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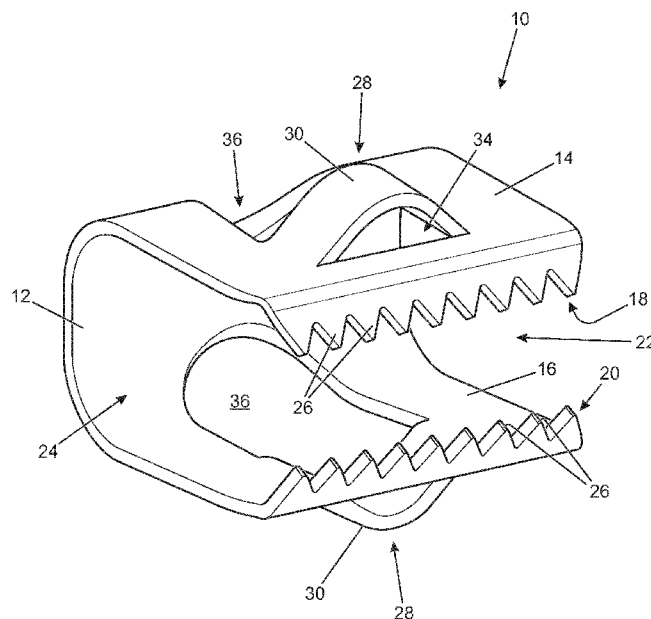


Fig. 1

(57) Abstract: A spring clip (10) for use with a fitting tool or tools. The spring clip (10) comprises a base (12) and a pair of opposing jaws (14, 16) extending from the base (12). Each jaw (14, 16) has an end (18, 20) that is distal to the base (12), and said distal ends (18, 20) of said jaws (14, 16) are separated from one another so as to define an open mouth (22) of the spring clip (10). Each jaw (14, 16) is provided with a tool locating formation (28) that is adapted to receive a portion of the tool operable to temporarily increase the separation distance of the jaws (14, 16) for the purpose of fitting the clip (10). The tool locating formation (28) of each jaw (14, 16) comprises an arched portion formed in the jaw (14, 16) which arches outwardly from the plane of the jaw (14, 16).

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SPRING CLIP

TECHNICAL FIELD

5 The present disclosure relates to a spring clip and particularly, though not exclusively, to a spring clip for mounting a trim part to a location on a vehicle. Another aspect of the invention relates to a vehicle including the spring clip.

BACKGROUND

10 Clips of varying configurations are utilised wholly or in part to connect items such as trim accessories to locations on a vehicle. An example of such an instance is the connection of a mud flap to the bumper of a vehicle. A "U" shaped metal clip having a base and two opposing arms is currently used to connect an upper region of the mud flap to an edge of the bumper. The mud flap is first aligned with the bumper before the clip is fitted over bumper and mud flap combination. The clip is positioned such that one arm overlies the bumper and the other of the arms overlies the mud flap. The arms may be provided with inwardly
15 projecting barbs. Once in position the clip is then deformed such that it grips both the bumper and mud flap and retains one in association with the other.

Deformation of the clip is achieved by a user compressing the clip with an appropriate tool, for example a pair of pliers. In instances where access to the fitting location of the clip is restricted, a user may not be able to fully deform the clip. Such partial or incomplete
20 deformation of the clip can lead to an unwanted gap being present between the mud flap and bumper.

Deformation of the clip can also lead to damage and/or deformation of the bumper and/or mud flap at the fitting location.

It is an aim of the present invention to address disadvantages associated with the prior art.

25 SUMMARY OF THE INVENTION

Aspects and embodiments of the invention provide a spring clip and a vehicle including the spring clip as claimed in the appended claims.

According to an aspect of the invention, there is provided a spring clip for use with a fitting tool, the spring clip comprising a base and a pair of opposing jaws extending from the base,
30 wherein each jaw has an end that is distal to the base, and said distal ends of said jaws are

separated from one another so as to define an open mouth of the spring clip, wherein each jaw is provided with a tool locating formation that is adapted to receive a portion of the fitting tool operable to temporarily increase the separation distance of the jaws for the purpose of fitting the spring clip. The fitting tool may, for example, comprise an appropriately configured pair of pliers. Alternatively, the fitting tool may comprise a pair of fitting arms that are receivable in respective tool locating formations of the spring clip.

The temporary increase in the separation of the jaws is opposed by the inherent spring force of the spring clip. As such, there is no need to compress or otherwise deform the clip in order for it to be retained at a fitting location as said spring force facilitates retention, in use.

The use of a fitting tool to temporarily increase the separation distance of the jaws enables the spring clip to be both fitted to, and removed from, a fitting location without damage to either the clip or fitting location. The possible re-use of the clip after removal is also facilitated. This is in contrast to known clips utilised for the fitting of trim components to vehicles, which require deformation in order to locate them to the desired fitting location. Such deformation of known clips may, for example, cause parts of the clip to gouge, score or otherwise mark the surface of fitting location.

The tool locating formation of each jaw may comprise an arched portion formed in the jaw which arches outwardly from the plane of the jaw. Configuring the tool locating formations to comprise arched portions formed in the jaw in this manner permits the tool location formations to be formed integrally with the jaws, without interfering with the distal ends of the jaws in the mouth region of the spring clip. Furthermore, configuring the tool locating formations to comprise arched portions formed in the jaw in this manner facilitates the manufacture of the spring clip as such arched portions may be formed by a simple press operation.

The tool locating formations of the jaws may be accessible by the tool from either a mouth side of the spring clip or from a base side of the spring clip.

Configuring the tool locating formations to be accessible from opposing sides of the spring clip enables the clip to be mounted in two different orientations on a fitting tool. This alternate configurability of the spring clip and fitting tool may assist a user in fitting and possibly removing the clip from a fitting location, especially in instances where access to the fitting location is restricted.

In an embodiment, the tool locating formation of each jaw is formed integrally with each jaw. Integral formation of the tool location formations with each jaw reduces the manufacturing

cost of the spring clip. Integral formation further contributes to the robustness of the spring clip as the likelihood of one or both of the tool location formations becoming detached from the spring clip is significantly reduced.

5 The tool locating formations of the jaws may be spaced from the distal ends of the jaws towards the base. For example, the tool locating formations of the jaws may be located substantially at a midway position between the base and the distal ends of the jaws or between said midway position and the distal ends of the jaws.

10 Optionally, each jaw is provided with a cut out portion aligned with the tool locating formation. In an embodiment, the cut out portion of each jaw may extend into the base of the clip.

The provision of such cut out portions facilitates ease of alignment of a fitting tool with the tool locating formations. The cut out portions also facilitate ease of insertion and withdrawal of a fitting tool with respect to the tool location formations. The cut out portions further serve to reduce the weight of the spring clip.

15 The distal ends of the jaws may each be inclined in a direction of the opposing jaw.

The distal ends of the jaws may be separated from one another so as to define the open mouth of the spring clip when the spring clip is in a rest position

20 When not in use, for example in an unfitted condition, the separation distance between the distal ends of the jaws may be less than the separation distance between the remainder of the jaws. The distal ends of the jaws thus define a mouth of the spring clip which is narrower than the separation distance between the remainder of the jaws. The provision of such a mouth may assist in the retention of the spring clip at a fitting location, in use.

25 The distal end of each jaw is provided with a gripping means for gripping a location to which the spring clip is fitted, in use. In one embodiment of the invention the gripping means comprises a plurality of teeth formed at the distal end of each jaw. The gripping means of the jaws further assist with the retention of the spring clip at a fitting location. The gripping means may be configured to penetrate or deform the underlying material at the fitting location. The gripping means of each jaw may be substantially the same, partially the same or different.

30 The clip may be integrally formed from a metal blank. The spring clip may be provided with a corrosion resistant coating. The corrosion resistant coating may be pigmented so as to enable the spring clip to conform to the visual requirements of the fitting location, in use. In

an alternative embodiment the spring clip may be formed from a corrosion resistant metal. The spring clip may provide a clamping force of between about 25 N and about 55 N, in use.

According to a further aspect of the invention there is provided a vehicle having a vehicle trim part and a spring clip comprising the features of the spring clip as claimed in any preceding claim, wherein the vehicle trim part is secured to a location on the vehicle at least partially by the spring clip, and wherein the distal end of one of the jaws is in contact with the vehicle trim part and the other of the jaws is in contact with the location on the vehicle. The vehicle trim part may be a mud flap and the location on the vehicle may be a portion of a bumper of the vehicle. Alternatively, the location on the vehicle may, for example, be a side fender, a fender lower cladding member, a front or rear wheel arch cladding member, or a wheel arch liner. The vehicle trim part may be a front mud flap.

In one embodiment, the present invention provides a spring clip which is able to securely connect a rear mud flap to a portion of a vehicle bumper. The spring clip is retained in place by the spring force inherent within the clip. The spring clip of the present invention thus does not require deformation during fitting. The spring clip is removable and repositionable if required.

Within the scope of this application it is expressly intended that the various aspects, embodiment, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual features thereof, may be taken independently or in any combination. That is, all embodiments and/or features of any embodiment can be combined in any way and/or combination, unless such features are incompatible. The applicant reserves the right to change any originally filed claim or file any new claim accordingly, including the right to amend any originally filed claim to depend from and/or incorporate any feature of any other claim although not originally claimed in that manner.

BRIEF DESCRIPTION OF THE DRAWINGS

One or more embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a spring clip according to an embodiment of the invention;

Figure 2 shows another perspective view of the spring clip of figure 1;

Figure 3 shows a further perspective view of the spring clip of figure 1;

Figure 4 shows a side view of the spring clip of figure 1 with a pair of fitting arms;

Figure 5 shows a spring clip according to an embodiment of the present invention in an opened condition prior to fitting to a vehicle;

5 Figure 6 shows a spring clip according to an embodiment of the present invention in a partially fitted condition on a vehicle,

Figure 7 shows a spring clip according to an embodiment of the present invention in a fully fitted condition on a vehicle;

Figure 8 shows a partially sectioned view of a spring clip according to an embodiment of the invention being used to locate a mud flap to the bumper of a vehicle; and

10 Figure 9 shows a side view of a vehicle having a mud flap which is attached using a spring clip according to an embodiment of the invention.

DETAILED DESCRIPTION

Referring firstly to figures 1 to 3 there is shown a spring clip according to an embodiment of the present invention and generally designated 10. The spring clip 10 is of a single piece
15 construction and is formed integrally from a metal blank. The spring clip 10 is shown in figures 1 to 3 in a rest position, which is to say the position the spring clip 10 adopts when no external forces are applied thereto.

The spring clip 10 has a base 12 and two opposing jaws 14, 16 which extend from the base 12. In the embodiment shown, the end 18, 20 of each jaw 14, 16 which is distal to the base
20 12 is inclined in the direction of the opposing jaw 14, 16. The jaws 14, 16 and base 12 are configured such that the jaws 14, 16 are spaced apart from one another along their entire length. The ends 18, 20 of the jaws 14, 16 thus define a mouth 22 of the spring clip 10, while the remainder of the jaws 14, 16 define a throat 24 of the spring clip 10. Due to the inclined configuration of the ends 18, 20 of the jaws 14, 16, it will be appreciated that the separation
25 distance between the jaws 14,16 at the mouth 22 is less than the separation distance between the jaws 14,16 at the throat 24.

The distal ends 18, 20 of the jaws 14, 16 are provided with gripping means. In the embodiment shown, the gripping means are in the form of a plurality of teeth 26 having a triangular profile. It will further be noted in the embodiment shown that each jaw 14,16 is
30 provided with the same number of teeth having the same shape and spacing as the other jaw 14,16. In the embodiment shown the peaks of the opposing teeth 26 are in peak to peak

alignment. It will be appreciated that other configurations of gripping means (not shown) may be utilised. For example, the distal end 18, 20 of each jaw 14, 16 may be provided with a differently configured gripping means. In such an embodiment, the gripping means of a given jaw 14, 16 may be tailored to the specific location to which the jaw 14, 16 is intended locate, in use.

In the embodiment shown, the majority of each jaw 14, 16 is aligned along a plane that is substantially parallel to the plane of the opposing jaw 14, 16. It will thus be appreciated that the separation distance between the jaws 14, 16 at the throat 24 of the spring clip 10 is substantially constant. In an alternative embodiment (not shown), the planes of the jaws 14, 16 may be inclined such that the separation distance between the jaws 14, 16 reduces in the direction of the ends 18, 20 of the jaws 14, 16.

Each jaw 14, 16 is further provided with a tool locating formation 28. In the embodiment shown, the tool locating formation 28 is defined by an arched portion 30 of the jaw 14, 16 which arches outwardly from the plane of the jaw 14, 16 with respect to the throat 24 of the spring clip 10. Each arched portion 30 defines an opening 32 accessible from the base side of the spring clip 10 and another opening 34 accessible from the jaw end 18, 20 side of the spring clip 10. As will be described in greater detail below, the tool locating formations 28 of the spring clip 10 are configured to receive portions of an appropriately configured tool, for example fitting arms of the type described with reference to figure 4, operable to temporarily increase the separation distance of the jaws 14, 16 for the purpose of fitting the spring clip 10 to a location on a vehicle.

In the embodiment shown, the tool locating formations 28 of the jaws 14, 16 are spaced from the ends 18, 20 of the jaws 14, 16 towards the base 12. The tool locating formations 28 may be located substantially at a midway position between the base and the distal ends of the jaws, such a midway position indicated by line A-A in Figure 1, or between said midway position and the distal ends of the jaws such as in the illustrated example.

In the embodiment shown, each jaw 14, 16 is further provided with a cut out 36 which is aligned with the arched portion opening 32 accessible from the base side of the spring clip 10. The cut out 36 improves tool accessibility to the arched portion opening 32 and reduces the possibility of a tool fouling or catching on the spring clip 10, in use. In the embodiment shown, each cut out 36 further extends into the base 12.

The tool usable to temporarily increase the separation distance of the jaws 14, 16 may, for example, be a pair of fine nosed pliers. Alternatively, the tool may comprise a pair of fitting

arms 37 as shown in figure 4. In the embodiment shown, each fitting arm 37 comprises an elongate member having a substantially circular cross-section that is constant along its length. A first end of each fitting arm 37 is, in use, inserted into a respective tool locating formation 28 of the spring clip 10. The opposing ends of each fitting arm 37 can then be moved towards one another as indicated by arrows 39 in order to open the jaws 15, 16. It will be appreciated that a portion of each of the cut outs 36 in the region of the base 12 acts as a fulcrum for each fitting arm 37. The fitting arms 37 are removed from the tool locating formations 28 once the spring clip 10 has been fitted.

As noted above, the spring clip 10 is of a single piece construction and is formed integrally from a metal blank. The spring clip 10 may be formed from low carbon steel. In one embodiment the spring clip 10 is formed from C67S-LC grade low carbon steel.

In an embodiment of the invention, the spring clip 10 is provided with a corrosion resistant surface coating. The corrosion resistant coating maybe pigmented. In one embodiment the spring clip 10 may be coated with a Delta (RTM) Seal corrosion resistant coating provided by Delta GBN Ltd. In an embodiment, the corrosion resistant surface coating is compliant with a standardised 1000 hour salt spray test thereby allowing the spring clip 10 to be used to attach exposed exterior components. The spring clip 10 may also be utilised to fit interior components of a vehicle. For such interior applications, the surface coating layer may be thinner than required for exterior use.

In an alternative embodiment the spring clip 10 may be formed from a corrosion resistant metal such as, for example, stainless steel.

Referring now to figures 5 to 9 there is shown an example of the manner in which a spring clip 10 according to an embodiment of the invention may be used. Specifically, figures 4 to 7 show the use of a spring clip 10 according to an embodiment of the invention to connect an upper portion of a mud flap 38 to the rear bumper 40 of a vehicle 46.

Figure 5 shows the spring clip 10 in a pre-applied condition relative to the mud flap 38 and rear bumper 40. Prior to application of the clip 10, the mud flap 38 is positioned at a desired location and orientation with respect to the rear bumper 40. In the embodiment shown, a mounting flange 42 of the mud flap 38 is aligned such that it at least partially overlies a portion of the rear bumper 40. The mud flap 38 may be maintained at the desired location and in the desired orientation by secondary fixing means. Such secondary fixing means may, for example, include adhesive tape 44 (see figure 8) disposed between the mounting flange 42 and the rear bumper 40.

Figure 5 shows the spring clip 10 in an unfitted and fully opened condition. The spring clip 10 is movable into the fully opened condition from the rest position (shown in figures 1 to 3) by the use of an appropriately configured tool (not shown). The tool may take the form of a pair of fine nosed pliers. In use, respective ends of the fine nosed pliers are inserted into the tool locating formations 28 from the base side of the spring clip 10. The fine nosed pliers are then opened to increase the separation distance of the jaws 14,16 as can be readily seen in Figure 4.

It will be appreciated that the jaws 14,16 are opened against the spring force inherent within the spring clip 10, and that the spring clip 10 will revert towards its rest position upon release from the fine nosed pliers. It will further be appreciated that the spring clip 10 is retained on the fine nosed pliers when said pliers are manipulated to increase the separation distance of the jaws 14,16. A user is thus able to offer the spring clip 10 into position by holding the pliers. This can assist the user in positioning the spring clip 10 at locations where access is compromised.

Figure 6 shows the spring clip 10 in a partially fitted and partially opened condition. The spring clip 10 has been moved relative to the mud flap 38 and rear bumper 40 such that a portion of the rear bumper 40 and overlying mounting flange 42 of the mud flap 38 are received within the mouth 22 and throat 24 of the spring clip 10. One jaw 14 of the spring clip 10 thus overlies the mounting flange 42, while the other jaw 16 overlies the rear bumper 40. The separation distance of the jaws 14,16 of the spring clip 10 in figure 5 is less than the separation distance shown in figure 4, but greater than the separation distance shown in figures 1 to 3. This is due to partial closure of the fine nosed pliers by the user.

Figures 7 and 8 show the spring clip 10 in a fully fitted condition. In the fully fitted condition the spring clip 10 has been released from the fine nosed pliers and is engaged with the mud flap 38 and rear bumper 40. The inherent spring force of the spring clip 10 acts to draw the jaws 14,16 of the spring clip 10 back towards their rest separation distance. It will be appreciated that, in order to maximise the clamping force of the spring clip 10, the thickness of the mud flap mounting flange 42, adhesive tape 44 and rear bumper 40 combination is greater than the separation distance of the ends 18,20 of the jaws 14,16 in the rest position of the spring clip 10. The inherent spring force of the spring clip 10 biases the ends of the jaws 14,16 into contact with the rear bumper 40 and mud flap mounting flange 42 respectively.

Depending upon the hardness of the materials from which the rear bumper 40 and mud flap mounting flange 42 are constructed, and the inherent spring force of the spring clip 10, it will

be appreciated that the teeth 26 of the spring clip 10 may at least partially penetrate 40a the surface of the rear bumper 40 and/or may at least partially penetrate 26a the mud flap mounting flange 42. Such penetration 26a, 40a of the rear bumper 40 and/or mud flap mounting flange 42 acts to resist disengagement of the spring clip 10 from its fitting location.

5 In other embodiments the surface of the rear bumper 40 and/or mud flap mounting flange 42 may have a recess (not shown) or similar such feature arranged to resist disengagement of the spring clip 10 from its fitting location. The recess may further assist a user of the spring clip 10 when fitting the spring clip 10 by providing a visual and/or tactile indication of the fitting location to the user.

10 In relation to the embodiment shown where the spring clip 10 is used for the connection of the upper portion of a mud flap 38 to the rear bumper 40 of a vehicle 46, the spring clip 10 has the following characteristics. The spring clip 10 is formed from a low carbon steel blank having a thickness of 0.5mm. In the rest position the spring clip 10 has a jaw separation distance of 3.5mm to 4mm at the mouth 22. The spring clip 10 is openable by an
15 appropriately configured tool or tools to increase the jaw separation distance at the mouth 22 to 10mm to 12mm. The spring clip 10 exhibits a clamping force of between 25 N and 30 N at a jaw separation distance of 5 mm, and a clamping force of between 48 N and 55 N at a jaw separation distance of 8 mm. The spring clip 10 further exhibits sufficient retention characteristics to require the application of a force of between 125 N and 132 N to pull the
20 spring clip 10 from its fitting location.

While the arrangement described with reference to figures 5 to 9 concerns the fitting of a rear mud flap 38 to a vehicle rear bumper 40 with the spring clip 10 in accordance with an embodiment of the present invention, it will be appreciated that the spring clip 10 has other uses particularly, though not exclusively, in the automotive vehicle field. For example, the
25 spring clip 10 in accordance with an embodiment of the present invention may be used to at least partially secure a front mud flap 53 to a vehicle 46. Depending upon the configuration of the vehicle 46, the spring clip 10 in accordance with an embodiment of the present invention may be used to connect items to such locations as, for example, side fenders 50, fender lower cladding members 51, front and rear wheel arch cladding members 52a, 52b,
30 and wheel arch liners (not shown).

The spring clip 10 of the present invention may be used both internally and externally to connect, secure, locate or otherwise join together items which are sized to fit into at least the mouth 22 of the spring clip 10 when it has been manipulated into an open condition.

CLAIMS

1. A spring clip for use with a fitting tool, the spring clip comprising a base and a pair of opposing jaws extending from the base, wherein each jaw has an end that is distal to the base, and said distal ends of said jaws are separated from one another so as to define an open mouth of the spring clip, wherein each jaw is provided with a tool locating formation that is adapted to receive a portion of the tool operable to temporarily increase the separation distance of the jaws for the purpose of fitting the spring clip; wherein the tool locating formation of each jaw comprises an arched portion formed in the jaw which arches outwardly from the plane of the jaw.
2. A spring clip as claimed in claim 1, wherein the tool locating formations of the jaws are accessible by the tool from either a mouth side of the spring clip or from a base side of the spring clip.
3. A spring clip as claimed in claim 1 or claim 2, wherein the tool locating formation of each jaw is formed integrally with each jaw.
4. A spring clip as claimed in any preceding claim, wherein the tool locating formations of the jaws are spaced from the distal ends of the jaws towards the base, and are located substantially at a midway position between the base and the distal ends of the jaws or between said midway position and the distal ends of the jaws.
5. A spring clip as claimed in any preceding claim, wherein each jaw is provided with a cut out aligned with the tool locating formation.
6. A spring clip as claimed in claim 5, wherein the cut out of each jaw extends into the base of the spring clip.
7. A spring clip as claimed in any preceding claim, wherein the distal ends of the jaws are each inclined in a direction of the opposing jaw.
8. A spring clip as claimed in any preceding claim, wherein the distal ends of the jaws are separated from one another so as to define the open mouth of the spring clip when the spring clip is in a rest position.

9. A spring clip as claimed in any preceding claim, wherein when not in use the separation distance between the distal ends of the jaws is less than the separation distance between the remainder of the jaws.

10. A spring clip as claimed in any preceding claim, wherein the distal end of each jaw is provided with a gripping means for gripping a location to which the spring clip is fitted, in use.

11. A spring clip as claimed in claim 10, wherein the gripping means comprises a plurality of teeth formed at the distal end of each jaw.

12. A spring clip as claimed in any preceding claim, wherein the spring clip is integrally formed from a metal blank.

13. A spring clip as claimed in any preceding claim, wherein the spring clip includes a corrosion resistant coating.

14. A spring clip as claimed in claim 12 wherein the metal of the blank is a corrosion resistant metal.

15. A spring clip as claimed in any preceding claim, wherein the spring clip provides a clamping force of between about 25 N and about 55 N, in use.

16. A spring clip as claimed in any preceding claim, wherein the spring clip further includes a pair of fitting arms which are temporarily locatable in the tool locating formations of the spring clip.

17. A vehicle comprising a vehicle trim part and a spring clip comprising the features of the spring clip as claimed in any preceding claim, wherein the vehicle trim part is secured to a location on the vehicle at least partially by the spring clip, and wherein the distal end of one of the jaws is in contact with the vehicle trim part and the distal end of other of the jaws is in contact with the location on the vehicle.

18. A vehicle as claimed in claim 17, wherein the vehicle trim part is: a rear mud flap and the location on the vehicle is a portion of a bumper of the vehicle; or a front mud flap

19. A vehicle as claimed in claim 17 wherein the location on the vehicle is:
a side fender or fender lower cladding member;
a front or rear wheel arch cladding member; or
a wheel arch liner.

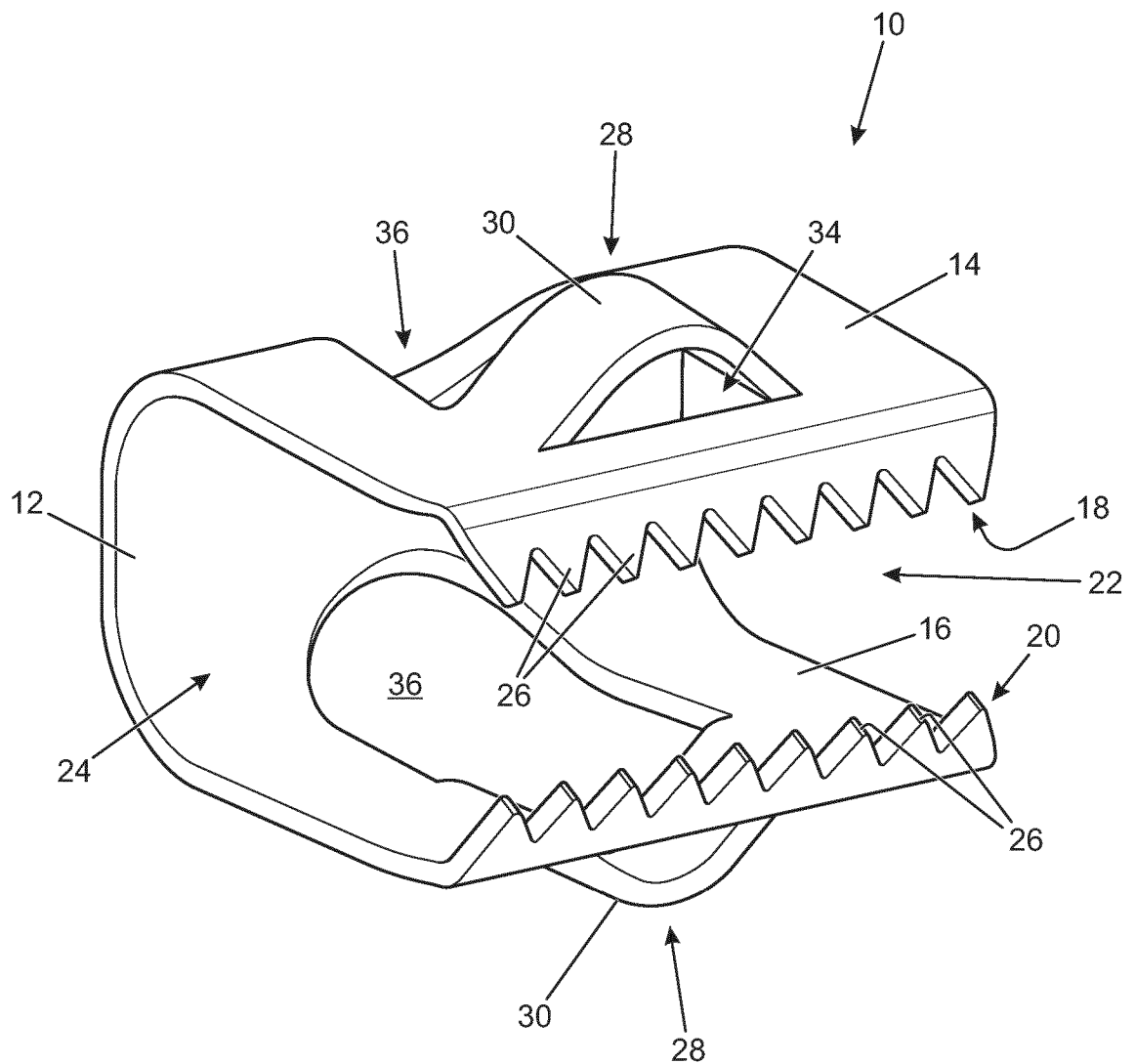


Fig. 1

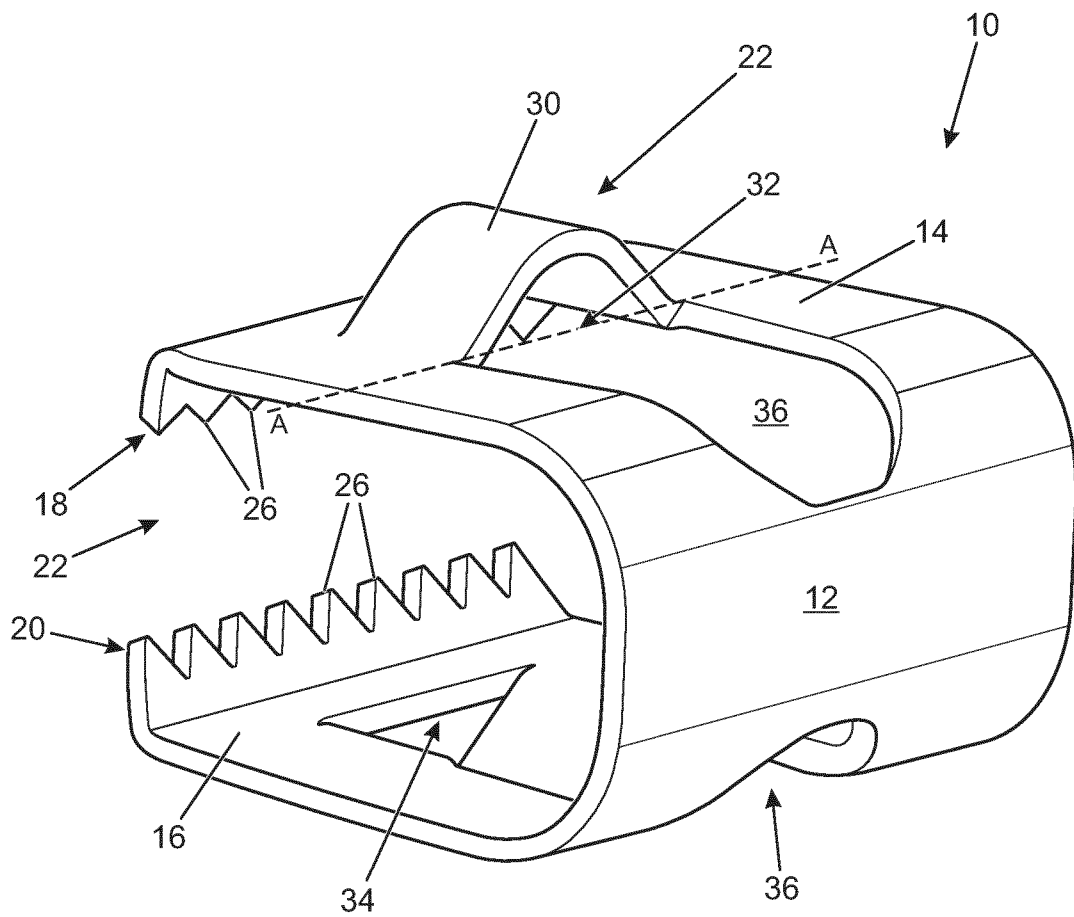


Fig. 2

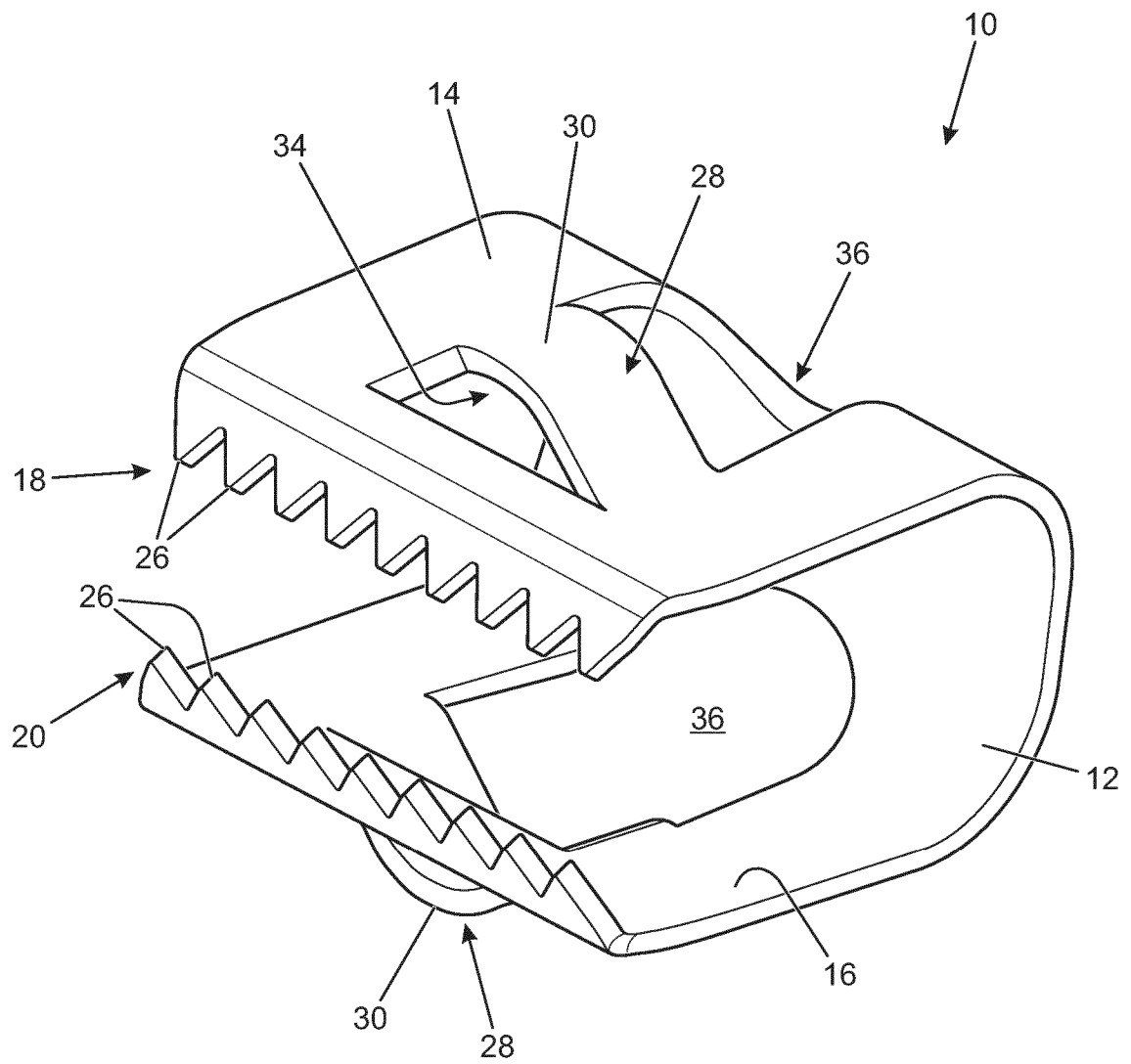


Fig. 3

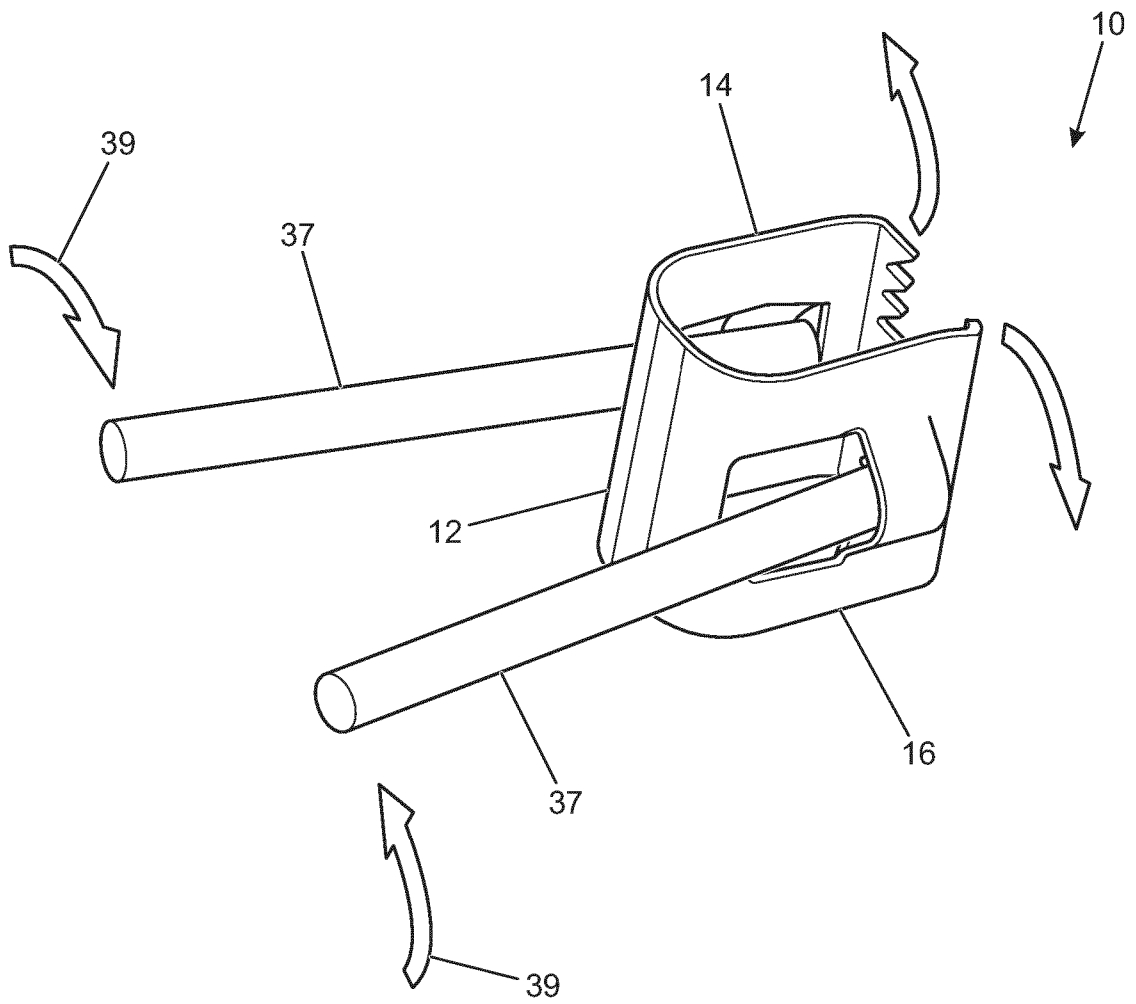


Fig. 4

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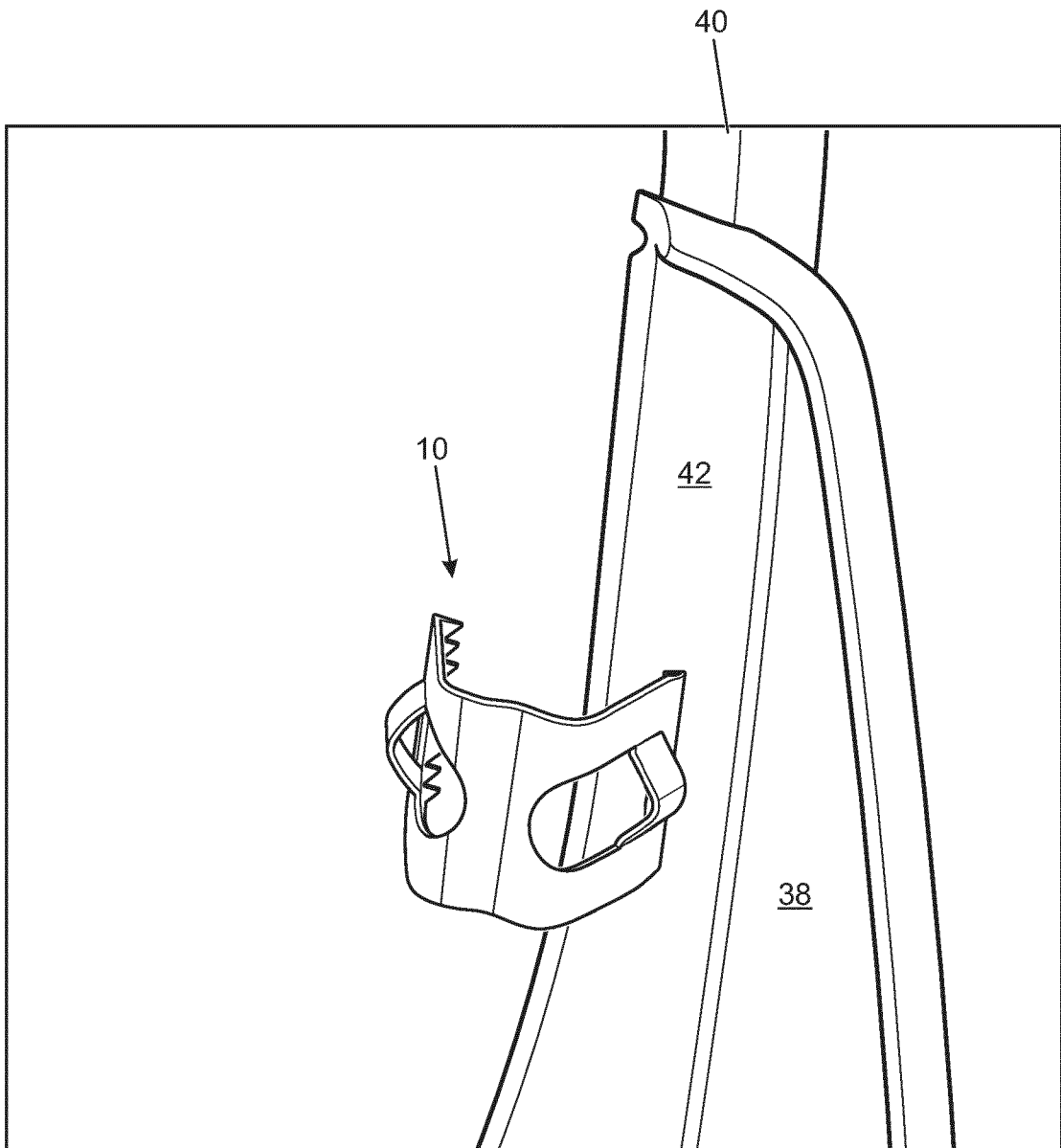


Fig. 5

6/9

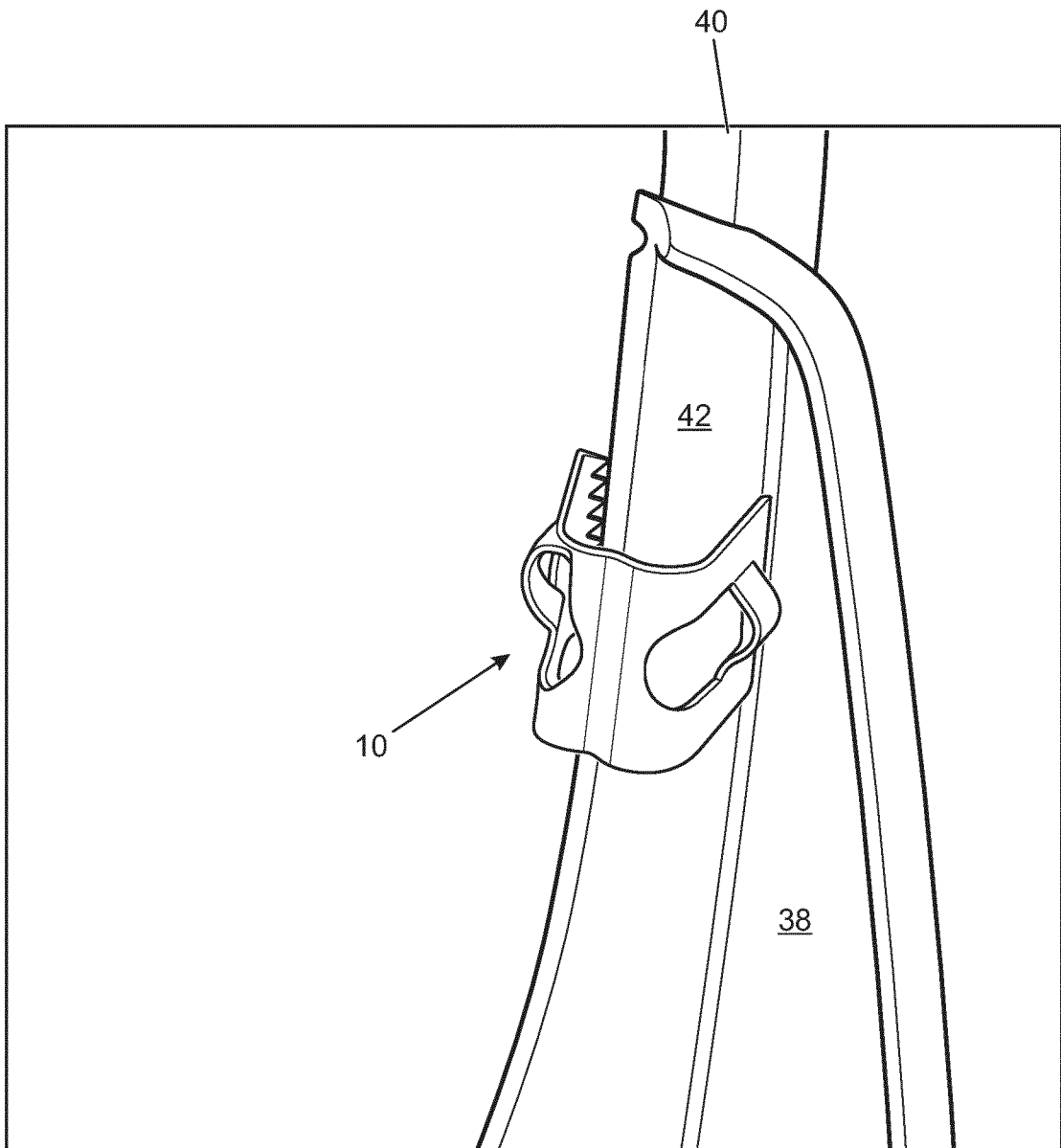


Fig. 6

7/9

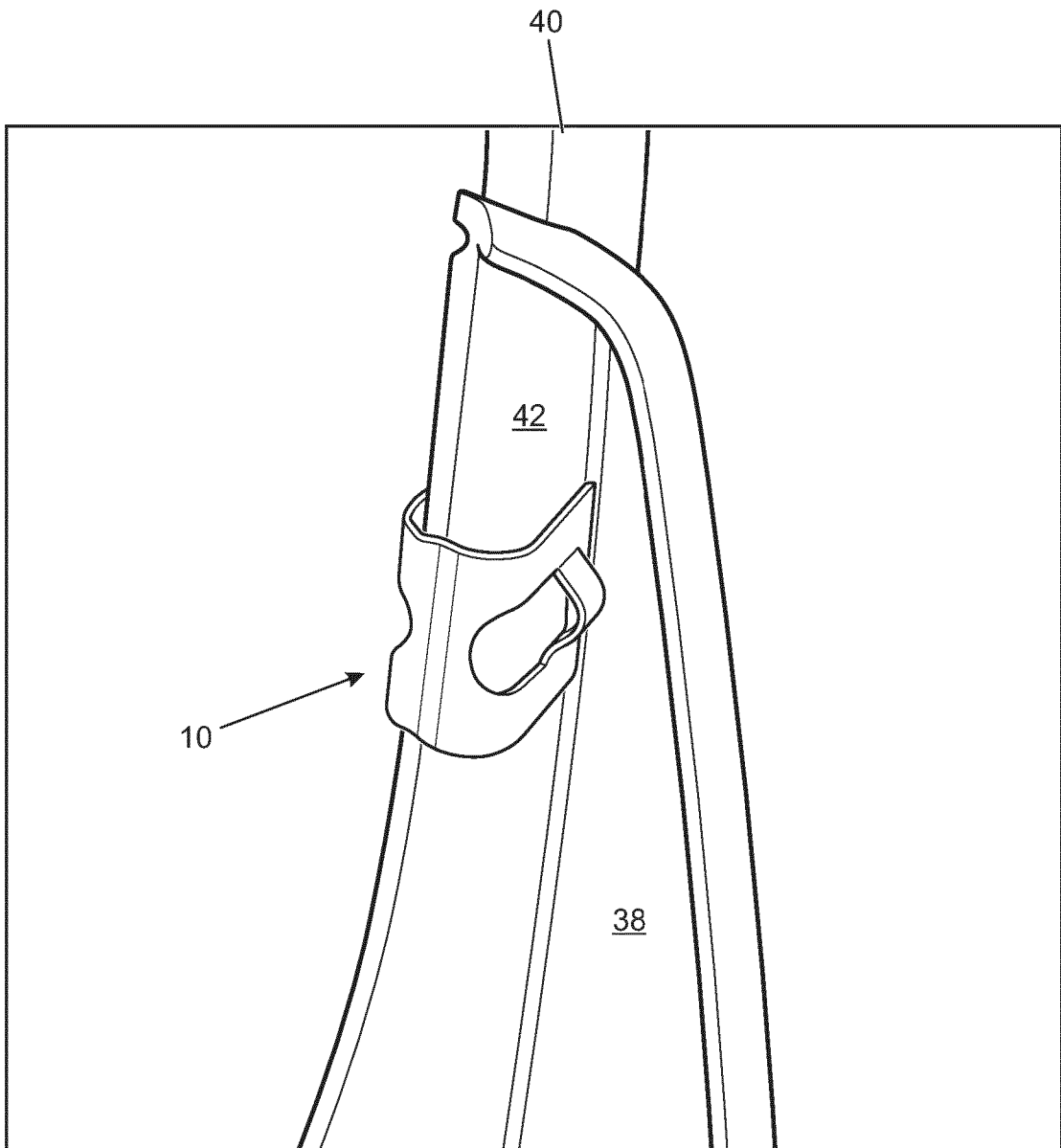


Fig. 7

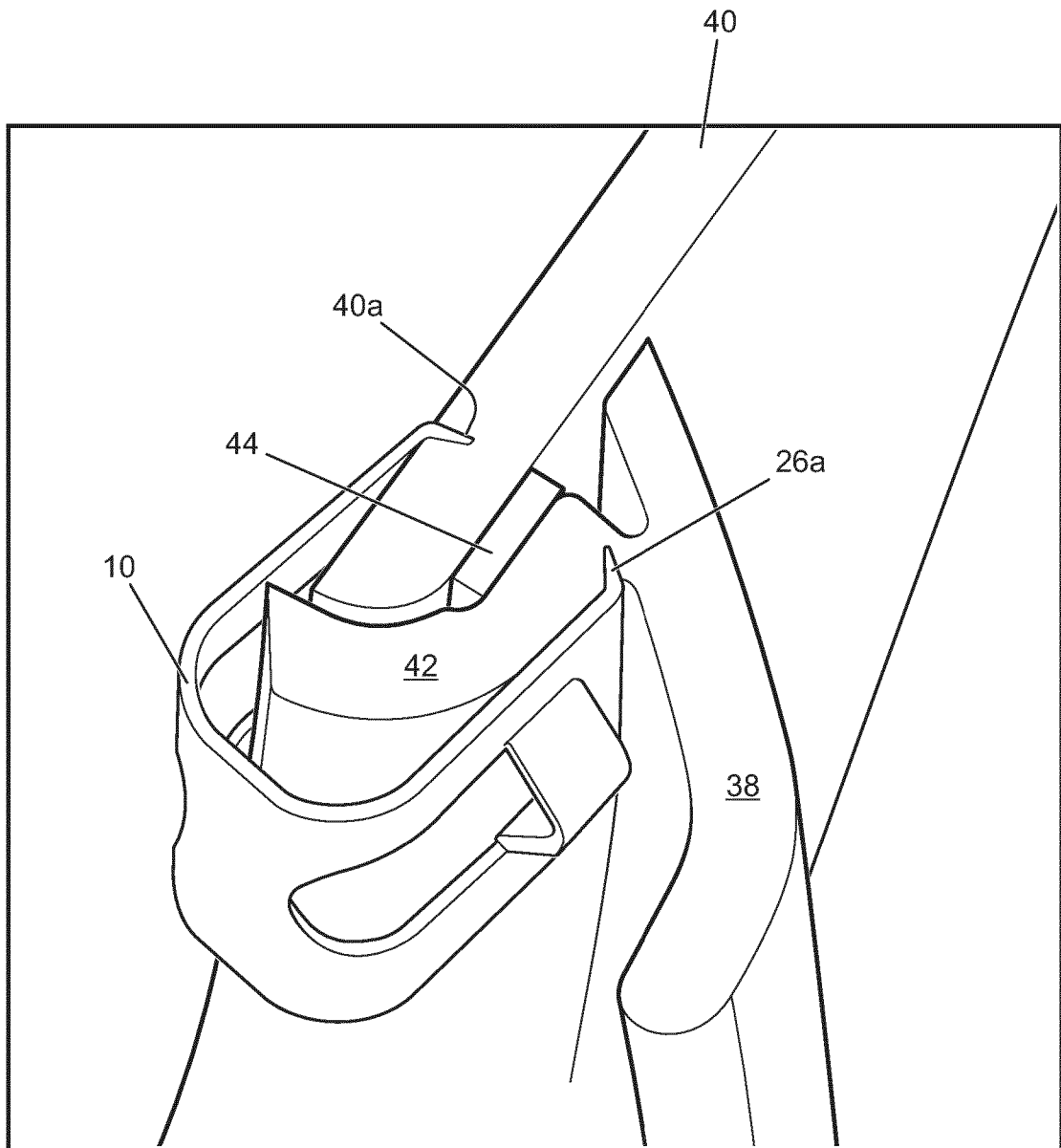


Fig. 8

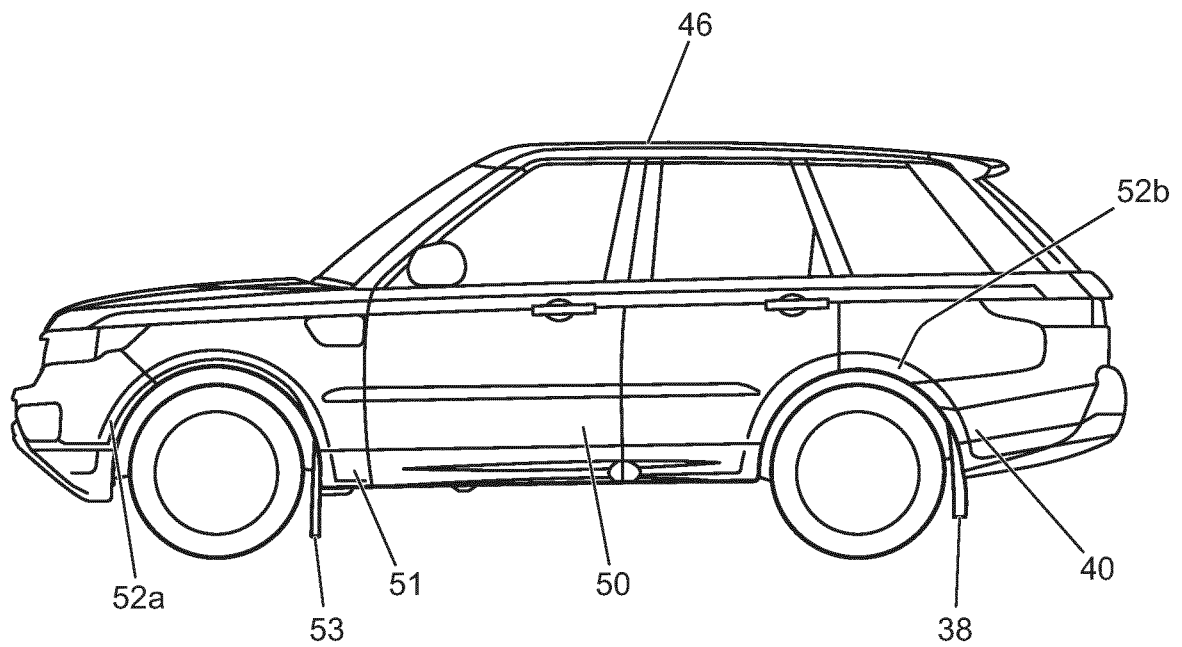


Fig. 9

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/083117

A. CLASSIFICATION OF SUBJECT MATTER
INV. F16B2/24
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)
F16B B62D

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

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

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 2006/130288 A1 (CARLS DAVID R [US]) 22 June 2006 (2006-06-22) abstract; figure 6 -----	1-19
X	FR 2 898 945 A1 (CAILLAU ETS [FR]) 28 September 2007 (2007-09-28) figure 1 -----	1-19
X	US 1 150 073 A (SPENGLER CHARLES C [US]) 17 August 1915 (1915-08-17) figures 1-4 -----	1-19



Further documents are listed in the continuation of Box C.



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3 April 2018

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2017/083117

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006130288	A1	22-06-2006	NONE
FR 2898945	A1	28-09-2007	NONE
US 1150073	A	17-08-1915	NONE