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(54) **Attachment device for attaching a panel to a furnishing element**

(57) An attachment device (1) for attaching a front panel to the sides of a drawer, comprising an engagement element (2,3,4), which is designed to be fixed in a receiving part (6) along a guided insertion path; the receiving part (6) comprises a movable slider (8) having a guide slit (9) that extends internally for engaging and holding the engagement element (2,3,4) in an inner position. Advantageously, a bottom portion of the guide slit (9) defines an abutment wall (12) that counteracts a displacement of said engagement element (2,3,4) coming closer to said front side (7a) of said receiving part (6) and, at the same time, connection means (13,14) movably connect the slider (8) to the frame (7) of the receiving part (6) to counteract a displacement of the slider from the forward position to the backward position as a result of an action of the engagement element upon the abutment wall (12).

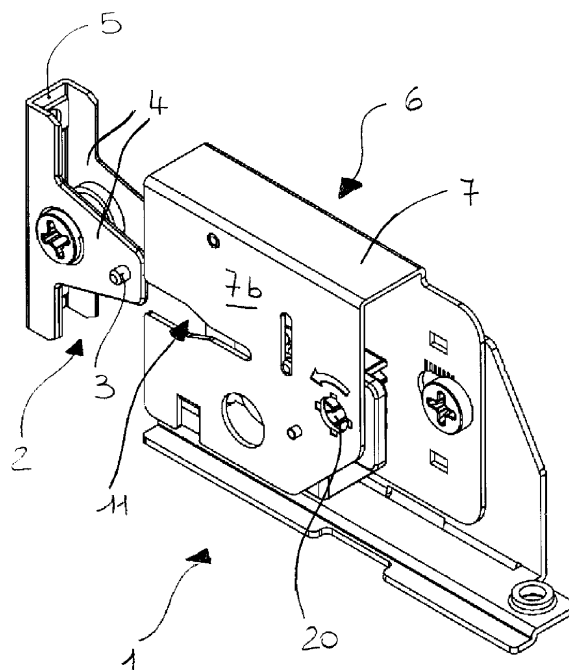


Fig. 1

Description

[0001] The present invention relates to a device as defined in the preamble of claim 1 for attaching a panel to a furnishing element.

[0002] For simplicity, reference will be particularly made herein, without limitation, to a drawer as a furnishing element, whereby the device of the invention allows attachment of the front panel of a drawer to the body of such drawer.

[0003] In the field of furniture manufacture, furniture is generally manufactured and assembled with the drawers already in their natural locations, but without equipping such drawers with their front sides. This is because while the bottom, the sides and the back of a drawer have a standard finish, the finish of the front changes according to particular needs and may be highly differentiated.

[0004] The requirement to be fulfilled is to allow simple and quick mounting of the drawer front, so that such drawer front is caused to engage the rest of the drawer, preferably in a guided straight insertion direction, perpendicular to the drawer front. This kind of insertion is strongly desired to prevent damages to the drawer front during mounting thereof to the drawer body.

[0005] Spring-loaded insertion devices are widely used in the prior art, and allow the engagement member integral with the drawer front to be forcefully pulled against a receiving part, attached to the drawer sides. One example of this device is disclosed in the prior art document EP-A-0740917.

[0006] Concerning these devices, they are found to be affected by the drawback that the attachment force with which the drawer front is held in engagement with the drawer sides is given by the force of the elastic means that act upon the device, whereby springs having a very high spring modulus have to be used.

[0007] This invention is based on the problem of conceiving an attachment device for attaching a panel to a furnishing element, which has such structural and functional characteristics as to fulfill the above need, while obviating the above prior art drawbacks.

[0008] This problem is solved by an attachment device as defined in claim 1.

[0009] Further features and advantages of the device of the present invention for attaching a panel to a furnishing element will be apparent upon reading the following description of a few preferred embodiments thereof, which is given by way of illustration and without limitation with reference to the accompanying figures, in which:

- Figure 1 is a perspective view of an attachment device of the invention for attaching a panel to a furnishing element, with separated parts;
- Figure 2 is a perspective view of the device of Figure 1 with joined parts;
- Figures 3 and 4 are two exploded perspective views of the device of Figure 1 as taken from two different points of view;

- Figure 5 is a partially sectional planar side view of the device of Figure 1;
- Figure 6 is a planar side view of the device of Figure 5, with certain parts omitted for better identification of the internal parts;
- Figure 7 is a partially sectional planar side view of the device of Figure 2;
- Figure 8 is a planar side view of the device of Figure 7, with certain parts omitted for better identification of the internal parts;
- Figure 9 is a partially sectional planar side view of the device of the invention, with the parts in an intermediate configuration between those of Figures 1 and 2;
- Figure 10 is a planar side view of the device of Figure 9, with certain parts omitted for better identification of the internal parts;
- Figures 11 and 12 are two perspective views of the slider of the device of Figure 1 as taken from two different points of view;
- Figures 13 and 14 are two planar side views of the slider of Figures 11 and 12 respectively;
- Figure 15 is a perspective view of an attachment device of the invention according to a variant embodiment, with separate parts;
- Figure 16 is a perspective view of the device of Figure 15 with joined parts;
- Figures 17 and 18 are two exploded perspective views of the device of Figure 15 as taken from two different points of view;
- Figure 19 is a partially sectional planar side view of the device of Figure 15;
- Figure 20 is a planar side view of the device of Figure 15, with certain parts omitted for better identification of the internal parts;
- Figure 21 is a partially sectional planar side view of the device of Figure 16;
- Figure 22 is a planar side view of the device of Figure 21, with certain parts omitted for better identification of the internal parts;
- Figures 23 and 24 are two perspective views of the slider of the device of Figure 15 as taken from two different points of view;
- Figures 25 and 26 are two planar side views of the slider of Figures 23 and 24 respectively.

[0010] Referring to the accompanying figures, numeral 1 generally designates an attachment device of the invention for attaching a panel (not shown) to a furnishing element (not shown).

[0011] As a furnishing element, reference will be made herein by way of example and without limitation to a drawer, the panel to be attached being thus the front side of the drawer.

[0012] Particularly, the attachment device 1 comprises an engagement element 2 which is designed to be fixed to the front of the drawer and a receiving part 6 that may be conveniently fixed to the body of the drawer.

[0013] Concerning the engagement element 2, in the illustrated embodiment it is shown to comprise a pin 3, here extending horizontally, which is supported near its opposed ends 3a by two parallel and mutually facing flanges 4, perpendicularly projecting from a base plate 5.

[0014] The engagement element 2 is designed to be fixed to the inner side of the drawer front so that said base plate 5 abuts against the inner side of the drawer front. The base plate 3 includes holes for screws or other fastening elements.

[0015] Still concerning the engagement element 2, it should be further noted that the ends 3a of the pin 3 laterally project to a predetermined limited extent from both of said flanges 4, which ensure support and proper positioning thereof relative to the base plate 5 and, as a result, to the inner side of the drawer front.

[0016] Concerning the receiving part 6 of the attachment device, it is shown to comprise a support frame 7 through the receiving part 6 may be firmly fixed to the body of the drawer. Namely, the receiving part 6 is typically fixed to a side wall of the drawer, otherwise such receiving part may be either fixed to the bottom of the drawer or to a lateral guide thereof.

[0017] According to the illustrated embodiments, the support frame 7 consists of a box-like body having a substantially rectangular section and a small thickness, so that the receiving frame 6 is adapted to be frontally held in a built-in arrangement in the end of a drawer side, whereby the front wall/end 7a of the box-like body is substantially flush with the front end of the drawer side. In any case, it will be understood that the above described box-like shape corresponds to a preferred embodiment, and different shapes of support frames may be provided.

[0018] The engagement element 2 has such a shape as to allow insertion thereof into the receiving part 6 to a secure engagement condition, while ensuring the possibility of separating the engagement element 2 from the receiving part.

[0019] Particularly:

- Figures 1, 5 and 6 (and Figures 15, 19 and 20) show a condition in which the engagement element 2 is separated from the receiving part 6;
- Figures 2, 7 and 8 (and Figures 16, 21, 22) show a condition in which the engagement element 2 is fully inserted into engagement in the receiving part 6, to be firmly retained therein, as better shown hereinafter, and in this configuration the base plate 5 is substantially flush with the front wall 7a of the box-like body defined by the support frame 7, whereas
- Figures 9 and 10 show a condition in which the engagement element 2 starts to fit into the receiving part 6.

[0020] Concerning the insertion of the attachment element 2 into the receiving part, it shall be noted that the parts have such shapes as to ensure that such insertion occurs as a guided front insertion, namely so that a pre-

determined guided insertion path is created, which causes insertion of the engagement element to occur in the predetermined insertion mode, to the condition in which the engagement element 2, namely the pin 3, is firmly held.

[0021] Such predetermined guided insertion path is also defined by the presence of guide means 11, which are formed in or associated with the support frame 7, for engagement by the engagement element 2 during insertion thereof into the receiving part 6.

[0022] In this example, said guide means 11 extend perpendicular to the front side 7a of the box-like body 7 along the side walls 7b and 7c of the box-like body. Particularly:

- along a first side wall 7c of the box-like body 7, said guide means 11 consist of a slot 11a, that opens out at the front side 7a of the box-like body 7, whereas
- at the opposed side wall 7c of the box-like body 7, said guide means 11 consist of a longitudinal recess 11b, jutting out toward the exterior of the box-like body 7.

[0023] The longitudinal slot 11a and the corresponding longitudinal recess 11b have such sizes, distance and positions that the two flanges 4 of the engagement element 2 fit in a substantially precise manner between the two side walls 7b and 7c of the box-like body 7, while said opposed ends 3a of the pin 3 engage the longitudinal slot 11a and the longitudinal recess 11b respectively to be guided thereby.

[0024] Therefore, in the above embodiment, said guide means 11 allow the engagement element 2 to fit into the receiving part 6 along a straight insertion path extending in the box-like body 7 from the front wall 7a and perpendicular thereto.

[0025] The receiving part 6 comprises a movable slider 8, which is supported by the support frame 7 through interposed connection means, which allow said slider 8 to move between a backward position and a forward position.

[0026] The movable slider 8 comprises a guide slit 9 extending into the slider from a front opening 9a, through which the engagement element 2, namely its pin 3, may fit into the receiving part 6, as explained above.

[0027] Concerning the movable slider 8, it should be noted that:

- in said backward position, the front opening 9a of the guide slit 9 is located within said guided insertion path, to allow the pin 3 of the engagement element 2 to fit into and engage the guide slit 9,
- whereas in said forward position, the front opening 9a of the guide slit 9 is ahead of the guided insertion path of the pin 3, and hence prevents the pin 3 from coming out of the guide slit 9 to hold it engaged in the guide slit 9 of the slider 8.

[0028] The receiving part 6 also comprises elastic means 10, which act upon the slider 8 to urge it toward said forward position with a predetermined preload, and stop means for releasably holding, i.e. retaining the slider 8 in said backward position against the action of the elastic means 10.

[0029] Concerning said guide slit 9, it should be noted that it comprises at least an intermediate section, i.e. in this example the first section from the front opening 9a that extends in a direction transverse, not perpendicular to said guided insertion path.

[0030] Furthermore:

- said guide slit 9 comprises an innermost section, i.e. in this example the end section of the guide slit 9 which, when the pin 3 is inserted in the guide slit 9 and the slider 8 is in said forward position, acts as an abutment wall 12 capable of counteracting displacement of the pin 3 toward the front side 7a of the receiving part 6 and
- the connection means movably connect the slider 8 to the support frame 7 to prevent displacement of the slider 8 from said forward position toward said backward position as a result of an action exerted by the pin on the abutment wall 12, having a component directed perpendicular to the front wall 7a of the support frame 7 from the abutment wall to the front wall 7a of the receiving part 6.

[0031] Preferably, as shown in Figures 6, 8, 10, 13 and 14, said abutment wall is included so that an angle of at least 90° is defined between:

- a first vector V_1 coming out of the plane of the abutment wall 12 perpendicular to the plane of said front wall in a direction oriented toward said front wall and
- a second vector V_2 whose direction is tangent to the starting section of the guided path imposed by the connection means to the slider 8 from the forward position to the backward position.

[0032] In the illustrated example, such path for guided insertion of the engagement element 2 into the receiving part 6, which is defined by the guide means 11, is a straight path, perpendicularly extending from the front side 7a of the box-like body 7 and said abutment wall is defined by an end section of the guide slit 9 extending perpendicular to said straight guided insertion path.

[0033] It should be noted that, as a result of the above described structure, as the pin 3 is inserted in the guide slit 9 and reaches its position at the front opening 9a, the displacement of the movable slider 8 from the backward position to the forward position causes the pin 3 to fit into the receiving part 6 along said guided insertion path, until the pin 3 reaches said abutment wall 12 formed by the innermost end portion of the guide slit 9.

[0034] The connection means connect the slider 7 to the support frame 7, to allow the slider 8 to translate trans-

verse to said guided insertion path. Preferably, the connection means connect the slider 8 to the support frame 7 so that the first section of the initial guided path imposed by the connection means to the slider to move from the forward position toward the backward position is tangent or at least parallel to the abutment wall 12.

[0035] In the embodiment of Figures 1 to 14, the displacement of the slider 8 from the forward position to the backward position consists in a translation parallel to the abutment wall 12.

[0036] In this example, said connection means provide at least one double pin 14 and slot 13 connection between the slider 8 and the support frame 7, the slots 13 being parallel in a direction transverse, preferably perpendicular to the guided insertion path.

[0037] In this embodiment, said stop means for releasably holding the slider 8 in said backward position against the action of the elastic means 10 comprise a lever 15 which is pivotally linked in 16 to the support frame to be able to rotate about an axis perpendicular to the plane in which the slider 8 from the backward position to the forward position, in which:

- the lever 15 is rotatably movable between an operating limit stop position (see Figure 6) in which it acts as a strut between the pin 16 and said slider (8) to keep the slider in the backward position thereby preventing it from moving forward toward the forward position and a spaced away position (see Figure 8) in which it allows the slider 8 to move to the forward position;
- elastic return means 17 acting upon the lever 15 to pull it into said operating limit stop position with a predetermined preload.

[0038] Advantageously, the displacement of the lever 15 from the operating limit stop position to the spaced away position in which it allows the slider 8 to move to the forward position, is caused by the engagement element 2 during its guided insertion into the receiving part 6.

[0039] As shown in Figures 9 and 10, the front ends of the flanges 4 and the ends 3a of the pin 3 exert a thrust on the lever 15 to push it into the spaced away position against the elastic action of the elastic return means 17.

[0040] Preferably, the elastic means 10 of the slider 8 exert a stronger elastic action than that exerted by the elastic return means 17 that act upon the lever 15.

[0041] Referring to the embodiment as shown in Figures 15 to 26, the receiving device has no lever 15 and elastic return means 17. In this embodiment, while the connection means are still of the pin 19 and slot 18 type, they allow the slider 8 to an initial displacement from the backward position toward the forward position comprising a displacement component parallel to said guided insertion path.

[0042] Preferably, in this embodiment, the initial displacement of the slider 8 from the backward position toward the forward position consists of:

- a translation of the slider 8 along said guided insertion path and/or
- a rotation of the slider 8.

[0043] In the embodiment of Figures 15 to 26, the connection means form at least one double pin 19 and slot 18 connection between the slider 8 and the support frame, wherein:

- the slots 18 extend parallel to one another and
- at least one slot 18 comprises a first initial section 18a extending parallel to the guided insertion path and a second section 18b extending parallel to the abutment wall 12. This slot 18 is engaged by a corresponding first pin 19 at the first initial section 18a when the slider 8 is in the backward position, such first section 18a of the slot 19 defining said stop means for preventing the slider to reach the forward position under the action of the spring 10. The insertion of the engagement element 2 into the receiving part causes an initial displacement of the slider 8 along the guided insertion path, allowing disengagement of the first pin 19 from the first initial section 18a extending parallel to the guided insertion path and engagement of the second section 18b extending parallel to the abutment wall 12, thereby allowing the slider 8 to move forward toward the forward position.

[0044] Preferably, both the above embodiments of the attachment device 1 include actuation means that can be reached from the outside to move said slider back into said backward position against the action of elastic means. Particularly, a tool such as the tip of a Philips screw driver may be used on said slider 8 to move the slider 8 back into the backward position against the action of elastic means 10.

[0045] Preferably, said actuation means that can be reached from the outside include:

- a tothing or rack 20 associated with the slider 8 and extending parallel to the direction of translation of the slider and
- an opening 21 for insertion of a tool (such as the tip of a Philips screw driver) capable of rotatably engaging the teeth of said tothing formed in the side wall 7b of the box-like body 7 that forms the support frame.

[0046] Preferably, such tothing 20 is closed at the back, i.e. at the side wall 7c of the box-like body 7, by a bottom wall having an increasing thickness at the portion of such tothing that is located at the opening 21 when the slider is in the backward position. Such increasing thickness profile of the bottom wall causes the insertion depth of the tool tip into the tothing to decrease as the slider 8 comes closer to the backward position, thereby preventing any sticking thereof.

[0047] Furthermore, in the embodiment of Figures 15 to 26, the tothing 21 has solid teeth at the portion of such tothing that is located at the opening 21 when the slider is in the backward position. This causes the slider to translate toward the front end 7a, so that the first pin 19 comes back to engagement of the first section 18a of the slot 18.

[0048] It shall be noted that, considering the above described structure, when the pin 2 is inserted in the guide slit 9 and has reached the above mentioned abutment wall 12, the displacement of the slider 8 from the forward position to the backward position necessarily causes the pin 3 to move back along the guide slit 9 and along the guided insertion path, which moves the engagement element 2 to full disengagement from the receiving part 6. Such behavior is caused by the presence of said guided insertion path in the receiving part 6, and by the fact that, as described above, at least one section of the guide slit 9 extends transverse to the guided insertion path.

[0049] As clearly shown in the above description, the attachment device of the present invention fulfills the above mentioned need and also obviates prior art drawbacks as set out in the introduction of this disclosure. The guided insertion of the engagement element into the receiving part causes insertion of the pin into the front opening of the guide slit and release of the slider by the stop means, as well as full insertion of the pin into the slider, which is caused by the elastic means that act upon the slider. It should be noted that, when the pin is fully inserted in the guide slit, said abutment wall prevents such pin from moving toward the front opening of the guide slit. In this respect, it will be appreciated that the force opposed by the abutment wall to movement toward the front opening of the guide slit is independent of the elastic action exerted by the elastic means that act upon the slider, as it caused by the restraint reaction that the connection means may exert upon the slider to prevent such movement.

[0050] A further advantage of the attachment device of the present invention is its simplicity and structural and functional strength.

[0051] Yet another advantage of the attachment device of the present invention shall be recognized in the feature of automatic disengagement of the engagement element 2 from the receiving part 6 in response to an action of the tip of a tool on the engagement device, namely the movable slider of the receiving part.

[0052] Those skilled in the art will obviously appreciate that a number of changes and variants may be made to the attachment device as described hereinbefore, without departure from the scope of the invention, as defined in the following claims.

Claims

1. Attachment device for attaching a panel to a furnishing element, particularly for attaching a front panel

to the body of a drawer, comprising an engagement element intended to be fixed to a first element, selected from the front panel and the body of the furnishing element, and a corresponding receiving part (6) comprising a frame for attaching to the other element selected from the front panel and the body of the furnishing element, said engagement element being able to be inserted at the front and in a guided manner in said receiving part (6), from a front side (7a) of said receiving part (6) along a predetermined guided insertion path, to be held here in an engagement condition in which:

- said receiving part (6) comprises a mobile slider (8) supported by said support frame (7);
- said mobile slider (8) comprises a guide slot (9) that extends inside said slider (8) from a front opening (9a) through which said engagement element (2,3,4) inserts to reach a position inside said slider (8) with respect to said front wall to be constrained to said receiving part (6) ;
- at least one first section of said guide slot (9) extends in a transversal direction to said guided insertion path;
- said slider (8) is constrained to said support frame (7) through fixed connection means (13,14;18,19) which allow said slider (8) to move between a back position in which said slider is positioned so as to guide said engagement element in said guide slot through said front opening (9a), and an advanced position, in which said slider is positioned with respect to said guided insertion path so as to keep said engagement element (2,3,4) constrained in said guide slot (9) of said slider (8);
- said receiving part (6) comprises elastic means acting upon said slider (8) to push said slider (8) towards said advanced position with a predetermined preload and
- said receiving part (6) comprises stop means for releasably holding said slider (8) in said back position in contrast to the action of said elastic means, **characterised in that** when said engagement element (2,3,4) is inserted in said guide slot (9) and said slider (8) is in said advanced position:
- said engagement element (2,3,4) is positioned at a second section of said guide slot (9) of said slider (8) that defines an abutment wall (12) that counteracts a movement of said engagement element (2,3,4) towards said front side of said receiving part (6) and
- said fixed connection means (13,14;18,19) constrain said slider (8) to said support frame (7) so as to counteract a movement of said slider (8) from said advanced position towards said back position as a consequence of an action exerted by said engagement element (2,3,4) on

said abutment wall (12) directed perpendicularly to said front wall (7a) in a direction oriented from said abutment wall (12) towards said front wall of said receiving part (6).

2. Device according to claim 1, wherein:

- when said slider is in said back position the front opening (9a) of said guide slot is positioned along said insertion path to allow said engagement element (2,3,4) to insert into said slider (8), and
- when said slider is in said advanced position the front opening (9a) of said guide slot (9) goes ahead of said insertion path.

3. Device according to claim 1 or 2, wherein said abutment wall (12) is inclined so that an angle of at least 90° is defined between:

- a first vector (V_1) coming out from the plane of said abutment wall (12) perpendicularly to the plane of said front wall in a direction oriented towards said front wall and
- a second vector (V_2) in a direction tangent to the guided initial path set by said fixed connection means (13,14;18,19) to said slider (8) in passing from said advanced position towards said back position.

4. Device according to claim 1, 2 or 3, wherein, when said engagement element (2,3,4) is inserted in said guide slot (9) so as to be positioned at said front opening (9a), the passage of the mobile slider (8) from the back position to the advanced position determines the insertion of said engagement element (2,3,4) in said receiving part (6) along said guided insertion path until the engagement element (2,3,4) positions itself at said abutment wall (12) of the slider (8).

5. Device according to any one of claims 1 to 4, wherein said fixed connection means (13,14;18,19) fixedly connect said slider (8) to said support frame (7) so that a first section of the guided initial path set by said fixed connection means (13,14;18,19) to said slider (8) in passing from said advanced position towards said back position is parallel or tangent to said abutment wall (12).

6. Device according to any one of claims 1 to 5, wherein said fixed connection means (13,14;18,19) allow said slider (8) to translate in a direction transversal to said guided insertion path.

7. Device according to claim 6, wherein the movement of said slider (8) from said advanced position towards said back position consists of a translation parallel

to said abutment wall (12) of said slider (8).

8. Device according to claim 6 or 7, wherein said fixed connection means (13,14;18,19) make at least one pin-slot double fastening (18,19) between said slider (8) and said support frame (7), the slots (18) being parallel to one another along a direction transversal to said guided insertion path.

9. Device according to any one of claims 1 to 8, wherein stop means for releasably holding said slider (8) in said back position comprise a lever (15) pivoted at said support frame (7) so as to be able to rotate around an axis (16) perpendicular to the plane in which said slider (8) moves to go from the back position to the advanced position, in which:

- said lever (15) is mobile between an operative end stop position in which it acts as a stay between its own pin (16) and said slider (8) to keep said slider (8) in said back position preventing it from moving forward toward said advanced position and a distanced position in which it allows said slider (8) to go into said advanced position;
- said stop means comprise elastic return means (17) acting upon said lever (15) pivoted to draw it back into said operative end stop position with a predetermined preload;
- the passage of said lever (15) from said operative end stop position to said distanced position is determined by said engagement element (2,3,4) that during the guided insertion into said receiving part (6) acts upon said lever (15) to push it into said distanced position in contrast to the elastic action exerted on it by the elastic return means (17).

10. Device according to claim 9, wherein said fixed connection means (13,14;18,19) allow said slider (8) to make an initial movement from said back position towards said advanced position comprising a movement components parallel to said guided insertion path.

11. Device according to claim 10, wherein said initial movement from said back position towards said advanced position consists:

- of a translation of said slider (8) along said guided insertion path and/or
- of a rotation of said slider (8).

12. Device according to claim 10 or 11, wherein said fixed connection means (13,14;18,19) make at least one pin-slot double fastening (18,19) between said slider (8) and said support frame (7), wherein:

- the slots (18) extend parallel to one another and

- at least one slot comprises a first initial section (18a) extending parallel to said guided insertion path and engaged by the corresponding first pin (19) when said slider (8) is in said back position, said first section (18a) of the slot defining the aforementioned stop means,

- an insertion of said engagement element (2,3,4) in said receiving part (6) determines an initial movement of said slider (8) parallel to said guided insertion path until said first pin (19) is brought to engage the portion (18b) of said first slot (18) extending transversally to said guided insertion path.

13. Device according to any one of claims 1 to 12, wherein said predetermined guided insertion path in said receiving part (6) is defined by guide means (11) formed in said support frame (7) with which said engagement element (2,3,4) engages to be guided.

14. Device according to claim 13, wherein said guide means extend from the front side (7a) of said receiving part (6) according to a direction perpendicular to said front side (7a).

15. Device according to any one of claims 1 to 14, wherein said receiving part (6) comprises actuation means (20,21) able to be reached from the outside to take said slider (8) back into said back position in contrast to the action of elastic means.

16. Device according to claim 15, wherein said actuation means able to be reached from the outside comprise:

- a toothing (20) extending parallel to said direction of translation of said slider (8) and
- an insertion opening (21) for a tool able to engage the teeth of said toothing in rotation.

17. Device according to any one of claims 1 to 15, wherein when said engagement element (2,3,4) is inserted in said guide slot (9) and said slider (8) is in said advanced position, the passage of said slider (8) from the advanced position to the back position necessarily determines a withdrawal of said engagement element (3) along said guide slot (9) and along said guided insertion path until the disengagement of said engagement element from said receiving part (6) occurs.

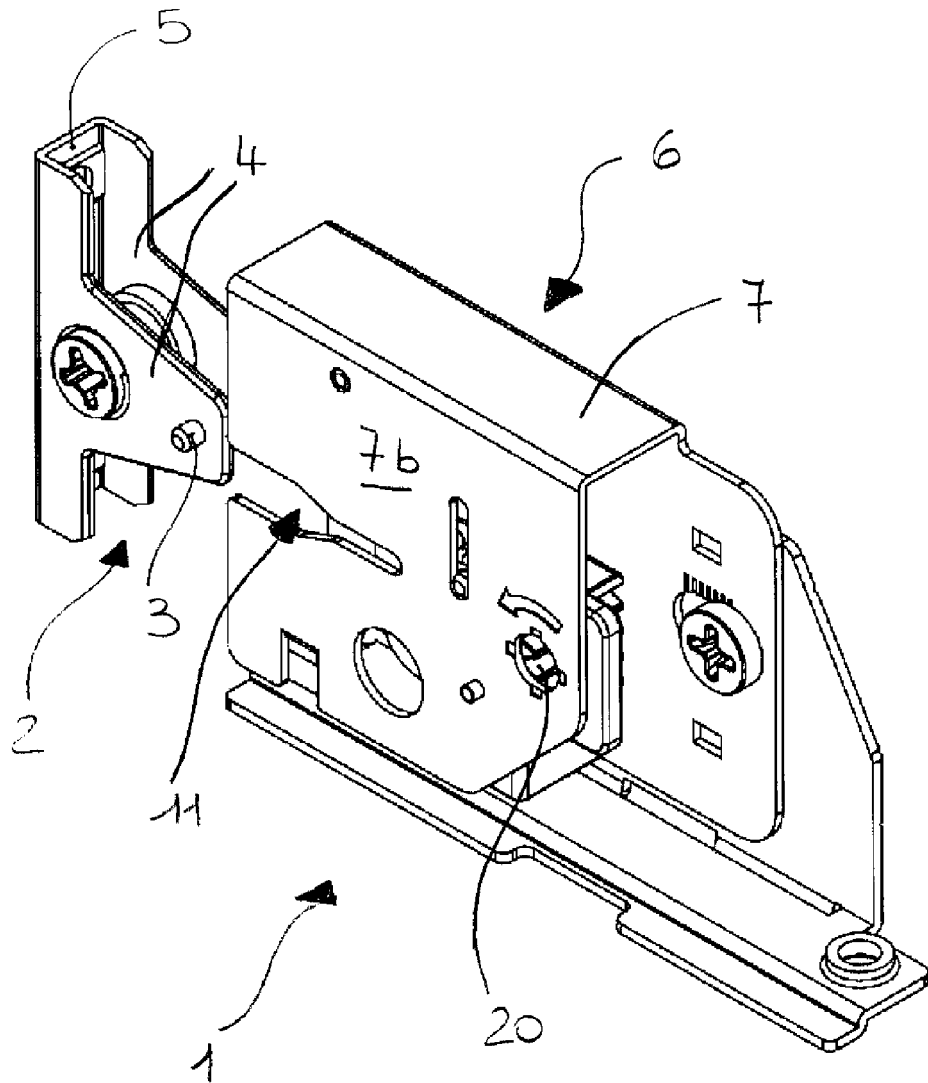


Fig. 1

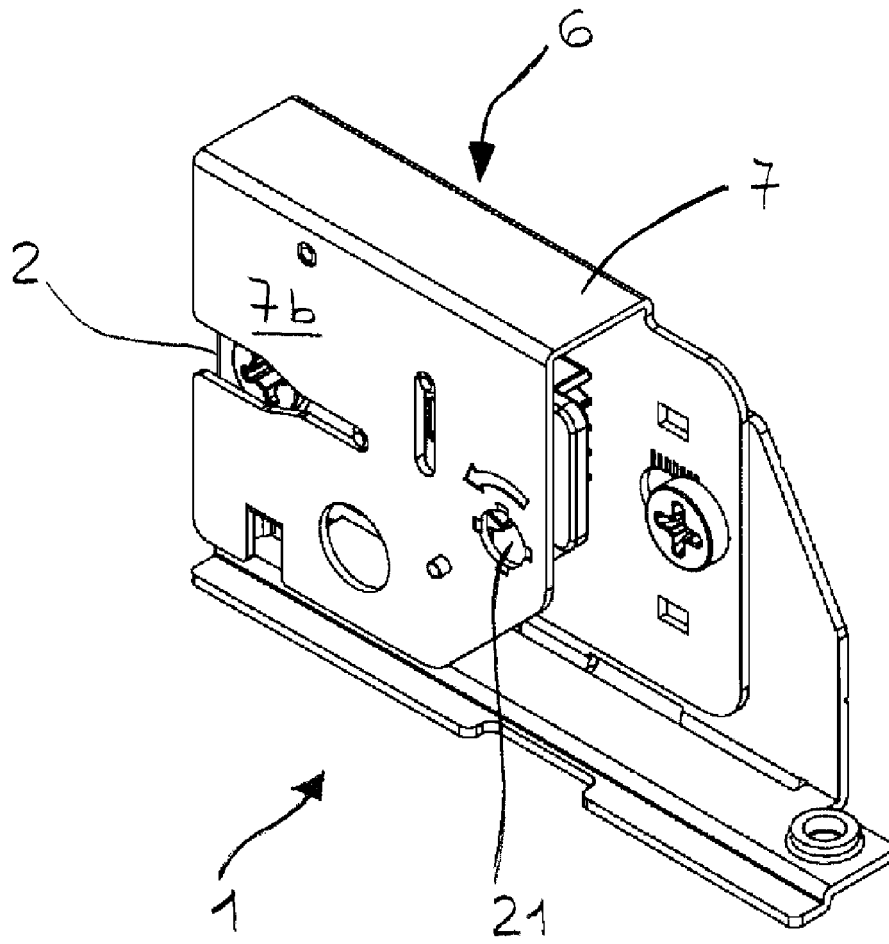


Fig. 2

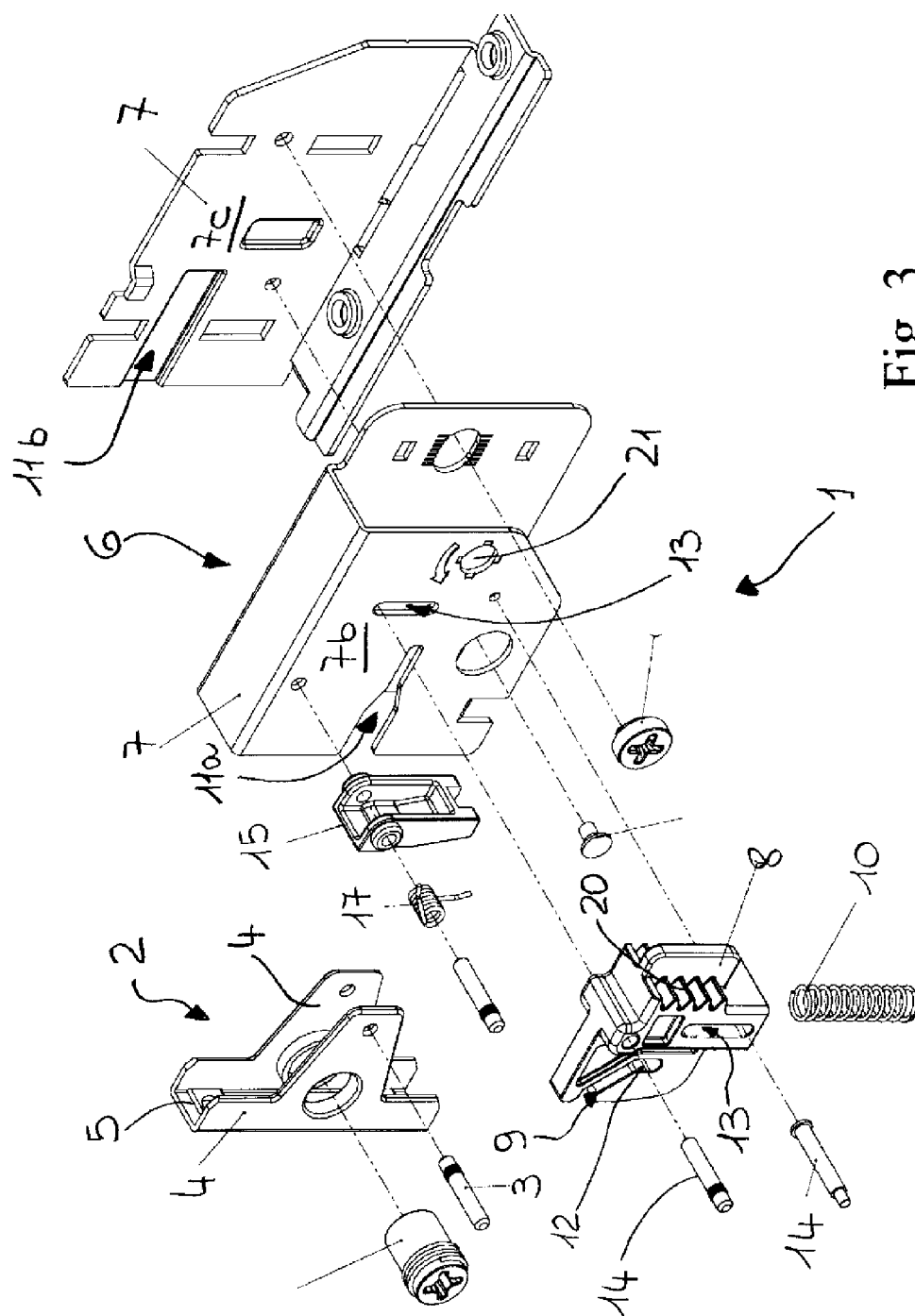


Fig. 3

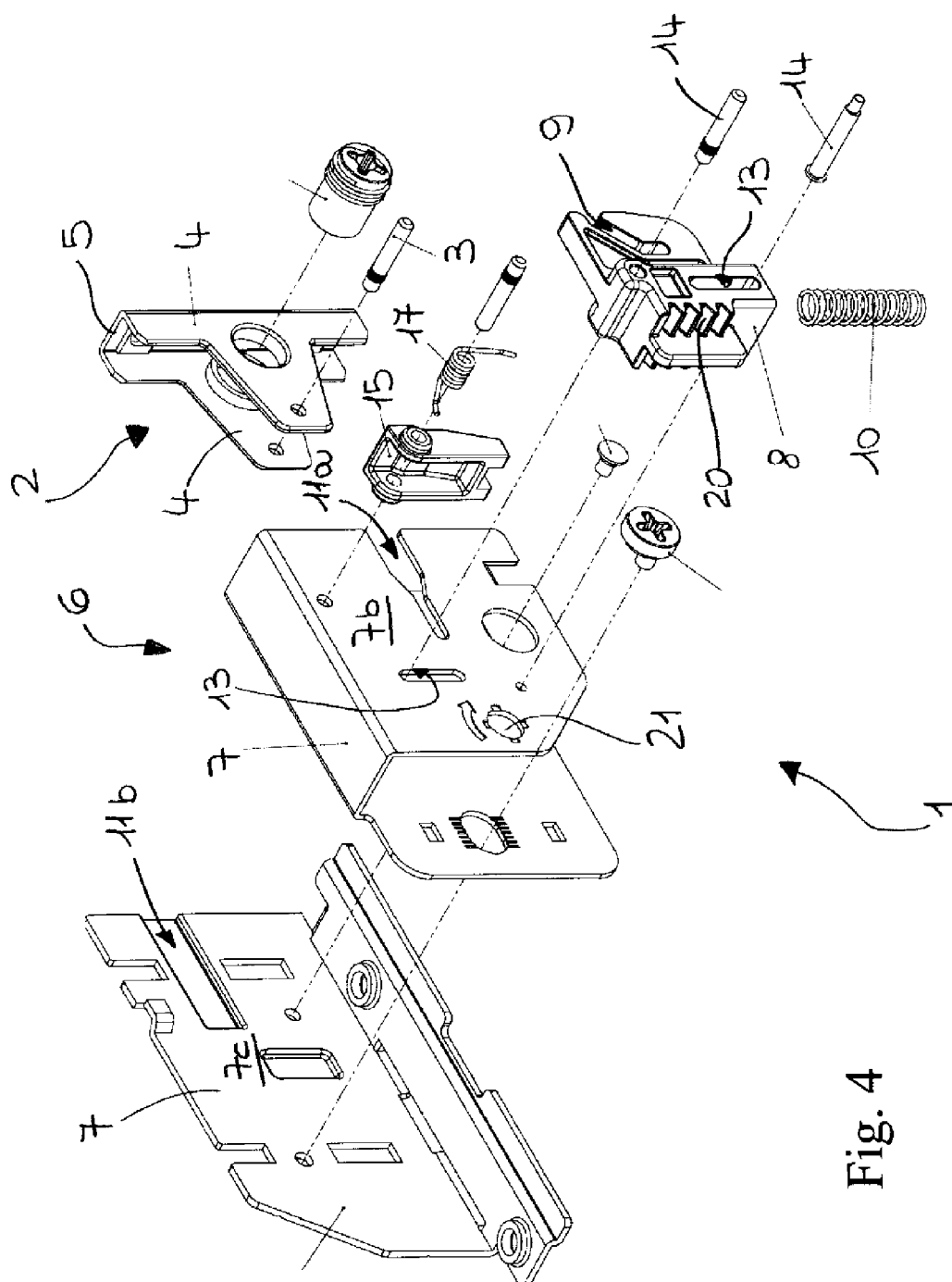
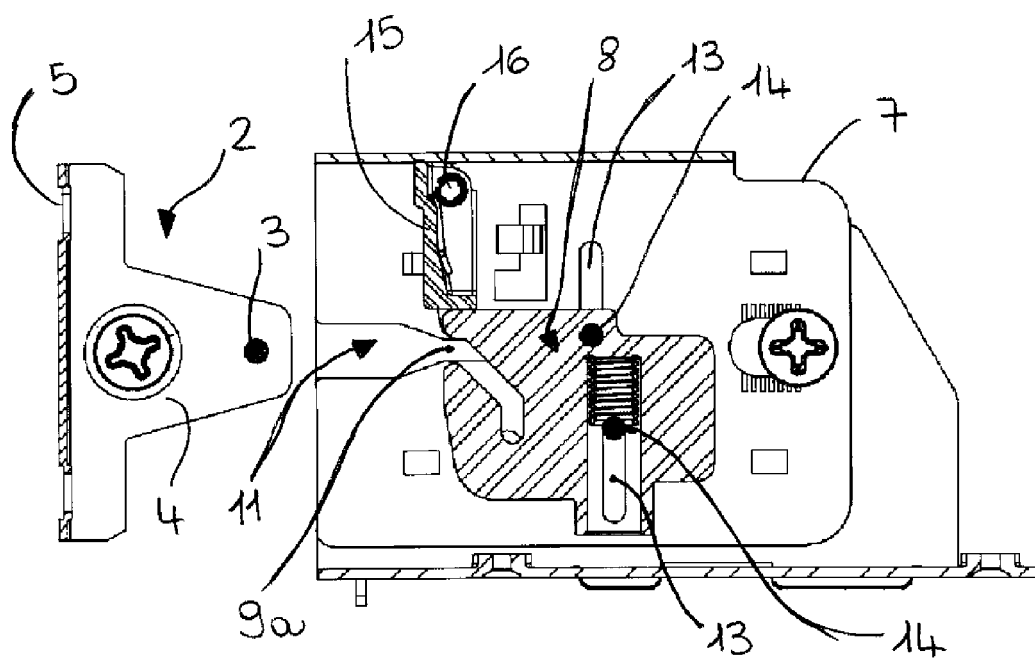
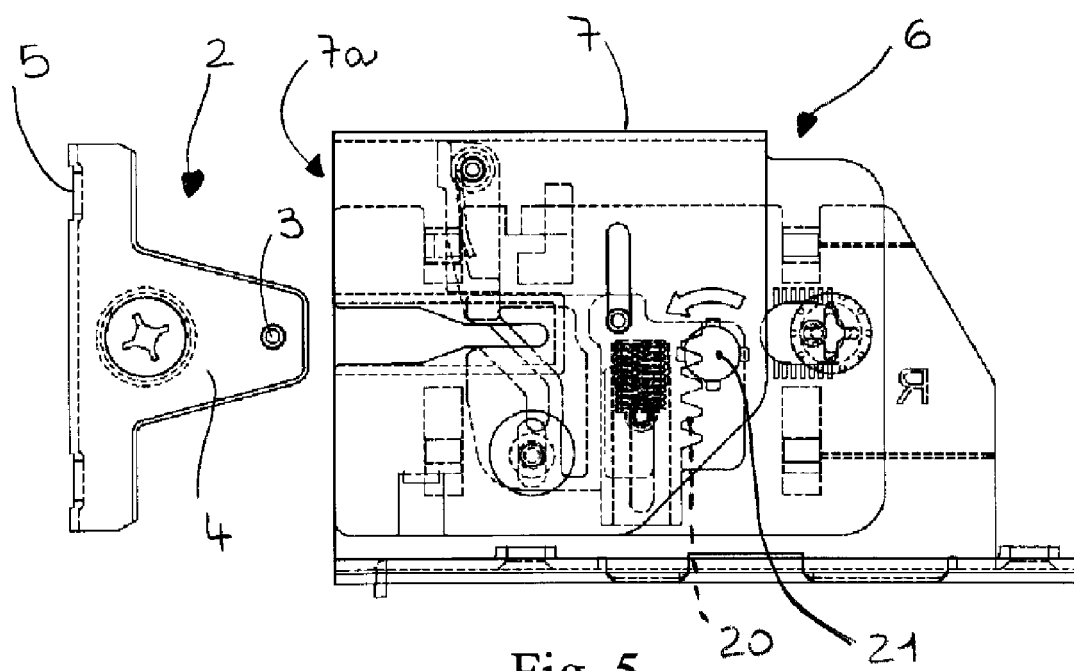


Fig. 4



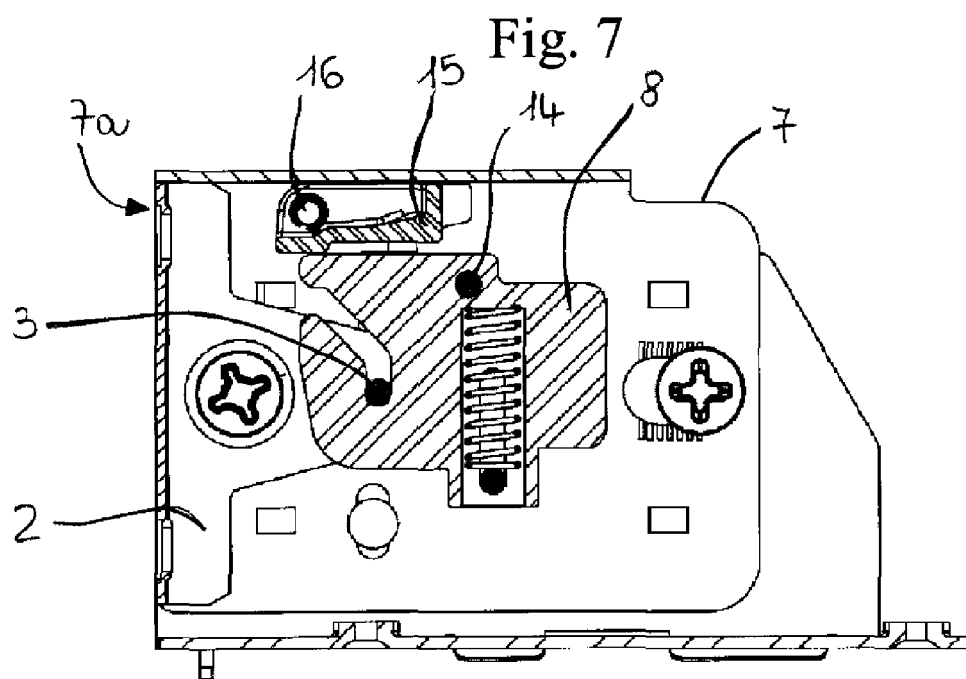
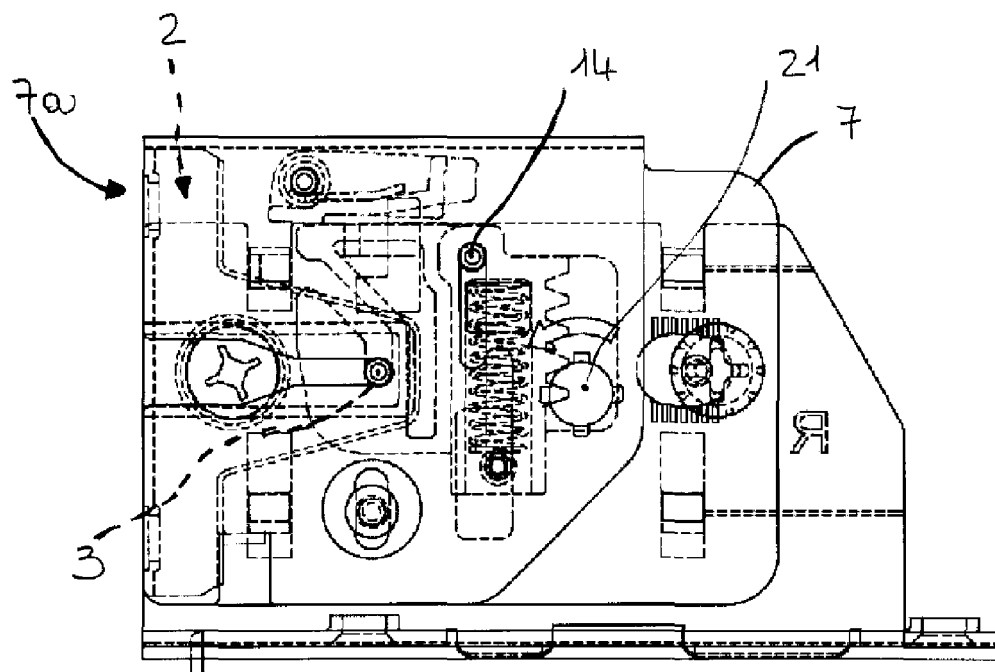


Fig. 8

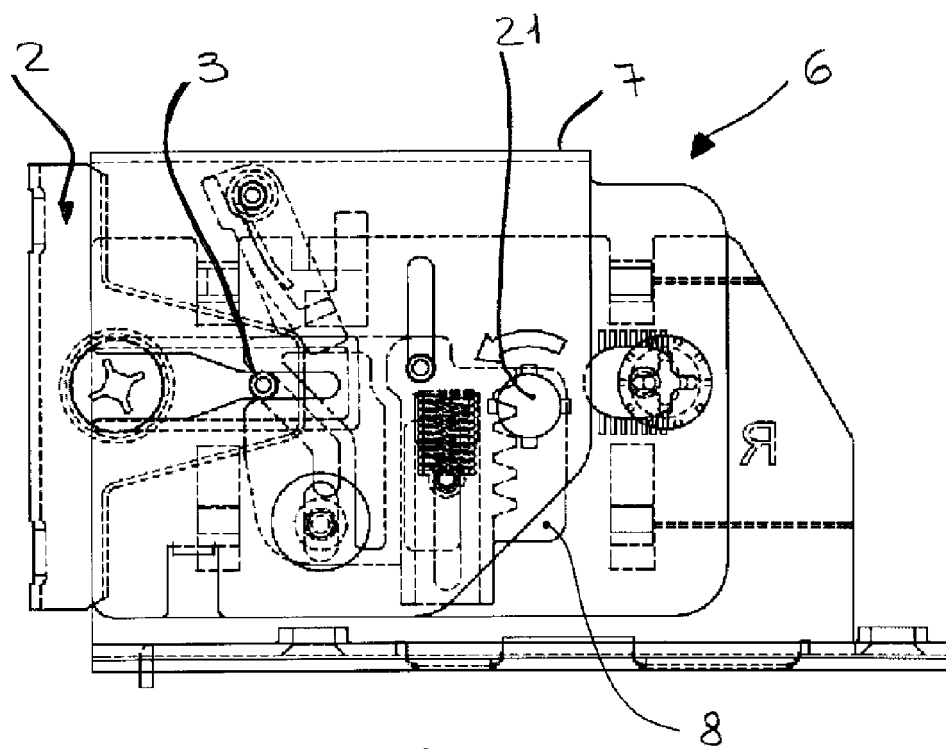


Fig. 9

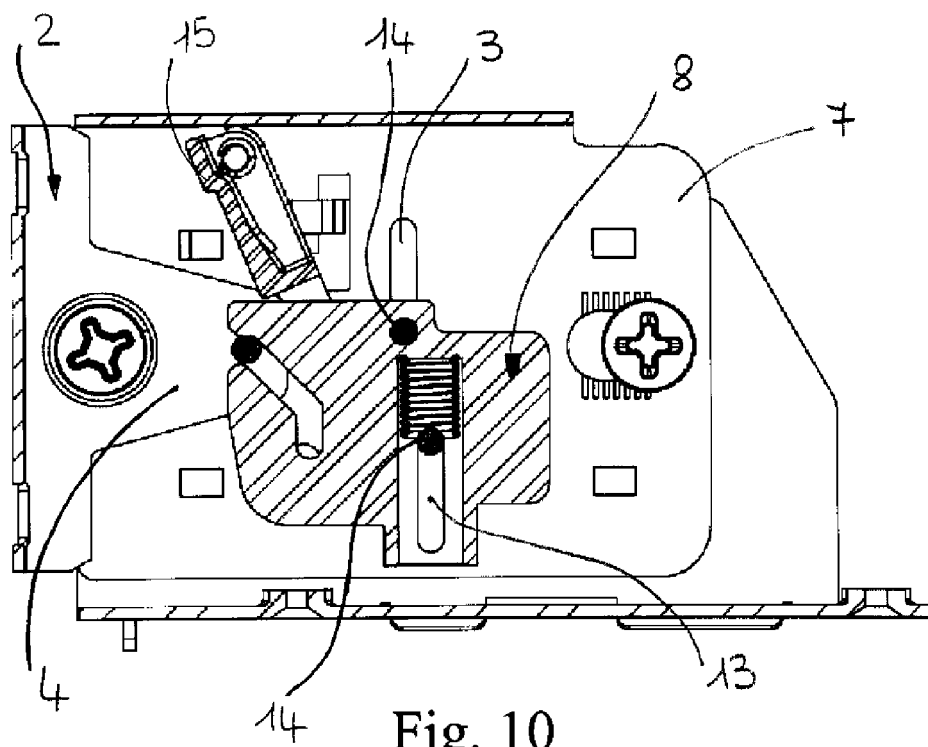


Fig. 10

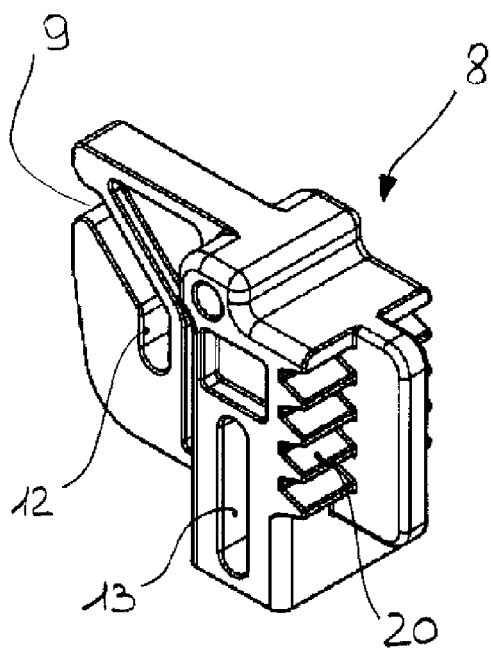


Fig. 11

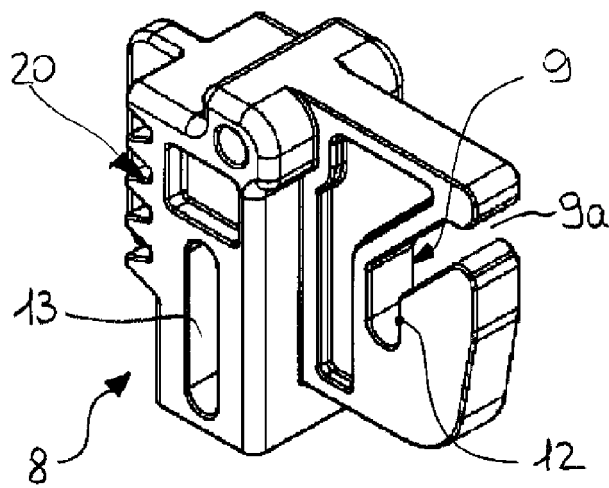


Fig. 12

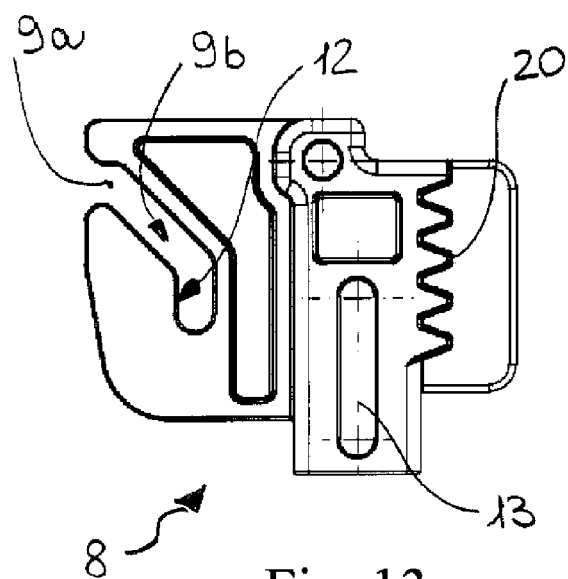


Fig. 13

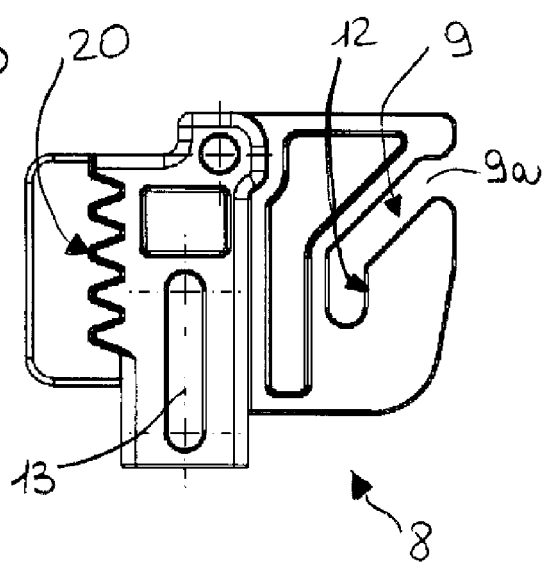


Fig. 14

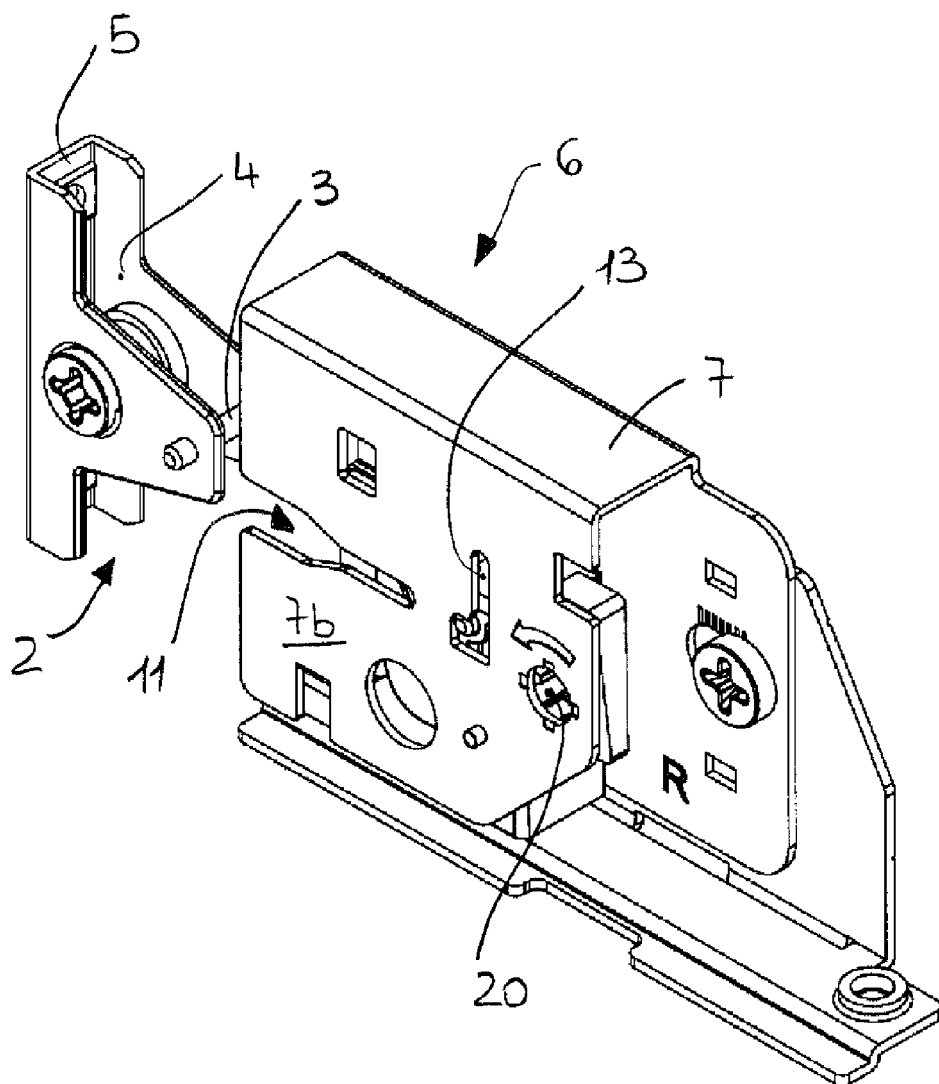


Fig. 15

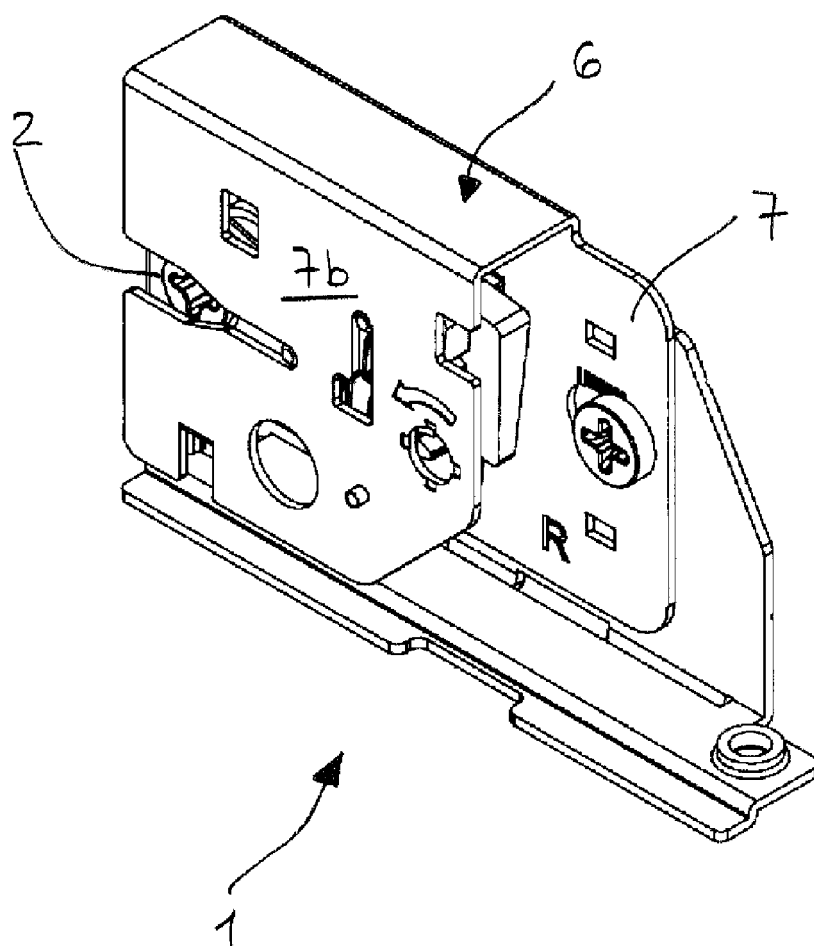


Fig. 16

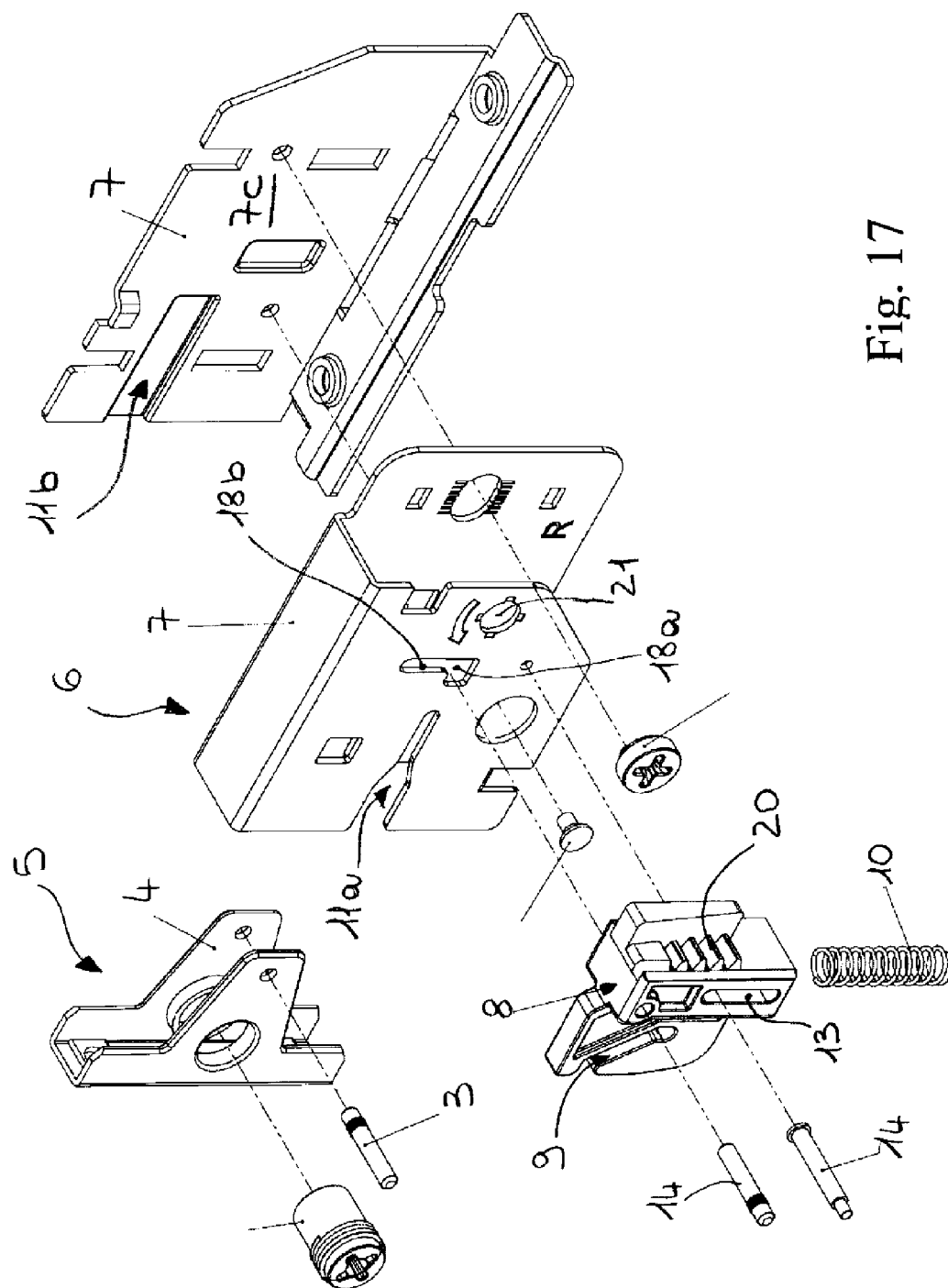


Fig. 17

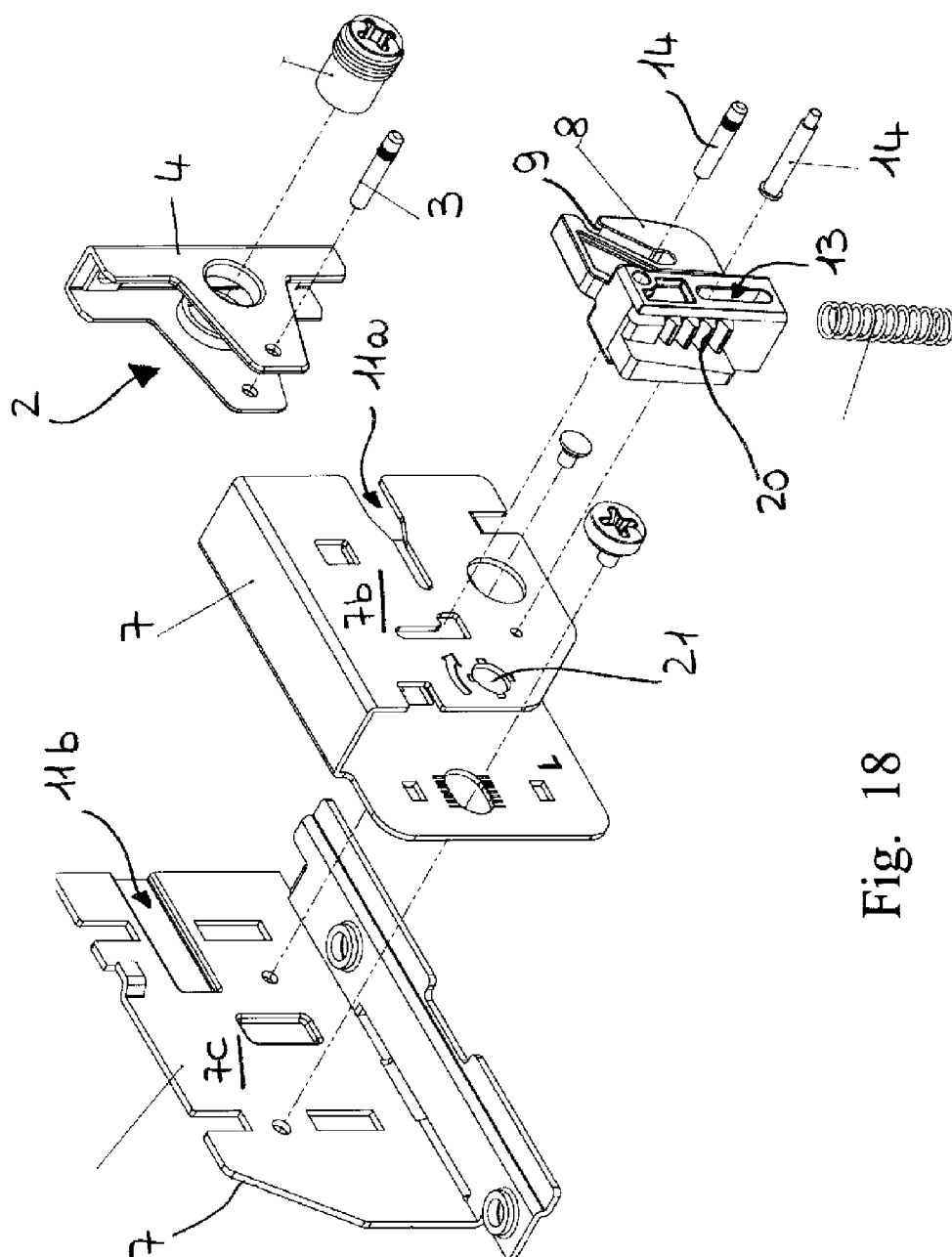
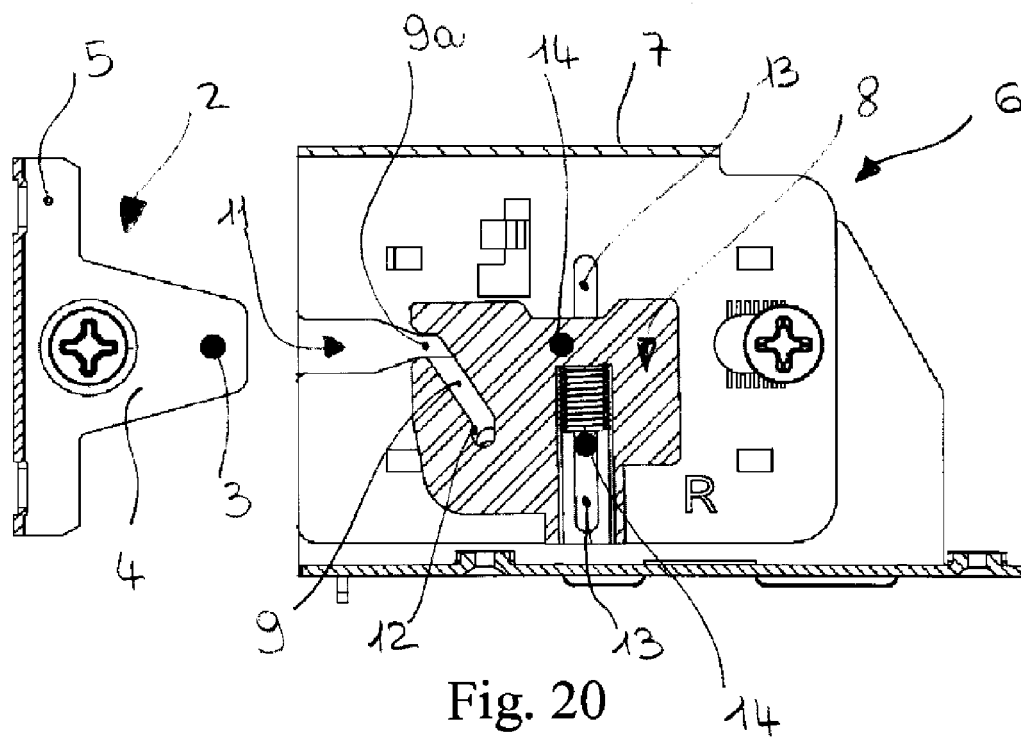
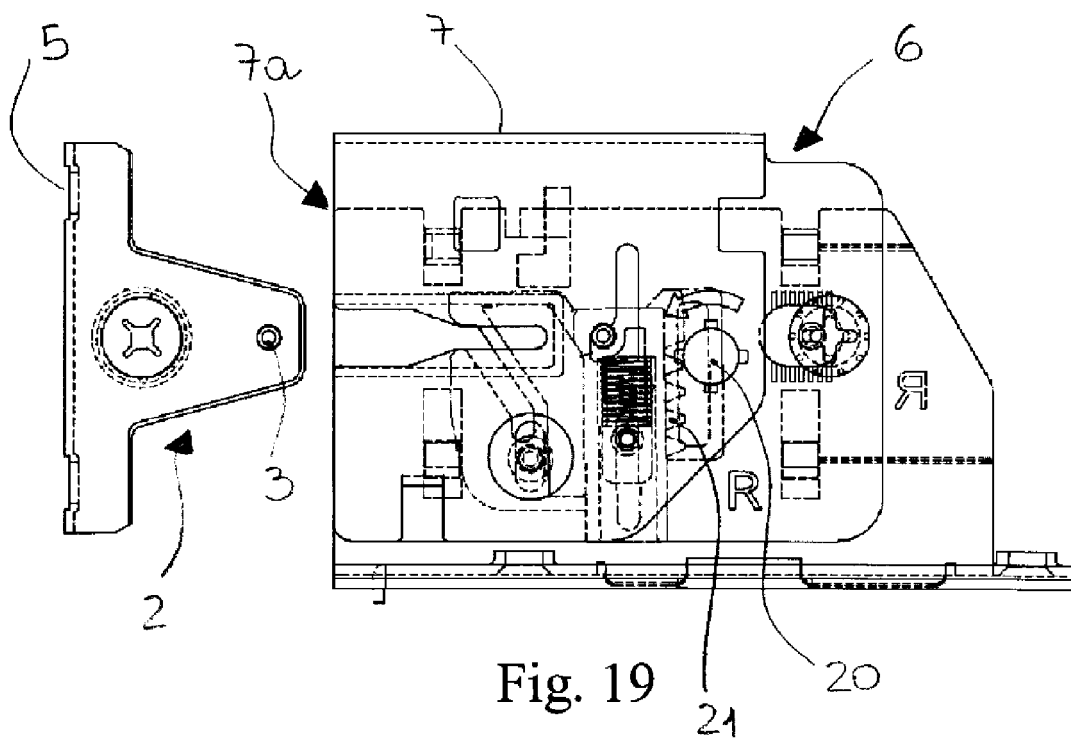


Fig. 18



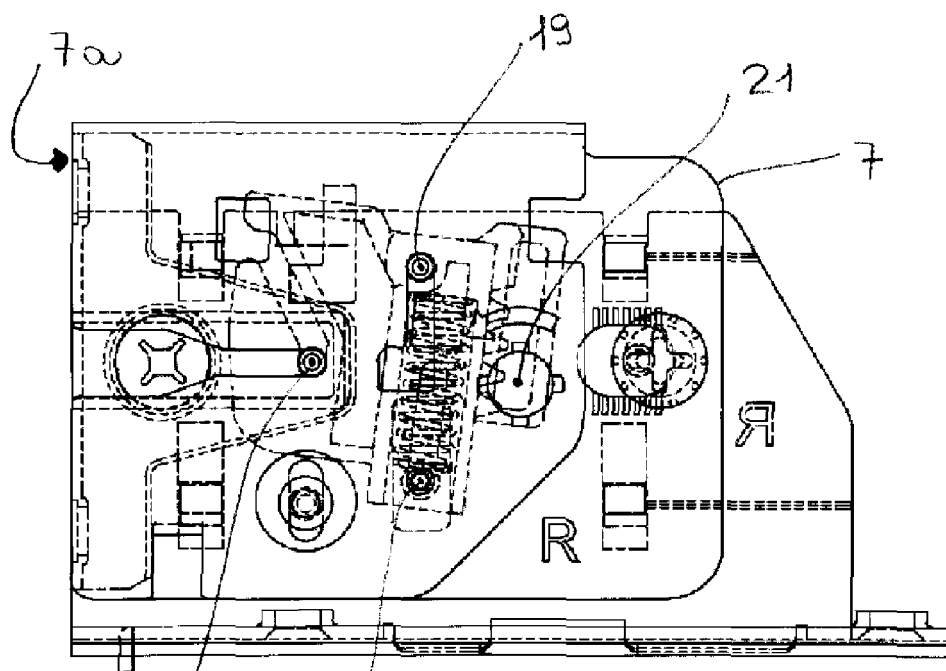


Fig. 21

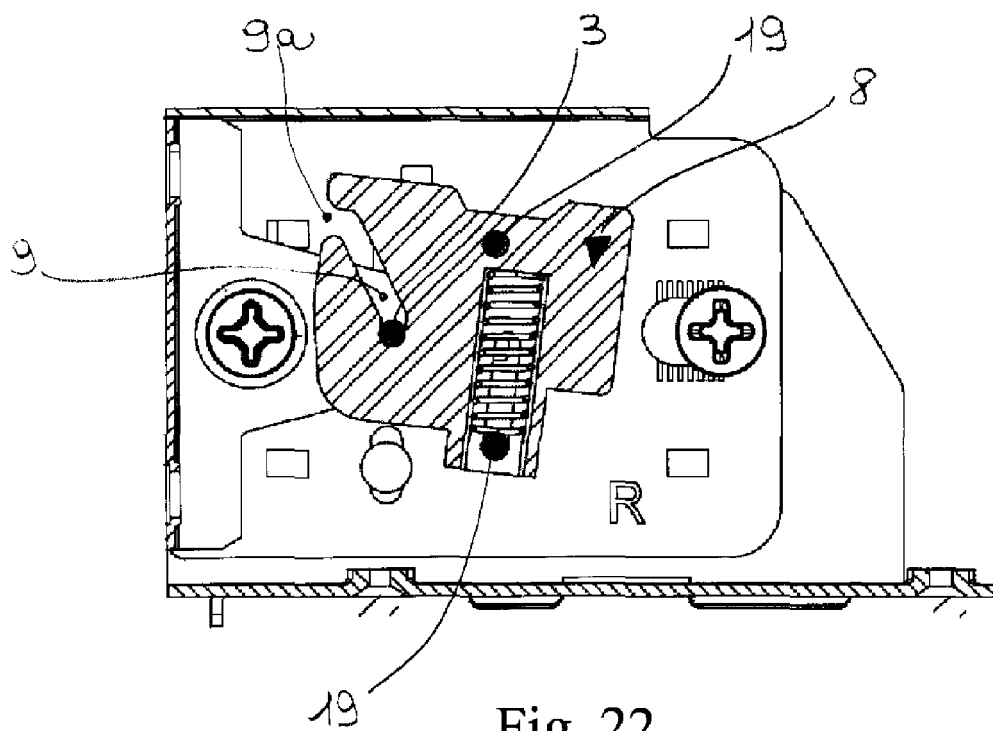


Fig. 22

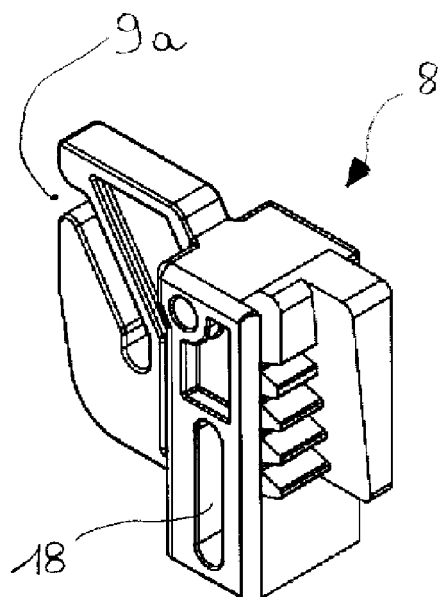


Fig. 23

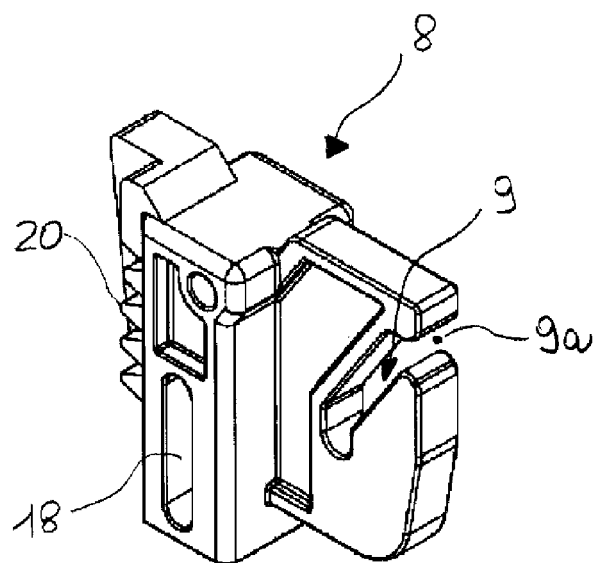


Fig. 24

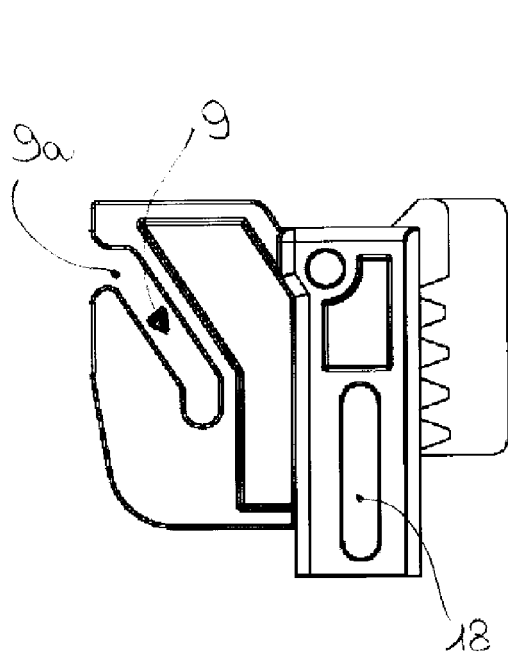


Fig. 25

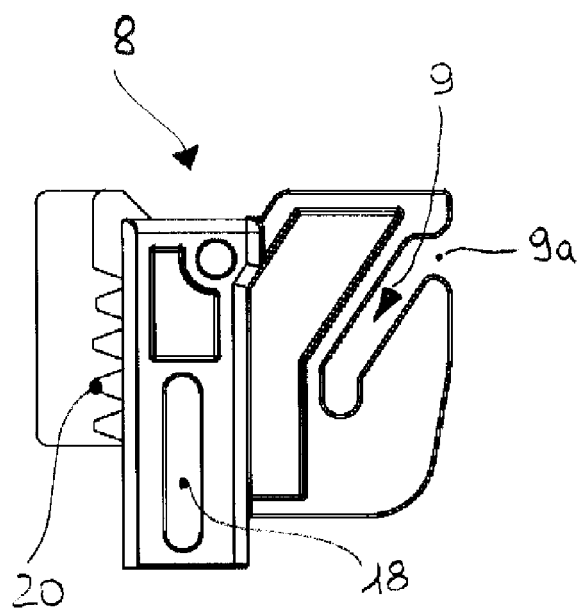


Fig. 26



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 9925

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2009/059652 A2 (LAUTENSCHLAEGER HORST [DE]) 14 May 2009 (2009-05-14) * abstract; figures 1,3,4 *	1	INV. A47B88/00
A	WO 2009/006651 A2 (BLUM GMBH JULIUS [AT]; HAEMMERLE JUERGEN [AT]) 15 January 2009 (2009-01-15) * abstract; figures 3-6,9-11 *	1	
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			TECHNICAL FIELDS SEARCHED (IPC)
			A47B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 August 2011	Examiner Alff, Robert
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The members are as contained in the European Patent Office EDP file on
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