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(54) **A pivot hinge fitting with engagement means and a roof window comprising a set of such pivot hinge fittings**

(57) The pivot hinge fitting for a roof window has a frame hinge part (100) for fastening to a frame of the roof window and include guide means, and a sash hinge part (200) for fastening to a sash of the roof window includes a slide rail to cooperate with the guide means of the frame hinge part. An additional set of engagement means (150,

250) is provided on the frame hinge part and the sash hinge part to pull the frame hinge part and the sash hinge part together. The sash hinge part (200) comprises a base plate (201) and the additional set of engagement means comprises a first engagement element (250) connected to the base plate of the sash hinge part.

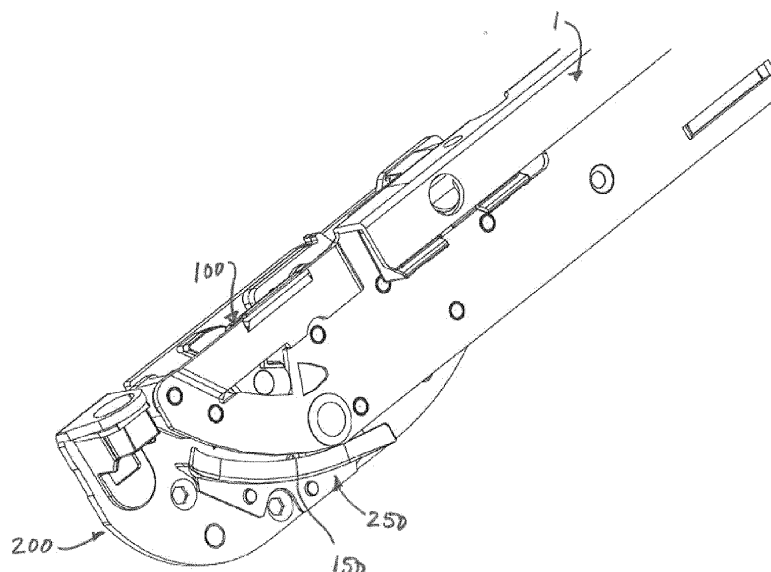


Fig. 2b

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Description

[0001] The present invention relates to a pivot hinge fitting for a roof window, comprising a frame hinge part for fastening to a frame of the roof window and including guide means, and a sash hinge part for fastening to a sash of the roof window and including a slide rail to co-operate with the guide means of the frame hinge part. The invention furthermore relates to a roof window comprising a set of such pivot hinge fittings.

[0002] Such a pivot hinge fitting is most often used in a roof window, forming part of a set of pivot hinge fittings at either side of the window. Basically, such roof windows may be provided in a number of varieties and include more or less complicated structures in order to allow opening of the sash and to fulfil other functions, such as ventilation.

[0003] Windows of the pivoting or centre-hung type have found widespread acceptance, especially as roof windows, inter alia because this kind of window facilitates easy window cleaning, due to the fact that the pane-carrying sash may be pivoted essentially 180° to allow cleaning of the outside surface of the pane from inside the building. This is made possible by the provision of a pivot hinge establishing an overlap between the cover members of the sash and the frame in the closed position of the pivot window, without the use of elaborate devices such as linkage mechanisms to provide the appropriate relative movement. This is a particularly important feature in windows installed in a roof. A further advantage of the pivot window is that it can be fully opened to a position where the sash is turned approximately 90° in which position air inlet is essentially unrestricted. Eventually, a pivot window provides for an easy operation, partly due to the position of the operating means at the top member of the sash, partly because the weight of the sash is substantially balanced with the hinge axis situated close to the centre line of the window.

[0004] On the other hand, top-hung windows, i.e. windows in which the hinge axis is located near or at the top members of the sash and frame, have a number of advantages as well; for instance, operation of the window may take place with a handle at the bottom member of the sash, which is a logical and easily accessible position. Furthermore, a large opening is provided when the sash is opened, allowing even small top-hung windows to function as emergency exits. However, in order to allow cleaning of a top-hung window, normally installed in an inclined roof, from the inside of the building, an intermediate frame must be provided.

[0005] Examples of top-hung windows that pivot for cleaning are for instance disclosed in Applicant's WO-A-89/10460, EP 0 733 146 B1 and EP 1 873 323 B1. To make it possible to pivot the window sash approximately 180° to a convenient cleaning position, the sash structure is connected with an intermediate frame with frame arms, which in the closed position of the window are positioned between the upper parts of the frame and sash side mem-

bers, and which during normal use of the window as a top-hung turning window follow the sash side members. The axis of rotation of this connection lies approximately halfway between the top and bottom members of the frame and sash, and operation of the window to this pivoting movement is carried out in a manner frequently used in connection with roof windows by means of a ventilation and control flap which releases a locking mechanism positioned between the frame and sash top members. As this double pattern of movements entails that the upper part of the sash both during normal use as a top-hung window must be rotatable outwards relative to the frame and, at the pivoting movement to a cleaning position, has to be able to pivot inwardly relative to the frame, the upper cap or cladding members must be able to move relative to the lower cap or cladding members. This most often requires that the top cap connected with the intermediate sash is retained against a support member connected with the intermediate sash arm, whereas the lower part with a screw connection is secured to the screw fitting which is connected with the part of the fitting connected with the intermediate frame arm between the intermediate frame arm and the sash side member.

[0006] The pivot hinge utilized in the pivot windows and the engagement between the intermediate frame and the sash in top-hung windows that pivot for cleaning is of a well-known kind. Examples of prior art pivot hinges are disclosed in EP 1 038 083 B1 and EP 1 781 883 B1.

[0007] In the above-mentioned prior art roof windows, the mutual engagement between the pivot hinge parts connected to the sash and frame, respectively, is of fundamental importance, regardless of whether the frame is a stationary window frame installed in the roof structure, or an intermediate frame which is hinged at the top for normal operation of the window, but which is also provided with a frame hinge part to allow the pane-carrying sash to pivot for cleaning or other purposes. For most fields of application, the engagement between the guidance of the frame hinge part and the slide rail of the sash hinge part is sufficient, and is necessarily designed with a view to allowing easy operation. However, there are situations in which a more tight and secure engagement between the sash hinge part and the frame hinge part is desired.

[0008] With this background it is an object of the present invention to improve a hinge fitting for a roof window of the kind mentioned in the introduction with respect to engagement conditions.

[0009] This and further objects are met by the provision of a hinge fitting for roof window, which is characterized in that an additional set of engagement means is provided on the frame hinge part and the sash hinge part to pull the frame hinge part and the sash hinge part together.

[0010] Thereby a pivot hinge fitting for roof window is provided, with which the desired improved engagement between the frame hinge part and the sash hinge part is achieved. As the additional set of engagement means is provided on the hinge parts themselves, the pulling to-

gether of the hinge parts takes place automatically when the hinge parts are brought from an open position towards the closed position.

[0011] Preferred embodiments and further advantages will be apparent from the following detailed description and the appended dependent claims.

[0012] The invention will be described in more detail below by means of a non-limiting example of an embodiment and with reference to the schematic drawing, in which

Figs 1 a and 1 b show a perspective view of a pivot hinge fitting in an embodiment according to the invention, the frame hinge part being provided as a part of an intermediate frame, in a shaded and a line drawing version, respectively;

Figs 2a and 2b show partial views corresponding to Figs 1 a and 1 b, respectively, on a larger scale;

Fig. 3 shows a view corresponding to Fig. 2a, with the sash hinge part in another position;

Figs 4a and 4b show partial views corresponding to Figs 1 a and 1 b, respectively, on a still larger scale; Fig. 5 shows a view corresponding to Fig. 4a, with the sash hinge part in another position;

Figs 6a and 6b show partial views corresponding to Figs 1 a and 1 b, respectively, on a still larger scale; Fig. 7 shows a view corresponding to Fig. 6a, with the sash hinge part in another position;

Fig. 8 shows a perspective view of the sash hinge part in an embodiment of the pivot hinge fitting according to the invention;

Figs 9 and 10 show perspective views of a detail of the sash hinge part shown in Fig. 8, on a larger scale; and

Figs 11 and 12 show perspective views of the frame hinge part in an embodiment of the pivot hinge fitting according to the invention, seen from two different angles.

[0013] The embodiment of the pivot hinge fitting shown in Fig. 1 is in its mounted position installed in a roof window (not shown in detail) comprising a stationary frame to be built into an inclined roof surface and a sash carrying a pane. The sash is hinged at the top of the roof window to render the roof window top-hung during normal operation, via an intermediate frame, represented by general reference numeral 1, but also pivotally in order to be able to rotate the sash to provide access to the outside of the pane, for instance for cleaning purposes. Such a roof window is shown and described in further detail in Applicant's above-mentioned European patent No. 0 733 146 B1, the contents of which are hereby incorporated by reference. A lifting device generally designated 10 and a spring arrangement (not shown) comprising a spring, or two springs, connected to a sledge (not shown) slidable in a sledge guidance 16 are provided, as is also described in the EP patent.

[0014] From a closed position, the user operates the

operating device of the window. The operating device may be a handle (not shown) connected with the sash bottom member. The bias of the lifting device 10 acts on a lifting arm 14, which in turn exerts a moment on the intermediate frame 1 and hence to the sash relative to an axis through a top hinge pin 11. In combination with the force, and hence moment, exerted by the user operating the operating device, the moment resulting from the weight of the sash and the pane is overcome. Closing the window from the open position entails the opposite movements of the sash and relevant parts of the lifting device. A similar lifting device may be provided at each side of the roof window.

[0015] In order to pivot the sash of the roof window to a cleaning position, in which the outer side of the pane is accessible from the inside of the building in which the roof window is mounted, the intermediate frame 1 is provided with a frame hinge part 100 of the pivot hinge fitting according to the invention, and the sash is provided with the sash hinge part 200 of the pivot hinge fitting.

[0016] As one hinge part, the pivot hinge fitting thus comprises the frame hinge part 100 for fastening to a frame of the roof window, here the intermediate frame 1, and includes guide means for cooperating with a slide rail 220 on the sash hinge part for fastening to a sash of the roof window. The guide means of the frame hinge part 100 comprise a guide block 130 and guide parts 120 inserted between a base plate 101 and a top plate 110. The top plate 110 of the frame hinge part 100 is connected to the base plate 101 by means of a number of rivets, and furthermore a lever spring 125, not described in detail, as this is standard procedure in such pivot hinge fittings. Correspondingly, the other hinge part, i.e. the sash hinge part 200 comprises a base plate 201 on which the slide rail 220 is rotatably connected.

[0017] During operation of the pivot hinge fitting, the slide rail 220 of the sash hinge part slides in the guidance of the frame hinge part 100 in a manner known as such.

[0018] According to the invention, an additional set of engagements means is provided to pull the frame hinge part and the sash hinge part together. In the embodiment shown, the additional set of engagement means comprises a first engagement element 250 and a second engagement element 150, of which the first engagement element 250 is connected to the base plate 201 of the sash hinge part 200 and the second engagement element 150 is connected to the top plate 110 of frame hinge part 100. The second engagement element 150 may be provided as a separate element, but in a preferred embodiment, the second engagement element 150 is formed integrally with the top plate.

[0019] In order to ease the insertion of the second engagement element 150 into the first engagement element 250, the first engagement element 250 has an inclined entrance portion 251. Furthermore, the first engagement element 150 has a flange portion 252 adapted to be connected to the base plate 201 of the sash hinge part 200. The flange portion 252 is provided with two apertures

253, 254 to receive connecting means such as rivets. At the opposite end of the first engagement element 250, a corresponding inclined entrance portion 256. This is for the provision of a first engagement element 250 which is symmetrical so that one and the same first engagement element may be utilized at the left-hand and the right hand pivot hinge fitting. The first engagement element 250 furthermore comprises an arched guide wall portion 257 and a top portion 258. The first engagement element may be formed by any suitable means, for instance as a symmetrical element of a plastic material, e.g. manufactured by moulding. However, due to the load on the pivot hinge, the first engagement element is preferably made by metal, which is fastened by means of rivets. A holding clip 260 adapted to accommodate fastening means for a side sash cladding is connected to the base plate 201 of the sash hinge part 200.

[0020] The second engagement element 150, which in the embodiment shown is provided as wedge-shaped portion 151 of the top plate 110 of frame hinge part 100, forms the front part as seen in the direction, in which the sash hinge part 200 is moved towards the closed position, cf. Fig. 5.

[0021] During operation, when the sash is brought from the open position towards the closed position, the second engagement element 150 enters the first engagement element 250 by its wedge-shaped portion 151. In combination with the inclined entrance portion 251, safe engagement between the sash hinge part 200 and the frame hinge part 100 is possible, even if these parts are located at a relatively large distance from each other, and approach each other at an angle. Such deviation between the base plate 201 of the sash hinge part 200 and the top plate 110 of the frame hinge part 100 may occur due to tolerances in the sash itself, especially in tall windows, or if the intermediate frame 1 is for instance affected by a wind load. The alignment made possible by the additional set of engagement means entails that a very satisfactory sealing is obtained, as the sash abuts the frame tightly.

[0022] A roof window according to the invention thus comprises a set of pivot hinge fittings as described in the above. The pivot hinge fittings need not necessarily be identical at either side. In order to standardize manufacture of the parts, the additional set of engagement means at one pivot hinge fitting may be mirror-imaged in the opposite pivot hinge fitting. The frame hinge part is provided on an intermediate frame in the embodiment shown, but may also be formed as a separate hinge part to be connected to the stationary frame of a window.

[0023] It should be noted that the above description of preferred embodiments serves only as an example, and that a person skilled in the art will know that numerous variations are possible without deviating from the scope of the claims.

Claims

1. A pivot hinge fitting for a roof window, comprising:
 - a frame hinge part (100) for fastening to a frame of the roof window and including guide means, and
 - a sash hinge part (200) for fastening to a sash of the roof window and including a slide rail to cooperate with the guide means of the frame hinge part,
 - characterized in that** an additional set of engagement means (150, 250) is provided on the frame hinge part and the sash hinge part to pull the frame hinge part and the sash hinge part together.
2. A pivot hinge fitting according to claim 1, wherein the sash hinge part (200) comprises a base plate (201) and the additional set of engagement means comprises a first engagement element (250) connected to the base plate of the sash hinge part.
3. A pivot hinge fitting according to claim 2, wherein the first engagement element (250) has an inclined entrance portion (251).
4. A pivot hinge fitting according to claim 2 or 3, wherein the first engagement element (250) has a flange portion (252) adapted to be connected to the base plate of the sash hinge part, an arched guide wall portion (257) and a top portion (258).
5. A pivot hinge fitting according to any one of claims 2 to 4, wherein the first engagement element (250) is formed as a symmetrical element, preferably of a metal or plastic material.
6. A pivot hinge fitting according to any one of the preceding claims, wherein the frame hinge part (100) in addition to the guide means (120, 130) comprises a top plate (110) and the additional set of engagements means comprises a second engagement element (150) connected to the top plate (110) of frame hinge part, preferably formed integrally with the top plate.
7. A pivot hinge fitting according to claim 6, wherein the top plate (110) of the frame hinge part is connected to a base plate (101) of the frame hinge part (100).
8. A pivot hinge fitting according to any one of the preceding claims, wherein the frame hinge part (100) is provided on an intermediate frame (1).
9. A pivot hinge fitting according to any one of claims 6 to 8, wherein the second engagement element (150) is provided as a wedge-shaped portion (151)

of the top plate (110) of frame hinge part (100).

- 10.** A roof window comprising a set of pivot hinge fittings according to any one of claims 1 to 9.

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- 11.** A roof window according to claim 10, wherein the additional set of engagement means at one pivot hinge fitting is mirror-imaged in the opposite pivot hinge fitting.

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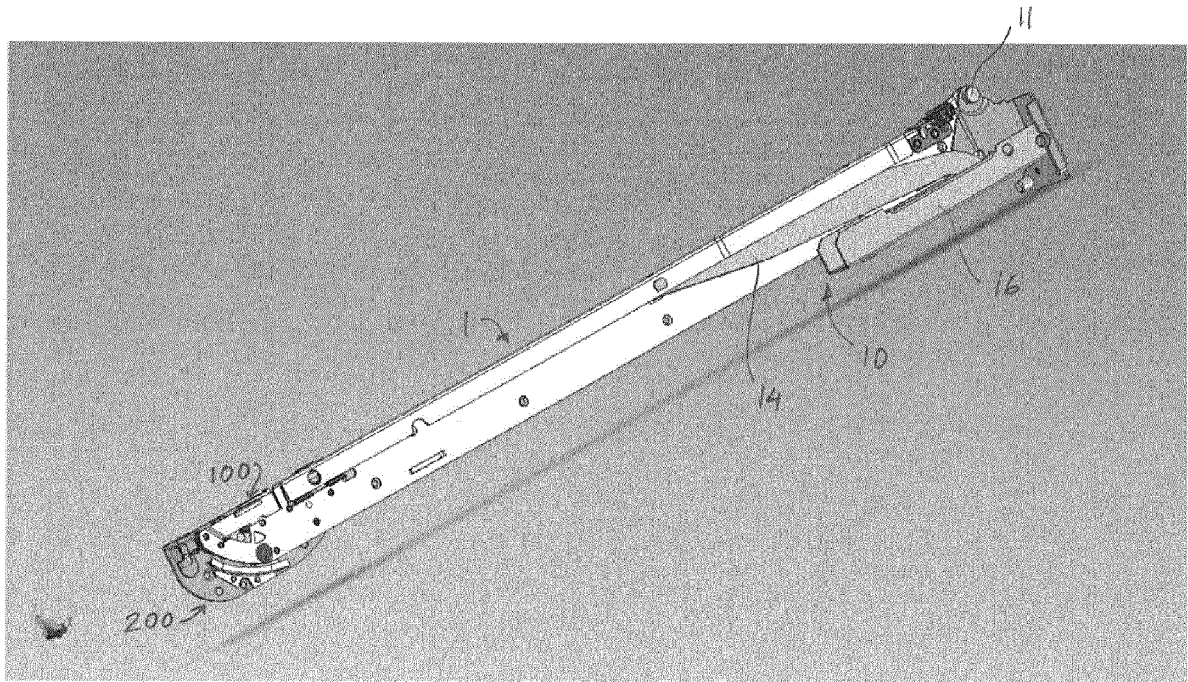


Fig. 1a

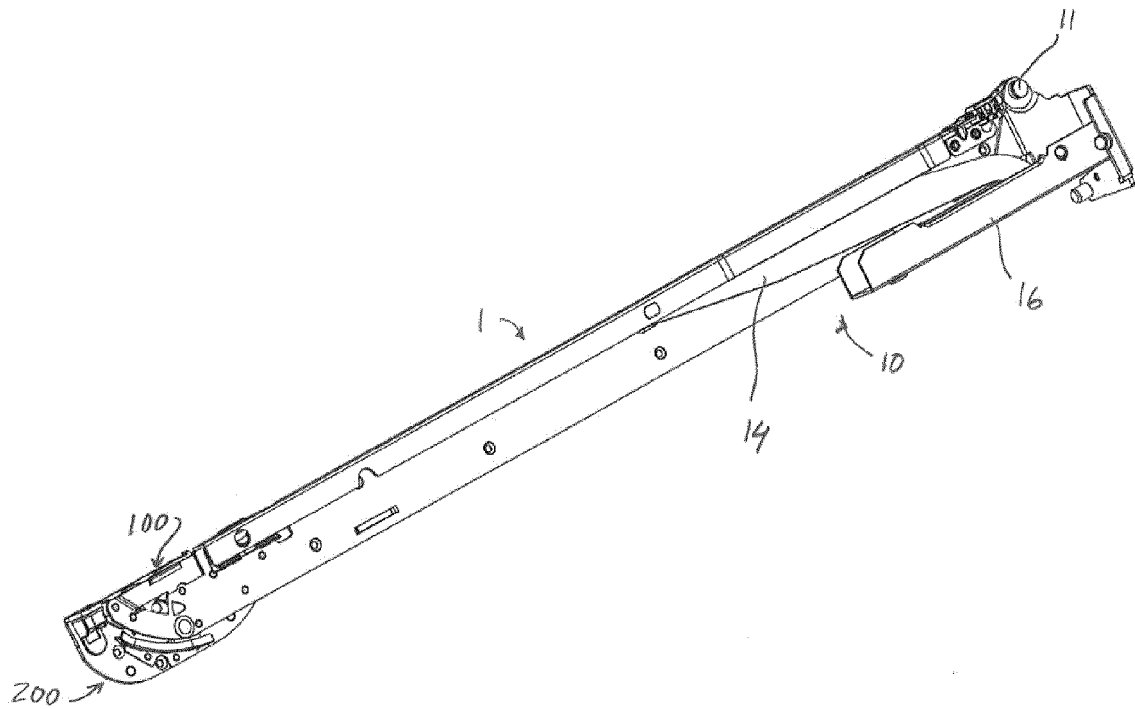


Fig. 1b

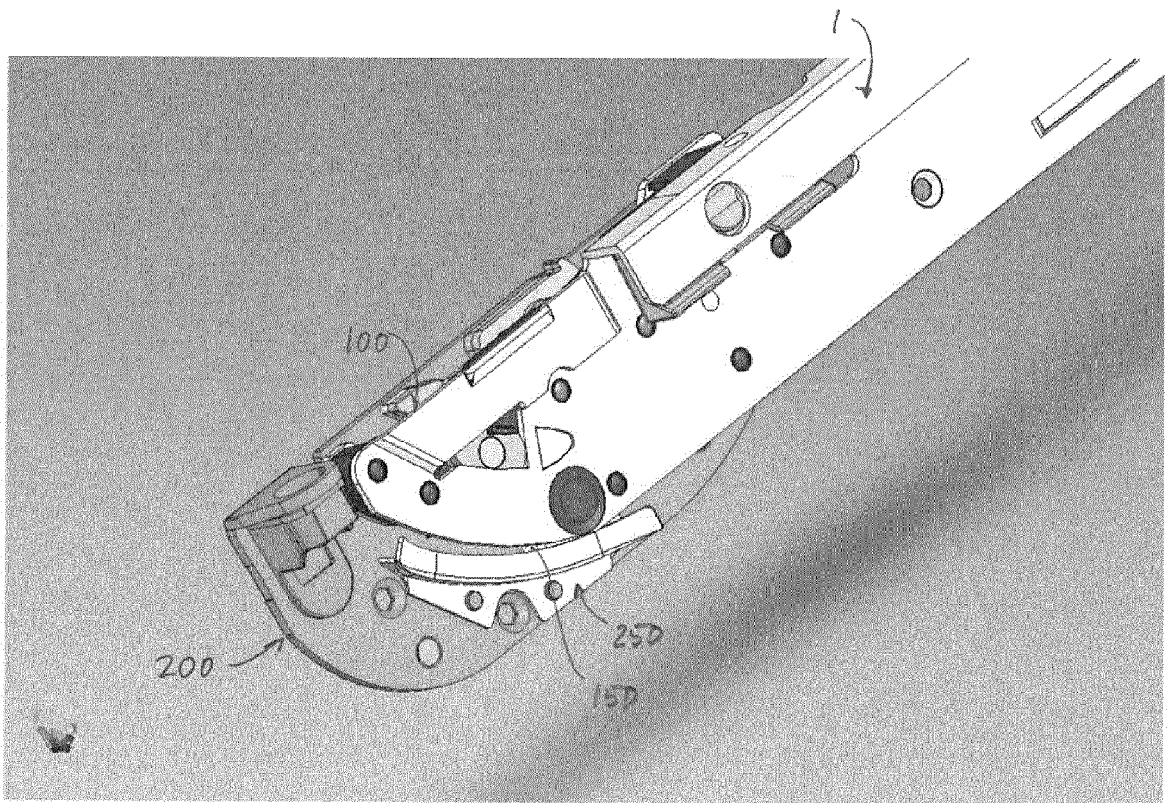


Fig. 2a

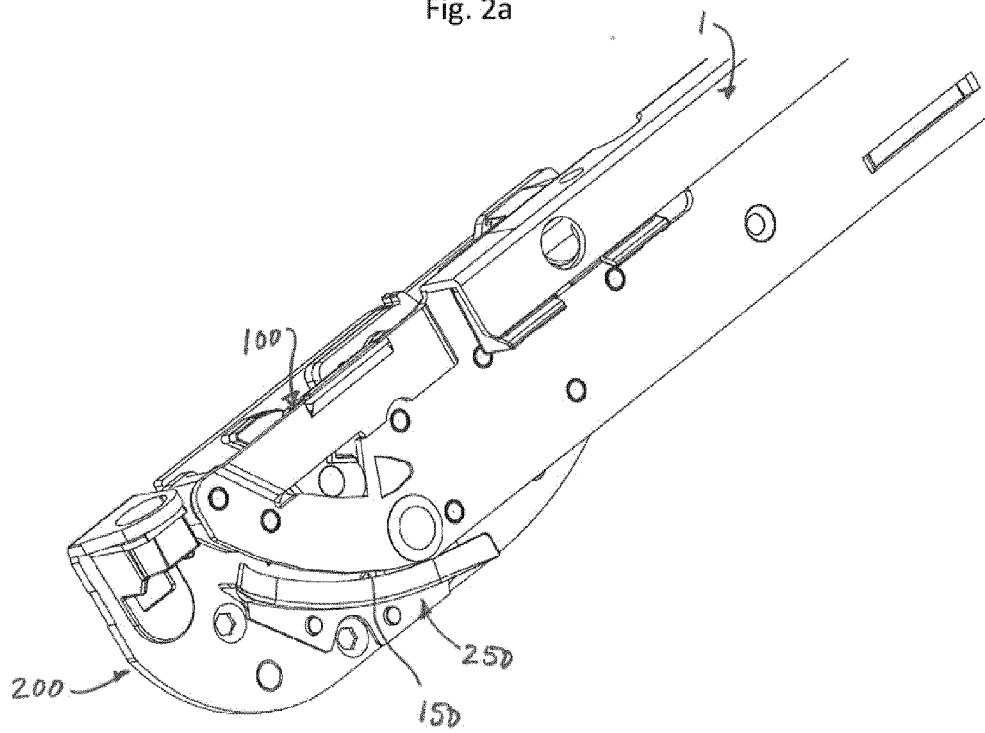


Fig. 2b

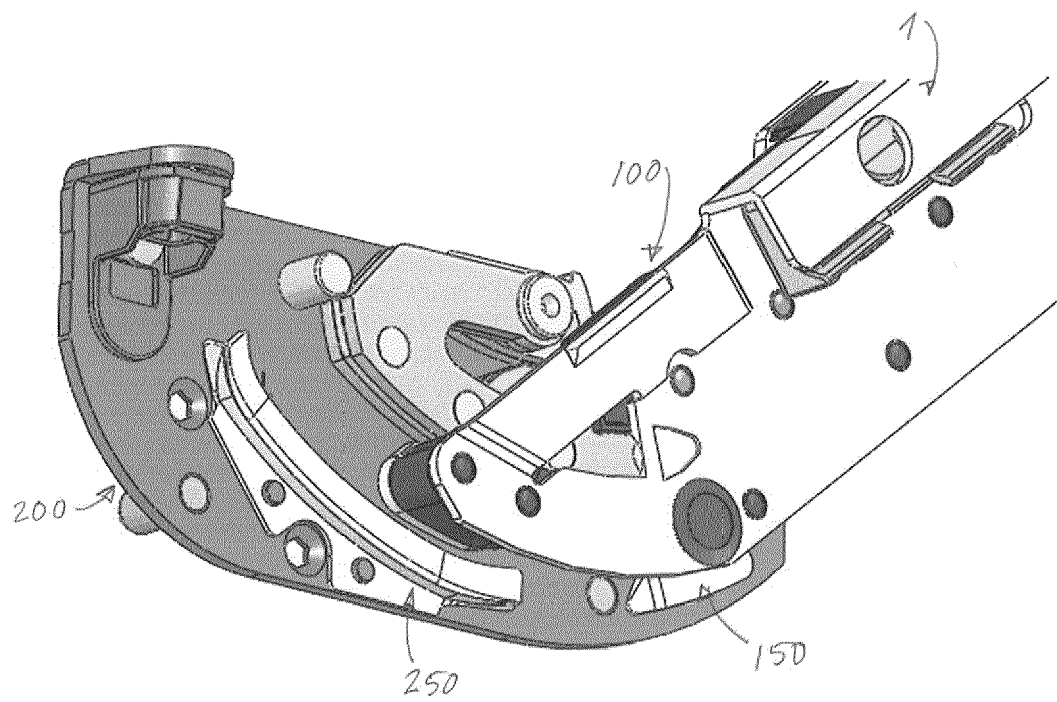


Fig. 3

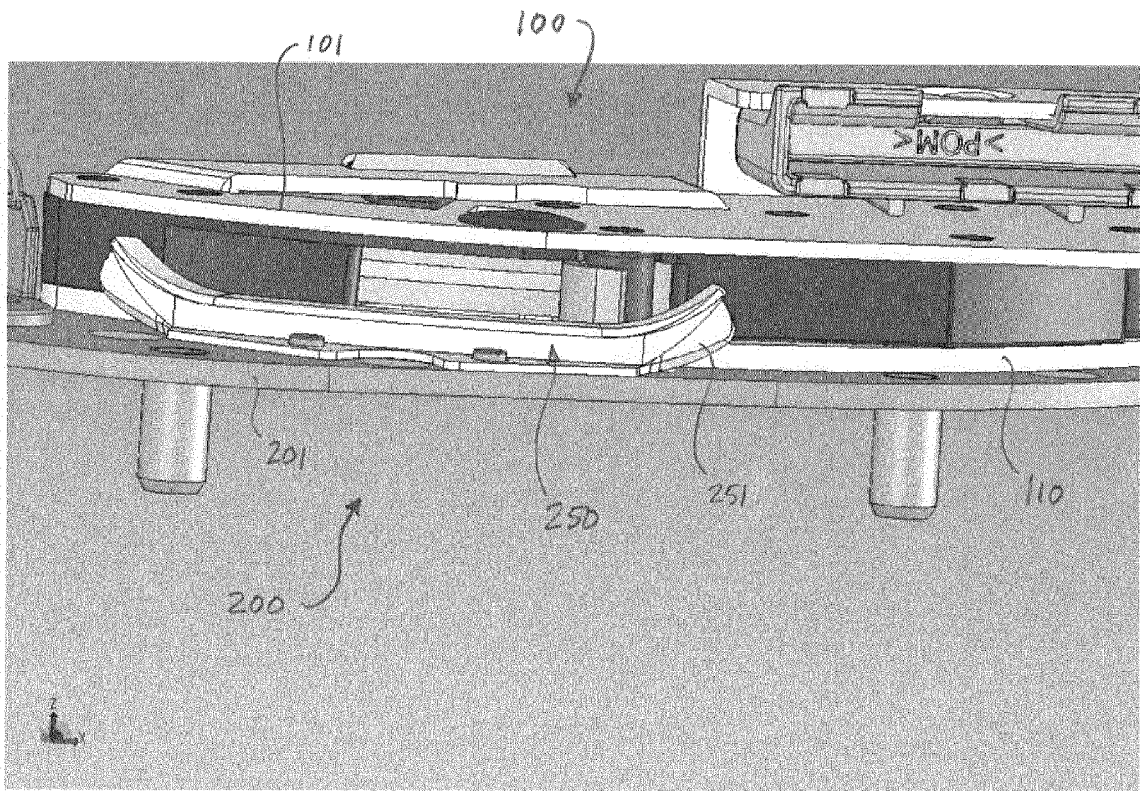


Fig. 4a

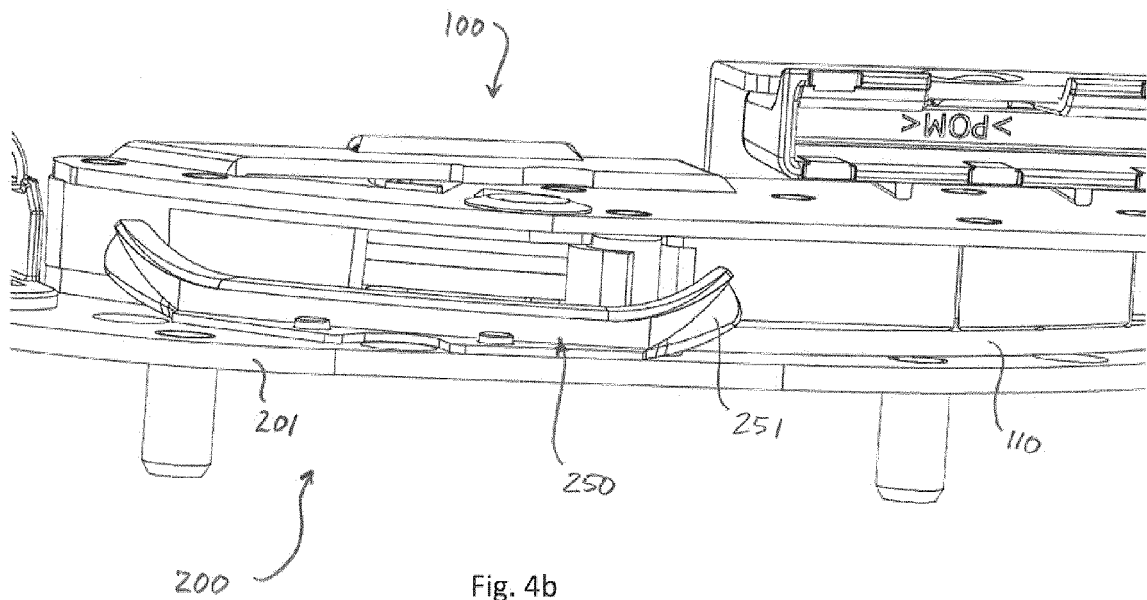


Fig. 4b

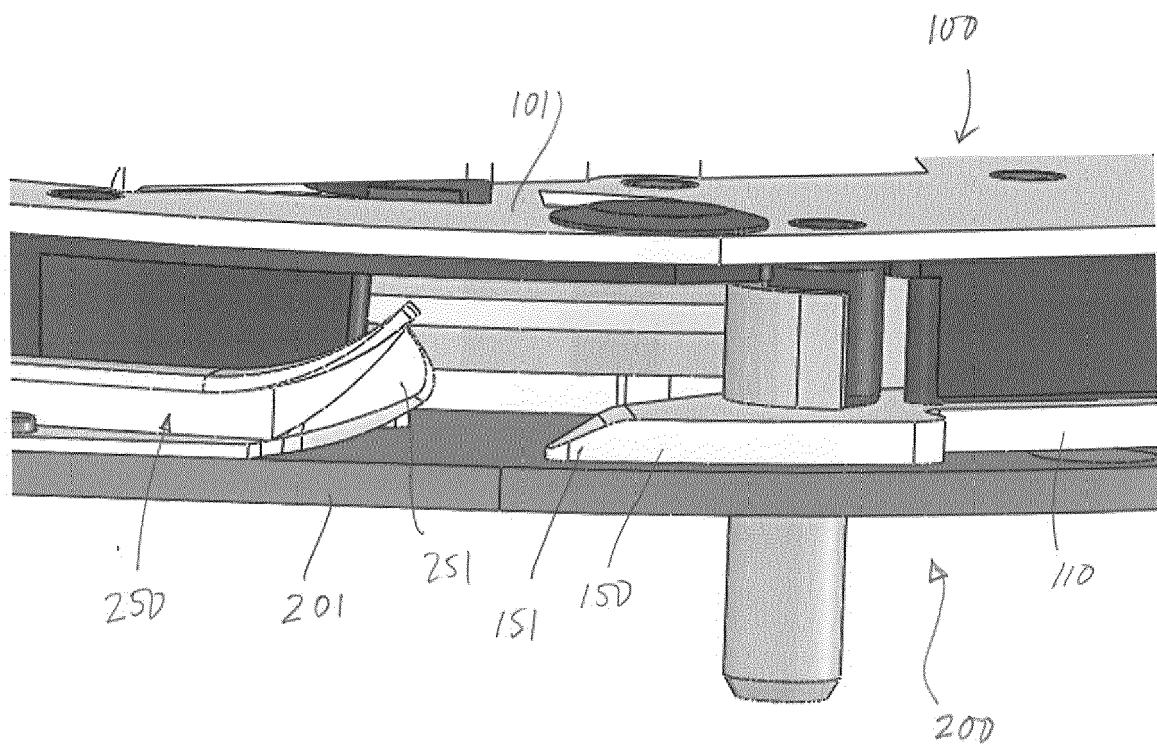


Fig. 5

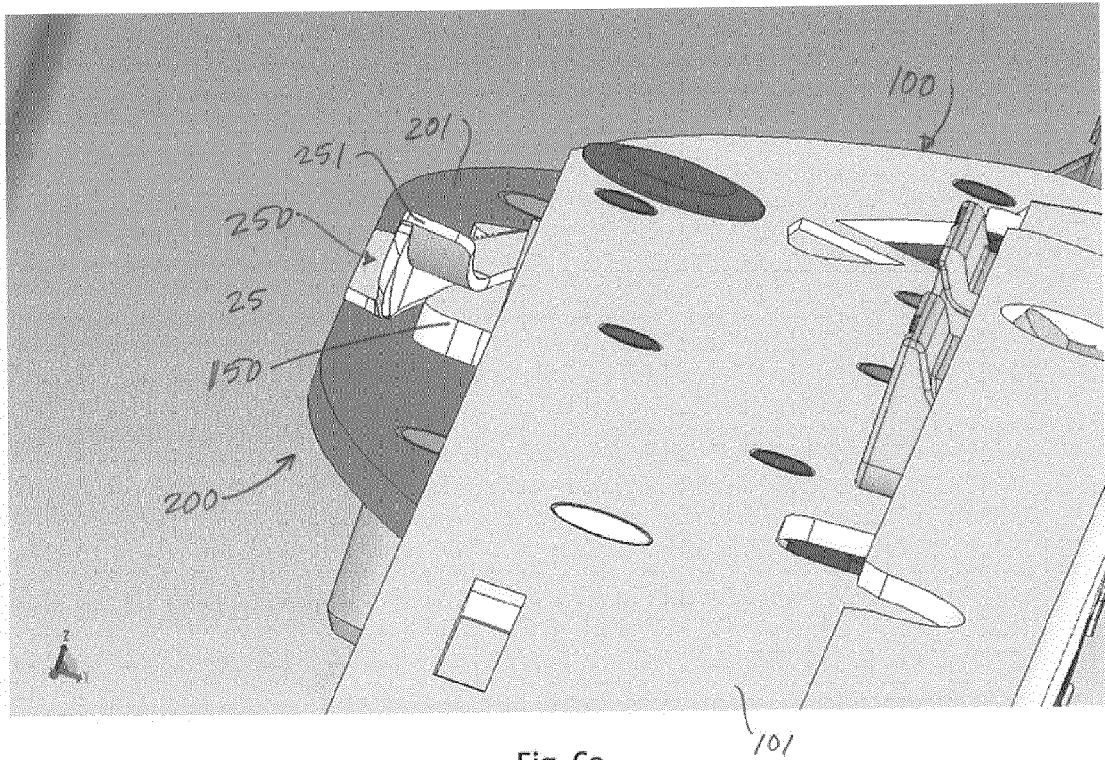


Fig. 6a

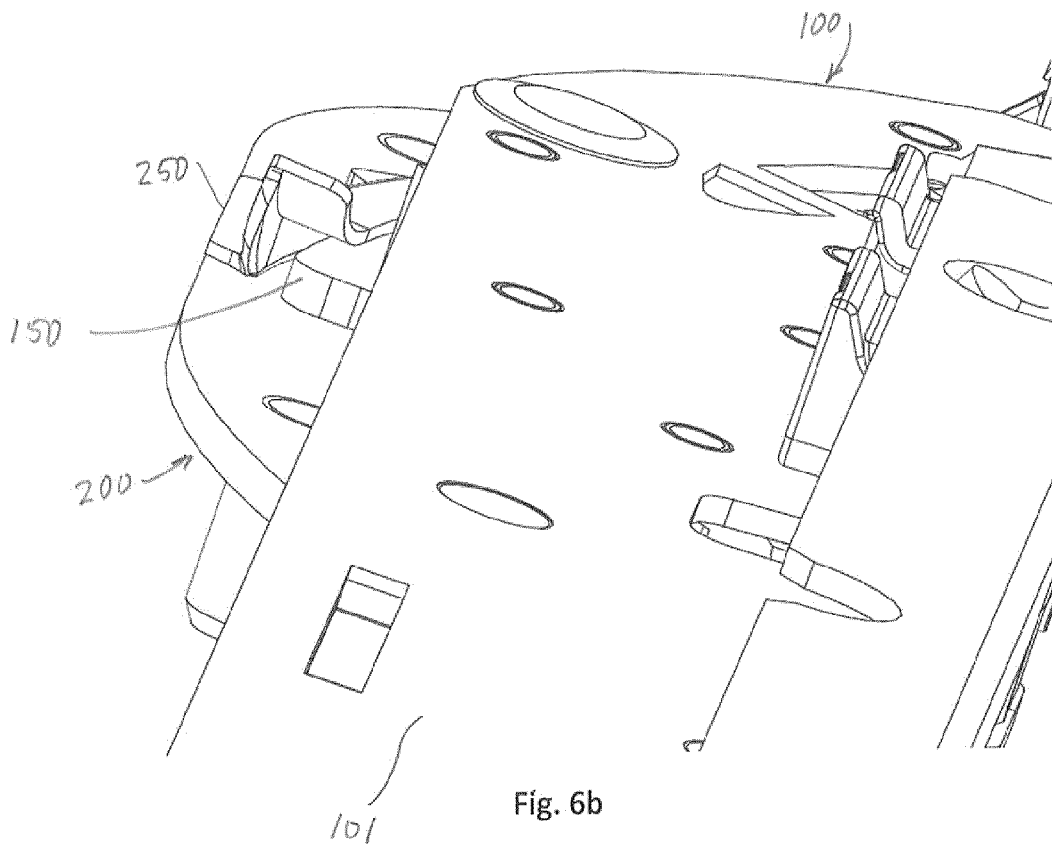


Fig. 6b

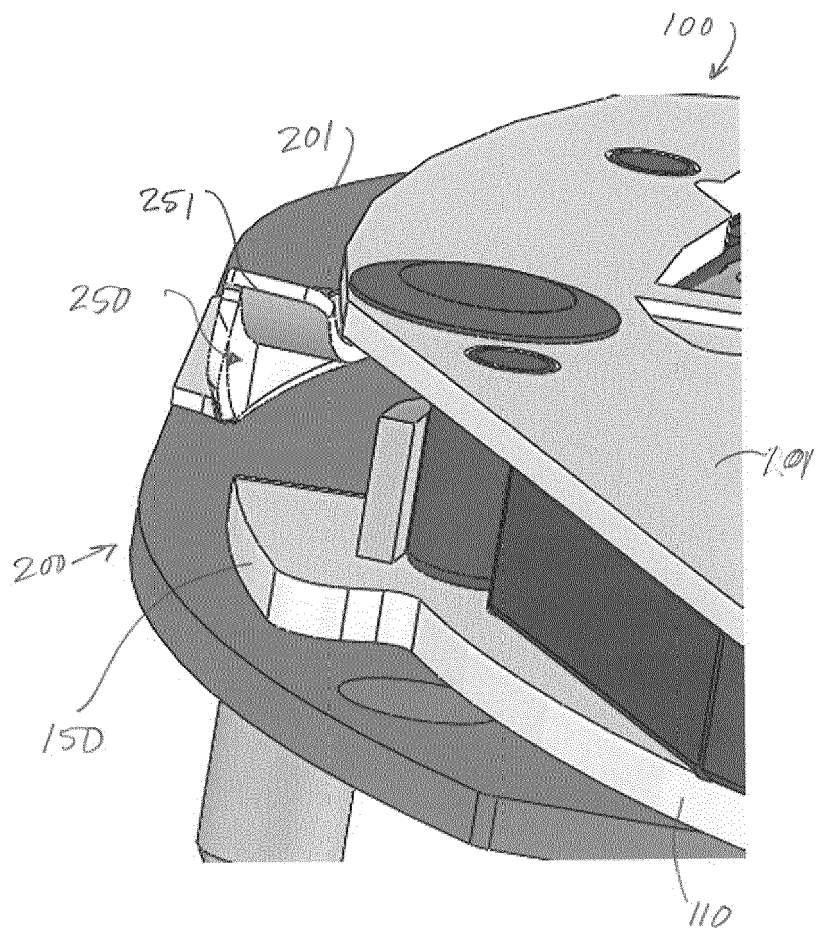


Fig. 7

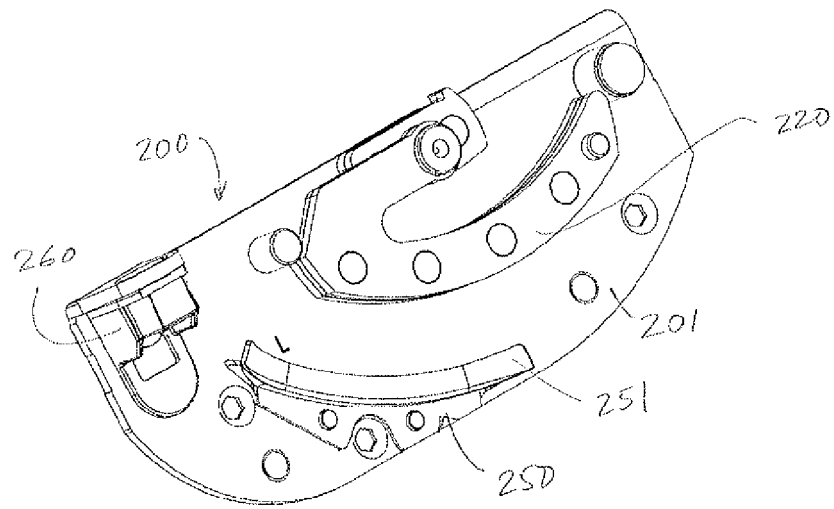


Fig. 8

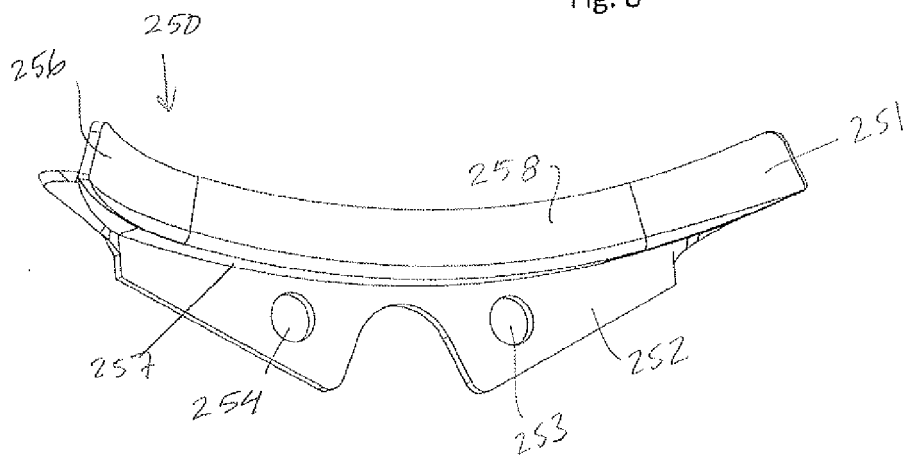


Fig. 9

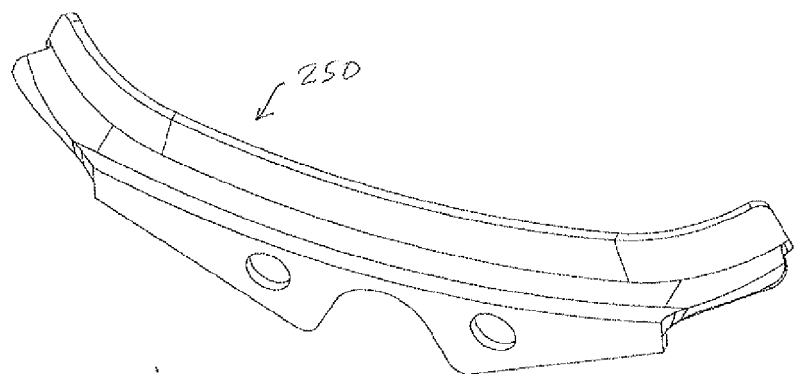


Fig. 10

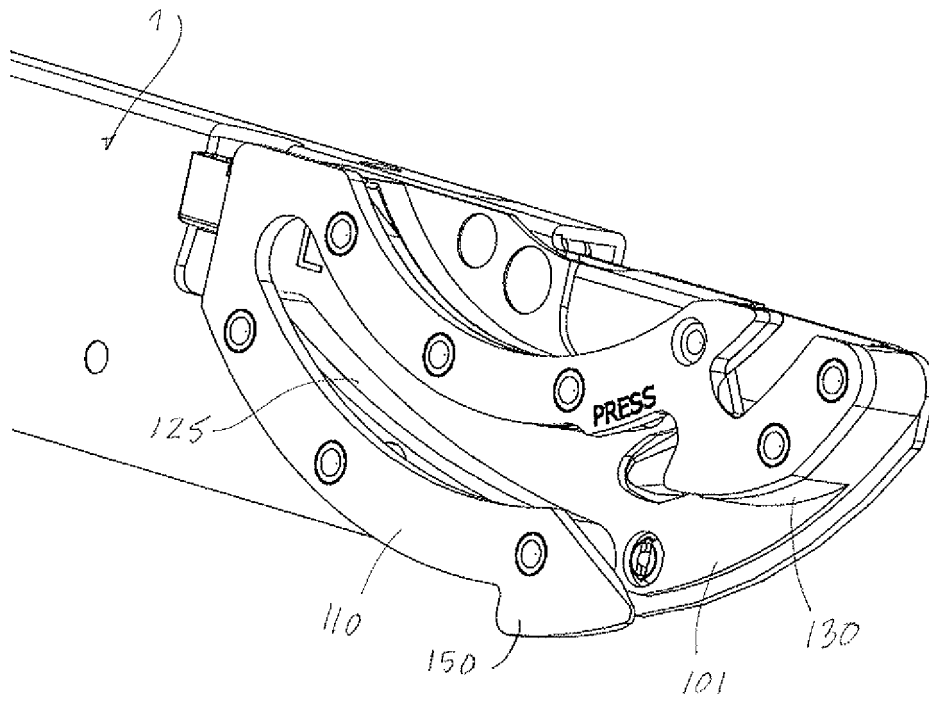


Fig. 11

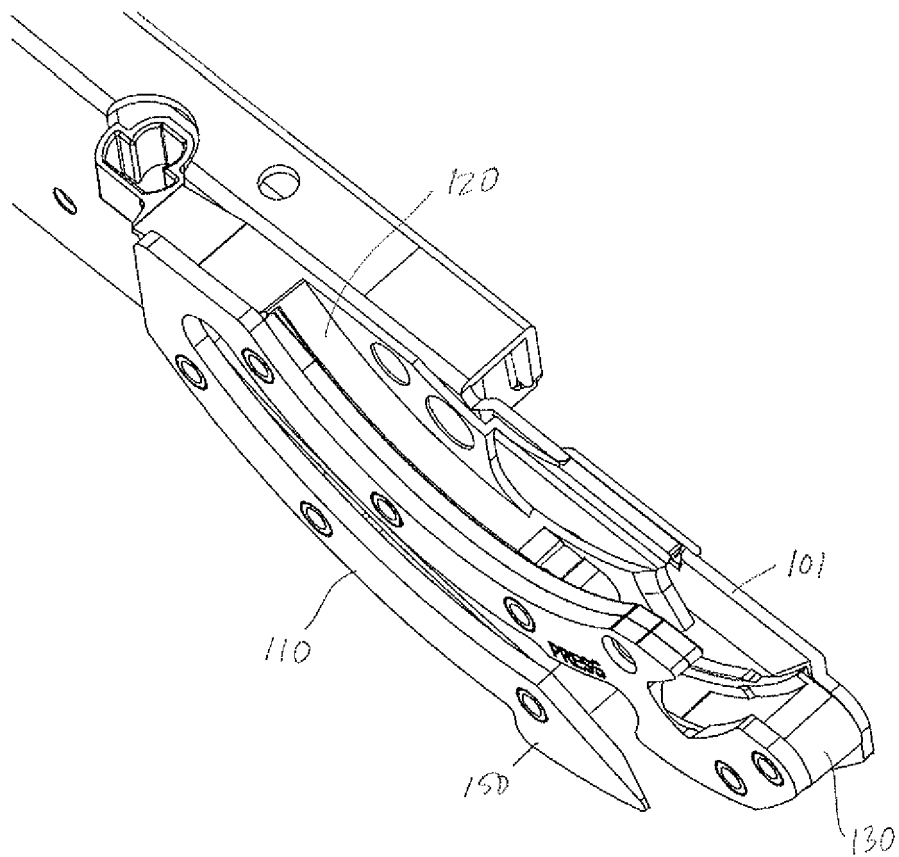


Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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