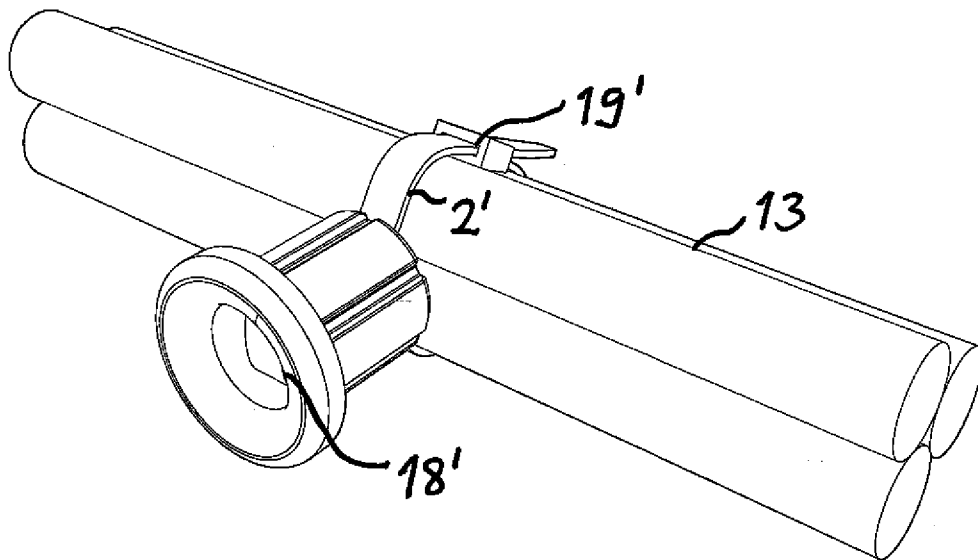


Fig 6

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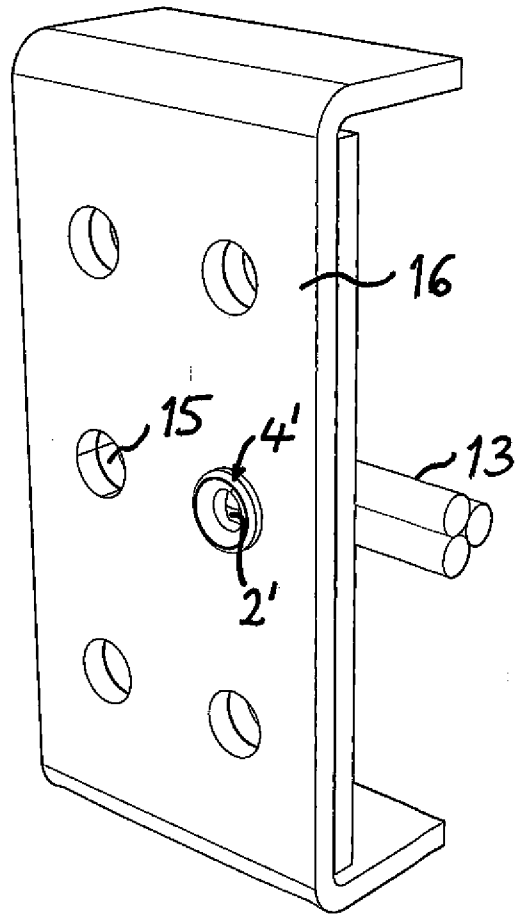


Fig 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2015/050659

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, H02G

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, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2007144756 A2 (ITW AUTOMOTIVE ITALIA S R L CO ET AL), 21 December 2007 (2007-12-21); abstract; figures 1,2,7 --	1-15
A	DE 10313866 A1 (TAKEUCHI IND CO), 2 October 2003 (2003-10-02); abstract; figures 1,5,6 --	1-15
A	FR 2985797 A1 (PEUGEOT CITROEN AUTOMOBILES SA), 19 July 2013 (2013-07-19); abstract; figures 1,4 --	1-15
A	FR 2790796 A1 (LEGRAND SA), 15 September 2000 (2000-09-15); abstract; figure 1 --	1-15



Further documents are listed in the continuation of Box C.



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

“P” document published prior to the international filing date but later than the priority date claimed

“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

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“&” document member of the same patent family

Date of the actual completion of the international search

08-09-2015

Date of mailing of the international search report

10-09-2015

Name and mailing address of the ISA/SE

Patent- och registreringsverket
Box 5055
S-102 42 STOCKHOLM
Facsimile No. + 46 8 666 02 86

Authorized officer

Rune Bengtsson

Telephone No. + 46 8 782 28 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2015/050659

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2369185 A1 (SUMITOMO WIRING SYSTEMS), 28 September 2011 (2011-09-28); abstract; figures 1a,1b,2,7 -- -----	1-15

Continuation of: second sheet

International Patent Classification (IPC)

H02G 3/30 (2006.01)

F16L 3/137 (2006.01)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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