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(54) **Lever catch for locking orthopaedic straps**

(57) A lever catch mainly for orthopaedic use for blocking straps, belts or fastenings of various kinds, presents components designed to perform compass-like opening and closing movements with snap fastening means. These components comprise a fixed part (10) or platform, fitted on the upright of a brace or orthosis, comprising a transverse pin (11) on which a lever (14) is hinged and equipped with at least one pair of

teeth (15) designed to engage in respective housings (16) cut in the ends of two wings (12, 13) of the fixed platform (10) and integral with a cursor (17) which can slide linearly in its housing on the lever in order to move from its normal forward position with the teeth extended to a forcedly retracted position countering elastic means (18) with the teeth (15) withdrawn thus being released when the lever is opened.

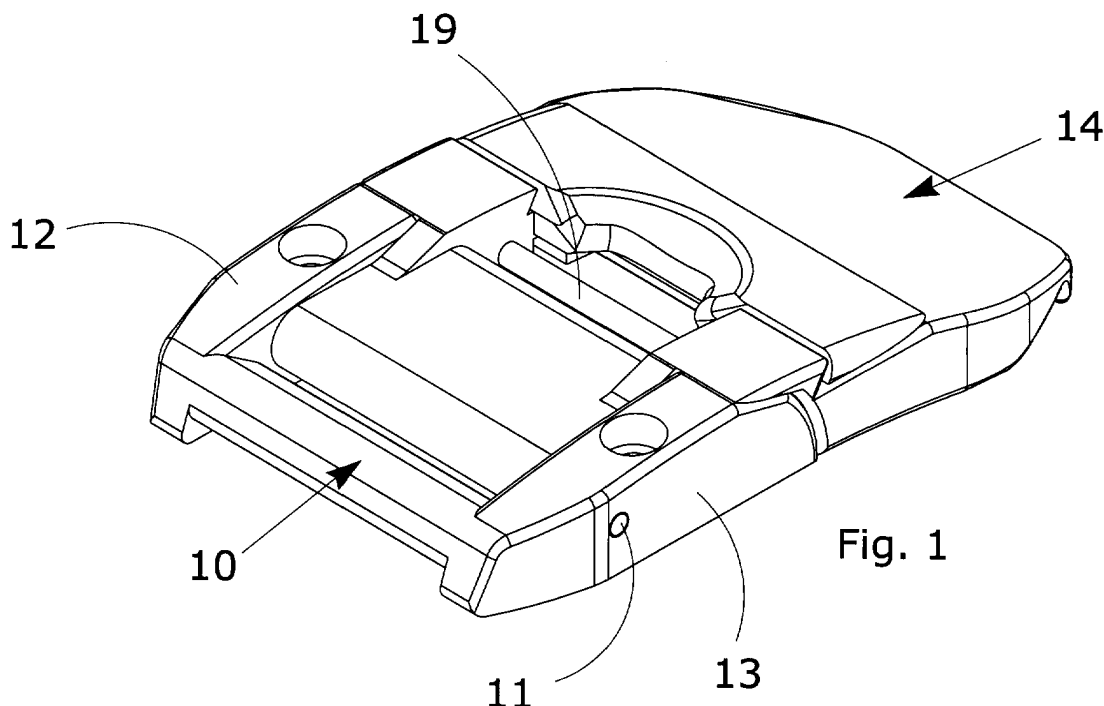


Fig. 1

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Description

TECHNICAL FIELD

[0001] This invention concerns a lever catch mainly for orthopaedic use for blocking straps, belts or fastenings of various types, presenting components that permit compass-like opening and closing with snap catch means.

[0002] More specifically, this invention refers to a lever catch which, compared to known solutions, has the considerable advantage of guaranteeing maximum security in blocking the flaps which must be joined together and fixed or more specifically during the tensioning of the straps.

[0003] This makes it possible for the joined together flaps to be held very securely, since this catch system allows the closed position to be maintained, preventing re-opening unless a specific release movement is performed by operating the unblocking means.

[0004] The lever catch according to the invention, which can be part of an orthosis, for example the orthopaedic jacket type or the brace type for joints or the like, guarantees greater - and in this case almost absolute - security against accidental opening or release.

[0005] This invention can be applied in the sector for the production of therapeutic jackets in general but also of prostheses and braces mainly used in conservative, post-traumatic, rehabilitation and post-operative therapy.

BACKGROUND ART

[0006] It is known that in the presence of some disorders of the limbs, as in the case of problems with the spinal column or the trunk, it is necessary to use particular orthoses of the jacket or the brace type when treating joints, which guarantee a certain degree of support for the patient and absorb the most intense stresses which develop in the trunk or in the limbs.

[0007] Various kinds of jackets, braces or orthoses are currently known and available, but in the majority of cases these devices consist of a rigid frame with a covering, padding and means for fixing them to the trunk or to the limbs.

[0008] These fixing means consist of strap harnesses which are wrapped around the trunk or the limb and blocked in place by using appropriate fastening means.

[0009] One of these means is the subject of patent EP0733349B1 in the name of Otto Bock Orthopädische and the relative German priority number DE29504983, which describe a fastening system for hyperextension orthoses using blocking means of the type comprising a hollow housing in which a snap catch type male element is inserted to allow the straps to be pulled taut on the part of the body to be treated.

[0010] The reciprocal restraining of the two opposite elements that are coupled to make the straps taut is en-

sured by an elastic tab body which engages in the relative housing of the male element which is inserted in it.

[0011] This solution, however, presents a number of problems, the main one being represented by a fairly limited degree of secure grip between the coupled parts, since it is sufficient, even involuntarily, to press the restraining tab which allows the release of the male element inserted in the female part housing.

[0012] This means that even in the presence of secure restraining means designed to be inserted in the hollow area of the respective coupling element, a perfect and constant grip between the parts cannot be ensured since the stop tab can disengage from the housing in the piece it ought to hold in place.

DESCRIPTION OF THE INVENTION

[0013] This description proposes to provide a lever catch mainly for orthopaedic use for blocking and tensioning straps, belts or fastenings of various types, in which the typical components use compass-like opening and closing means and snap restraining means, that is able to eliminate or at least reduce the problems described above.

[0014] In particular the lever catch according to the invention proposes to provide a solution to the problems caused by the possibility of inadvertent opening of traditional systems using buckles or the like.

[0015] The invention also proposes to provide a lever catch that can be easily produced in order to be economically advantageous as well as extremely efficient from the point of view of security and stability.

[0016] This is due to the fact that the proposed aim is to provide a lever catch which can be mounted on straps and belts, in particular for orthopedic jackets or braces or orthoses in general, comprising means designed to accommodate and reciprocally restrain the ends of tension straps or fastenings, preventing in particular any possibility of opening other than by deliberate manual action.

[0017] This is achieved by means of a safety lever catch presenting the features described in the main claim.

[0018] The dependent claims describe advantageous embodiments of the invention.

[0019] The safety lever catch according to the invention therefore foresees the presence of a fixed part or platform, which is fitted on the upright of a brace or in a specific housing in an orthopaedic jacket or other type of restraining or rehabilitative orthosis.

[0020] The fixed part of the catch is equipped with a pin joint hinged to a lever with at least one pair of teeth designed to engage in respective housings of the fixed platform.

[0021] The teeth positioned on the lever part of the catch are elastically countered with a spring and a control system by means of a sliding cursor which, keeping the teeth blocked in a position normally pushed out-

wards, and in particular pressed into the housings in the fixed part, makes it possible to control the release of the teeth from the housings in which they are engaged.

[0022] The control cursor can slide linearly in its housing on the lever in order to move from its normal forward position with the teeth extended to a forcedly retracted position countering the elastic means with the teeth withdrawn thus being released when the lever is opened.

[0023] The catch is made from lightweight metal alloy material or from high-resistance composite plastic material, the surface in contact with the body being in any case made from anallergic material.

DESCRIPTION OF THE DRAWINGS

[0024] Other features and advantages of the invention will become evident on reading the following description of one embodiment of the invention, given as a non-binding example, together with the accompanying drawings in which:

- figure 1 is a schematic and axonometric of the catch shown in its entirety;
- figure 2 shows a front schematic view;
- figure 3 is a schematic view from below, i.e. the inner side, of the catch according to the invention;
- figure 4 is a side schematic view of the catch;
- figure 5 shows a side schematic view of the side facing outwards;
- figures 6, 7 and 8 are schematic and prospective views of the catch shown, respectively, in the closed position, the open position from above and the open position from below.

DESCRIPTION OF ONE EMBODIMENT OF THE INVENTION

[0025] The catch according to the invention is mainly used in the orthopaedic sector for blocking and tensioning straps, belts or fastenings of various kinds, and presents components that allow compass-like opening and closing movements and snap restraining means.

[0026] More specifically, the catch according to the invention substantially consists of a fixed part 10 or platform, which is fitted on the upright of a brace or in the specific housing in an orthopaedic jacket or any other type of restraining or rehabilitative orthosis.

[0027] The fixed part of the catch, which is substantially hollow and open on the inner side, being essentially "U" shaped, is associated with a transverse pin 11 which connects two wings 12 and 13 of the fixed part.

[0028] A lever, globally indicated with 14, is hinged on this pin, the lever being shaped so that it can be inserted and enclosed in the base 10 in such a way that when in the closed position it forms a continuous slightly curved shape with the base, the convex part facing outwards.

[0029] The lever 14 is equipped with at least one pair

of teeth 15 designed to engage in respective housings 16 in the ends of the wings 12 and 13 of the fixed platform 10.

[0030] More specifically, the teeth 15 are positioned on the part of the lever close to symmetrical oppositely shaped bevelled edges and complementary to each other with respect to the shape of the two ends 12 and 13 of the fixed platform 10, into the housings 16 of which the teeth penetrate in the closed position.

[0031] The teeth 15 are mounted on and integral with a cursor 17 which controls the movement of the teeth and is countered by a spring 18, as can be seen in figure 4.

[0032] According to a preferred embodiment, the teeth 15 are cut from a single metal bar bent at the ends, which is housed in a seat in the cursor 17 with which it forms an integral part.

[0033] This arrangement allows the teeth 15 to be held in, a normally pushed outwards position, making it possible in particular for them to be blocked in the housings 16 of the fixed part 10.

[0034] The cursor 17 makes it possible to control the release of the teeth 15 from their respective housings 16 in the fixed part in which they are engaged.

[0035] The cursor 17 can slide linearly in its housing on the lever in order to move from its normal forward position with the teeth extended to a forcedly retracted position countering the elastic means 18 with the teeth 15 withdrawn thus being released when the lever is opened.

[0036] As can be seen in figures 3 and 5, the lever part of the catch presents a pin 19 which represents the coupling means for the strap to be tensioned. The pin 19 is positioned transversally with respect to the lever and in such a way that the inserted strap can be tensioned when the lever 14 is closed.

[0037] In this position, the teeth 15 remain engaged in their housings 16 in the fixed part, ensuring perfect resistance of the strap to traction stress.

[0038] To loosen the tension of the strap, i.e. to open the orthosis, the cursor 17 is moved back a certain distance in order to release the teeth 15 from their respective housings 16 in the fixed body. The lever 14 can then be lifted to loosen the tension of the strap on the pin 19.

[0039] The described latch system can naturally be applied on several points of the orthosis, in order to tension straps that cover even fairly extensive parts of the body.

[0040] As can be noted, the described solution makes it possible to achieve all the aims indicated above and in particular the latch system can be kept in the blocked position, preventing any possible re-opening except by a specific release movement, acting on the uncoupling means.

[0041] The invention is described above with reference to a preferred embodiment. It is nevertheless clear that it is susceptible to numerous variations that are within its scope, in the framework of technical equiva-

lents.

Claims

1. A lever catch mainly for orthopaedic use for blocking straps, belts or fastenings of various kinds, **characterised in that** it presents components designed to perform compass-like opening and closing movements with snap fastening means, and **in that** these components comprise a fixed part (10) or platform, fitted on the upright of a brace or orthosis, comprising a transverse pin (11) on which a lever (14) is hinged and equipped with at least one pair of teeth (15) designed to engage in respective housings (16) cut in the ends of two wings (12, 13) of the fixed platform (10) and integral with a cursor (17) which can slide linearly in its housing on the lever in order to move from its normal forward position with the teeth extended to a forcedly retracted position countering elastic means (18) with the teeth (15) withdrawn thus being released when the lever is opened.

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2. A lever catch according to the foregoing claim, **characterised in that** the teeth (15) are positioned on the part of the lever close to symmetrical oppositely shaped bevelled edges and complementary to each other with respect to the shape of the two ends (12, 13) of the fixed platform (10), into the housings (16) of which the teeth penetrate in the closed position.

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3. A lever catch according to either of the foregoing claims, **characterised in that** the teeth (15) are mounted on and integral with a cursor (17) which controls the movement of the teeth and is countered by a spring (18).

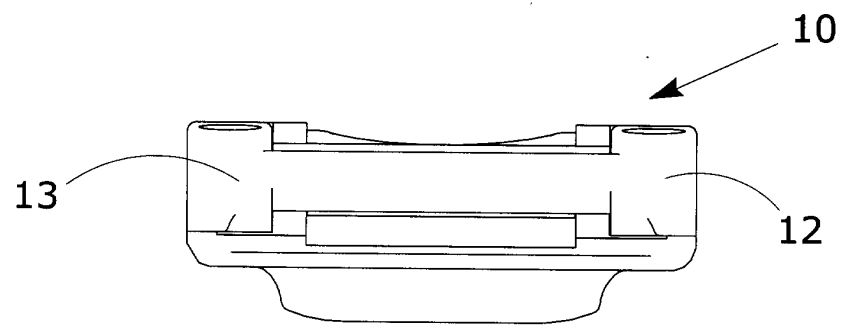
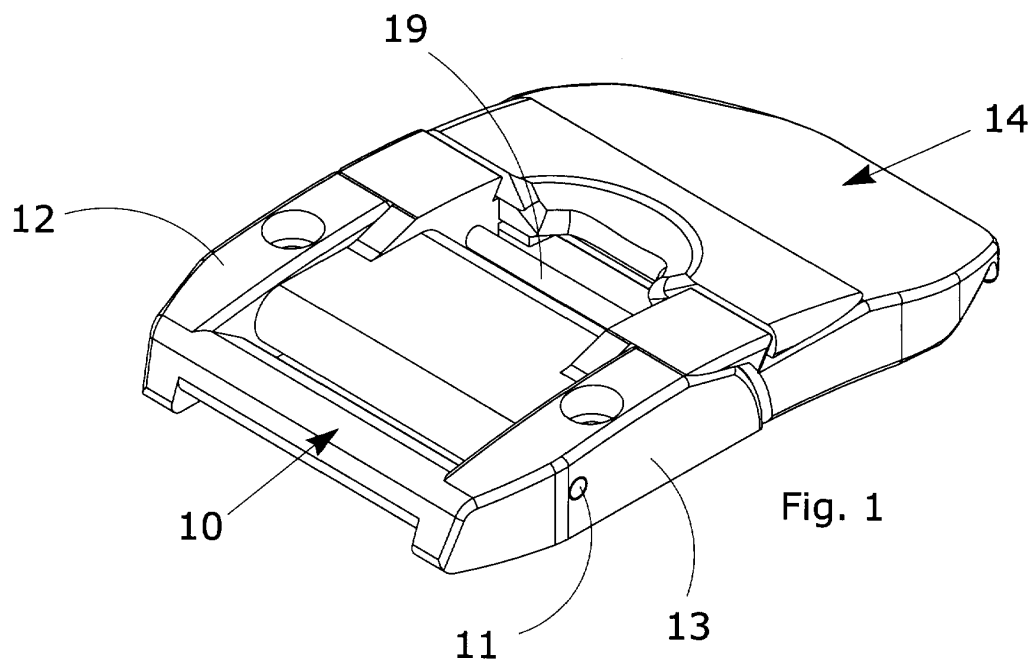
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4. A lever catch according to any of the foregoing claims, **characterised in that** according to a preferred embodiment the teeth (15) are cut from a single metal bar bent at the ends, which is housed in a seat in the cursor (17) with which it forms an integral part.

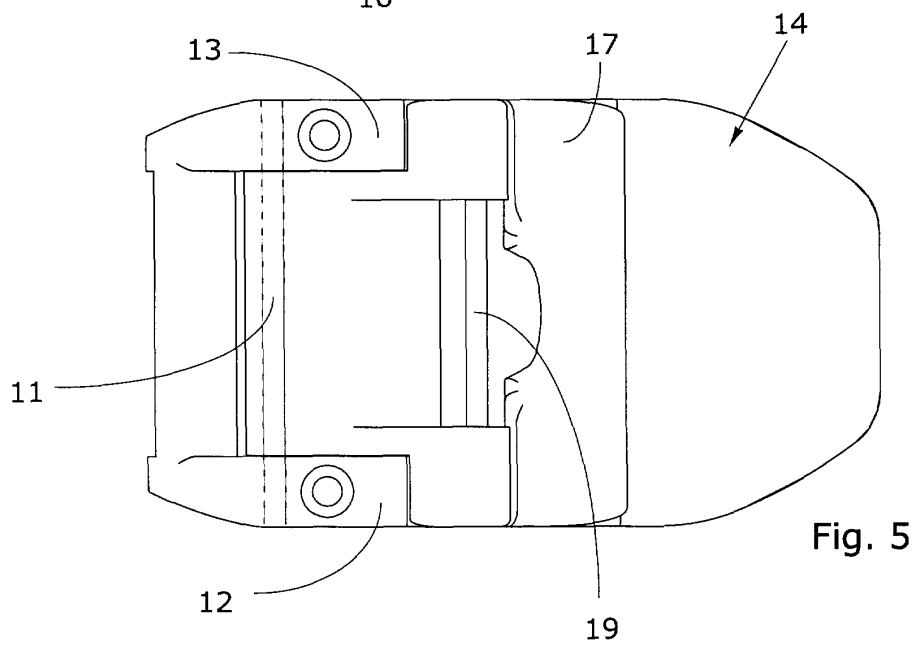
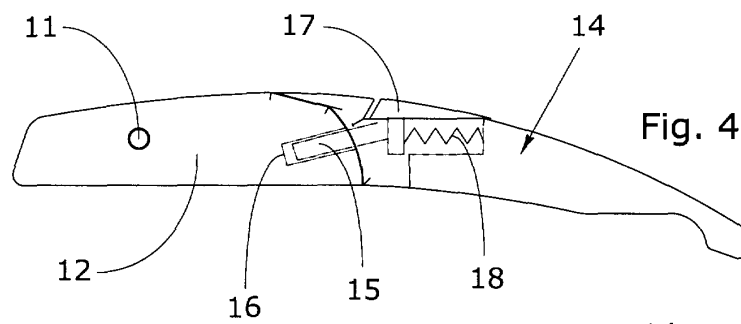
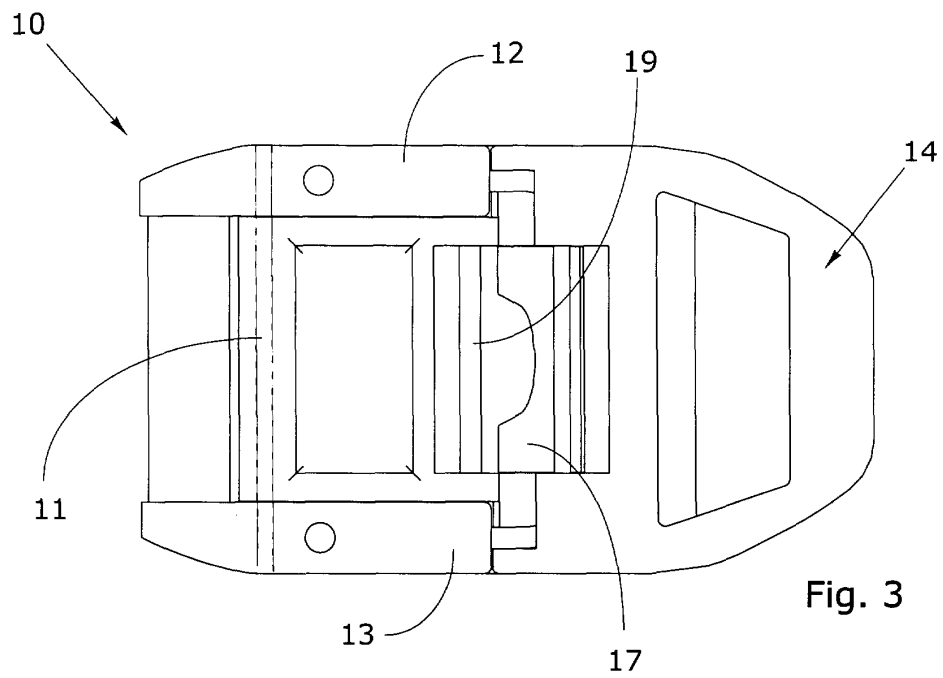
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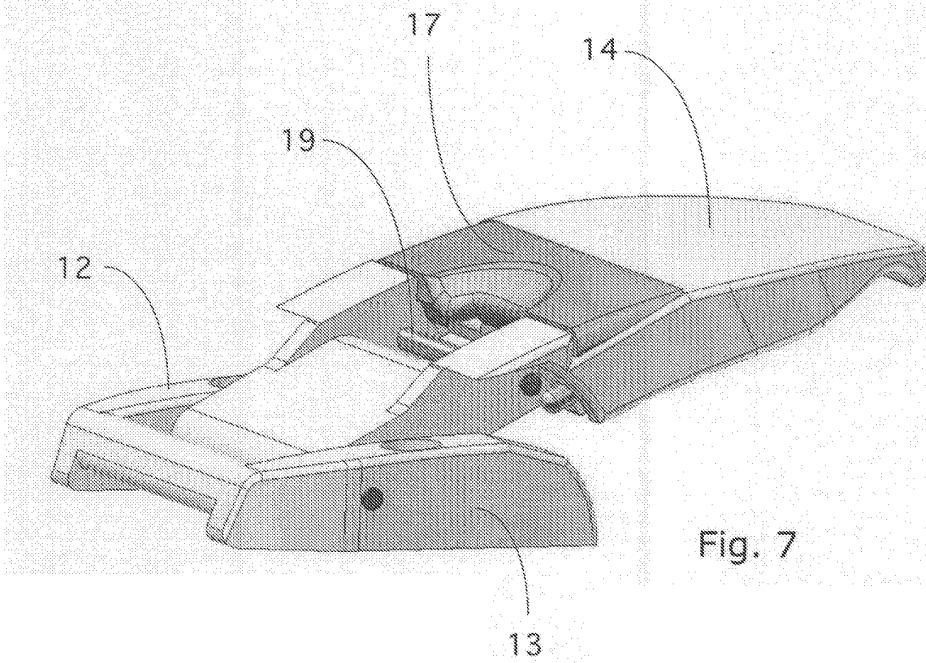
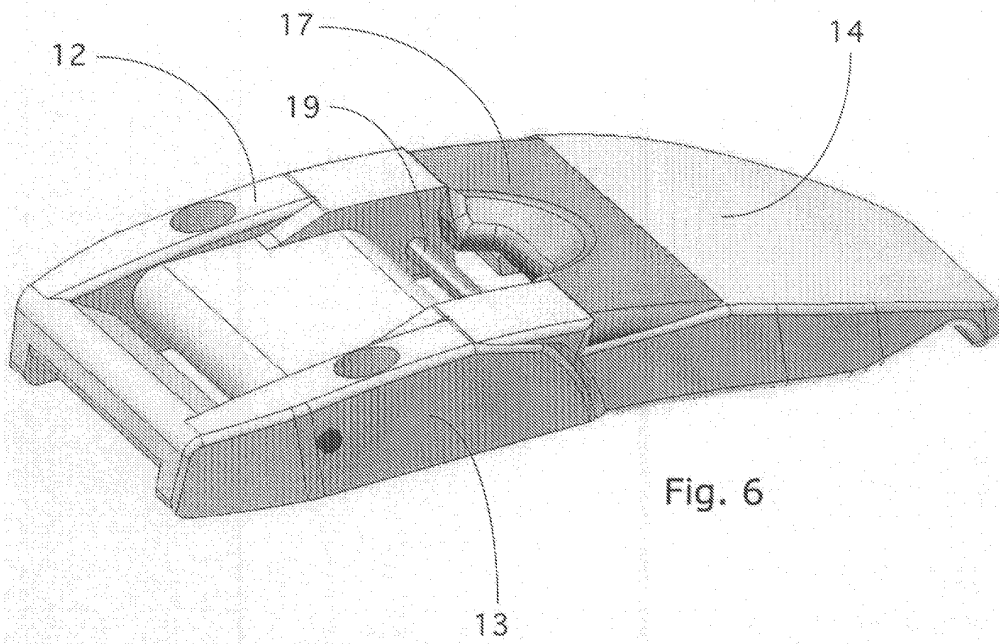
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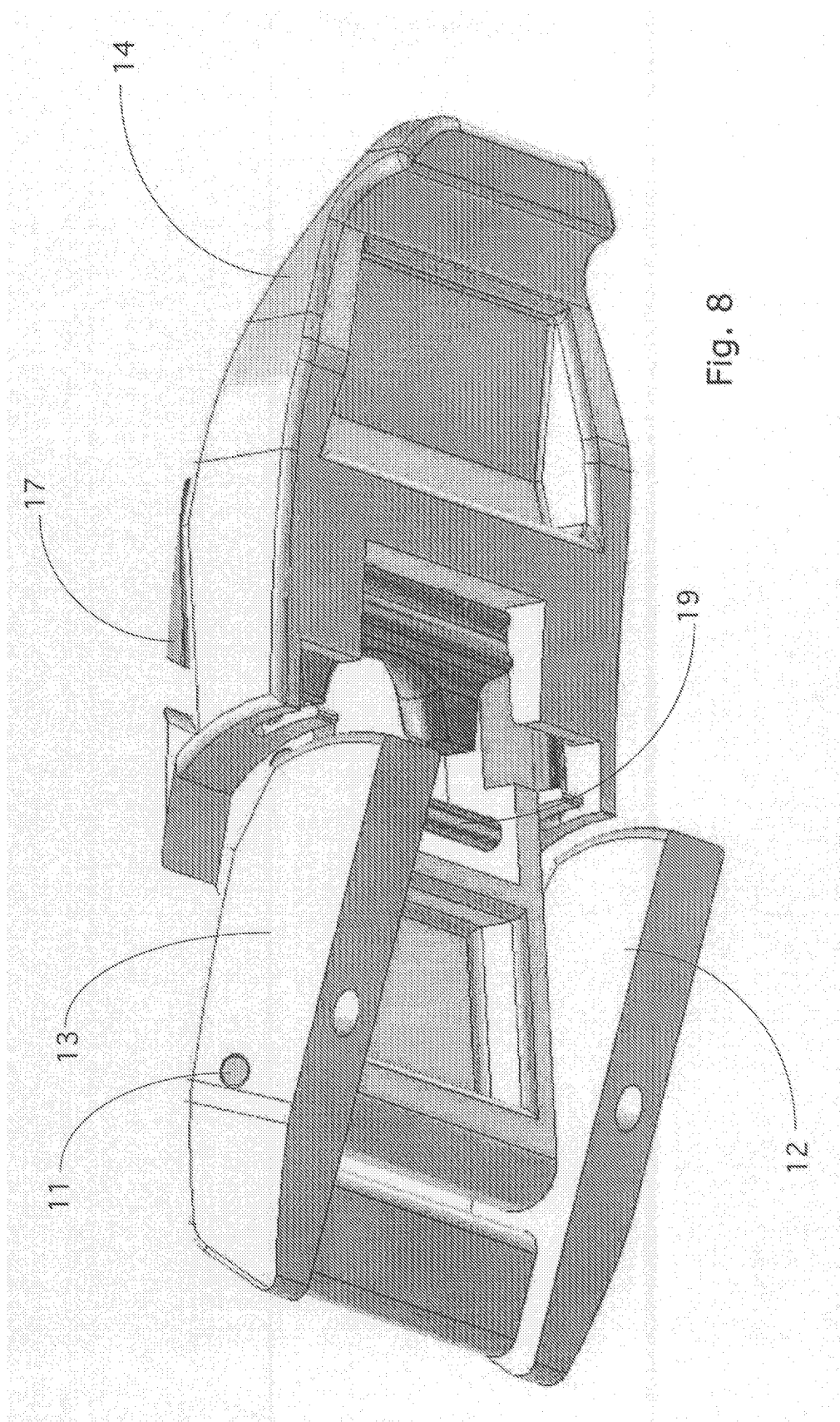


Fig. 8