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(54) **A roof window having a lifting device and hinge connection**

Dachfenster mit Hebevorrichtung und Scharnierverbindung

Fenêtre de toit avec dispositif de levage et connexion de charnière

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Description

[0001] The present invention relates to a roof window comprising: a frame having a top member, a bottom member and two side members defining a frame plane, a sash having a top member, a bottom member and two side members, said sash carrying a pane and defining a sash plane, the sash being connected with the frame by means of a set of hinges defining a hinge axis of the window, and a lifting device including a lifting arm adapted to act between the frame and the sash to provide a spring bias and assist the movement of the sash.

[0002] 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, with a particular pattern of movements, which in turn makes it possible to establish an overlap between the cladding members forming part of a set of 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, rather than being restricted by a linkage mechanism limiting the opening angle. 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 members, 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.

[0006] US 4 055 024 discloses a roof window comprising a frame having a top member, a bottom member and two side members and a sash having a top member, a bottom member and two side members, the sash being connected with the frame by means of hinges. A lifting device including an arm arm adapted to act between the frame and the sash to provide a spring bias and assist the movement of the sash is provided on the lower half of a side member of the frame.

[0007] Moreover, the above-mentioned documents discuss another concern with top-hung windows: The whole or partial outbalancing of the weight of the sash and pane during opening and closing in order to provide an assisted operation.

[0008] In the above-mentioned prior art roof windows, the lifting device is provided with a lifting arm having a predefined length thus defining an end point of the opening angle range. In order to provide a sufficient opening angle range, it is thus possible to provide the lifting arm with a certain length, which is disadvantageous as regards structural and manufacturing aspects.

[0009] One attempt at alleviating this drawback is disclosed in WO 2007/031094 A1, in which the lifting device comprises an extendable lifting arm including biasing means urging to extend the lifting arm to push the sash to a larger angular position.

[0010] Although well-functioning, this mechanism is relatively complicated and its use is limited to high-end or rescue openings, in which the costs are not the most decisive factor.

[0011] With this background it is an object of the present invention to improve a roof window of the kind mentioned in the introduction with respect to versatility and flexibility of use, but which is nevertheless of a simple and inexpensive design.

[0012] This and further objects are met by the provision of a roof window according to claim 1, wherein the lifting arm of the lifting device is releasably connected with the sash, and that the lifting arm is adapted to assume a stable releasing and receiving position at a predefined opening angle.

[0013] Thereby a roof window is provided, with which the desired versatility as regards installation conditions and the possibility to provide a larger opening is achieved by relatively simple and inexpensive means.

[0014] Presently preferred embodiments and further

advantages will be apparent from the following detailed description and the dependent claims.

[0015] 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

Fig. 1 shows a perspective view of a roof window according to the invention;
Fig. 2 shows a partial perspective view of an embodiment of a roof window, seen from the inside;
Fig. 3 shows a partial perspective view of a detail of the roof window of the embodiment shown in Fig. 2;
Fig. 4 shows a view corresponding to Fig. 3, with some parts removed;
Fig. 5 shows a view corresponding to Fig. 3, seen from another angle;
Fig. 6 shows a view as in Fig. 5, on a larger scale, and from a slightly different angle;
Fig. 7 shows a view corresponding to Fig. 5, with some parts removed;
Fig. 8 shows a perspective view of other details of an embodiment of the roof window according to the invention;
Fig. 9 shows a partial view of the details of Fig. 8, on a larger scale;
Fig. 10 shows a cross-sectional views of the details of Fig. 9; and
Fig. 11 shows a perspective view of one of the details of Fig. 9.

[0016] In the embodiment of the window shown in Fig. 1, the window comprises a sash 2 and a window frame 1. The window is intended to be built into a surface, which is inclined with respect to the horizontal. At a position between the top and centre of the window, there is a hinge connection between the frame 1 and the sash 2 carrying a glazing in the form of a pane 3. The hinge connection will be described in further detail below. In a manner known per se, the frame 1 and sash 2 is each formed by four members of which one frame side member 1a and one sash side member 2a are indicated. The sash 2 is openable with respect to the frame 1, as the sash 2 may be moved from a closed position, in which e.g. the sash side member 2a is substantially parallel with the frame side member 1a, to an open position, in which the sash side member 2a forms an angle with the frame side member 1a. During this movement the sash 2 rotates about a hinge axis α situated at the hinge connection.

[0017] The hinge connection comprises a set of hinges of a structure substantially as traditionally utilized in pivot windows. Details of such pivot hinges are disclosed in EP 1 038 083 B1 and EP 1 781 883 B1. However, certain adaptations forming part of the present invention have been carried out; this will be described in detail below. In principle, each hinge fitting of the set of hinges thus comprises a pivot hinge fitting at either side of the roof window, including a frame hinge part 100 having a base plate 101 with a guidance 121, and a sash hinge part 200 having a base plate 201 and a slide rail 220. 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. 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.

[0018] For assisting the movement of the sash 2 from the closed position to an open position, a lifting device generally designated 10 is mounted between the sash 2 and the frame 1. Referring now to Figs 2 to 8, the lifting device 10 in the shown embodiment comprises includes a sash part 12 and a frame part 11 including a spring arrangement 13 and a lifting arm 14 acting between the frame 1 and the sash 2 to provide a spring bias and assist the movement of the sash. As shown, the spring arrangement 13 is received in a longitudinally extending recess 10a in the frame side member 1a and the frame part 11 of the lifting device 10 in a frame part receiving recess 10b. A corresponding lifting device may be provided at each side of the roof window.

[0019] In the position shown in Fig. 1, the window is in an open position, in which the sash 2 is still influenced by the lifting device 10. As will be described in further detail below, with the present invention it is possible to open the sash further to a further extent, to an opening angle beyond the angle shown in Fig. 1, in which the lifting device 10 does not participate in the opening movement, but is ready for re-engagement with the sash, when the sash reaches substantially the same opening angle. According to the invention the lifting arm 14 is affected by a spring bias up until the predefined opening angle, the effect of the spring bias being halted at the predefined opening angle, and the lifting arm 14 is provided with open reception means for engagement means on the sash side member. The halting of the spring bias may for instance be provided by the spring assuming its relaxed position, or by providing a stop. As the reception means are open, the engagement means on the sash side member may be received at any time.

[0020] Other details of the lifting device, including the spring arrangement 13 comprises a spring, or two springs, as is described in further detail in Applicant's above-mentioned European patent No. 0 733 146 B1. The operation of the lifting device when installed in the embodiment of the roof window is as follows:

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 is transmitted to the lifting arm 14. The lifting arm 14 exerts a moment on the sash 1, and 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 1 and pane 3 is overcome. During this movement, the sledge 15 and the lifting arm 14 are displaced along the sledge guidance 16. All in all, this operation entails that the sash 1 is moved from a closed position to an open position as represented by Fig. 1, in which the sash plane forms an opening angle with the frame plane. Closing the window from the open position entails the opposite movements of the sash 1 and relevant parts of the lifting device. It is possible to position the sash 2 in a number of arbitrary opening positions, in which the sash 2 is held stable relative to the frame 1. Up to the predefined opening angle, in which the lifting arm 14 has reached its stable releasing and receiving position, the lifting arm 14 follows the movement of the sash 2. Opening the window further, the sash 2 is moved out of engagement with the lifting arm 2, but may still be positioned in further arbitrary opening positions.

[0021] In Fig. 2, the lifting device 10 assumes substantially the same position as shown in Fig. 1. The lifting arm 14 of the lifting device 10 is at a first end 141 connected to the frame part 11 and its opposite, other end 142 is releasably connected with the sash 2 via the sash part 12 of the lifting device 10. In the position shown in Fig. 2, the lifting arm 14 assumes a stable releasing and receiving position at a predefined opening angle. In the embodiment shown, this predefined opening angle is approximately 45°. In principle, the predefined opening angle to be defined by the lifting arm 14 may assume any suitable value making it possible to obtain a sufficient opening and at the same time reliable operation of the lifting device. Advantageously, the predefined opening angle defined by the lifting arm 14 lies in the range 20° to 80°, preferably 30° to 60°, more preferably 35° to 50°. Depending on the length of the lifting arm 14 and the dimensions of the hinge connection itself, the sash 2 and window frame 1, and the position of the hinge connection, this predefined opening angle has a correlation to the angle formed between a general length direction of the lifting arm 14 and the frame side member 1a in the stable releasing and receiving position. According to the invention the first end 141 of the lifting arm 14 is rotatably connected to a spring-biased sledge 15 accommodated in a sledge guidance 16 connected to the frame side member 2a, and the opposite, second end 142 includes open reception means, which are here constituted by a fork or cradle 143 adapted to be connected to an engagement means connected to the sash side member 1a. The engagement means of the sash part 12, which in turn is connected to the sash side member 1a in its mounted position, has the form of a rivet 21 connected to a sash hinge part 200 of a hinge fitting of said set of hinges. The sledge guidance 16 is, in the embodiment shown connected to the frame hinge part 100 by means of fastening means such as rivets. As shown, the sledge 15 itself is mounted in a runner 17 fitting slidingly into the sledge guidance 16. The lifting arm 14 is spring-biased towards the stable releasing and receiving position at the predefined opening angle by means of a wire spring 150. The wire spring 150 has the function of keeping the lifting arm 14 in the correct position at all times. To this end, the wire spring 150 may as indicated be mounted with a slight inclination to force the lifting arm 14 in the direction of the sash. In this manner, secure engagement of the lifting arm 14 with the rivet 21 is ensured. Furthermore, a holding clip 160 adapted to accommodate fastening means for a side frame cladding is connected to the base plate 101 of the frame hinge part 100.

[0022] In the embodiment shown, the rivet 21 constituting the engagement means is connected to the base plate 201 of the sash hinge part 200. The rivet 21 is formed with such dimensions that it is able to transmit the load properly into the sash hinge part 200 and further into the sash structure itself. In order to reinforce the engagement between the rivet 21 and the base plate 201 of the sash hinge part 200, the rivet is formed with a collar-like structure in that the rivet 21 is inserted from the back side of the base plate 201 (cf. Fig. 3) and abuts against the back side with a first collar part 21a. Following this, a second collar part 21b is formed at the front side of the base plate 201 as shown most clearly in Fig. 6.

[0023] As indicated in Fig. 1, the hinge axis α is located between a centre axis and the top of the roof window, preferably in the interval 1/3 to 2/3 of the distance between the centre axis and the top, most preferred substantially at 1/2 of the distance between the centre axis and the top. It is conceived in response to the recognition that a pivot hinge fitting as described in the above is subjected to a larger load than other hinges. In order to meet the requirements, a number of precautions are foreseen in the embodiments shown and described:

As shown in for instance Figs 2, 4 and 6, the base plate 101 of the frame hinge part 100 is provided with a distance bushing 170 adapted to abut the frame side member 1a, viz. in the frame part receiving recess 10b.

[0024] In order to make the pivot hinge of the present invention able to withstand larger forces, partly due to the position of the hinge, partly due to its function to transmit the load from the sash to the frame via the lifting arm, a number of measures have been taken to reinforce the pivot hinge and to secure that the load is transmitted safely to the sash and frame structures.

[0025] A first measure will be described with particular reference to Figs 9 to 11, in which the base plate 101 of the frame hinge part comprises a reinforcing element 180 adapted to support the guide block 130 of the frame hinge

part 100. As shown, the reinforcing element 180 is received in a recess 131 in the guide block; the guide block 130 is formed with a corresponding recess in the other side as well, cf. Fig. 11. This makes it possible to utilize one and the same guide block in the left-hand and the right-hand hinge part. The reinforcement element 180 may be provided as a separate element connected to the base plate 101, for instance a rivet, but in a presently preferred embodiment, the reinforcement element 180 is provided as a part formed by the material of the base plate itself as shown in the cross-sectional view of Fig. 10. The deformation of the material to provide the reinforcement element 180 may be provided in any suitable manner, for instance by punching or embossing the base plate 101.

[0026] Moreover, a reinforcement plate 260 (cf. Fig. 3) is connected to the base plate 201 of the sash hinge part 200. The base plate 201 of the sash hinge part 200 is in a manner known per se provided with a number of spigots 211 and 212 on its back side to be inserted into corresponding bores in the sash side member. Additional separate fastening means such as screws may be present as well to be introduced through the base plate 201 and connected to the sash side member. Alternatively, only separate fastening means may be utilized. However, all of these fastening means are located within the contours of the base plate 201 itself. In particular, the spigots 211 and 212 are virtually located along the same longitudinal position of the sash side member. This is usually not a disadvantage, as any load subjected to for instance the pane will be safely transmitted to the sash structure via the sash hinge part 200. However, in some applications, for instance in such windows in which the hinge axis is located at a position between the top and the centre, forces from for instance a sudden impact may cause a local load which in the worst case will lead to splitting of the sash member. This is particularly pronounced in frame and sash structures made of wood, in which the direction of the grains or streak direction is often more or less parallel with the length direction or the frame and sash members. In order to counteract such disadvantageous load distribution, the pivot hinge in the embodiment shown is provided with additional fastening means displaced from the base plate 201, and the reinforcement plate 260 is thus provided with an aperture 213 adapted to receive supplemental fastening means displaced from the base plate 201 of the sash hinge part 200. The supplemental fastening means introduced through the displaced aperture 213 is thus positioned in another grain than the spigots 211 and 212 located within the contour of the base plate.

[0027] Also the frame hinge part 100 is provided with a spigot 111, and the spigot 111 together with the connection between the frame hinge part 100 and the sledge guidance 16 of the above embodiment transfer the load that the frame hinge part 100 is subjected to, further into the frame structure. The sledge guidance 16 and other parts of the lifting device, such as the spring arrangement 13 is as described in the above received in the longitudinally extending recess 10a in the frame side member 1a and the frame part 11 of the lifting device 10 in the frame part receiving recess 10b. This provides for a satisfying distribution and transfer of the load into the frame structure.

[0028] 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 roof window comprising:

a frame (1) having a top member, a bottom member and two side members (1a) defining a frame plane,
a sash (2) having a top member, a bottom member and two side members (2a), said sash carrying a pane (3) and defining a sash plane, the sash being connected with the frame by means of a set of hinges (100, 200) defining a hinge axis of the window, and
a lifting device (10) including a lifting arm (14) adapted to act between the frame and the sash to provide a spring bias and assist the movement of the sash,
wherein the lifting arm (14) of the lifting device (10) is releasably connected with the sash (2), and the lifting arm is adapted to assume a stable releasing and receiving position at a predefined opening angle, wherein the lifting arm (14) is affected by the spring bias up until the predefined opening angle, the effect of the spring bias being halted at the predefined opening angle, **characterized in that** the lifting arm (14) being provided with open reception means for engagement means (21) on the sash side member, that the spring bias is provided **in that** the lifting arm (14) has a first end (141) rotatably connected to a spring-biased sledge (15) connected to a frame side member (1a) and an opposite, second end (142) including the open reception means constituted by a fork or cradle (143) adapted to be connected to the engagement means (21) connected to the sash side member, and that the lifting arm (14) is spring-biased towards the stable releasing and receiving position at the predefined opening angle by means of a wire spring (150).

2. A roof window according to claim 1, wherein the engagement means has the form of a rivet (21) connected to a sash hinge part (200) of a hinge fitting of said set of hinges.

3. A roof window according to claim 1 or 2, wherein the sledge (15) is accommodated in a sledge guidance (16) connected to the frame hinge part (100) of a hinge fitting of said set of hinges, preferably in a runner (17).

4. A roof window according to any one of the preceding claims, wherein each hinge fitting of said set of hinges comprises a frame hinge part (100) having a base plate (101) and a guidance including a guide block (130) and a sash hinge part (200) having a base plate (201).

5. A roof window according to claim 1 and 4, wherein the rivet (21) is connected to the base plate (201) of the sash hinge part (200).

6. A roof window according to claim 4 or 5, wherein the base plate (101) of the frame hinge part (100) is provided with a distance bushing (170) adapted to abut the frame side member (1a).

7. A roof window according to any one of claims 4 to 6, wherein a holding clip (160) adapted to accommodate fastening means for a side frame cladding is connected to the base plate (101) of the frame hinge part (100).

8. A roof window according to any one of claims 4 to 7, wherein the base plate (101) of the frame hinge part (100) comprises a reinforcing element (180) adapted to support the guide block (130) of the frame hinge part (100), preferably formed as a part formed by the material of the base plate itself.

9. A roof window according to any one of claims 4 to 8, wherein a reinforcement plate (260) is connected to the base plate (201) of the sash hinge part (200), the reinforcement plate (260) being provided with an aperture adapted to receive supplemental fastening means displaced from the base plate (201) of the sash hinge part (200).

10. A roof window according to any one of the preceding claims, wherein a lifting device (10) is provided at each side of the roof window.

11. A roof window according to any one of the preceding claims, wherein the predefined opening angle defined by the lifting arm lies in the range 20° to 80°, preferably 30° to 60°, more preferably 35° to 50°.

12. A roof window according to any one of the preceding claims, wherein the hinge axis (α) is located between a centre axis and the top of the roof window, preferably in the interval 1/3 to 2/3 of the distance between the centre axis and the top, most preferred substantially at 1/2 of the distance between the centre axis and the top.

Patentansprüche

1. Dachfenster, aufweisend:

einen Rahmen (1) mit einem oberen Bauteil, einem unteren Bauteil und zwei Seitenbauteilen (1a), die eine Rahmenebene definieren,
einen Flügel (2) mit einem oberen Bauteil, einem unteren Bauteil und zwei Seitenbauteilen (2a), wobei der Flügel eine Fensterscheibe (3) trägt und eine Flügelebene definiert, wobei der Flügel mit dem Rahmen mittels eines Satzes von Scharnieren (100, 200) verbunden ist, die eine Scharnierachse des Fensters definieren, und
eine Hebevorrichtung (10) mit einem Hebearm (14), der dazu angepasst ist, zwischen dem Rahmen und dem Flügel zu wirken, um eine Federvorspannung bereitzustellen und die Bewegung des Flügels zu unterstützen,
wobei der Hebearm (14) der Hebevorrichtung (10) lösbar mit dem Flügel (2) verbunden ist, wobei der Hebearm dazu angepasst ist, eine stabile Freigabe- und Aufnahmeposition in einem vorbestimmten Öffnungswinkel einzunehmen,
wobei der Hebearm (14) bis zum vorbestimmten Öffnungswinkel durch die Federvorspannung beeinflusst wird, wobei die Wirkung der Federvorspannung im vorbestimmten Öffnungswinkel unterbrochen wird,
dadurch gekennzeichnet, dass der Hebearm (14) mit offenen Aufnahmemitteln für Eingriffsmittel (21) auf dem seitlichen Flügelbauteil versehen ist, dass die Federvorspannung dadurch bereitgestellt wird, dass der Hebearm (14) ein erstes Ende (141), das drehbar mit einem federvorgespannten Schlitten (15) verbunden ist, der mit einem seitlichen Rahmenbauteil (1a) verbunden ist, und ein gegenüberliegendes, zweites Ende (142) aufweist, wobei an dem zweiten Ende (142) die offenen Aufnahmemittel durch eine Gabel oder einen Träger (143) gebildet werden, der dazu angepasst ist, mit den Eingriffsmitteln (21), die mit dem seitlichen Flügelbauteil verbunden sind, verbunden zu werden, und dass der Hebearm (14) in Richtung der stabilen Freigabe- und Aufnahmeposition im vorbestimmten Öffnungswinkel mittels einer Drahtfeder (150) vorgespannt wird.

2. Dachfenster nach Anspruch 1, wobei die Eingriffsmittel die Form eines Niets (21) aufweisen, der mit einem Flügelscharnierteil (200) eines Scharnierbeschlags aus dem Satz von Beschlägen verbunden ist.

3. Dachfenster nach Anspruch 1 oder 2, wobei der Schlitten (15) in einer Schlittenführung (16) aufgenommen ist, die mit dem Rahmenscharnierteil (100) eines Scharnierbeschlags aus dem Satz von Beschlägen verbunden ist, vorzugsweise in einem Läufer (17).

4. Dachfenster nach einem der vorhergehenden Ansprüche, wobei jeder Scharnierbeschlag aus dem Satz von Beschlägen ein Rahmenscharnierteil (100) mit einer Basisplatte (101) und einer Führung mit einem Führungsblock (130) und ein Flügelscharnierteil (200) mit einer Basisplatte (201) aufweist.

5. Dachfenster nach den Ansprüchen 1 und 4, wobei der Niet (21) mit der Basisplatte (201) des Flügelscharnierteils (200) verbunden ist.

6. Dachfenster nach Anspruch 4 oder 5, wobei die Basisplatte (101) des Rahmenscharnierteils (100) mit einer Distanzhülse (170) versehen ist, die dazu angepasst ist, an dem seitlichen Rahmenbauteil (1a) anzuliegen.

7. Dachfenster nach einem der Ansprüche 4 bis 6, wobei ein Halteclip (160) dazu angepasst ist, Befestigungsmittel für eine seitliche Rahmenverkleidung aufzunehmen, wobei der Halteclip (160) mit der Basisplatte (101) des Rahmenscharnierteils (100) verbunden ist.

8. Dachfenster nach einem der Ansprüche 4 bis 7, wobei die Basisplatte (101) des Rahmenscharnierteils (100) ein Verstärkungselement (180) aufweist, das dazu angepasst ist, den Führungsblock (130) des Rahmenscharnierteils (100) abzustützen, wobei das Verstärkungselement (180) vorzugsweise als ein Teil ausgebildet ist, das durch das Material der Basisplatte selbst gebildet wird.

9. Dachfenster nach einem Ansprüche 4 bis 8, wobei eine Verstärkungsplatte (260) mit der Basisplatte (201) des Flügelscharnierteils (200) verbunden ist, wobei die Verstärkungsplatte (260) mit einer Öffnung versehen ist, die dazu angepasst ist, zusätzliche Befestigungsmittel aufzunehmen, die von der Basisplatte (201) des Flügelscharnierteils (200) verschoben sind.

10. Dachfenster nach einem der vorhergehenden Ansprüche, wobei eine Hebevorrichtung (10) auf jeder Seite des Dachfensters bereitgestellt ist.

11. Dachfenster nach einem der vorhergehenden Ansprüche, wobei der durch den Hebearm definierte vorbestimmte Öffnungswinkel im Bereich von 20° bis 80°, vorzugsweise 30° bis 60°, besonders bevorzugt 35° bis 50°, liegt.

12. Dachfenster nach einem der vorhergehenden Ansprüche, wobei die Scharnierachse (α) zwischen einer zentralen Achse und der Oberseite des Dachfensters angeordnet ist, vorzugsweise im Bereich 1/3 bis 2/3 des Abstandes zwischen der zentralen Achse und der Oberseite, besonders bevorzugt im Wesentlichen bei 1/2 des Abstands zwischen der zentralen Achse und der Oberseite.

Revendications

1. Fenêtre de toit comprenant :

un cadre (1) ayant un organe de dessus, un organe de dessous et deux organes de côté (1a) définissant un plan de cadre,
un châssis (2) ayant un organe de dessus, un organe de dessous et deux organes de côté (2a), ledit châssis portant un carreau (3) et définissant un plan de châssis, le châssis étant raccordé au cadre au moyen d'un ensemble d'articulations (100, 200) définissant un axe d'articulation de la fenêtre, et
un dispositif de levage (10) comportant un bras de levage (14) adapté pour agir entre le cadre et le châssis pour fournir une sollicitation de ressort et aider au mouvement du châssis,
dans laquelle le bras de levage (14) du dispositif de levage (10) est raccordé de façon libérable au châssis (2), et le bras de levage est adapté pour adopter une position de libération et de réception stable à un angle d'ouverture prédéfini, dans laquelle le bras de levage (14) est affecté par la sollicitation de ressort jusqu'à l'angle d'ouverture prédéfini, l'effet de la sollicitation de ressort étant arrêté à l'angle d'ouverture prédéfini, **caractérisée en ce que** le bras de levage (14) est pourvu d'un moyen de réception ouvert pour un moyen d'enclenchement (21) sur l'organe de côté de châssis, **en ce que** la sollicitation de ressort est prévue, **en ce que** le bras de levage (14) a une première extrémité (141) raccordée en rotation à une coulisse (15) sollicitée par ressort raccordée à un organe de côté de cadre (1a) et une seconde extrémité opposée (142) comportant le moyen de réception ouvert constitué d'une fourche ou d'un support (143) adapté(e) pour être raccordé(e) au moyen d'enclenchement (21) raccordé à l'organe de côté de châssis, et **en ce que** le bras de levage (14) est sollicité par ressort vers la position de libération et de réception stable à l'angle d'ouverture prédéfini au moyen d'un ressort en fil (150).

2. Fenêtre de toit selon la revendication 1, dans laquelle le moyen d'enclenchement a la forme d'un rivet (21) raccordé à une partie d'articulation de châssis

(200) d'une ferrure d'articulation dudit ensemble d'articulations.

3. Fenêtre de toit selon la revendication 1 ou 2, dans laquelle la coulisse (15) est logée dans un dispositif de guidage de coulisse (16) raccordé à la partie d'articulation de cadre (100) d'une ferrure d'articulation dudit ensemble d'articulations, de préférence dans une glissière (17).

4. Fenêtre de toit selon l'une quelconque des revendications précédentes, dans laquelle chaque ferrure d'articulation dudit ensemble d'articulations comprend une partie d'articulation de cadre (100) ayant une plaque de base (101) et un dispositif de guidage comportant un bloc de guidage (130) et une partie d'articulation de châssis (200) ayant une plaque de base (201).

5. Fenêtre de toit selon les revendications 1 et 4, dans laquelle le rivet (21) est raccordé à la plaque de base (201) de la partie d'articulation de châssis (200).

6. Fenêtre de toit selon la revendication 4 ou 5, dans laquelle la plaque de base (101) de la partie d'articulation de cadre (100) est pourvue d'une butée entretoise (170) adaptée pour buter contre l'organe de côté de cadre (1a).

7. Fenêtre de toit selon l'une quelconque des revendications 4 à 6, dans laquelle une pince de maintien (160) adaptée pour loger un moyen de fixation pour un revêtement de cadre de côté est raccordée à la plaque de base (101) de la partie d'articulation de cadre (100).

8. Fenêtre de toit selon l'une quelconque des revendications 4 à 7, dans laquelle la plaque de base (101) de la partie d'articulation de cadre (100) comprend un élément de renforcement (180) adapté pour supporter le bloc de guidage (130) de la partie d'articulation de cadre (100), de préférence sous forme d'une partie formée par le matériau de la plaque de base elle-même.

9. Fenêtre de toit selon l'une quelconque des revendications 4 à 8, dans laquelle une plaque de renfort (260) est raccordée à la plaque de base (201) de la partie d'articulation de châssis (200), la plaque de renfort (260) étant pourvue d'une ouverture adaptée pour recevoir un moyen de fixation supplémentaire déplacé depuis la plaque de base (201) de la partie d'articulation de châssis (200).

10. Fenêtre de toit selon l'une quelconque des revendications précédentes, dans laquelle un dispositif de levage (10) est prévu de chaque côté de la fenêtre de toit.

11. Fenêtre de toit selon l'une quelconque des revendications précédentes, dans laquelle l'angle d'ouverture prédéfini défini par le bras de levage se trouve dans la plage de 20° à 80°, de préférence de 30° à 60°, de manière davantage préférée de 35° à 50°.

12. Fenêtre de toit selon l'une quelconque des revendications précédentes, dans laquelle l'axe d'articulation (α) est situé entre un axe central et le dessus de la fenêtre de toit, de préférence dans l'intervalle de 1/3 à 2/3 de la distance entre l'axe central et le dessus, de manière la plus préférée sensiblement à 1/2 de la distance entre l'axe central et le dessus.

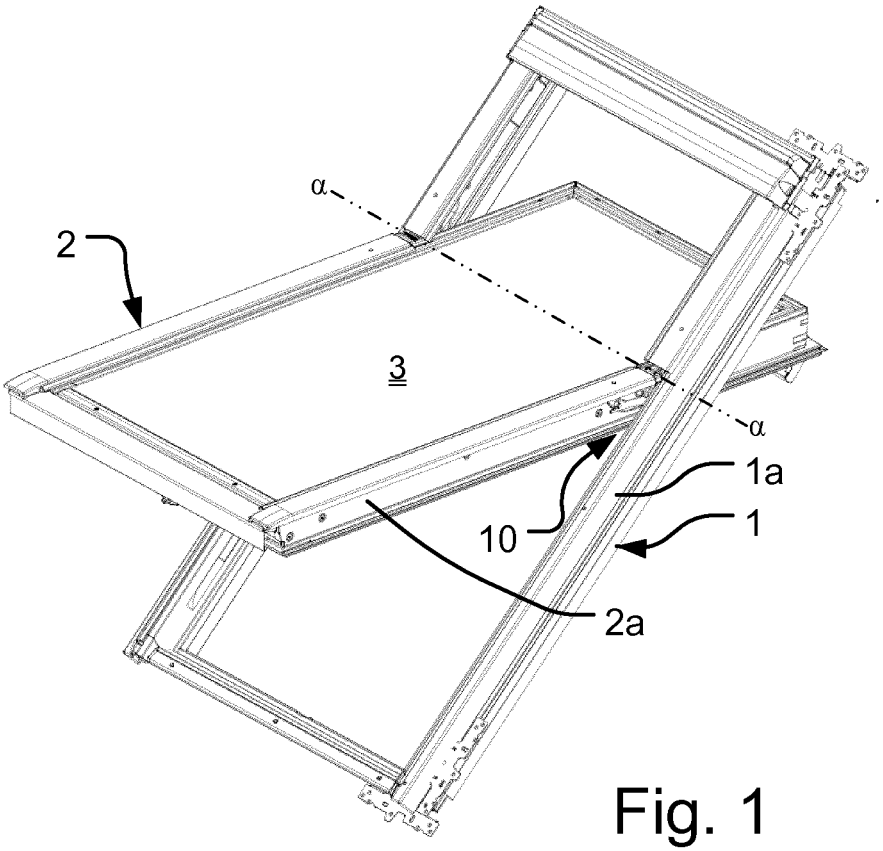

Fig. 1

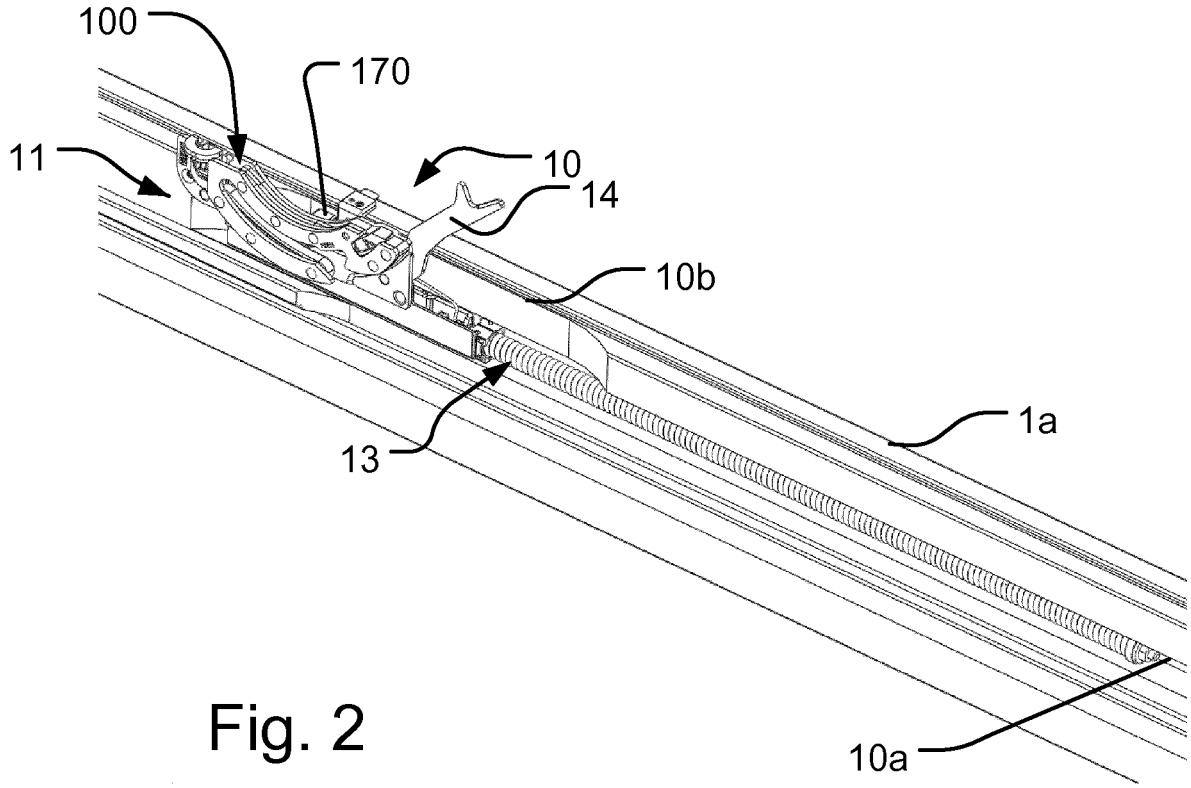

Fig. 2

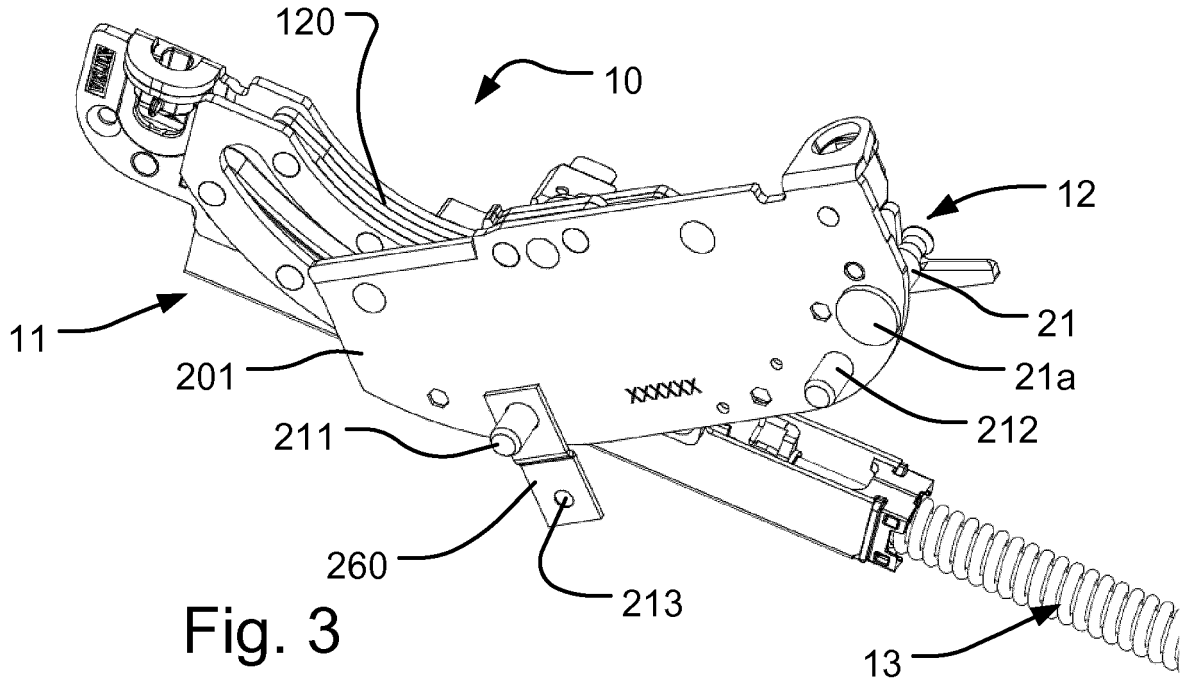
120
10
12
11
21
201
21a
211
212
260
213
13

Fig. 3

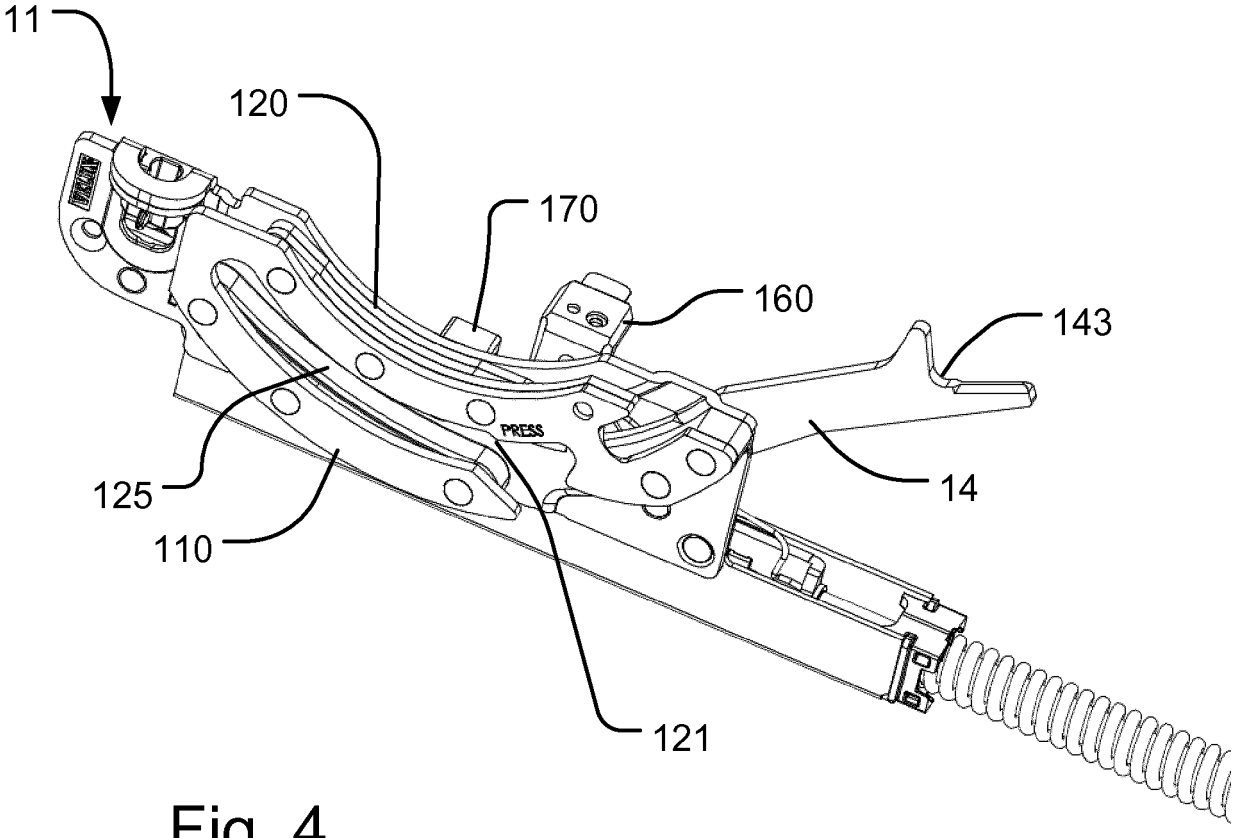
11
120
170
160
143
PRESS
125
14
110
121

Fig. 4

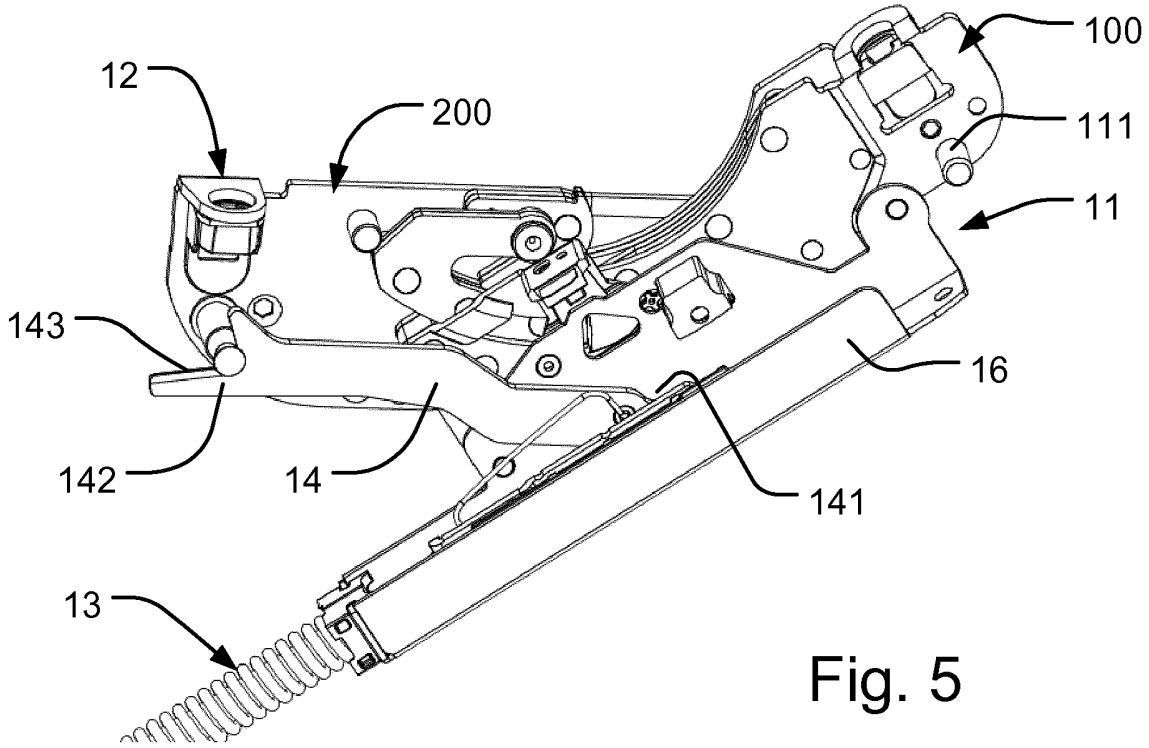
12
200
100
111
11
143
16
142
14
141
13

Fig. 5

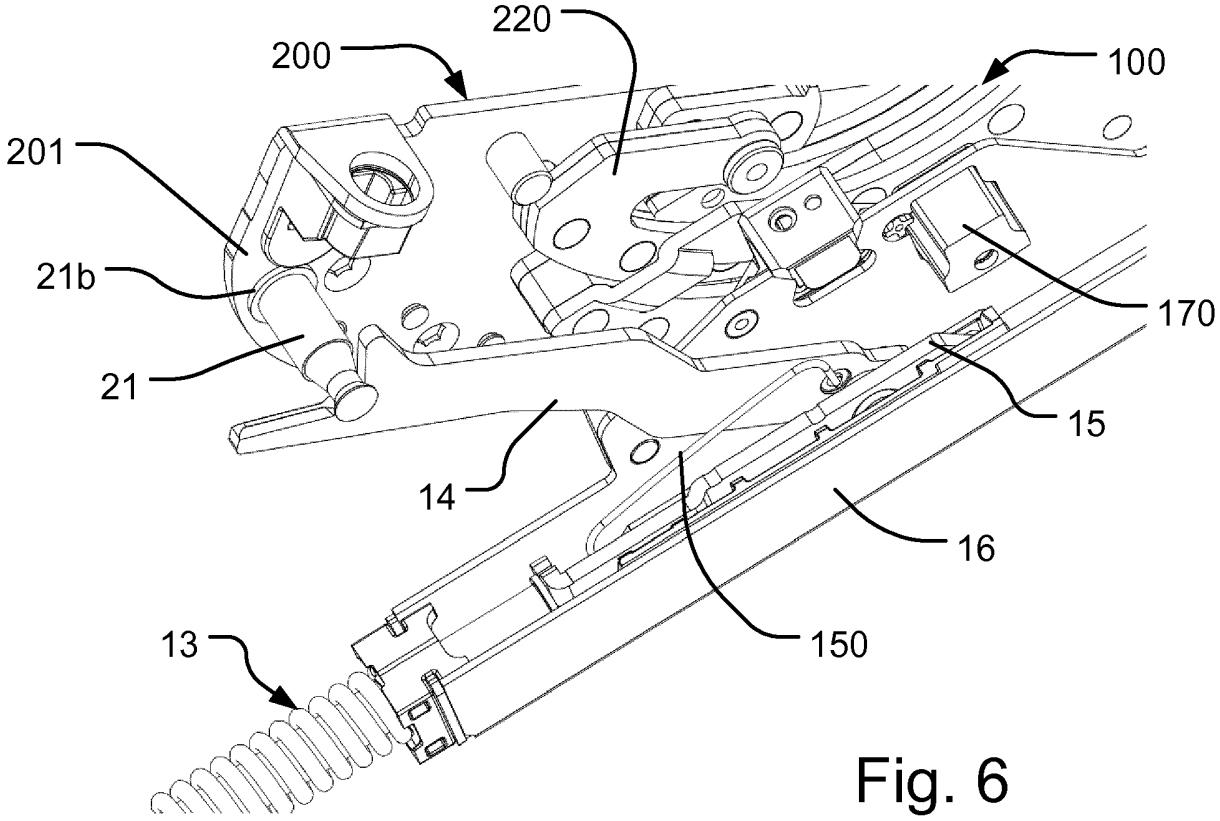
220
200
100
201
21b
170
21
15
14
16
150
13

Fig. 6

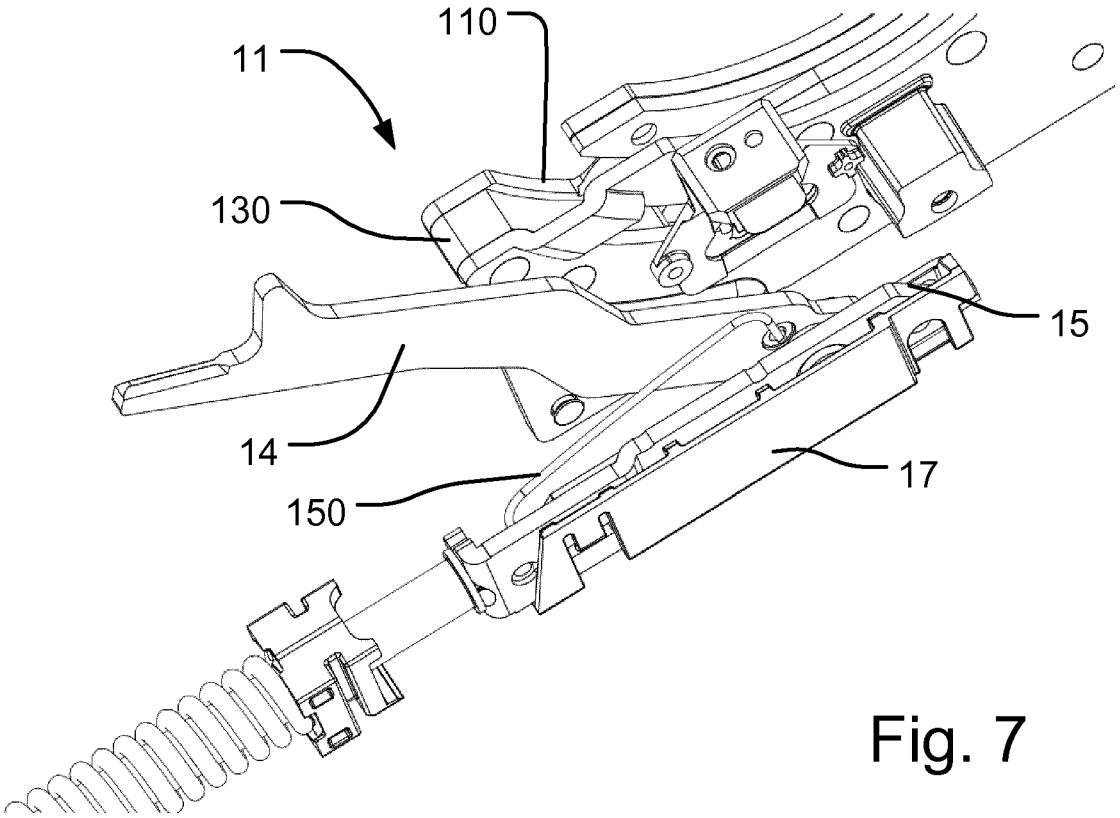

Fig. 7

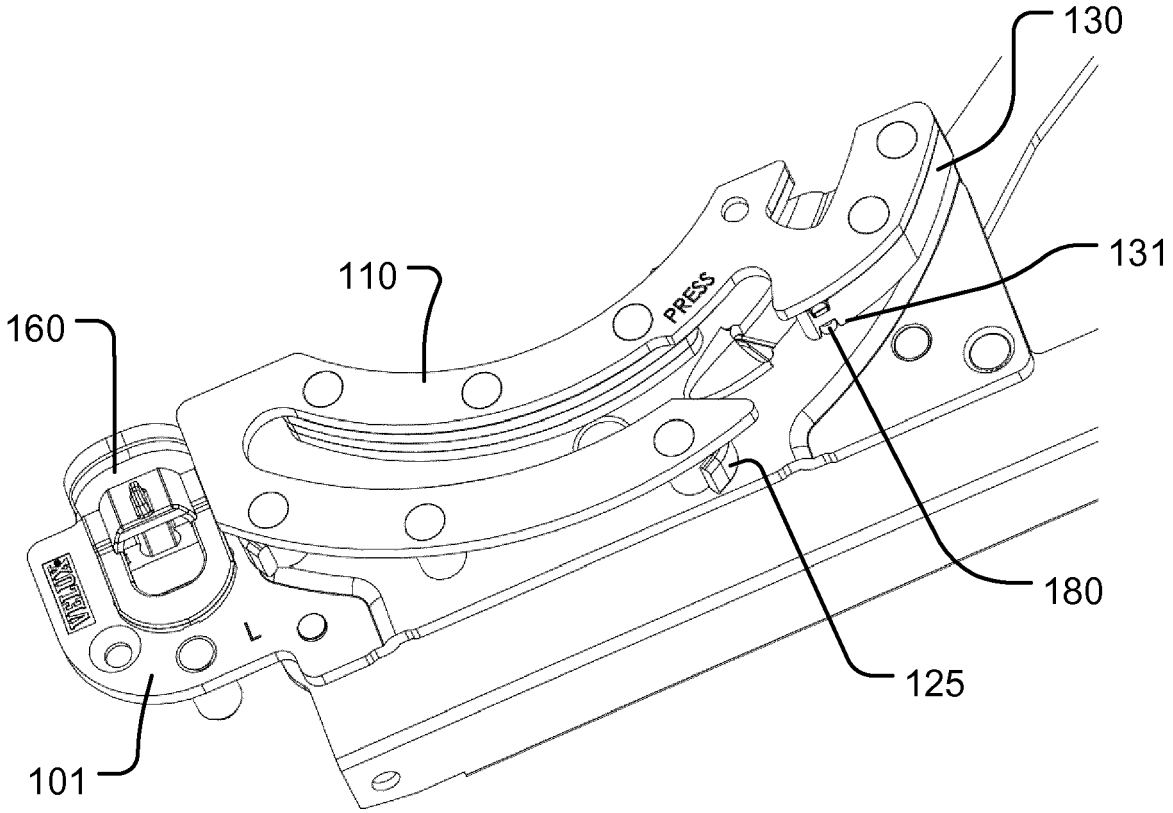

Fig. 8

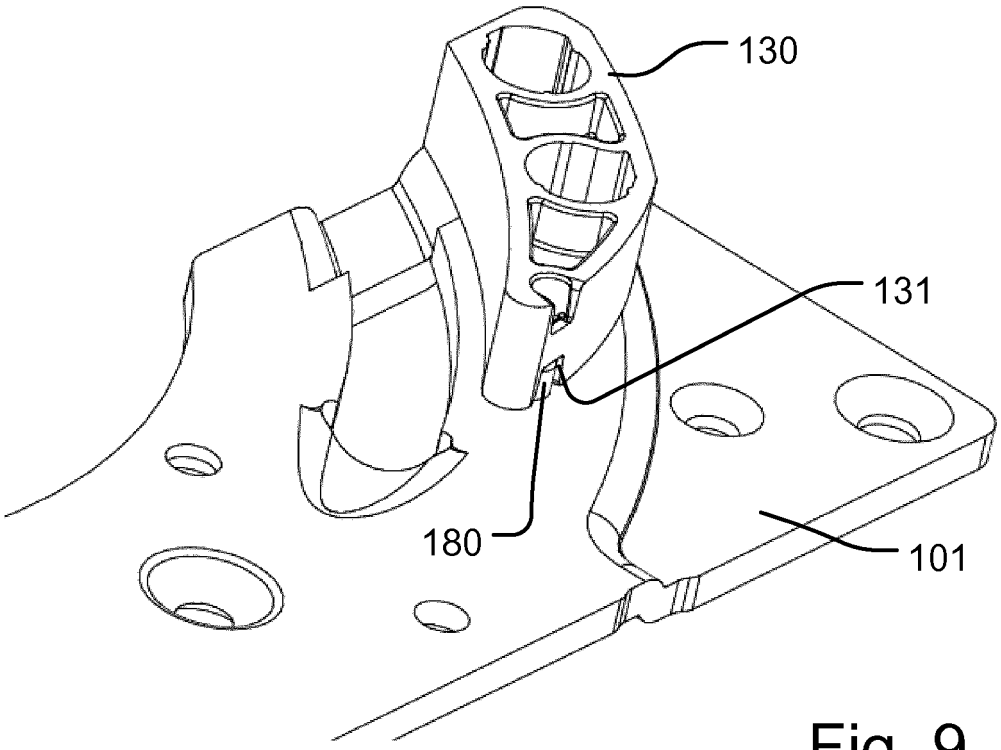

Fig. 9

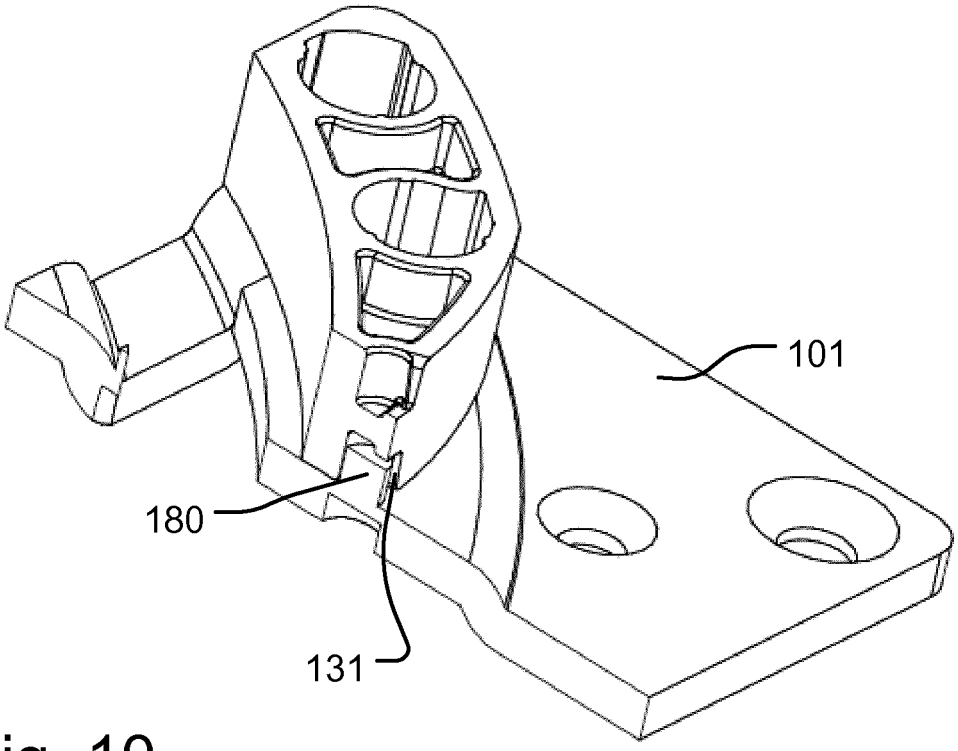

Fig. 10

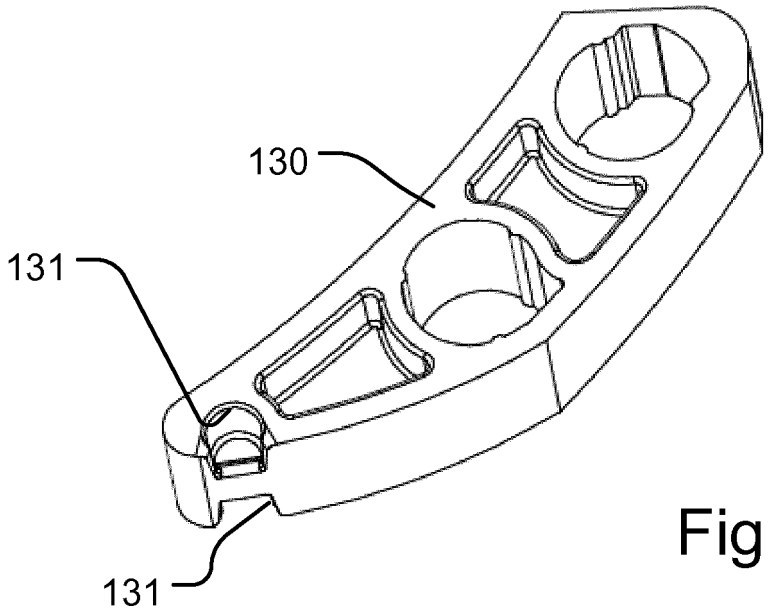

Fig. 11

REFERENCES CITED IN THE DESCRIPTION

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