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(54) Mounting device

(57) A bracket for mounting a radiator on a wall is designed so as to prevent unintentional lifting off of the bracket and has a rail (1) with a lower anchorage and an upper anchorage (4) for engagement with the radiator. The upper anchorage (4) is slidable along the rail (1) and is biased downwards by the intermediary of a spring (6). The upper anchorage (4) has a locking member which is partly disposed in a recess interiorly in the upper anchorage (4). In a locking position, the locking member, by engagement with the rail (1) prevents an upwardly directed movement of the upper anchorage and accompanies it in a downwardly directed movement by force of gravity. The locking member has gripping portions (18) on the outside of the upper anchorage (4) for manual release of the locking member.

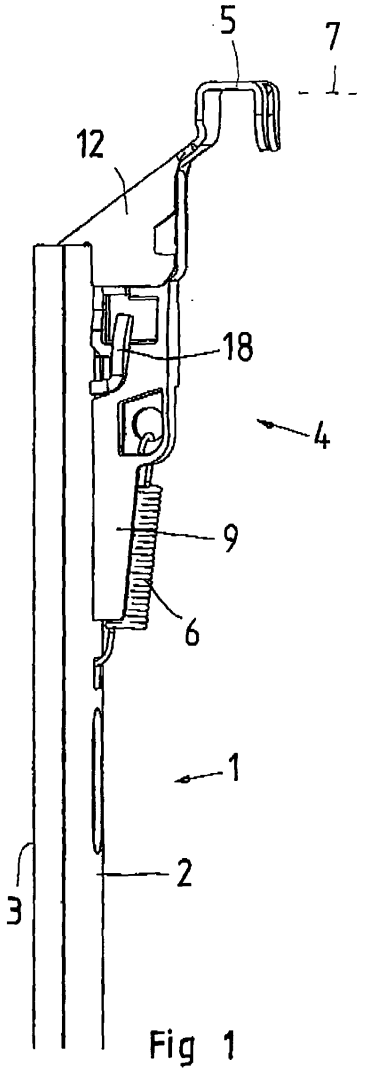

Fig 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a mounting device for the lift-safe mounting of a radiator and comprises: an elongate rail designed for fixing on a wall, a first or lower bracket device on the rail for cooperation with a first part of the radiator or a first engagement member disposed thereon, a second or upper bracket device on the rail, the second bracket device having a retainer member for cooperation with a second part of the radiator or a second engagement member disposed thereon, and the second bracket device being movable along the rail towards and away from the first and being biased by means of a spring towards the first bracket device for retaining the radiator, and a locking member for preventing movement of the second bracket device away from the first against the action of the spring.

BACKGROUND ART

[0002] Devices of this type are previously known in the art through each one of EP 0 950 864 and EP 0 982 549.

[0003] EP 0 950 864 discloses a device for suspension and mounting of a radiator on a wall. The device has an elongate rail with a lower anchorage in the lower end and an upper anchorage in the upper end. The lower anchorage is fixed, while the upper anchorage is slidable in the longitudinal direction of the rail towards and away from the lower anchorage. The upper anchorage is spring biased in a downward direction towards the lower anchorage.

[0004] The upper anchorage has a locking element which cooperates with the rail and which is accommodated in an opening in the upper anchorage. In its end facing away from the rail, the locking element has a downwardly directed catch which is intended for engagement with the radiator. Under the action of the spring tension, the upper anchorage is drawn downwards and, below it, downwardly directed movement is prevented by the outer, catch-shaped portion of the locking element from moving downwards because of the engagement with the radiator, so that the locking element is pivoted. In such instance, the locking element, as a result of its engagement with the rail, will be clamped in place by a function that may be likened to a "jammed drawer effect".

[0005] The embodiments according to Figs. 1 to 9 in the above-mentioned publication function satisfactorily, since the downwardly directed catch of the locking element that engages with the radiator is located at approximately the same height level as that portion of the locking element which engages with the rail.

[0006] The above disclosures imply that if an attempt is made to lift the radiator upwards, the locking element will, because of the upwardly directed force, be brought into an increasingly harder engagement with the rail. If, on the other hand, an attempt is made to pull the upper edge of the radiator at right angles out from the wall on which the rail is mounted, the engagement between the locking element and the rail does not cease. In the above-mentioned embodiments, the described construction affords a satisfactory protection against unintentional lifting off of the radiator from its anchorages.

[0007] In the embodiment according to Fig. 10, the locking element has, in its end facing away from the rail, an upwardly directed portion which engages with an upper edge part on the radiator. Here, the point of engagement of the locking element with the radiator lies at a considerably higher vertical level than the engagement of the locking element with the rail. In an attempt to pull the upper edge of the radiator straight out from the wall behind, the locking element will show a tendency to be pivoted in such a manner that the portion of the locking element engaging with the rail strives to lift itself. Such a tendency to lift the portion of the locking element engaging with the rail entails that the engagement comes loose.

[0008] The construction according to EP 0 982 549 is fully analogous with that disclosed in the above-mentioned document with reference to Fig. 10. Consequently, the problems inherent in the construction according to EP 0 982 549 are the same as those outlined above.

[0009] The problems involved in the above-considered constructions might possibly be alleviated by an increase of the spring biasing which acts on the anchorage devices. However, this is not a satisfactory solution, on the one hand because the stiffer spring is more expensive and, on the other hand, because on mounting of a radiator the upper anchorage must be manually lifted against the action of the spring.

PROBLEM STRUCTURE

[0010] The present invention has for its object to design the mounting device intimated by way of introduction such that the drawbacks inherent in the prior art technology are obviated. In particular, the present invention has for its object to design the mounting device so that it reliably prevents unintentional lifting off of the radiator despite the fact that the engagement point between the bracket device and the radiator lies at a distance above the upper end of the rail. The present invention further has for its object to realise a mounting device where the force of the spring which draws the bracket device downwards can be greatly reduced without jeopardising the overall superior function. Further, the present invention has for its object to design the mounting device such that it may be produced at low cost and that it will afford a fully satisfactory function.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

[0011] The present invention will now be described in greater detail hereinbelow, with reference to the accompanying Drawings. In the accompanying Drawings:

Fig. 1 is a perspective view of an upper end part of a mounting device according to the invention, where a bracket device included in the mounting device is located in a lowered position;

Fig. 2 is a view corresponding to that of Fig. 1 of the mounting device with the bracket device in a raised position;

Fig. 3 a is a view corresponding to that of Fig. 1;

Fig. 3b is a view corresponding to that of Fig. 3a on a larger scale and with certain obscuring parts having been cut away for purposes of clarity;

Fig. 3c is a detailed magnification of the view according to Fig. 3b;

Fig. 4 is a perspective view of a sliding body included in the bracket device;

Fig. 5 shows the sliding body according to Fig. 4 seen from the opposite direction compared with that Figure; and

Fig. 6 shows a locking member which, according to the present invention, is employed to lock the bracket device against lifting in relation to the rail.

DESCRIPTION OF PREFERRED EMBODIMENT

[0012] In the detailed description of the device according to the present invention given below, directional and positional disclosures will be used. These refer to a situation where the device according to the invention is employed in a normal manner, i.e. to a situation where a rail included in the device according to the present invention is mounted on a substrate, preferably a wall included in a building, with the longitudinal direction of the rail being vertical.

[0013] Further, use will be made of expressions such as front/outer in the sense of being turned away from or out from the wall, while the expressions rear/inner signify turned to face in towards the wall.

[0014] In Fig. 1, reference numeral 1 relates to a rail which, in the Figure, is mounted with its longitudinal direction vertical in relation to a wall (not shown on the Drawing). The rail 1 has a front or outer defining wall 2 and a rear side 3 which is intended to abut against the wall (not shown). The rail 1 may be fixed to the wall for example by means of screws which extend through suitable openings in the rail and into the wall.

[0015] In its lower end, the rail 1 has a first or lower bracket device which is intended to cooperate with a first or lower part of a radiator (not shown) or a first engagement member provided on the radiator.

[0016] In an upper end region, the rail 1 has a second or upper bracket device 4 which is secured in the rail 1 in such a manner that it is slidable in the longitudinal direction of the rail towards and away from the lower bracket device. The upper bracket device is provided, in its upper end, with an upper or second retainer member 5 which is intended for cooperation with the second or upper part of the radiator (not shown) or a second engagement member disposed thereon.

[0017] An engagement member (both the upper and the lower) relates in this context for example to edge portions on a radiator with which the retainer members can engage. The engagement members in this sense however also include anchorages disposed on the radiator for cooperation with the device according to the present invention, convector plates disposed on the radiator, protective covers disposed on the radiator, etc. Hence, the term "engagement member" should be taken to signify all such portions, extra parts or accessories on the radiator which may serve for securing the radiator in the device according to the present invention.

[0018] As was mentioned above, the bracket device 4 is slidable in the vertical direction along the rail 1. Further, it is biased by means of a spring 6 in a downward direction, i.e. in a direction towards the lower bracket device. In the bracket device 4, there is nothing to prevent a downward movement, while on the other hand the reverse does not apply.

[0019] In Fig. 1, the bracket device 4 is shown in a position drawn downwards by the spring 6, and the broken line 7 indicates the height position of an engagement member disposed on the radiator. It will be readily perceived that, if the engagement member is located interiorly in the downwardly open, U-shaped retainer member 5, the upper region of the radiator will be urged downwards by the spring 6 at the same time as it is prevented in its movement towards and away from the wall (not shown), i.e. movement in the longitudinal direction of the broken line 7.

[0020] In Fig. 2, the bracket device 4 is shown in a raised position. In this Figure, the broken line 7, i.e. an upper defining surface for the upper engagement member on the radiator, is located at the same height level as in Fig. 1, since the radiator rests on the lower bracket device of the subject matter of the present invention. With this raised position of the bracket device 4, it is possible, with the radiator resting in a lower bracket device, to pivot the upper part of the radiator, with the upper engagement member in the longitudinal direction of the broken line, in a direction in towards the wall (not shown), i.e. in a direction to the left in Fig. 2. When the upper part of the radiator is pivoted to a position straight under the downwardly open, U-shaped retainer member 5, the bracket device 4 may be released downwards and pulled in the same direction under the action of the spring 6 so that the retainer member 5 comes into engagement with the upper engagement member of the radiator. In this position, the spring 6 will bias the retainer member 5 in a downward direction towards the engagement member.

[0021] According to the present invention, the spring 6 is weaker than that which is normally employed in prior art constructions. This implies that the spring alone does not afford sufficient protection against unintentional lifting off of a radiator from the device according to the invention. For this reason, the bracket device 4 has a locking member 8, see Figs. 3b, 3c and 6. In the locked state, the locking member realises the positionally fixing interconnection between the upper bracket device 4 and the rail 1 so that the bracket device cannot move upwards, i.e. away from the lower bracket device at the lower end of the rail 1. On the other band, the locking member 8 does not prevent movement in the opposite direction in the locked state. This implies that the spring 6 will always ensure that the retainer member 5 lies abutted against the radiator or its engagement member.

[0022] It will be apparent from the Figures that the bracket device 4 includes a sliding body 9 which is shown in perspective in Figs. 4 and 5. The sliding body 9 has grooves 10 along opposing sides. The front wall 2 of the rail 1 has, in its upper end region, a longitudinal slot 11 (Fig. 2), which is defined laterally by opposing edge portions of the front wall 2. These opposing edge portions on either side of the slot 11 are accommodated in grooves 10 on the sliding body 9. Hereby, the sliding body 9 is slidable in the longitudinal direction of the groove and, under the action of the spring 6, is drawn in a downward direction towards the lower bracket device of the rail. The sliding body 9 is further provided with a connection portion 12 which, in its upper/outer end, supports the retainer member 5. The connection portion 12 is rigidly secured in the sliding body 9, for which reason the retainer member 5 and the sliding body are movable together as a rigid unit.

[0023] As is apparent from Fig. 3b and 5, the sliding body has a recess 13 in which at least a part of the locking member 8 is placed.

[0024] As is apparent from Fig. 6, the locking member has two mutually registering recesses 14 which are analogous with the grooves 10 in the sliding body 9. From this it follows that those edge portions that surround the longitudinal slot 11 in the front wall 2 of the rail 1 are intended to be accommodated in these recesses 14. This implies that the locking member 8 may be slid in the longitudinal direction of the rail in the same manner as the sliding body 9, when the longitudinal direction 15 of the locking member is approximately at right angles to the longitudinal direction of the rail 1.

[0025] However, the recesses 14 are dimensioned in such a manner that, together with the rail, they afford a "jammed drawer effect". This implies, as was intimated above, that when the longitudinal direction 15 of the locking member 8 (Figs. 3b and 6) is approximately at right angles to the longitudinal direction of the rail, the locking member 8 may be freely displaced up and down along the slot 11. If, on the other hand, the locking member 8 is angled so that the angle between the longitudinal direction of the locking member and the longitudinal direction of the slot 11 deviates from a right angle, the locking member 8 will pinch about the opposing edges along the groove 11. Figs. 3b and 3c show a locking position where the longitudinal direction 15 of the locking member 8 slightly deviates From a right angle, For which reason the locking member pinches fast about the edge portions of the slot 11.

[0026] Interiorly in the recess 13 of the sliding body 9, the locking member 8 has an operating portion 16 by means of which the locking member 8 may be obliquely slanted in relation to the rail so that the inclination of its longitudinal direction 15 will be as shown in Figs. 3b and 3c.

[0027] The lower defining wall 17 of the recess 13 may be considered as an operating surface for transferring the locking member 8 to the locked position. It will be apparent from Fig. 3b that, if an attempt is made to lift the sliding body 9 upwards, the lower defining wall 17, i.e. the operating surface, will actuate the operating portion 16 of the locking member in an upward direction, which also strives to increase the oblique slanting of the longitudinal direction 15 of the locking member so that the locking member thereby pinches fast even harder about both defining edges of the slot 11.

[0028] If, on the other hand, the sliding body 9 is subjected to a downwardly directed movement, the operating portion 16 will be pivoted downwards, for which reason the engagement between the locking member 8 and the edge portions of the slot 11 will cease. This will have as a consequence that the locking member will slide by force of gravity downwards in the slot 11. It should be observed in this context that the locking member 8 is wholly separate and discrete from both the retainer member 5 and from the spring 6.

[0029] It follows from the foregoing that, when a radiator is placed in the device according to the present invention, the spring 6 will draw the bracket device 4 downwards until the retainer member 5 comes into abutment against the radiator or its engagement member. During this downwardly directed movement, the locking member 8 will be entrained by force of gravity in its position in the recess 13 in the sliding body 9. When the downwardly directed movement has ceased, the locking member assumes a position where it is obliquely slanted as shown in Figs. 3b and 3c, this by cooperation between the operating portion 16 and the lower defining wall 17 in the recess 13. This is a locked position. If an attempt is made to lift the sliding body 9, the engagement of the locking member 8 will only be reinforced.

[0030] In order to be able to lift the sliding body 9 manually and thereby intentionally release a radiator mounted in a device according to the present invention, the locking member 8 has, as is clearly apparent from Fig. 6, two gripping portions 18 which extend from the recess 13 of the sliding body 9 out through recesses 19 to the outside of the sliding body 9 so that the gripping portions 18 are accessible, one on either side of the sliding body.

[0031] By manual actuation of the gripping portions 18

in a direction away from the rail 1, the locking member 8 will be pivoted in the recess 13 so that the engagement between the locking member and the rail ceases. In this manually realised position for the locking member 8, it is thus possible to lift the sliding body 9 upward so that the engagement between the retainer member 5 and the radiator or its engagement member can cease,

[0032] It should be observed that, as soon as the manual actuation of one or both of the gripping portions 18 ceases, the locking member 8 will, by force of gravity, fall back to the slanted locking position. This is possible because the locking member 8 has such a point of gravity which, by force of gravity, gives a moment of force which strives to pivot the locking member to the locked position.

DESCRIPTION OF ALTERNATIVE EMBODIMENTS

[0033] It was mentioned above how the spring 6 may be considerably weaker than is normally the case in prior art constructions. According to the invention, it is even possible to dispense with the spring entirely and, either manually or by force of gravity, cause the upper bracket device 4 to slide along the rail 1 so far down that engagement occurs between the upper retainer member 5 and the radiator. Possibly, the bracket device may be weighted in order to facilitate such sliding.

Claims

1. A mounting device for the lift-safe mounting of a radiator, comprising: an elongate rail (1) designed for fixing on a wall, a first or lower bracket device on the rail for cooperation with a first part of the radiator or a first engagement member disposed thereon, a second or upper bracket device (4) on the rail, the second bracket device having a retainer member (5) for cooperation with a second part of the radiator or a second engagement member disposed thereon, and the second bracket device being movable along the rail towards and away from the first and being biased by means of a spring (6) towards the first bracket device for retaining the radiator, and a locking member (8) for preventing movement of the second bracket device away from the first against the action of the spring, **characterised in that** the locking member (8) is discrete and separate from the retainer member (5), that it has an operating portion (16) by means of which it is movable to a locking position where the second bracket device (4) is positionally fixed in relation to the rail (1), by cooperation between the operating portion and an operating surface (17) on the second bracket device (4); and that the locking member has a gripping portion (18) accessible on the outside of the second bracket device and by means of which the locking member is movable from the locked position to a free position, where the second bracket device is movable away from the first against the action of the spring (6).

2. The mounting device as claimed in Claim 1, **characterised in that** the operating portion (16) of the locking member (8) is disposed in a recess (13) interiorly in the second bracket device (4) and is, disregarding force of gravity, freely movable therein and along the rail (1).

3. The mounting device as claimed in Claim 2, **characterised in that** the operating surface (17) on the second bracket device (4) is a lower defining surface to the recess (13).

4. The mounting device as claimed in any of Claims 2 and 3, **characterised in that** the locking member (8) has a point of gravity so as to be affected by force of gravity towards the locking position.

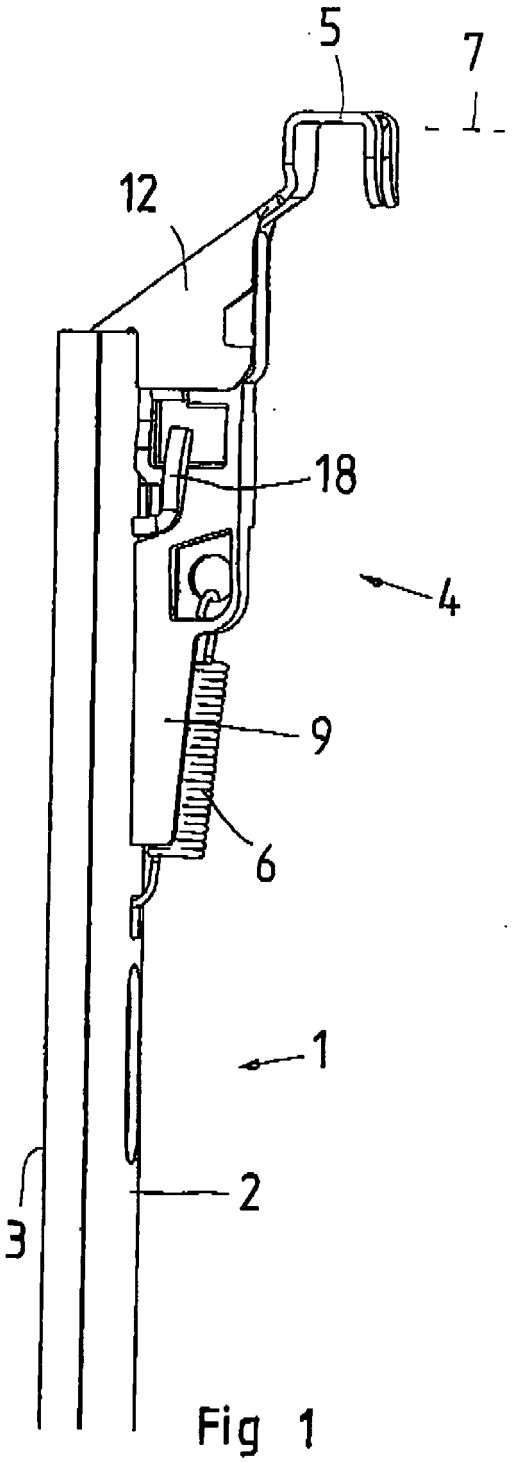

Fig 1

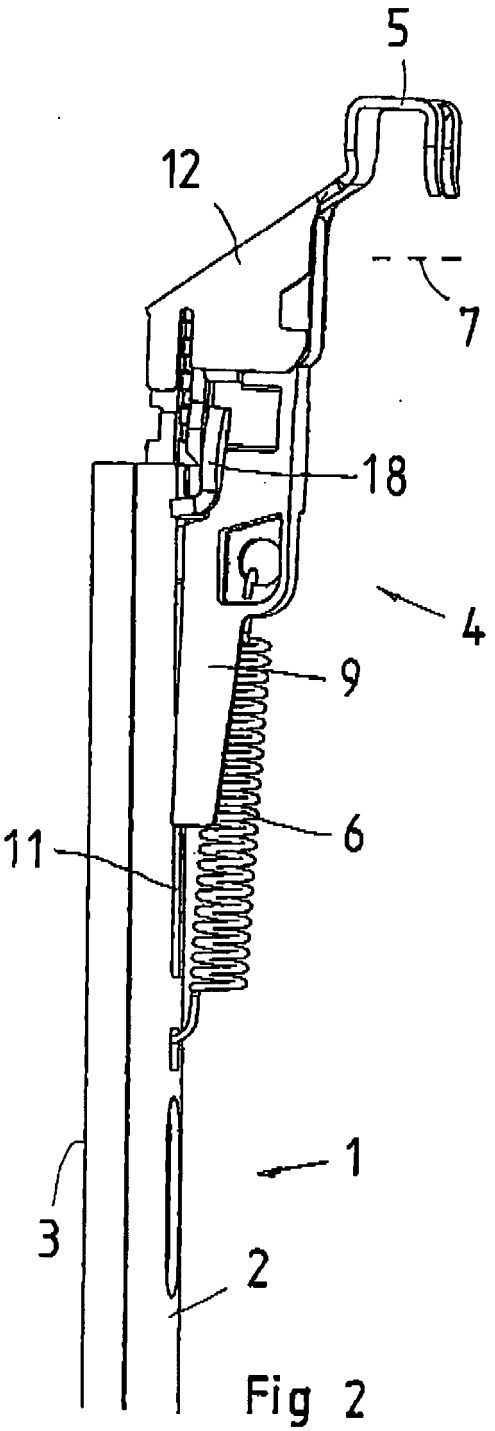

Fig 2

Fig 3c

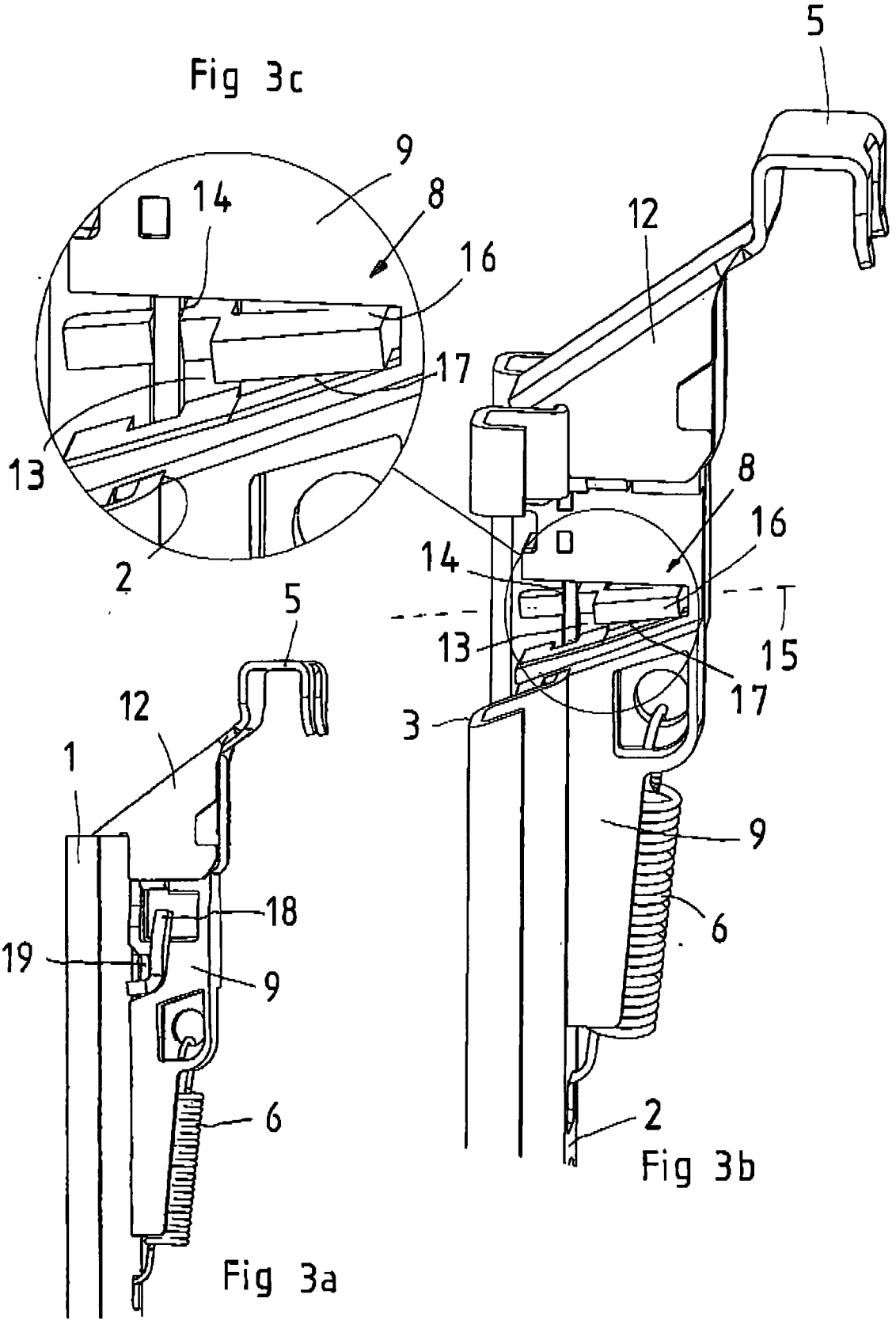

Fig 3b

Fig 3a

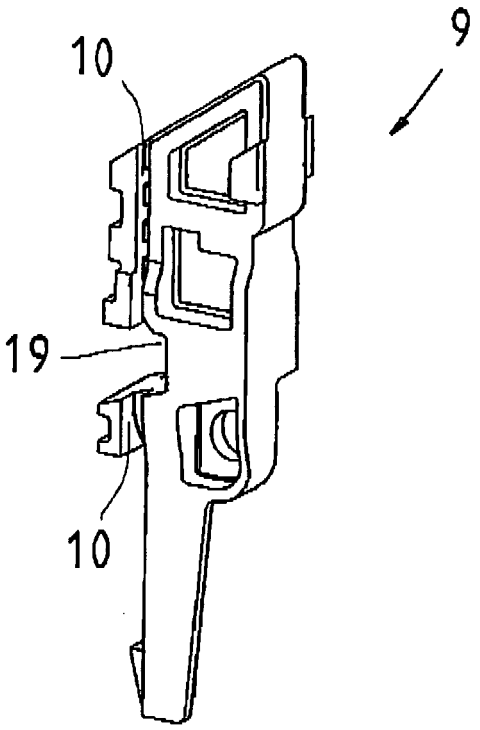

Fig 4

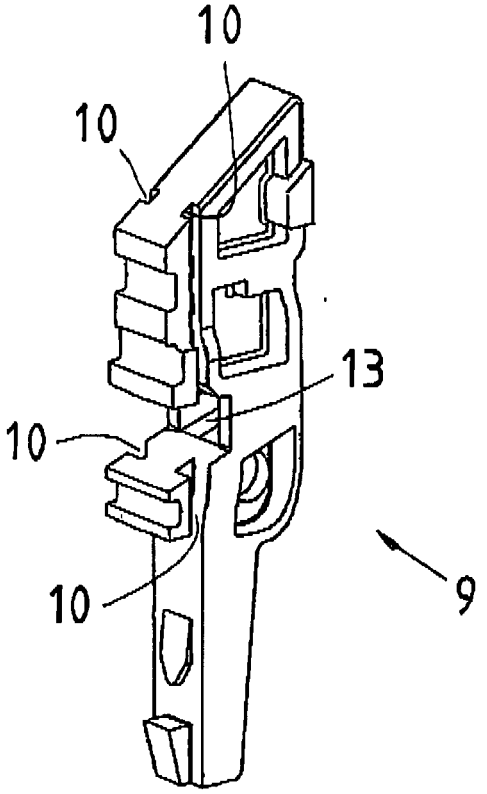

Fig 5

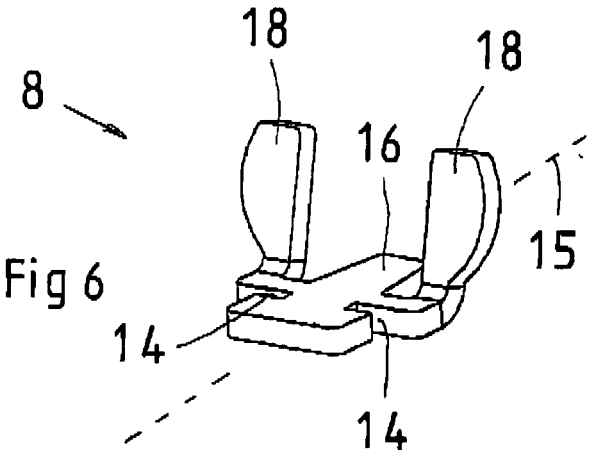

Fig 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 00 5384

DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 July 2007	Arndt, Markus

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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12-07-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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