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(54) **Title:** AN OPERATING AND LOCKING ASSEMBLY, AND A METHOD OF PROVIDING A CONDITION OF USE OF A WINDOW WITH SUCH AN OPERATING AND LOCKING ASSEMBLY

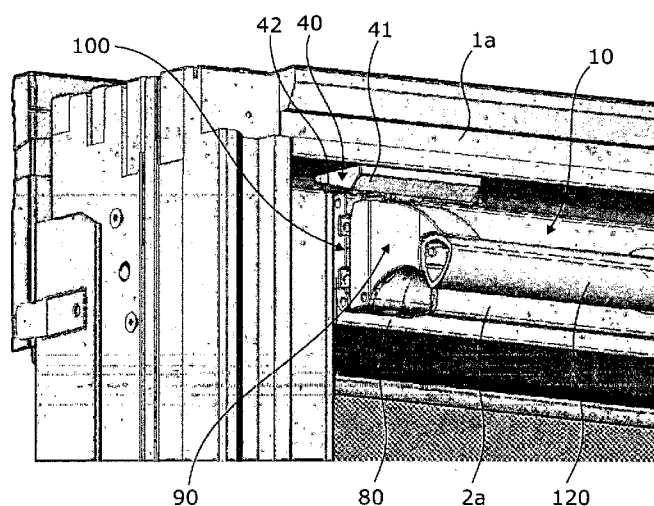


Fig. 3

(57) **Abstract:** The operating and locking assembly for opening, closing and locking a sash (2) relative to a frame (1) of a window, comprises a striking plate (40) on the frame (1), a lock mechanism (10) including a latch member, a roller member, a link member, at least one console member, a mounting base member (100) mounted on the sash (2), and a handle bar (120) connected to the at least one console member (80, 90). The operating and locking assembly is able to assume at least a locked position and an open position, and each console member comprises an inner console member (80) and an outer console member (90) pivotably connected to the inner console member (80), the handle bar (120) being connected to the outer console member (90).



An operating and locking assembly, and a method of providing a condition of use of a window with such an operating and locking assembly

5 The present invention relates to an operating and locking assembly for opening, closing and locking a sash relative to a frame of a window, comprising a striking plate adapted to be mounted on the frame, a lock mechanism including a latch member, a roller member, a link member, at least one console member, a mounting base member adapted to be mounted on the
10 sash, and a handle bar connected to the at least one console member, the link member being pivotably connected to the latch member in a first joint and to the mounting base member in a second joint, the latch member being pivotably and displaceably connected to the at least one console member in a third joint, and the at least one console member being pivotably connected to
15 the mounting base member in a fourth joint, and the operating and locking assembly being able to assume at least a locked position and an open position. The invention furthermore relates to a method of providing a condition of use of a window with such an operating and locking assembly.

 Basically, windows may be provided in a number of varieties and include more or less complicated structures in order to allow opening of the
20 sash and to fulfil other functions, such as ventilation.

 Applicant's international publications WO 94/04782 and WO 2004/063498 disclose operating and locking assemblies for use in windows. Although these assemblies function well, there are a number of limitations as
25 regards the conditions during manufacture, transportation and use.

 For instance, due to the design of the prior art assemblies, it is sought to ascertain that the handle bar conceals most of the console members in the most common view angle. Due to the shape of the console members, the handle bar also protrudes from the planes of the frame, sash and
30 pane, which not only poses an aesthetic challenge, but also requires particular precautions to be taken during transportation. Eventually, the prior art as-

semblies are not all optimal in all aspects during manufacture due to the co-operation between the parts.

With this background it is an object of the present invention to improve an operating and locking assembly of the kind mentioned in the introduction with respect to manufacture, transportation and operational facilities.

In a first aspect, this and further objects are met by the provision of an operating and locking assembly the kind mentioned in the introduction, which is furthermore characterized in that each console member comprises an inner console member including the fourth joint to the mounting base member and an outer console member pivotably connected to the inner console member in a fifth joint, and that the handle bar is connected to the outer console member.

Thereby an operating and locking assembly is provided, with which the desired improved manufacturing and operational facilities are improved. By dividing the function of the console member into an outer console member carrying the handle bar and an inner console member forming the transition to the mounting base member, it is thus possible to rotate the outer console member relative to the inner console member in an easy and uncomplicated manner.

In a further aspect, a method is provided of providing a condition of use of a window comprising a frame, a sash and at least one hinge connection for connecting the sash to the frame, and a locking and operating assembly for opening, closing and locking the sash relative to the frame.

Presently preferred embodiments and further advantages will be apparent from the following detailed description and the dependent claims.

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 window with an operating and locking assembly in an embodiment according to the invention;

Fig. 2 is a view of the window shown in Fig. 1, on a larger scale;

Fig. 3 is a view of the window shown in Figs 1 and 2, on a still larger

scale and from a different angle;

Figs 4, 5 and 6 each shows a perspective view of a lock mechanism of the operating and locking assembly in an embodiment of the invention, in three different positions;

5 Fig. 7 shows a perspective view of the lock mechanism of the assembly in the position shown in Fig. 6, from a different angle;

Fig. 8 shows an exploded perspective view of the lock mechanism of Fig. 7;

10 Figs 9, 10 and 11 show schematic side views of the lock mechanism of the assembly in an embodiment of the invention, in three different positions corresponding to the positions of Figs 4, 5 and 6, respectively;

Fig. 12 shows a perspective view of an operating and locking assembly in another embodiment of the invention;

15 Fig. 13 shows a perspective view of a detail of the assembly of Fig. 12;

Fig. 14 is a view of the lock assembly of Fig. 12, from another angle and with some parts removed;

Fig. 15 shows an isometric view of the operating and locking assembly in a further embodiment of the invention;

20 Fig. 16 shows an exploded isometric view on a larger scale of the lock mechanism of the assembly of Fig. 15;

Fig. 17 shows an isometric view of an operating and locking assembly in a still further embodiment of the invention;

25 Figs 18 and 19 show isometric views, on a larger scale, of the lock mechanisms of Fig. 17;

Fig. 20 shows an exploded isometric view on a larger scale of one lock mechanism of the assembly of Fig. 17;

Fig. 21 shows an isometric sectional view of one lock mechanism of the assembly of Fig. 17;

30 Fig. 22 shows a view corresponding to Fig. 20 of a yet another embodiment of the invention; and

Fig. 23 shows a view corresponding to Fig. 21 of the lock mechanism

of Fig. 22.

In the drawings, in particular in Fig. 1, is shown a window, which comprises a stationary frame 1 and a sash 2 carrying a pane 3. The stationary frame has, in a manner known per se, a bottom member, a top member, and two side members, which together define a frame plane, and the sash has, in a corresponding manner, a bottom member, a top member, and two side members encasing the pane 3 and defining a sash plane. The sash 2 is connected to the frame 1 by means of a set of hinges (not shown), in the embodiment shown positioned substantially at a centre axis of the window, i.e. substantially midway between the top and bottom members of the frame 1 and sash 2, respectively. Only the top member 1a of the frame 1 and the top member 2a of the sash 2 will be referred to in detail. The window may for instance be a roof window to be built into an inclined roof surface (not shown).

Referring now to Figs 2 and 3, it is shown how an operating and lock assembly is connected to the top member 2a of the sash 2 and the top member 1a of the frame. Additionally, a ventilation device 5 is present at top member 2a of the sash 2 in the embodiment shown.

The operating and locking assembly functions for opening, closing and locking the sash 2 relative to the frame 1 of the window, and comprises in the embodiment shown a handle bar 120, two striking plates 40 mounted on top member 1a of the frame 1, each having a first and second inclined portions 41, 42, and two lock mechanisms 10 forming units of latch members 50, roller members 60, link members 70, console members 80, 90 and mounting base members 100 as will be described in further detail below.

For understanding of the general principle underlying such an assembly, reference is made to prior art documents WO 94/04782 and WO 2004/063498.

According to the present invention, each console member comprises an inner console member 80 and an outer console member 90. Referring now to the more detailed views of Figs 4 to 8, it is shown how the link member 70 is pivotably connected to the latch member 50 in a first joint 71, 51 and to the mounting base member 100 in a second joint 72, 102. The latch member 50

cooperates with the latch member 60 and is pivotably and displaceably connected to the inner console member 80 in a third joint 53,83. The inner console member 80 is pivotably connected to the mounting base member 100 in a fourth joint 84,104. Furthermore, the outer console member 90 is pivotably
5 connected to the inner console member 80 in a fifth joint 95,85, and the handle bar 120 is connected to the outer console member 90.

In the embodiment shown, the outer console member 90 has a generally rounded top side 91 and two generally plane side walls 92 and has at least one bottom rounded face 93, 94, the handle bar 120 being connected
10 via apertures 97 and suitable fastening means to the one such rounded face 93. An aperture 95 forming part of the fifth joint 95,85 is formed in a respective side wall 92 of the outer console member 90. The outer console member 90 is connected to the inner console member 80 in an additional snap connection provided by an aperture 98 in the top side 91 of the outer console
15 member 90 cooperating with a flange portion 88 of the inner console member 80.

The inner console member 80 may in principle take any suitable form but is in the embodiment shown formed in the following manner: It is provided with an aperture 85 forming part of the fifth joint 95,85, and a slit 83 forming
20 part of the third joint 53,83 and accommodating a pin through a corresponding aperture 53 on the latch member 50 in a pivotable and displaceable manner. Furthermore, the inner console member 80 has a protruding joint section 84a provided an aperture 84 forming part of the fourth joint 84,104. Moreover, a number of elements accommodating the interaction with other parts are provided, such as an inclined flange portion 88 facing the outer console member
25 90, and an inclined flange portion 87 facing the slit 83 and a downwards facing body portion 89.

The inner console member 80 is biased by means of a coil spring 110 which cooperates with a spring stop 119. The mounting base plate 100 is
30 provided with corresponding apertures for receiving the spring (this aperture not indicated separately), and apertures 102 and 104 for receiving pins, or other joining or journaling means, through corresponding apertures 72 and 84

of the second and fourth joint, respectively. Eventually, the mounting base plate 100 is provided with apertures 108 for reception of fastening means such as screws for introduction into the top sash member 2a, and has on its backside a spigot or tap 109, likewise for introduction into the top sash member 2a.

The latch member 50 has, in the embodiment shown, a general shape of a U-profile with a base wall 57 and two side walls 58. The aperture 53 forming part of the third joint 53,83 is formed near one free corner of the respective side wall 58, an aperture 51 forming part of the first joint 71,51 is formed near an opposite free corner of the respective side wall 58, and has furthermore an aperture 56 for cooperating with a corresponding aperture 66 of the roller member 60. Throughout the embodiments, apertures in the respective parts are adapted to receive any suitable joint or journaling means, one example being a simple pin, but other solutions are conceivable as well.

Referring now to the series of Figs 9 to 11, the manner of operation of the operating and locking assembly according to the invention will be described in some detail.

In Fig. 9, the lock mechanism 10 of the operating and locking assembly is shown in its locked position in which the latch member 50 is in an upper position and the roller member 60 interacts with the inner inclined surface 42 of the striking plate 40. The latch member 50 assumes a non-angled position relative to the inner cover member 80 and the mounting base member 100, and the link member 70 forms a slight positive angle with the horizontal, i.e. points upwards. In Fig. 11, the open position is shown, in which the inner console member 80 forms an angle with the mounting base member 100. It follows from the context, i.e. the drawings and the above description, that the outer console member 90, which is not shown in Figs 9 to 11, follows the movement of the inner console member 80.

Additionally, the lock mechanism 10 of the operating and locking assembly of the embodiment shown here is able to assume an intermediate position in which the latch member 50 is in a lower, non-angled position relative to the inner cover member 80 and the mounting base member 100. Thus the

window is allowed to be closed without simultaneously being locked, even without the console members and the handle bar forming an angle with the mounting base member and protrudes into the room.

A further embodiment of the invention, which is particularly advantageous as regards transportation, is shown in Figs 12 to 14.

In this embodiment, a locking element 130 is provided for holding the outer console member 90 and the handle bar 120 in a transportation position differing from a position of use, the outer console member 90 being rotated about the fifth joint 95,85 relative to the inner console member 80, i.e. points substantially downwards in Figs 12 and 14.

The locking element 130 has an end portion 131 and a side portion 132 to engage with respective portions 89,84a of the inner console member 80. As shown, the locking element 130 furthermore has a grip portion 133.

During transportation, it is advantageous that the handle bar lies close to the pane 3, among other things to reduce the space needed for packaging, but also to prevent damage of the handle bar itself or of other parts. Bringing the window from a transportation condition to a condition of use may in principle be carried out in a number of ways.

One method of providing a condition of use of a window is devised, in which the window comprises a frame, a sash and at least one hinge connection for connecting the sash to the frame, and a locking and operating assembly for opening, closing and locking the sash relative to the frame, and the method comprises the steps of:

providing the locking and operating assembly in a transportation position differing from a position of use, in which the outer console member is positioned at a predefined angle relative to the inner console member,

rotating the outer console member about the fifth joint through said predefined angle to provide the a position of use of the locking and operating assembly and a condition of use of the window.

The handle bar may either be mounted subsequently but is advantageously connected to the outer console member in the transportation position.

In order to improve the retention of the outer console member to the

inner console member, the additional step of connecting the outer console member to the inner console member in an additional snap connection may be present.

In those cases, in which a locking element is present, the additional
5 steps of providing the locking element for holding the outer console member in the transportation position and removing the locking element before the step of rotating the outer console member are present.

Further details such as sealings, cover members etc. may be present in a manner known *per se*. The handle bar 120 may have any suitable form,
10 including a radius of curvature having good ergonomics, and may as indicated in Fig. 3 be a profiled, hollow bar, which can be produced at a moderate expense and with a low consumption of material.

A further embodiment of the operating and locking assembly according to the invention is shown in Figs 15 and 16. Elements having the same or
15 analogous function as in the embodiments shown in the above carry the same reference numerals in a series '200'. Only differences from the above embodiments will be described in detail.

The outer appearance of each lock mechanism 210 is virtually the same as in the embodiments of Figs 1 to 14. The handle bar 220 is provided
20 with end plugs 221.

The interior of the lock mechanism 210 has a corresponding functionality as in the above. One difference is the detail of the inner console member 280 indicated by reference numeral 289a; the downwards facing body portion 289 is provided with an indentation 289a adapted to receive a
25 locking element (not shown) in the transportation position of the operating and locking assembly.

A still further embodiment of the operating and locking assembly according to the invention is shown in Figs 17 to 21. Elements having the same or analogous function as in the embodiments shown in the above carry the
30 same reference numerals in a series '300'. Only differences from the above embodiments will be described in detail.

The lock mechanisms 310 and 315 of this embodiment are asymmet-

ric, as the left-hand lock mechanism 310 is provided with a depending flange portion 393a in one side wall at one side, and the right-hand lock mechanism 310 with a depending flange portion 393b at the opposite side. Each flange portion 393a, 393b is provided with a stub 397a, 397b which face each other
5 in the mounted position of the operating and locking assembly. The handle bar 320 extends between the stubs 397a, 397b and is retained on them.

Referring in particular to Fig. 21, in the inner console member 380, a compression spring 380a is shown. This spring has not been shown in the above embodiments, but may also be present there. Furthermore, the en-
10 gagement between the inclined flange portion 387 of the inner console member 380 and the aperture 98 of the outer console member 390 is indicated clearly.

A yet another embodiment of the operating and locking assembly according to the invention is shown in Figs 22 and 23. Elements having the
15 same or analogous function as in the embodiments shown in the above carry the same reference numerals in a series '400'. Only differences from the above embodiments will be described in detail.

It is noted that the aperture in the top side of the outer console member 490 has been dispensed with and is in this embodiment replaced by a
20 recess 498 opening towards the inner face of the top side of the outer console member 490. Thus, the top side of the outer console member 490 is unbroken, but on its inner side, there is still means for cooperating with the flange portion 488 of the inner console member 480.

It should be noted that the above description of preferred embodi-
25 ments 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.

P A T E N T C L A I M S

1. An operating and locking assembly for opening, closing and locking a sash (2) relative to a frame (1) of a window, comprising

a striking plate (40) adapted to be mounted on the frame (1),

5 a lock mechanism (10; 210; 310; 315) including a latch member (50), a roller member (60), a link member (70), at least one console member (80,90), a mounting base member (100) adapted to be mounted on the sash (2), and

a handle bar (120) connected to the at least one console member
10 (80, 90),

the link member (70) being pivotably connected to the latch member (50) in a first joint (71,51) and to the mounting base member (100) in a second joint (72,102), the latch member (50) being pivotably and displaceably connected to the at least one console member (80,90) in a third joint (53,83),
15 and the at least one console member (80,90) being pivotably connected to the mounting base member (100) in a fourth joint (84,104), and

the operating and locking assembly being able to assume at least a locked position and an open position,

characterized in that

20 each console member comprises an inner console member (80) including the fourth joint (84) to the mounting base member (100) and an outer console member (90) pivotably connected to the inner console member (80) in a fifth joint (95,85), and that the handle bar (120) is connected to the outer console member (90).

25 2. An operating and locking assembly according to claim 1, wherein the outer console member (90) has a generally rounded top side (91) and two generally plane side walls (92).

3. An operating and locking assembly according to claim 1 or 2, wherein the outer console member (90; 290; 390) has at least one bottom rounded face (93, 94; 293, 294; 393a, 393b, 394), the handle bar (120; 220; 320) being connected (97; 297; 397) to the one such rounded face (93; 293; 393), the rounded face being optionally provided as a flange portion (393a,

393b) provided with a stub (397a, 397b) for receiving an end of the handle bar (320).

4. An operating and locking assembly according to any one of claims 2 to 3, wherein an aperture (95) forming part of said fifth joint (95,85) is
5 formed in a respective side wall (92) of the outer console member (90).

5. An operating and locking assembly according to any one of the preceding claims, wherein the outer console member (90) is connected to the inner console member (80) in an additional snap connection (88,98; 388,398;488,498).

10 6. An operating and locking assembly according to claims 2 and 5, wherein the additional snap connection is provided by an aperture (98; 398) in the top side (91) of the outer console member (90; 390) cooperating with a flange portion (88; 388) of the inner console member (80; 380), or a recess (498) facing the inner side of the outer console member (490) cooperating
15 with a flange portion (488) of the inner console member (480).

7. An operating and locking assembly according to any one of the preceding claims, wherein a locking element (130) is provided for holding the outer console member (90) and the handle bar (120) in a transportation position differing from a position of use, the outer console member (90) being ro-
20 tated about the fifth joint (95,85) relative to the inner console member (80).

8. An operating and locking assembly according to claim 7, wherein the locking element (130) has an end portion (131) and a side portion (132) to engage with respective portions (89,84a) of the inner console member (80), and preferably a grip portion (133).

25 9. An operating and locking assembly according to any one of the preceding claims, wherein the inner console member (80) is provided with an aperture (85) forming part of the fifth joint (95,85), and a slit (83) forming part of the third joint (53,83) and accommodating a pin through a corresponding aperture (53) on the latch member (50) in a pivotable and displaceable man-
30 ner.

10. An operating and locking assembly according to claim 9, wherein the inner console member (80) has a protruding joint section (84a) provided

an aperture (84) forming part of the fourth joint (84,104).

11. An operating and locking assembly according to any one of claims 9 and 10, wherein the inner console member (80) is provided with an inclined flange portion (88) facing the outer console member (90).

5 12. An operating and locking assembly according to any one of claims 9 to 11, wherein the inner console member (80) is provided with an inclined flange portion (87) facing the slit (83) and a downwards facing body portion (89).

10 13. An operating and locking assembly according to any one of the preceding claims, wherein the latch member (50) has a general shape of a U-profile with a base wall (57) and two side walls (58).

15 14. An operating and locking assembly according to claim 13, wherein an aperture (53) forming part of the third joint (53,83) is formed near one free corner of the respective side wall (58), an aperture (51) forming part of the first joint (71,51) is formed near an opposite free corner of the respective side wall (58), and preferably an aperture (56) for cooperating with a corresponding aperture (66) of the roller member (60).

20 15. An operating and locking assembly according to any one of claims 9 to 14, wherein the operating and locking assembly is able to assume an intermediate position in which the latch member (50) is in a lower, non-angled position relative to the inner cover member (80) and the mounting base member (100).

25 16. An operating and locking assembly according to any one of the preceding claims, wherein two sets of striking plates (40) adapted to be mounted on the frame (1), latch members (50), roller members (60), link members (70), inner and outer console members (80,90), and mounting base members (100) adapted to be mounted on the sash (2), are connected to one handle bar (120).

30 17. A method of providing a condition of use of a window comprising a frame (1), a sash (2) and at least one hinge connection for connecting the sash (2) to the frame (1), and a locking and operating assembly (10) for opening, closing and locking the sash relative to the frame according to any one of

claims 1 to 16, comprising the steps of:

providing the locking and operating assembly in a transportation position differing from a position of use, in which the outer console member (90) is positioned at a predefined angle relative to the inner console member (80),

5 rotating the outer console member (90) about the fifth joint (95,85) through said predefined angle to provide the position of use of the locking and operating assembly and a condition of use of the window.

18. The method of claim 17, wherein the handle bar (120) is connected to the outer console member (90) in the transportation position.

10 19. The method of claim 17 or 18, wherein the additional step of connecting the outer console member (90) to the inner console member (80) in an additional snap connection (88,98; 388,398;488,498) is present.

20. The method of any one of claims 17 to 19, wherein the additional steps of providing a locking element for holding the outer console member in
15 the transportation position and removing the locking element before the step of rotating the outer console member are present.

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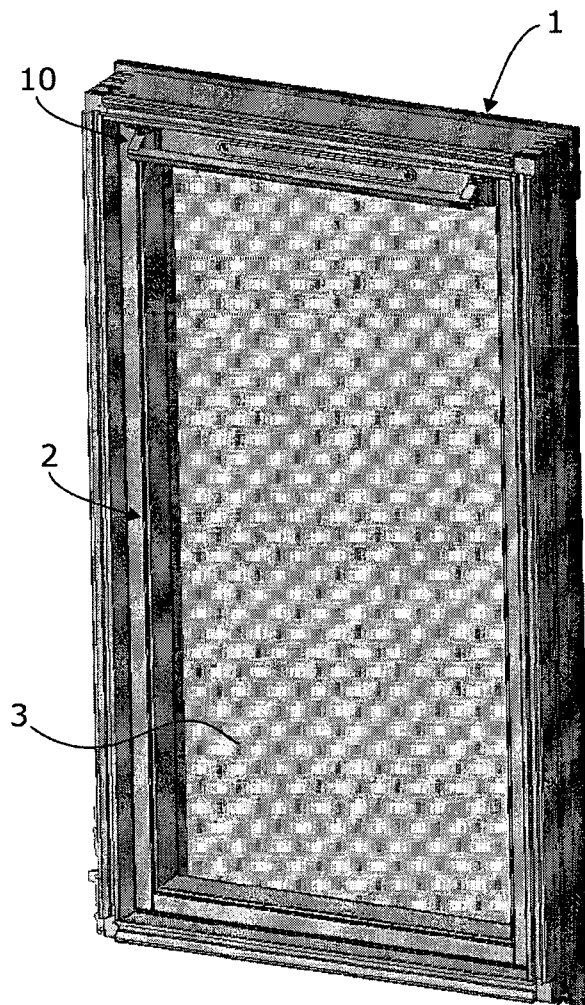


Fig. 1

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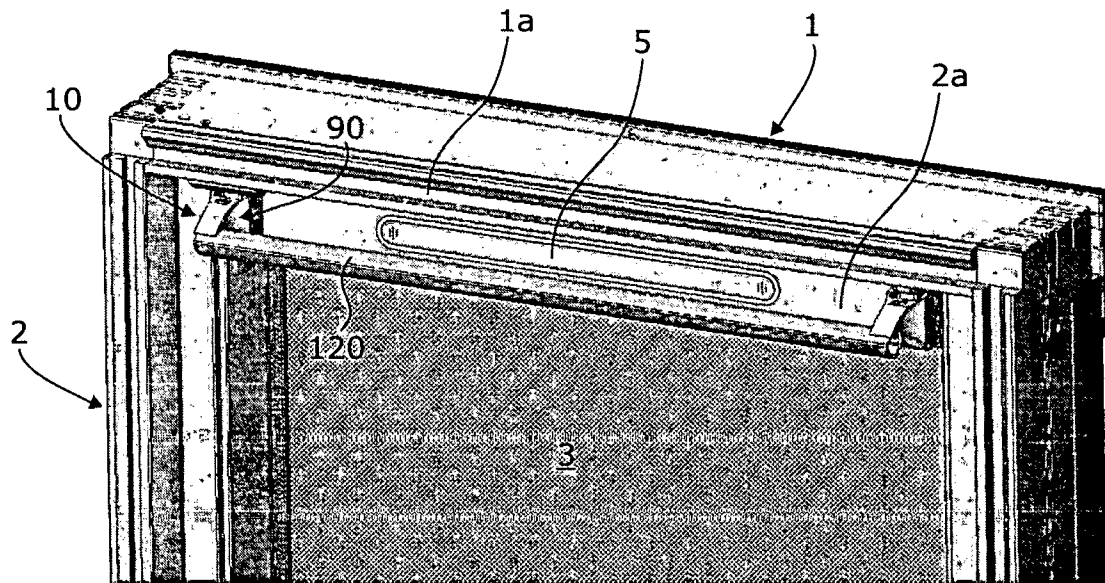


Fig. 2

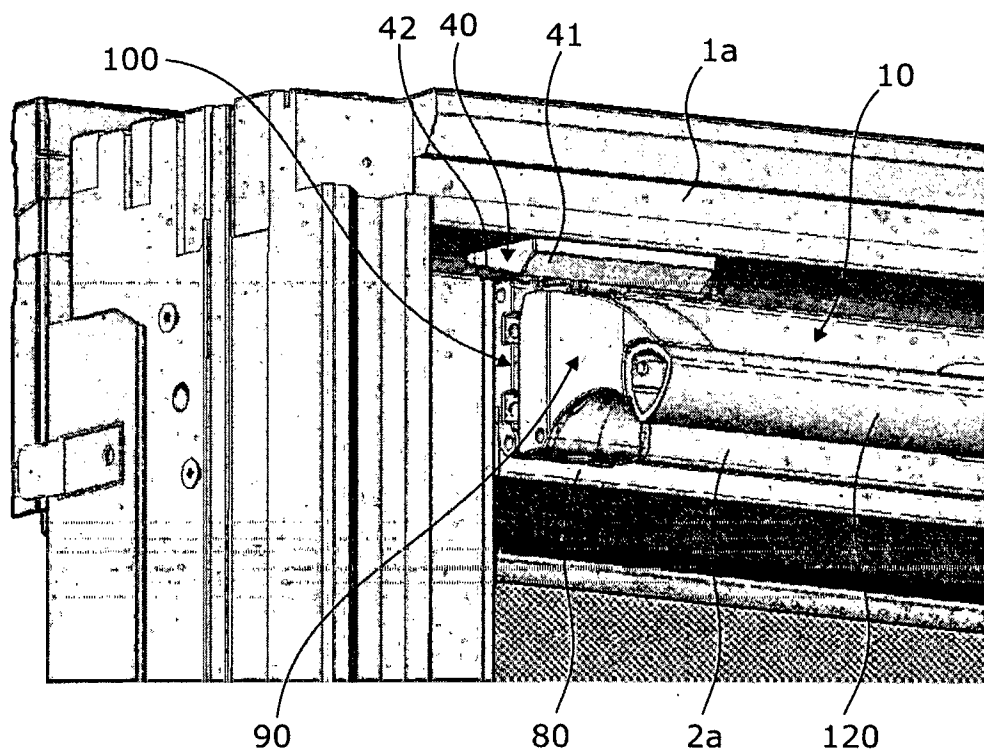
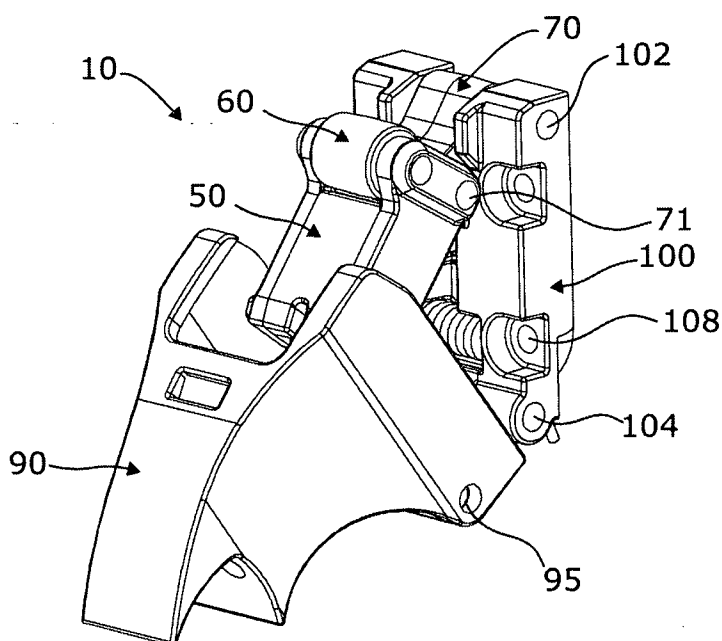
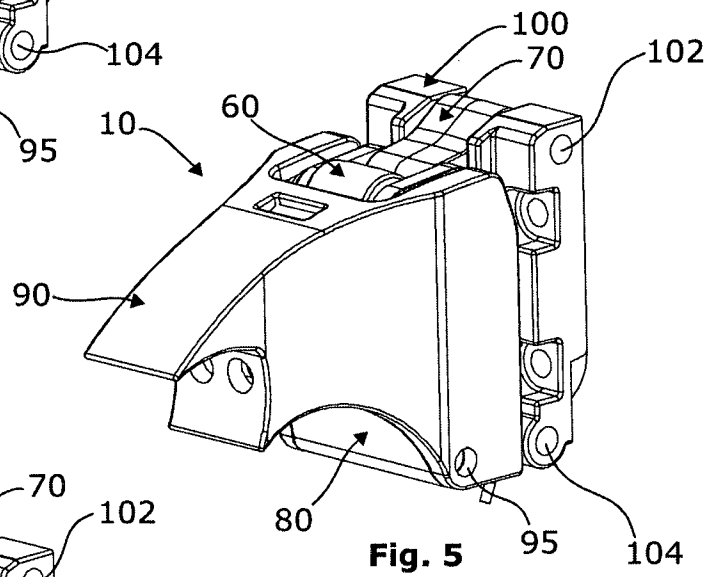
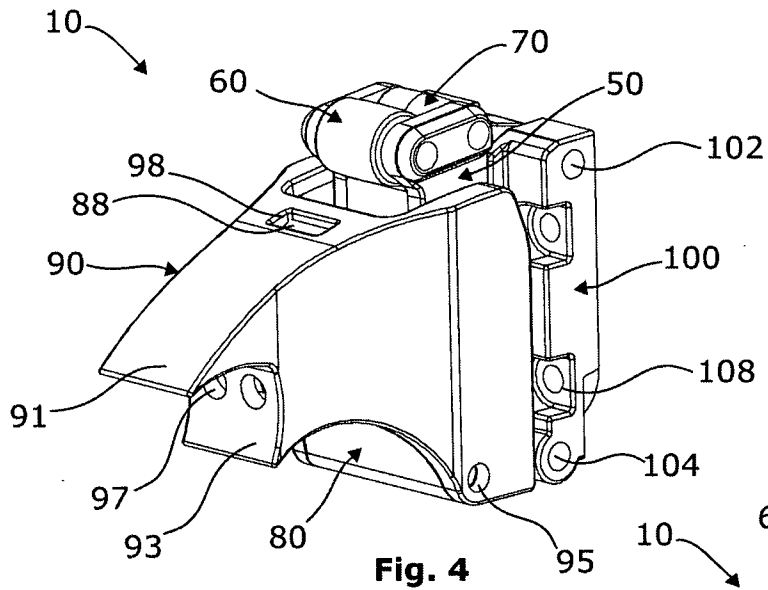
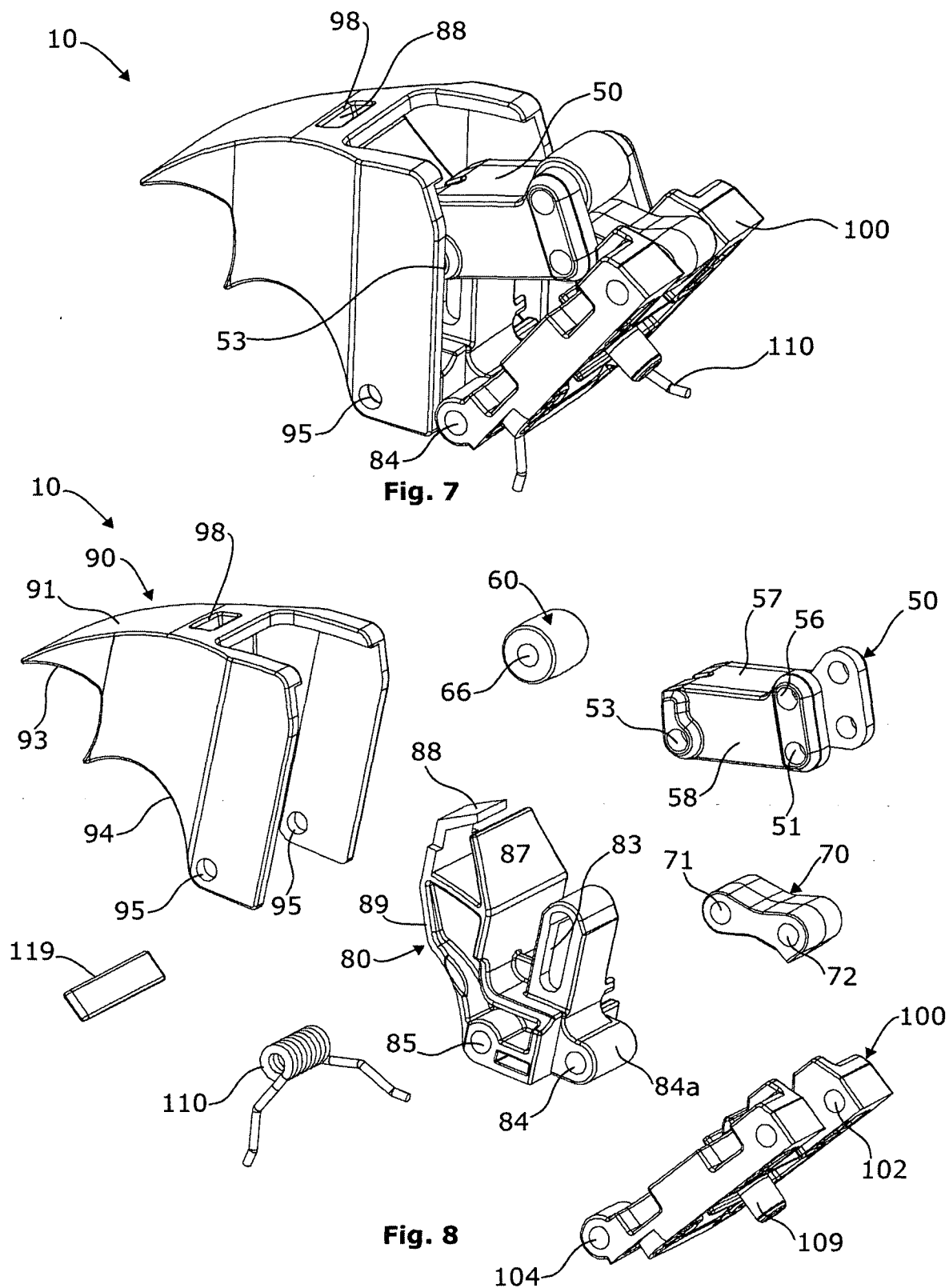


Fig. 3

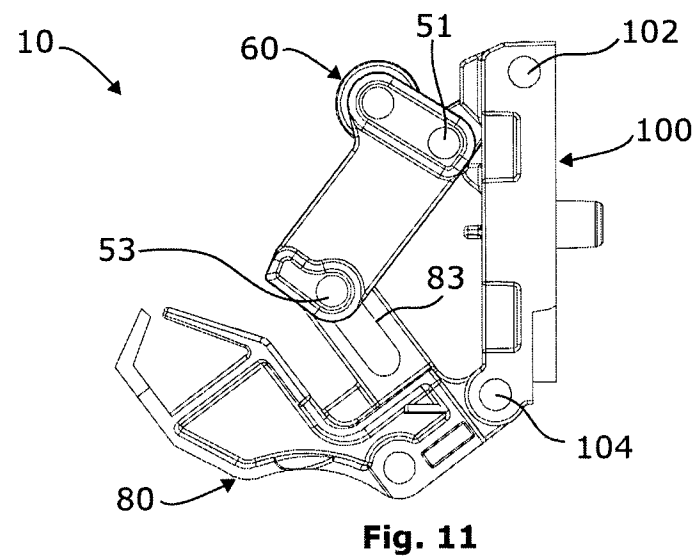
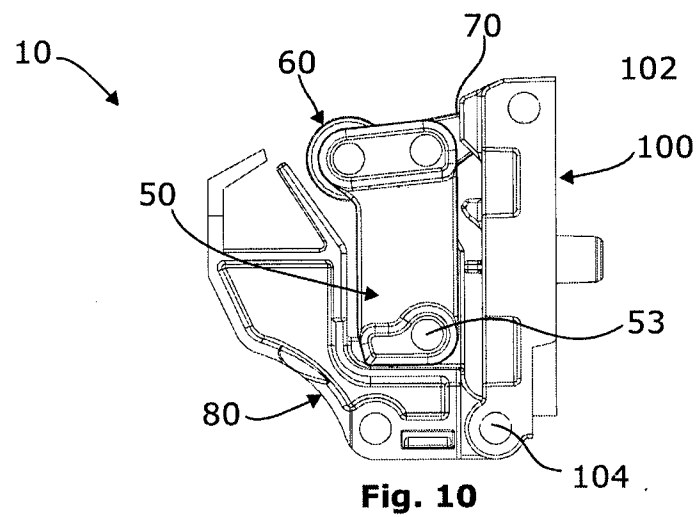
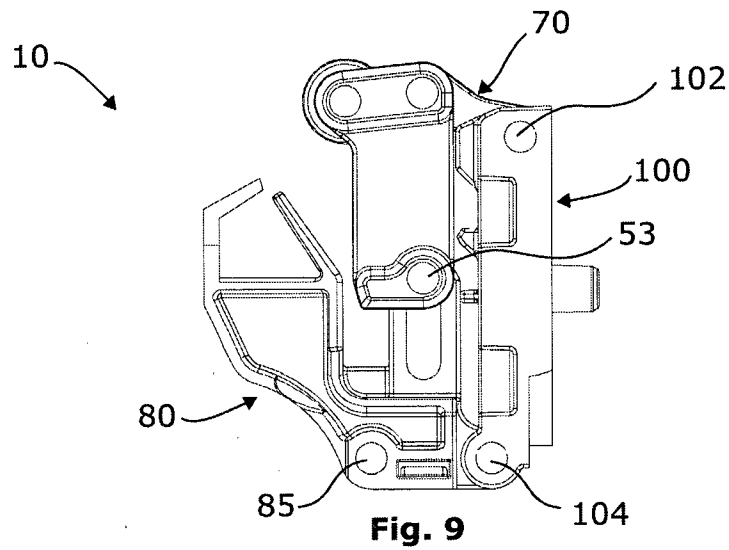
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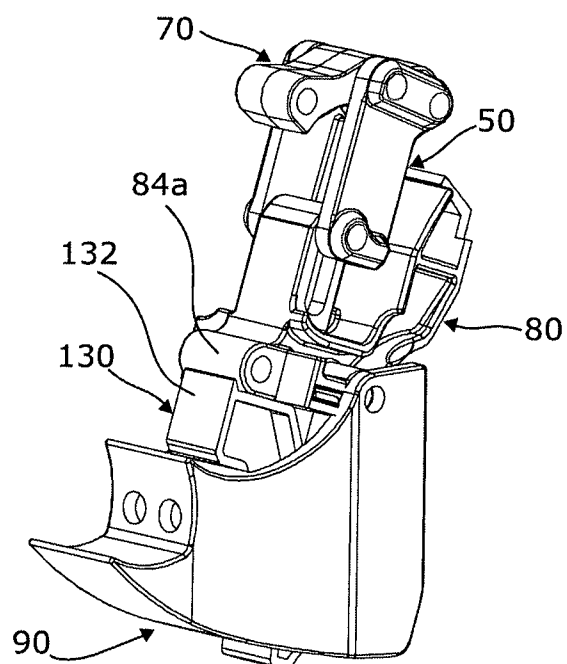
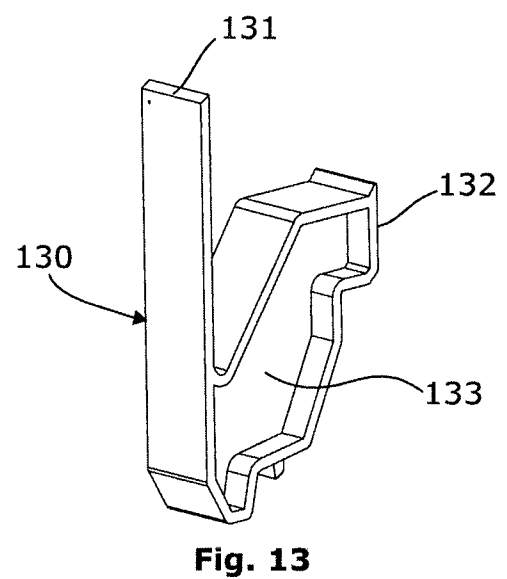
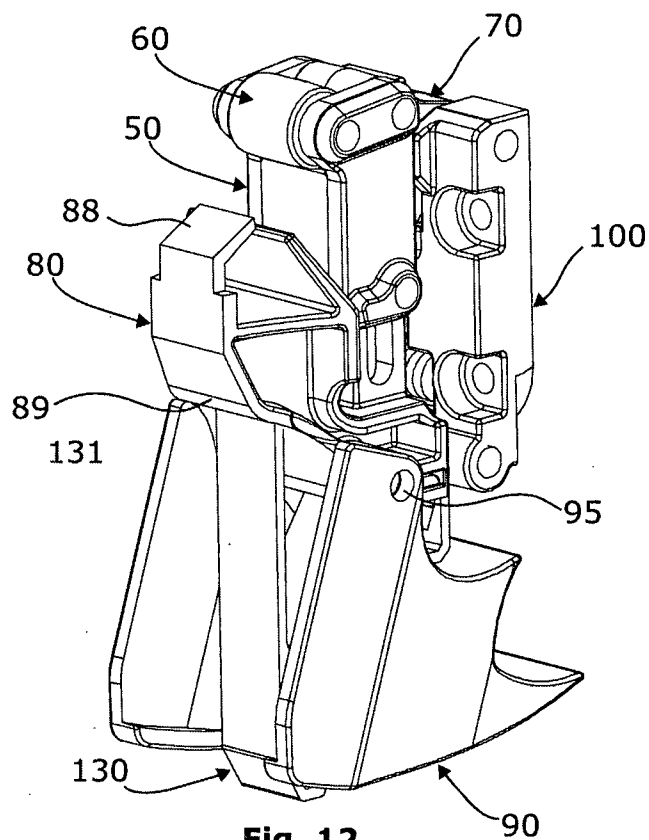
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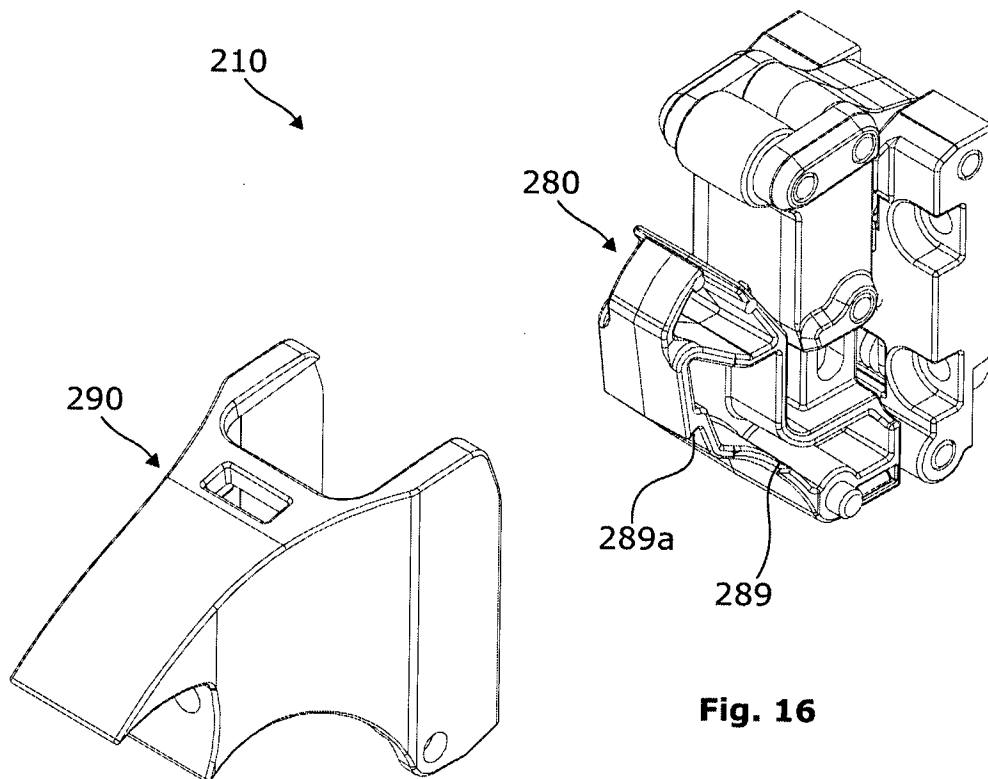
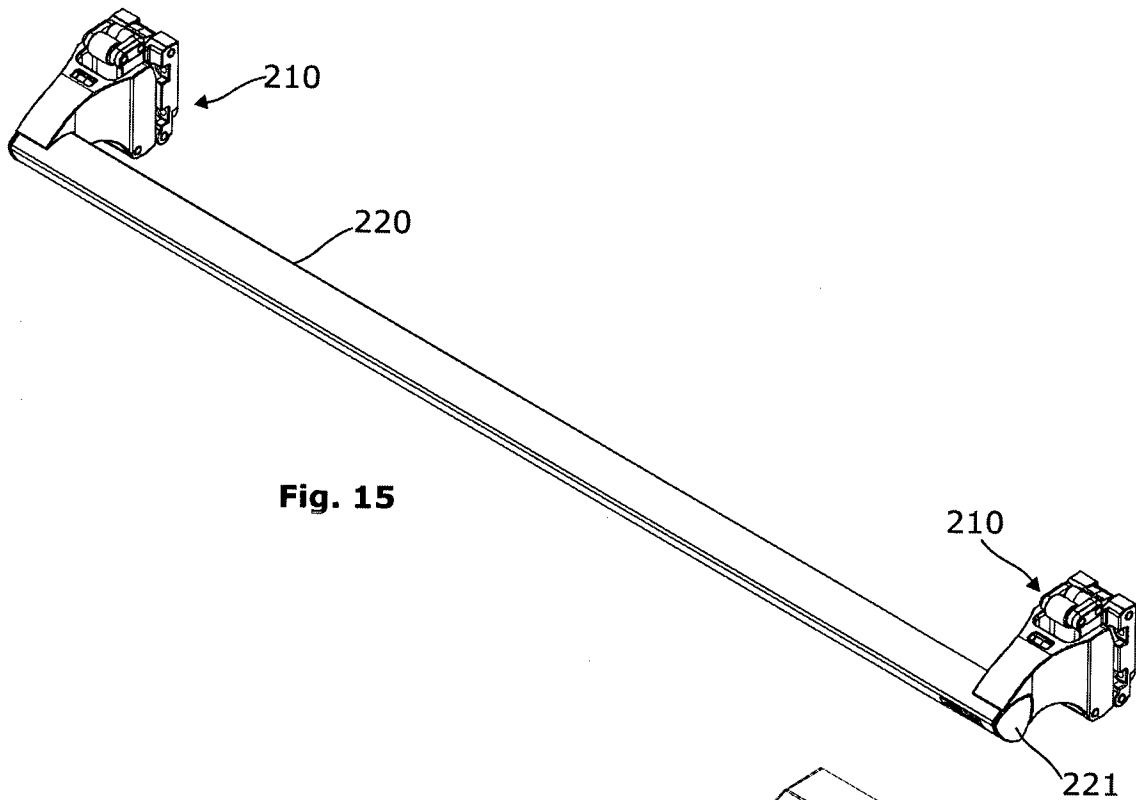
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6/10



7/10



8/10

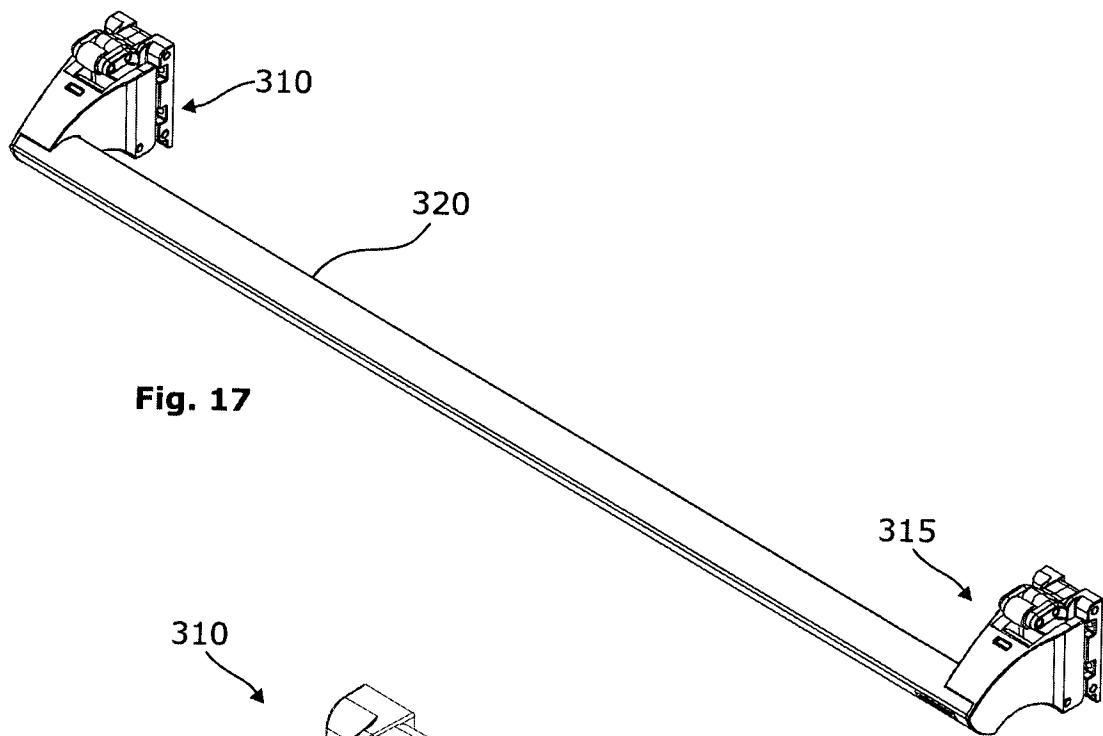


Fig. 17

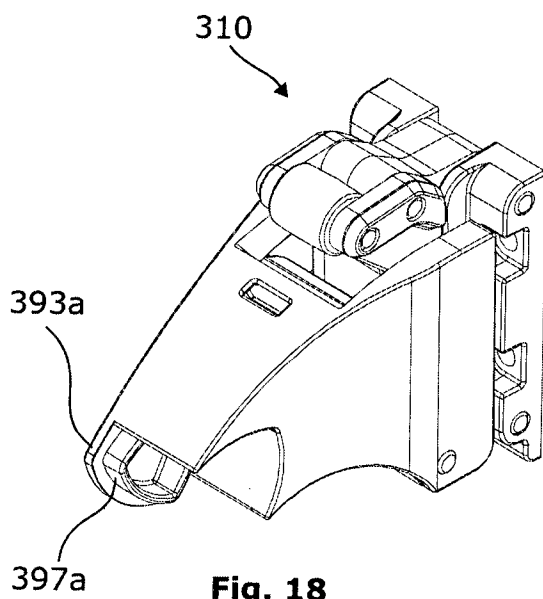


Fig. 18

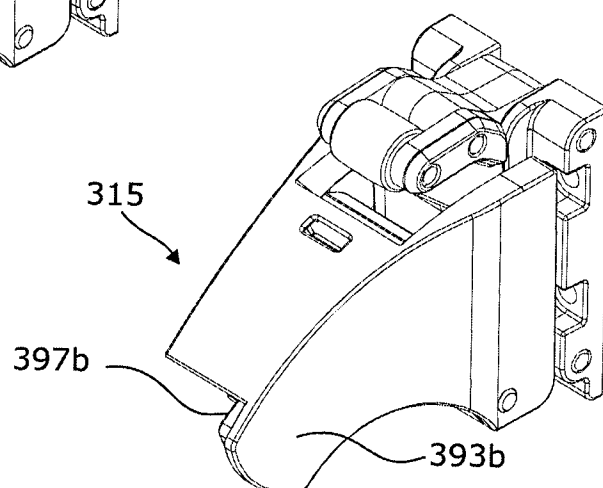
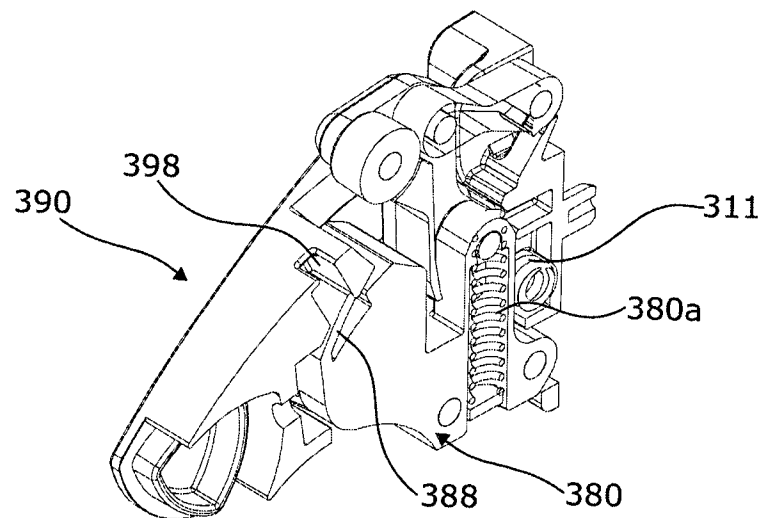
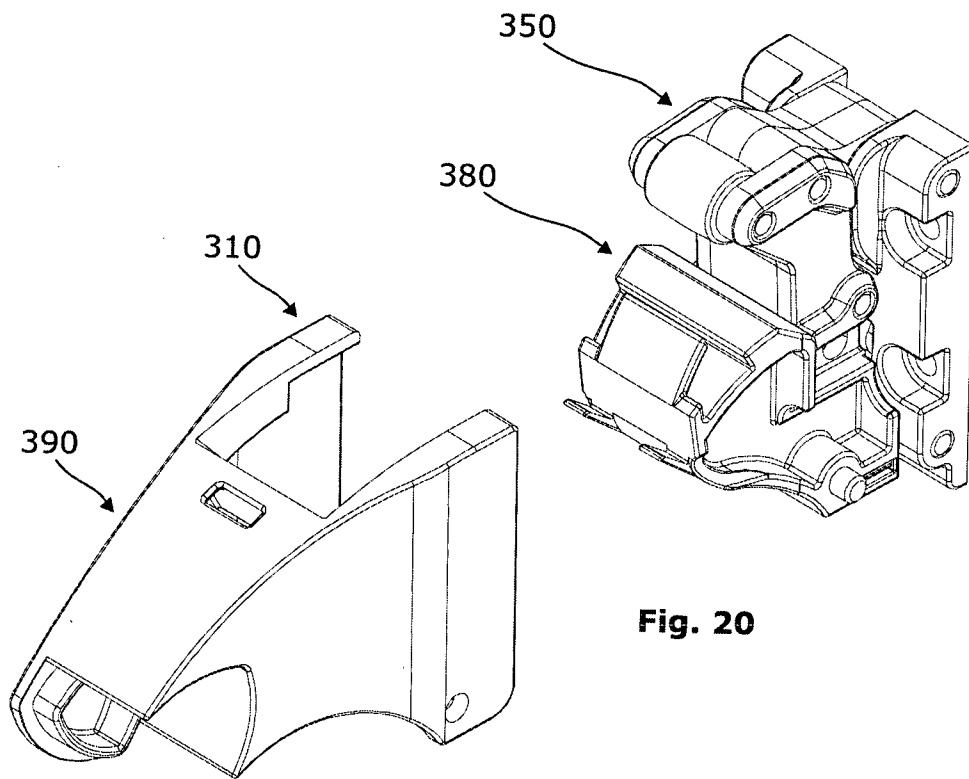


Fig. 19

9/10



10/10

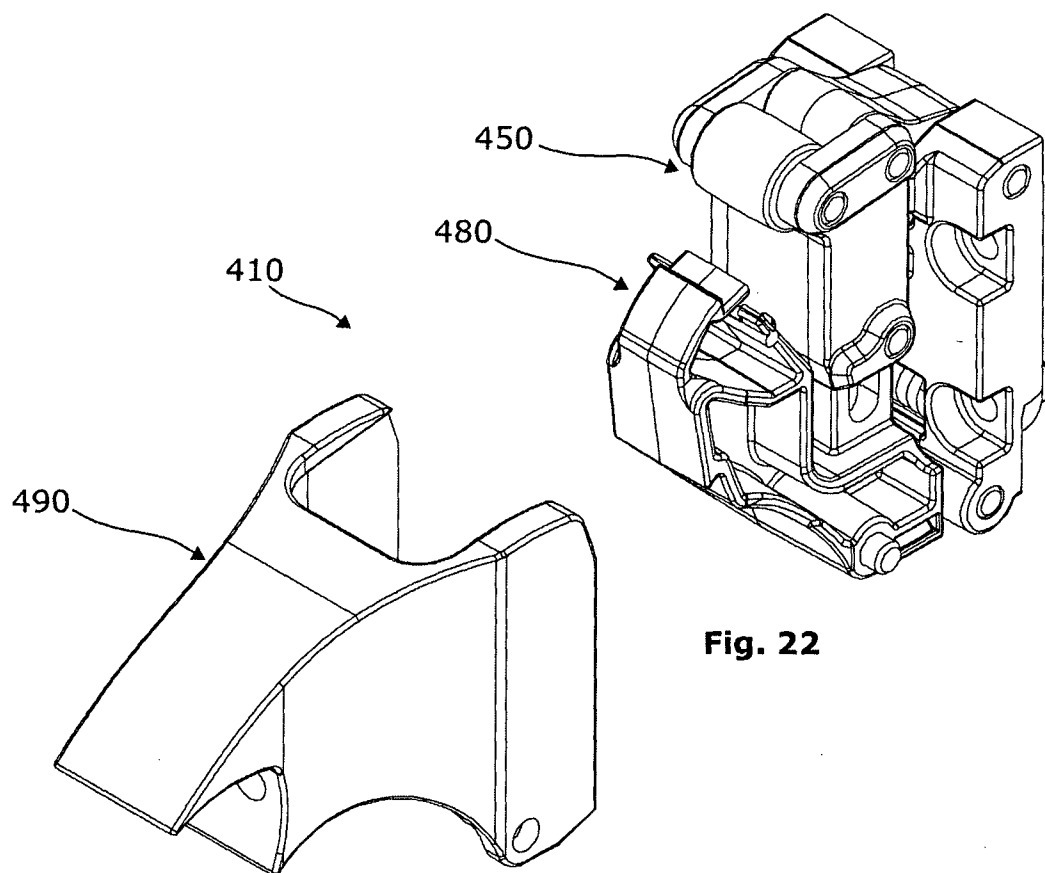


Fig. 22

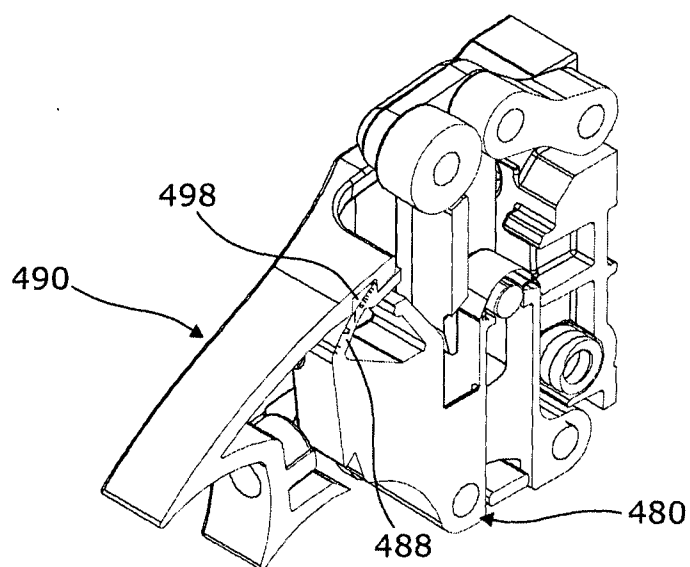


Fig. 23

INTERNATIONAL SEARCH REPORT

International application No
PCT/DK2014/050118

A. CLASSIFICATION OF SUBJECT MATTER
INV. E05C19/14 E05B17/00
ADD. E05B7/00

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)
E05C E05B

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.
A	EP 2 281 983 A1 (VKR HOLDING AS [DK]) 9 February 2011 (2011-02-09) the whole document	1,17
A	GB 2 351 765 A (ABBOT LESTER KENNETH [GB]) 10 January 2001 (2001-01-10) page 4 - page 5; figure 1	1,17



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"E" earlier application or patent but published on or after the international filing date

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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

15 August 2014

Date of mailing of the international search report

25/08/2014

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Authorized officer

Ansel, Yannick

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/DK2014/050118

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2281983	A1	09-02-2011	CN 201794407 U 13-04-2011
		EP 2281983 A1	09-02-2011
GB 2351765	A	10-01-2001	NONE