(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 950 864 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.10.1999 Bulletin 1999/42

(51) Int. Cl.[6]: **F24D 19/02**

(21) Application number: **98850056.7**

(22) Date of filing: **15.04.1998**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **INDUSTRI AB SIGARTH**
S-330 33 Hillerstorp (SE)

(72) Inventor: **Lindbäck, Kenneth**
335 93 Asenhöga (SE)

(74) Representative:
Wallengren, Yngvar
Patentbyran Y Wallengren AB
Box 116
331 21 Värnamo (SE)

(54) An apparatus for mounting a radiator on a substrate

(57) An apparatus for mounting a radiator (2) on a wall (1) includes an elongate, vertical rail (3) with a lower retainer device disposed at the lower end for carrying the radiator (2). At the upper end, the rail (3) has an upper retainer device for engagement with the radiator. The upper retainer device is reciprocally movable in relation to the lower and is spring pretensioned (14) towards it. The upper retainer device has a locking portion (16) for engagement with both the rail (3) and the radiator (2) and is disposed partly in an actuator portion (4) movable along the rail (3), the actuator portion transferring to the locking portion (16) the spring pretensioning (14). The locking portion (16) is, together with the actuator portion (4), movable towards the lower retainer device under the action of the spring pretensioning (14). On upward actuation of the radiator(2) towards the locking portion (16), this is disposed to enter into positionally fixing locking engagement with the rail (3).

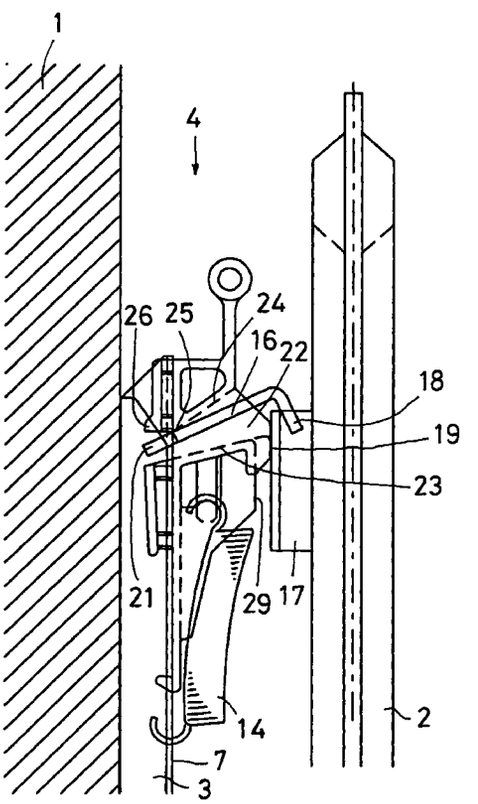

Fig 1

EP 0 950 864 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to an apparatus for mounting a radiator on a substrate and comprising an elongate carrier device with a first retainer device disposed at its one end for cooperation with the radiator or a first engagement device disposed thereon, and a second retainer device disposed at the other end of the carrier device for cooperation with the radiator or a second engagement device disposed thereon, the second retainer device being reciprocally movable in relation to the first and being spring tensioned towards it.

BACKGROUND ART

[0002] WO 87/05091 (corresponding to EP 294 377) discloses an apparatus of the type intimated by way of introduction. This prior art apparatus includes a rail for securing on a substrate such as a wall. In its lower end, the rail has an anchorage for supporting a radiator. In the upper end, the rail has an elongate slot in which an upper anchorage is slidable towards and away from the lower. The upper anchorage is spring tensioned in a downward direction and has engagement means for cooperation with corresponding engagement means on the radiator.

[0003] In the position when the radiator is mounted on the apparatus, the radiator is only secured by its own weight and the spring pretensioning in the upper anchorage, unless specific locking means are provided for fixedly locking the upper anchorage in relation to the rail.

[0004] Relying only on a spring pretensioning for retaining the radiator in the apparatus may be hazardous, since there is a certain risk that the radiator may, by mistake, be lifted up from the apparatus and thereafter technically hang freely in its connection plumbing. A burst pipe, if the radiator is intended for water-borne heating, would have disastrous effects.

[0005] Even though the apparatus according to the above mentioned document were to be provided with some type of locking means which prevents unintentional lifting of the radiator, there is always the risk that such locking means is forgotten or not activated in the correct manner after mounting of the radiator in the apparatus. Hence, this risk would not be obviated even in such an alternative.

PROBLEM STRUCTURE

[0006] The present invention has for its object to design the apparatus described by way of introduction such that the drawbacks inherent in the prior art technology are obviated. Thus, the present invention has for its object to design the apparatus such that it will be self-locking in connection with mounting of the radiator, such that the radiator cannot by mistake be removed or lifted off. The present invention further has for its object to design the apparatus such that the radiator may simply be released when necessary. Furthermore, the present invention has for its object to design the apparatus such that it will be simple and convenient in use and also economical and simple in manufacture.

SOLUTION

[0007] The objects forming the basis of the present invention will be attained if the apparatus disclosed by way of introduction is characterized in that the second retainer device includes a locking portion for engagement with the carrier device and with the radiator or a second engagement device disposed thereon, and means for transferring to the locking portion the spring pretensioning, in which event the locking portion, under the action of the spring pretensioning, is movable towards the first retainer device, and, on being acted upon by the radiator or the second engagement device disposed thereon away from the first retainer device, the locking portion is disposed to move into positionally fixing locking engagement with the carrier device.

[0008] Further advantages will be attained according to the present invention if the apparatus is also given one or more of the characterizing features as set forth in appended Claims 2 to 12.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

[0009] 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 vertical side elevation of a first embodiment of the present invention intended for mounting of a radiator with a specific engagement device;

Fig. 2 is a top plan view of the embodiment of Fig. 1;

Fig. 3 is a top plan view of a retainer device included in the embodiment of Figs. 1 and 2;

Fig. 4 is a side elevation of the retainer device of Fig. 3 (the same view as in Fig. 1);

Fig. 5 shows an upper end portion of a carrier device included in the embodiment of Figs. 1 and 2, seen in two views together with a portion of the retainer device according to Figs. 3 and 4, the Figure illustrating a mutual vertical position for the carrier device and the retainer device;

Fig. 6 shows the components illustrated in Fig. 5 in a different mutual vertical position;

Fig. 7 shows the components illustrated in Figs. 5 and 6 in yet a further different mutual vertical position;

Fig. 8 is a view corresponding to that of Fig. 1 of a modified embodiment of the present invention prior to mounting of the radiator;

Fig. 9 shows the embodiment according to Fig. 8 in a position in which the radiator is mounted in place; and

Fig. 10 shows yet a further embodiment of the present invention in a view corresponding to Figs. 1 and 9.

DESCRIPTION OF PREFERRED EMBODIMENT

[0010] In Fig. 1, reference numeral 1 relates to a substrate, for example a wall, on which the radiator 2 is to be mounted. Secured on the substrate is a carrier device 3 in the form of an elongate metal rail which has the cross-sectional configuration as shown in Fig. 2, with U-shaped rigidifying side portions which are interconnected via a front wall 8 located a distance from the wall 1. The carrier device 3 is secured in the substrate in a suitable manner, for example by means of screws, and, in the normal case, extends in the vertical direction. The parts of the carrier device illustrated in Figs. 1 and 2 are therefore the upper end portion of the carrier device.

[0011] In its lower end (as will also be designated below its first end), the carrier device 3 has a lower or first retainer device which engages with a lower portion of the radiator 2 or a lower or first engagement device or anchorage disposed thereon. The weight of the radiator 2 substantially rests on the lower retainer device.

[0012] The expression "retainer device" is employed below as a collective designation of those parts which are employed for interconnecting the carrier device 3 and the radiator 2 or anchorages or engagement devices disposed thereon. In the embodiment illustrated on the Drawings, the upper (second) retainer device includes an actuator portion 4 and a clamping or locking portion 16. In one alternative embodiment, the actuator portion may possibly be dispensed with, as will be apparent from the description below.

[0013] While the expressions "upper" and "lower" have been employed in connection whit the retainer devices and end portions of the carrier device 3, it is possible to dispose the carrier device 3 with its longitudinal direction approximately horizontal. In such an alternative, the retainer devices and end portions of the carrier device will be located at opposing, vertical side edge regions of the radiator. Further, extra means for taking up the weight of the radiator will probably be necessary.

[0014] As will be apparent from Figs. 2 - 4 taken as a whole, the upper or second retainer device has an actuator portion 4 with an outer abutment portion or plate 5 which is intended to abut against the outside 7 of the carrier device 3 facing away from the wall 1. On the rear side of the front wall 8 of the carrier device 3, the carrier device and the wall 1 define a space 9 in which an inner abutment portion 6 on the actuator portion 4 is accommodated. The outer abutment portion 5 and the inner abutment portion 6 are interconnected to one another via a neck portion 10 of such width that the actuator portion 4 is displaceable but guided in an upwardly open groove 11 in the upper end portion of the carrier device (see Fig. 5).

[0015] The two abutment portions 5 and 6 are, in the vertical direction of the actuator portion 4, divided into an upper section and a lower section, the locking portion 16 being, as will described in greater detail below, located between these sections. The distance between the upper sections of the outer and inner abutment portions 5 and 6, respectively is such that it more or less corresponds to the wall thickness of the front wall 8 of the carrier device 3. On the other hand, the distance between the lower sections of the outer 5 and inner 6 abutment portions is cuneiform and flares in an upward direction, for reasons which will be described below.

[0016] The actuator portion 4 has, in its lower end, a projection with a catch 12 which, when the actuator portion 4 is mounted in the carrier device 3, is displaceable in the longitudinal direction of a second groove 13 in the front wall 8 of the carrier device. In the position illustrated in Fig. 5, the catch 12 has come into abutment against the upper end of the groove 13 and hereby prevents displacement of the actuator portion 4 in the upward direction in relation to the carrier device 3. This measure prevents the actuator portion 4 from being lifted off the carrier device 3.

[0017] By bending of that arm on which the catch 12 is disposed, release of the actuator portion 4 from the carrier device 3 is permitted, if desired.

[0018] It will be apparent from Fig. 1 that the actuator portion 4 is pretensioned by means of a draft spring 14 in a downward direction, i.e. in a direction towards the lower or first retainer device at the lower end of the carrier device. This implies that the upper retainer device, which includes the actuator portion 4, is pretensioned towards the lower retainer device. The draft spring 14 engages with its lower end in the aperture 15, shown in Fig. 5, in the front wall 8 of the carrier device 3. The upper end of the spring 14 is anchored in the actuator portion 4 proper, relatively close to the outside 7 of the carrier device 3.

[0019] Fig. 7 shows the relative vertical position between the actuator portion 4 and the carrier device 3 with engagement between the upper retainer device (via its locking portion 16) and the engagement device

17 disposed on the radiator 2, see also Fig. 1. In a comparison between the vertical position of the catch 12 and the lower end of the groove 13, it will be apparent that a further downward movement of the retainer device would be possible. Further, a comparison between the vertical position of the lower end of the groove 11 and the lower end of the neck portion 10 of the actuator portion shows that there is no limit here either in a downward direction for a further, downwardly directed displacement of the retainer device. This implies that the retainer device is here spring pretensioned in a downward direction, i.e. in the engagement position illustrated in Fig. 1.

[0020] It will further be apparent from Fig. 7 that, in the engagement position of the upper retainer device, the upper sections of the abutment portions of the actuator portion 4 are in cooperation with the parts of the front wall 8 of the carrier device 3 surrounding the groove 11.

[0021] The upper retainer device further includes, as was mentioned above, a clamping or locking portion 16 disposed in the actuator portion 4 which is operative to engage with the radiator 2 or an engagement device 17 or anchorage disposed thereon. To this end, the locking portion 16 has a downwardly directed catch 18, i.e. directed towards the lower retainer device, which, as shown in Figs. 1 and 2, engages in on the rear side of the anchorage 17 of the radiator 2. Engagement against the anchorage 17 further has a support surface 19 on the actuator portion 4.

[0022] The opposite end of the locking portion 16 is designed for engagement and cooperation with the carrier device 3 and in particular its front wall 8. To this end, the locking portion 16 has a neck portion 20 which is of slightly less width than the interior width of the groove 11 in the front wall 8 of the carrier device. On the inside of the front wall 8 of the carrier device, the locking portion 16 has a flared portion 21 which is broader than the width of the groove 11, see Figs. 1 and 4. Correspondingly, the locking portion 16 is, on the outside of the front wall 8, of greater width than the groove 11. Expressed otherwise, the neck portion 20 is formed by recesses disposed at opposite side edges of the locking portion 16, in which recesses edge portions of the front wall 8 of the carrier device on either side of the groove 11 are accommodated. By a pivoting of the outer end of the locking portion 16 in an upward direction or the reverse according to the double-headed arrow A in Fig. 4, it is possible to establish a positionally fixing locking engagement between the locking portion 16 and the carrier device 3.

[0023] The above-mentioned locking engagement is realised when the locking portion 16 is pivoted in a counterclockwise direction in Fig. 4, i.e. when its outer end with the catch 18 is lifted in relation to its inner end. In a lower position of the catch 18, or when the longitudinal direction of the locking portion 16 begins to approach a right-angled position in relation to the longitudinal direction of the carrier device, the width of the above-mentioned recesses in the opposing side edges of the locking portion is so great that the locking portion may be freely displaced along the groove 11 and thereby accompany the movements of the upper retainer device towards and away from the lower retainer device. On lifting of the catch 18, i.e. when this is actuated in a direction away from the lower retainer device, the upper retainer device is locked and positionally fixed in relation to the carrier device 3.

[0024] In the embodiment illustrated on the Drawings, the locking portion 16 is, via the actuator portion 4, subjected to the above-mentioned spring pretensioning in a downward direction, and the point of engagement of this spring pretensioning is located as close to the front wall 8 of the carrier device 3 as can possibly be realised. It will be apparent herefrom that the spring pretensioning strives to displace the locking portion along the carrier device in a direction towards the lower retainer device. With a radiator in place, this implies that the locking portion 16 with its catch 18 will come into engagement with the engagement device 17 of the radiator 2, whereafter the outer end of the locking portion will be arrested against the engagement device, while its inner end, i.e. located most proximal the carrier device, will continue to be displaced downwards. This implies in reality a pivoting of the locking portion in a counterclockwise direction (the arrow A in Fig. 4) and a transfer of the locking portion to the locked position.

[0025] In an alternative embodiment, and as opposed to that shown in the Figures, the spring pretensioning from the spring 14 may engage directly with a suitable anchorage point in the locking portion 16 close to the front or outside 7 of the carrier device 3.

[0026] In the illustrated embodiment, the locking portion 16 is accommodated interiorly in a recess 22 in the actuator portion 4. As is apparent from Fig. 4, the recess 22 has a lower defining wall 23 against which rests the locking portion 16 in Fig. 4. The upper defining wall 24 of the recess 22 slopes in an upward direction, so that the recess 22 will be cuneiform, with greater vertical extent a distance from the carrier device than close to it. The cuneiform configuration of the recess 22 is produced in such a manner that it permits the necessary pivotal movements of the locking portion 16. In particular, in the position of the locking portion shown in Fig. 4, the locking portion is free to be displaced along the carrier device. On pivoting in a counterclockwise direction upwards towards the upper defining wall 24, for example half of the distance towards it, the positionally fixing engagement however occurs between the locking portion 16 and the carrier device 3. This positionally fixing locked position is shown in Fig. 1.

[0027] As was mentioned above, the spring pretensioning against the locking portion 16 is, in one embodiment of the present invention, provided via the actuator portion 4. It will be apparent from Fig. 1 that it is the upper defining wall of the recess 22 which, with its upper end portion 25 in region of the neck portion 20 of

the locking portion 16, abuts against the upper side of the locking portion. This is also clearly apparent from Figs. 9 and 10.

[0028] It was intimated above that the spring 14 can, with its upper end, engage directly with the locking portion 16 in the proximity of its neck portion 20. This requires that the actuator portion be provided with an aperture or channel in which the spring 14 may extend in to the locking portion 16 in the recess 22.

[0029] The actuator portion 4 also serves the function of guide portion which holds the locking portion 16 in the correct position and, for example, prevents it from being twisted (about its longitudinal axis) out of engagement with the groove 11 of the carrier device 3. Possibly, this function may be assumed by the locking portion 16 if this is designed for guiding cooperation with the radiator 2 or its engagement devices. One method of realising this is to replace the catch 18 with a downwardly open V- or U-shaped profile which grasps over the upper edge of the engagement device 17 along a considerable part of its length, see Fig. 2. In such an alternative, the actuator portion may be wholly dispensed with.

[0030] It will be apparent from Figs. 1 - 4 that the upper portion of the inner abutment portion 6 is provided, at its lower edge, with a heel 26 projecting in a direction towards the substrate 1. By lifting the actuator portion 4 against the action of the spring 14 so high that the upper section of the inner abutment portion 6 comes free from the upper end surface 27 of the groove 11 (see Figs. 6 and 8), it is possible, by pulling the upper end of the actuator portion away from the carrier device 3, to catch the actuator portion with the underside of the heel 26 resting on the upper end surfaces 27 of the carrier device 3. The outward withdrawal of the upper end of the actuator portion 4 entails a pivoting of the actuator portion in accordance with the arrow B in Fig. 6 and is possible as a result of the cuneiform appearance of the space between the lower sections of the outer and inner abutment portions 5 and 6, respectively. This pivoting also requires a certain bending of the arm at the lower end of the actuator portion where the catch 12 is disposed.

[0031] The hooked position of the actuator portion 4 on the upper end surfaces 27 of the carrier device 3 according to Figs. 6 and 8 implies a preparatory position where a radiator, in a very simple manner, may be mounted in the apparatus according to the present invention. It will be apparent from Fig. 8 that the anchorage of the radiator, in this instance a convector plate 28, when the upper portion of the radiator is displaced to the left in Fig. 8, will come abutment against an abutment surface 29 on the outside of the actuator portion 4. When the convector plate, in a movement opposed to the arrow B in Fig. 6, strikes this abutment surface 29, the entire actuator portion 4 is displaced in towards the substrate 1, for which reason the heel 26 will slide along the end surfaces 27 in order finally to come free from them 50 that the spring pretensioning may draw the actuator portion 4 in a downward direction from the vertical position illustrated in Figs. 6 and 8 to the engagement position illustrated in Fig. 7.

[0032] A lifting of the actuator portion 4 substantially beyond the preparatory position illustrated in Fig. 6 is prevented, as illustrated in Fig. 5, by the engagement between the catch 12 and the upper end of the groove 13.

[0033] Also in the embodiment according to Figs. 1 and 2, mounting may be put into effect in the above-described manner in that the anchorage 17 of the radiator 2, on displacement of the radiator in towards the wall or substrate 1, strikes the abutment surface 29 of the actuator portion 4.

[0034] Fig. 10 shows one embodiment which, in all essentials, is wholly analogous with that described above. The difference resides in the fact that in this embodiment, the locking portion 16 has an upwardly directed extension 30 with a downwardly open catch 31 which engages with an upper edge portion 32 on the radiator. In this embodiment, the radiator's own upper edge portion 32 has thus assumed the function of the above-described engagement device on the radiator (in the embodiment according to Figs. 8 and 9) the convector plate 28.

[0035] The present invention may be modified further without departing from the scope of the appended Claims.

Claims

1. An apparatus for mounting a radiator (2) on a substrate (1) comprising: an elongate carrier device (3) with a first retainer device disposed at its one end for cooperation with the radiator or a first engagement device disposed thereon, and a second retainer device disposed at the other end of the carrier device for cooperation with the radiator (2, 32) or a second engagement device (17, 28) disposed thereon, the second retainer device being reciprocally movable in relation to the first and being spring pretensioned (14) towards it, **characterized in that** the second retainer device includes a locking portion (16) for engagement with the carrier device (3) and with the radiator (2, 32) or the second engagement device (17, 28) disposed thereon, and means for transferring to the locking portion (16) the spring pretensioning (14), in which event the locking portion, under the action of the spring pretensioning, is movable towards the first retainer device, and, on being acted upon by the radiator or the second engagement device disposed thereon in a direction away from the first retainer device, the locking portion is disposed to move into positionally fixing locking engagement with the carrier device (3).

2. The apparatus as claimed in Claim 1, **characterized in that** the carrier device (3) in the region of

the second retainer device, has an elongate groove (11); and that the locking portion (16), at its end portion facing away from the radiator (2, 32) or the second engagement device (17, 28), has a neck portion (20) accommodated in the groove, the locking portion being, on either side of the neck portion, of greater width (21) than the groove.

3. The apparatus as claimed in Claim 2, **characterized in that** the neck portion (20) is of a length which is but insignificantly greater than the material thickness (8) of the carrier device (3) along the groove (11).

4. The apparatus as claimed in any of Claims 1 to 3, **characterized in** that the point of engagement of the spring pretensioning (14) against the locking portion (16) is located considerably more proximal the carrier device (3) than the end (18) of the locking portion which engages with the radiator (2, 32) or the engagement device (17, 28) disposed thereon.

5. The apparatus as claimed in any of Claims 1 to 4, **characterized by** an actuator portion (4) included in the second retainer device and disposed to transfer to the locking portion (16) the spring pretensioning (14).

6. The apparatus as claimed in Claim 5, **characterized in that** the part of the locking portion (16) most proximal the carrier device (3) is accommodated in a recess (22) in the actuator portion (4).

7. The apparatus as claimed in Claim 6, **characterized in that**, in the region of the carrier device (3), the recess (22) is of an extent in the longitudinal direction of the carrier device which but insignificantly exceeds the extent of the locking portion (16) in the same direction, while the recess, a distance from the carrier device, is of considerably greater extent in this direction.

8. The apparatus as claimed in any of Claims 5 to 7, **characterized in** that the actuator portion (4), on either side of the neck portion (20) of the locking portion (16) seen in the longitudinal direction of the carrier device (3), has narrow portions (10) accommodated in the groove (11); and that it, on either side of these narrow portions (seen transversely of the longitudinal direction of the carrier device), has wide portions (5, 6) of greater width than the groove (11).

9. The apparatus as claimed in any of Claims 5 to 8, **characterized in** that the actuator portion (4) has a first locking surface (26) for cooperation with a corresponding first locking surface (27) on the carrier device (3), the actuator portion being, on cooperation between the locking surfaces, displaced against the action of the spring pretensioning (14) to an open position and locked there; and that the open position is located such a distance from the first retainer device of the carrier device (3) that the radiator (2) is mountable on or dismountable from the carrier device in the open position of the actuator portion.

10. The apparatus as claimed in Claim 9, **characterized in that** the first locking surfaces (26, 27) are movable from their cooperation position by the displacement of the actuator portion (4) transversely of the longitudinal direction of the carrier device (3) towards the substrate (1) under the action of the radiator (2), the actuator portion being released from the open position.

11. The apparatus as claimed in any of Claims 5 to 10, **characterized in that** the actuator portion (4) has a second locking surface (12) for cooperation with a corresponding second locking surface on the carrier device (3), the actuator portion being, on cooperation between the second locking surfaces, located in an arrest position where it is prevented from being further removed from the first retainer device of the carrier device (3).

12. The apparatus as claimed in any of Claims 9 to 11, **characterized in that** the actuator portion (4) in the arrest position has greater or equal distance to the first retainer device of the carrier device (3) than applies in the open position.

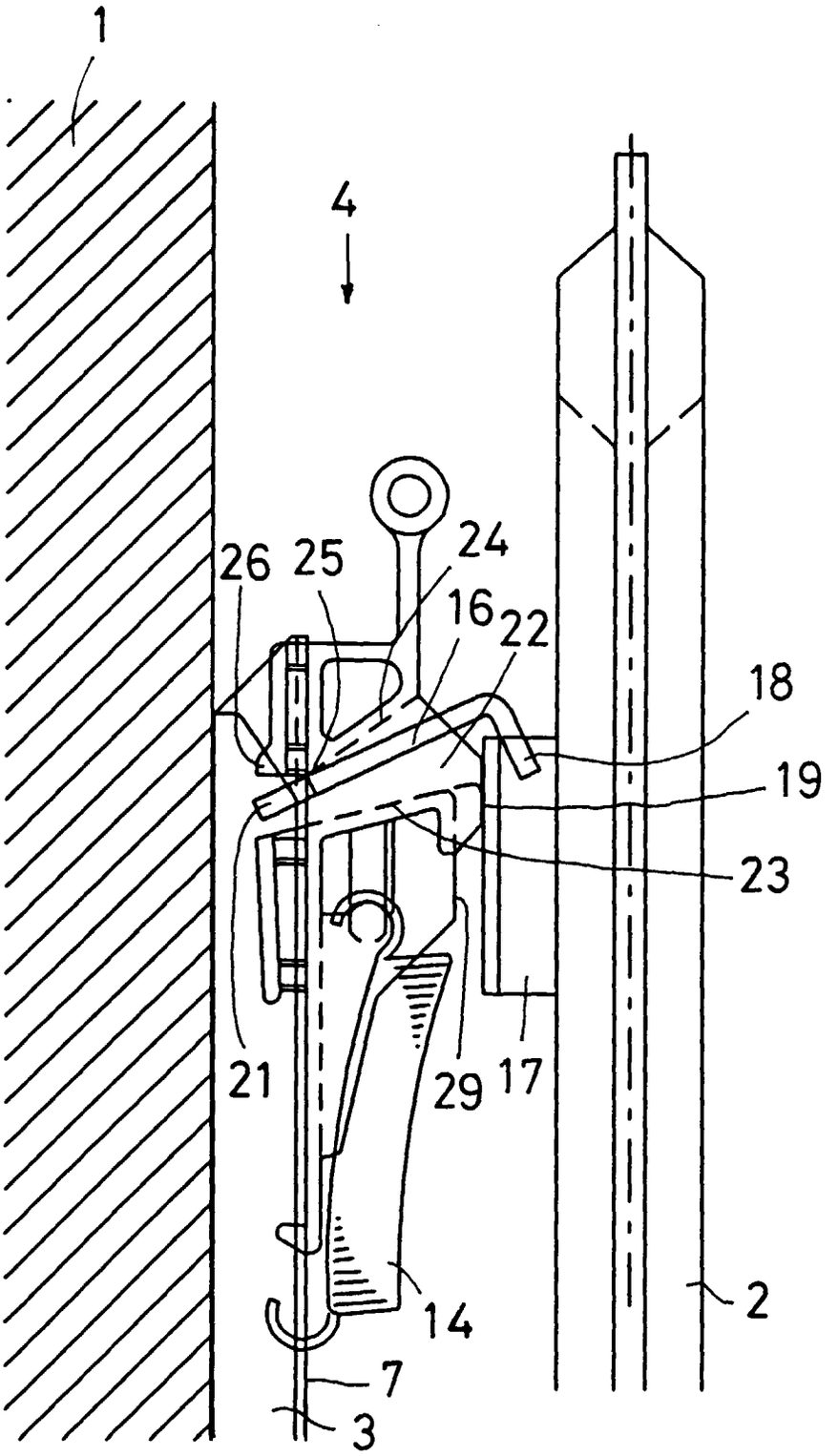

Fig 1

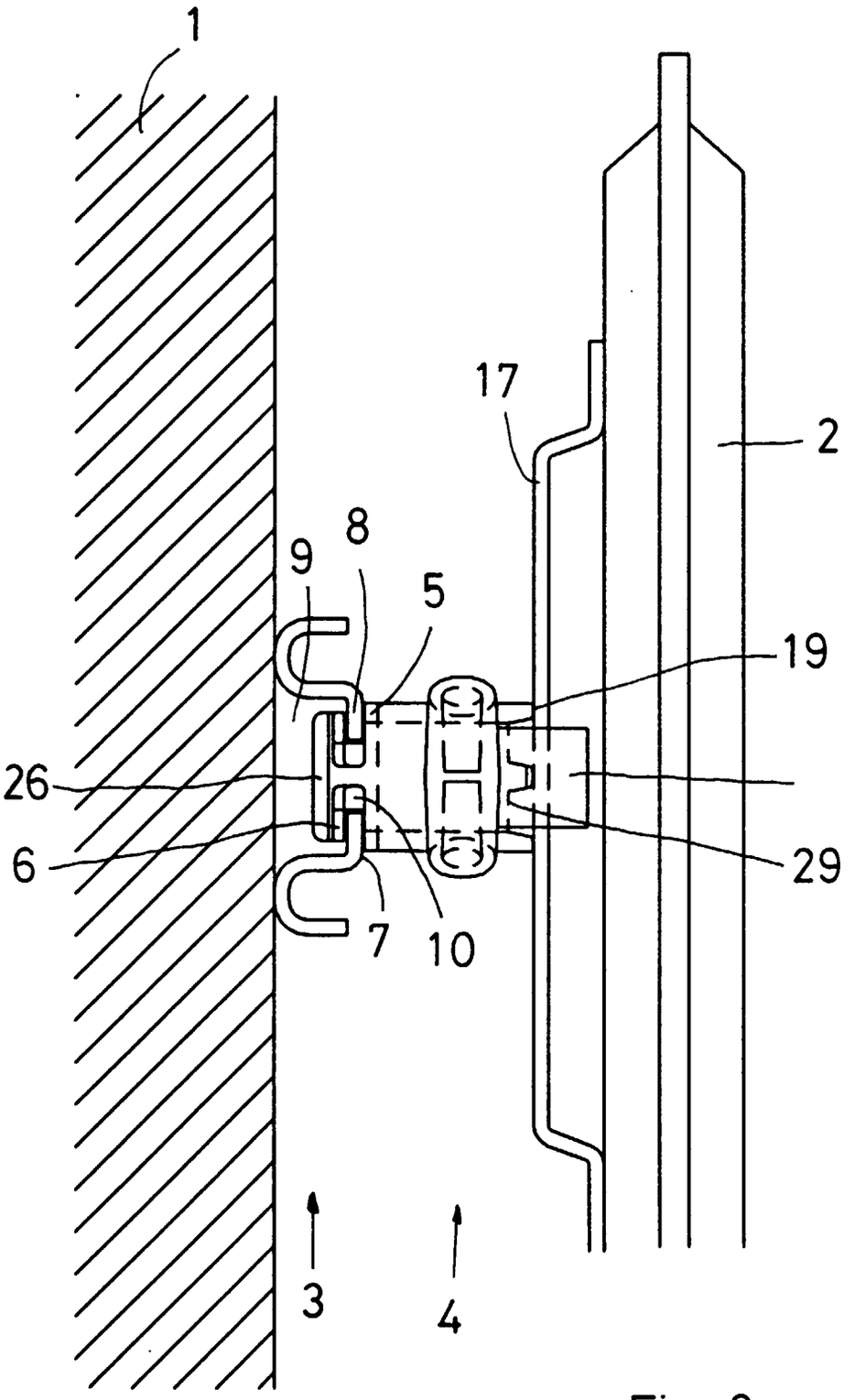

Fig 2

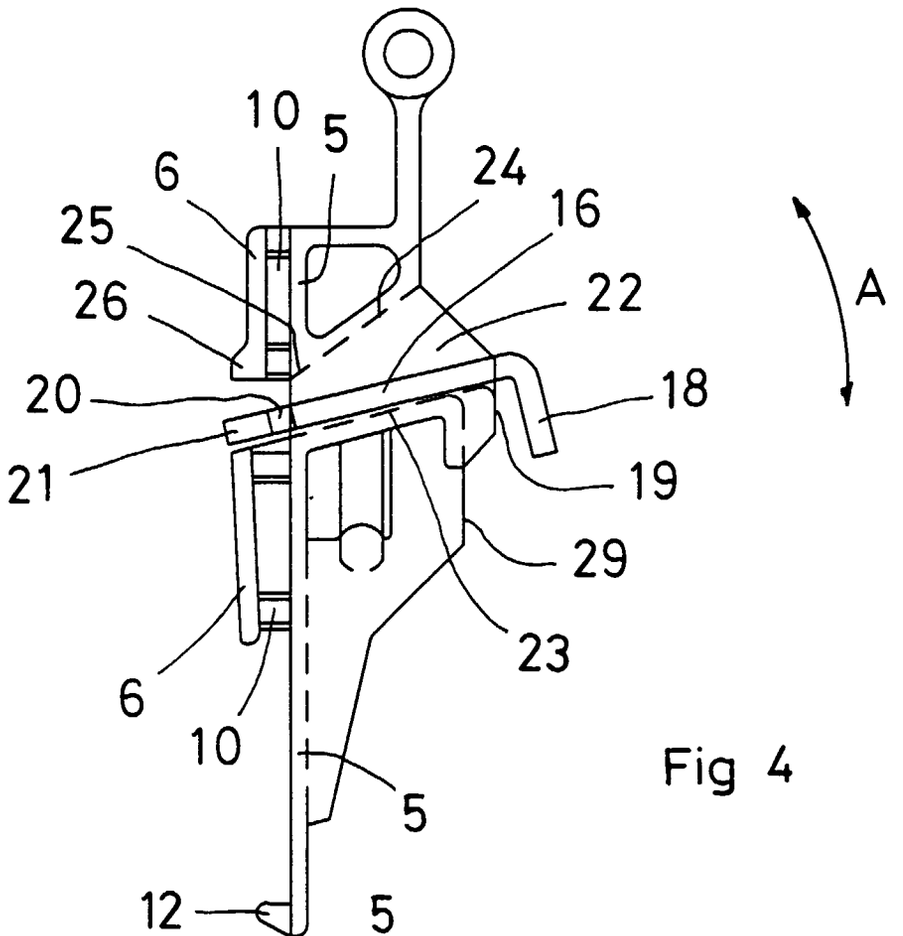

Fig 4

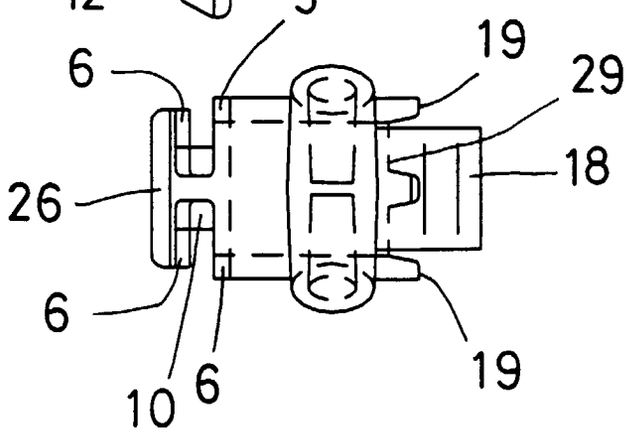

Fig 3

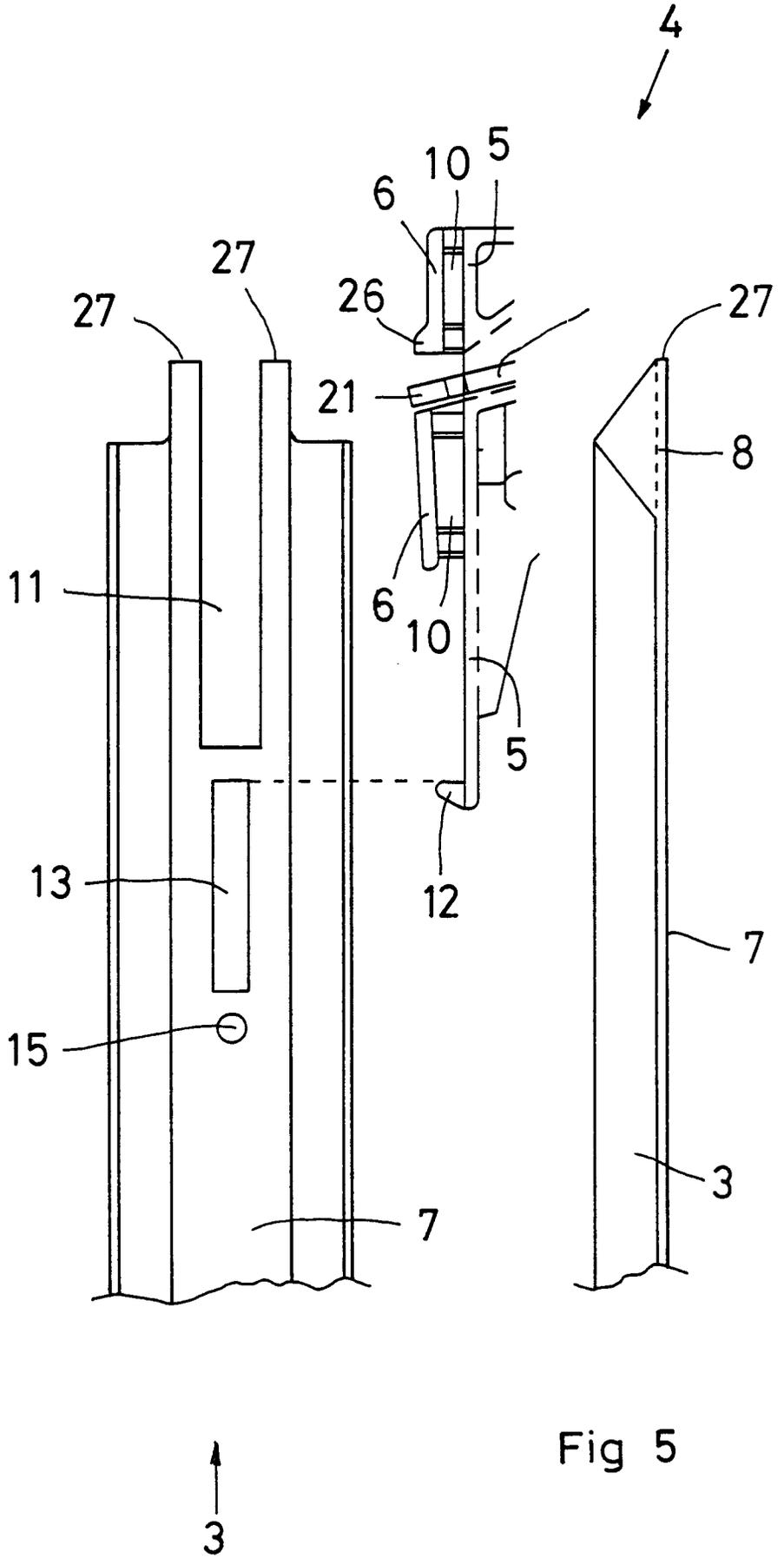

Fig 5

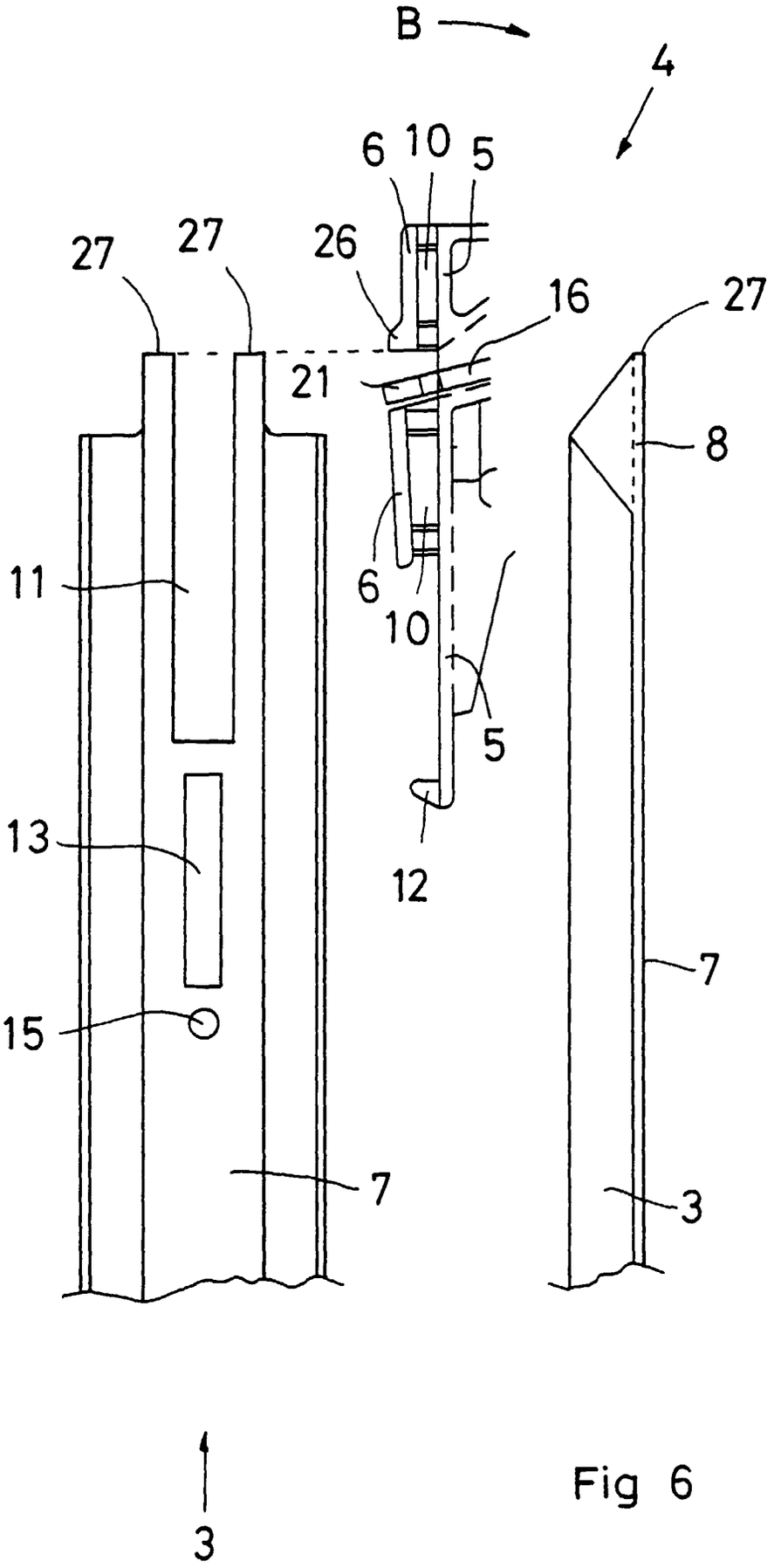

Fig 6

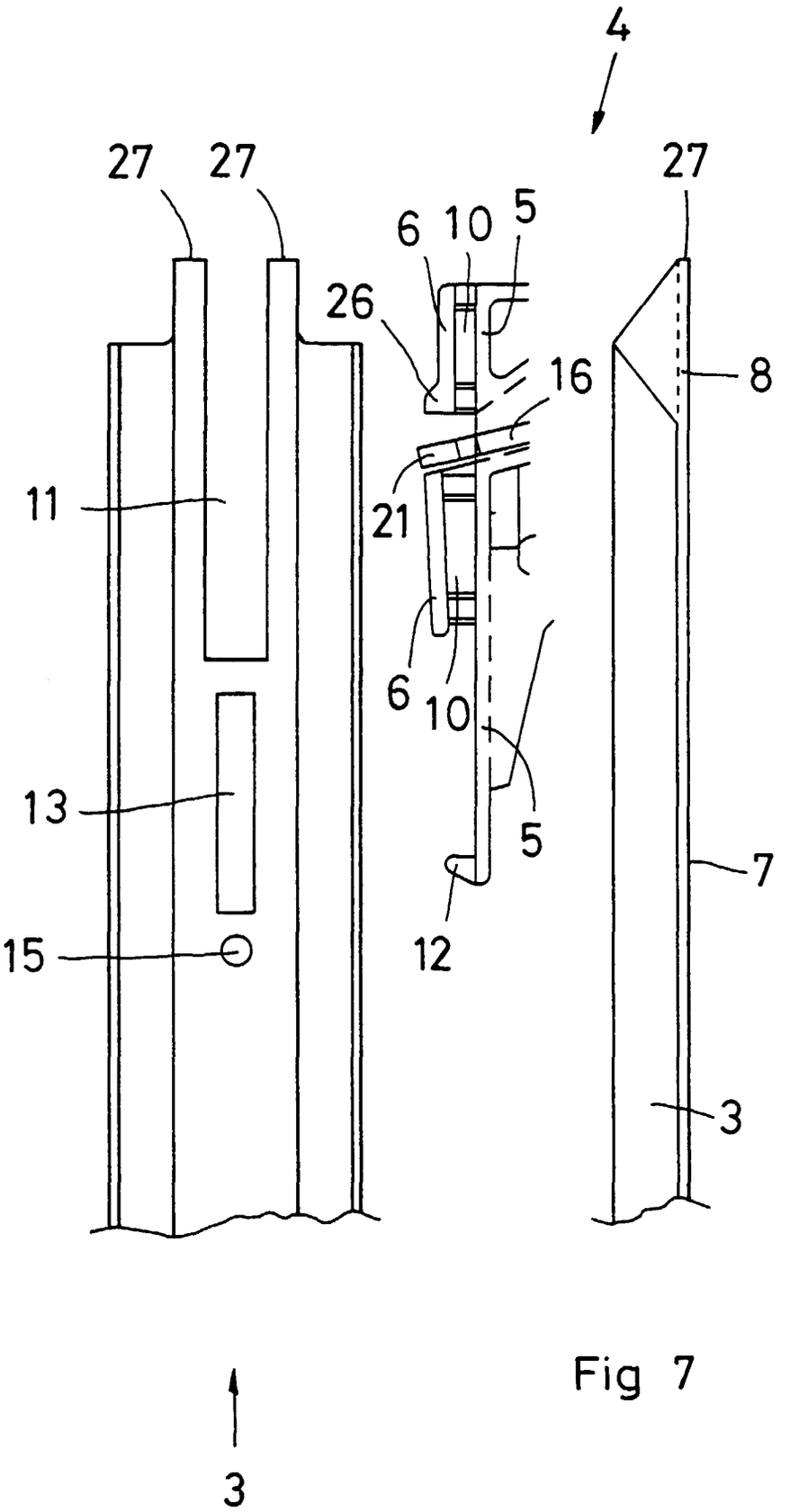

Fig 7

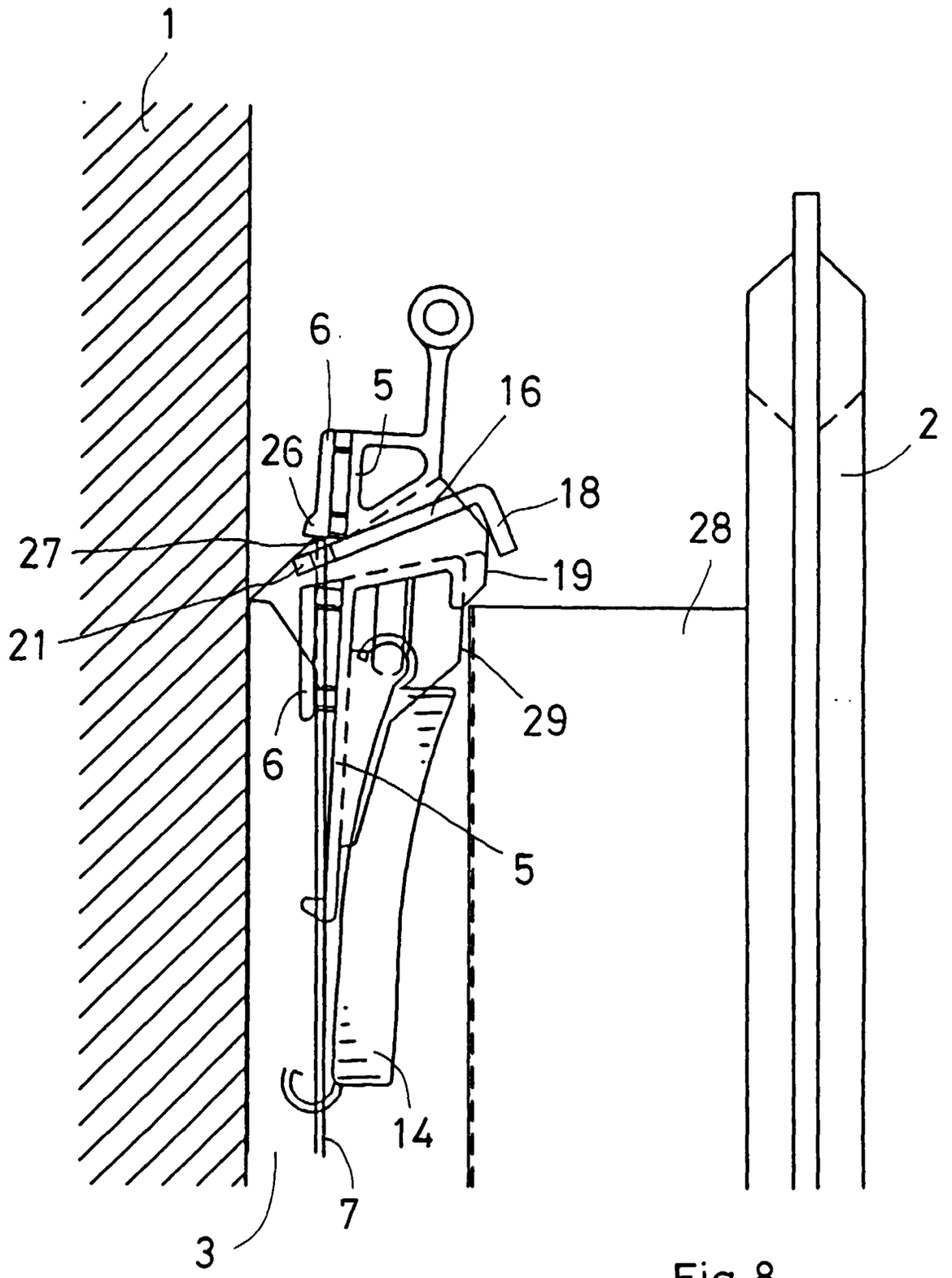

Fig 8

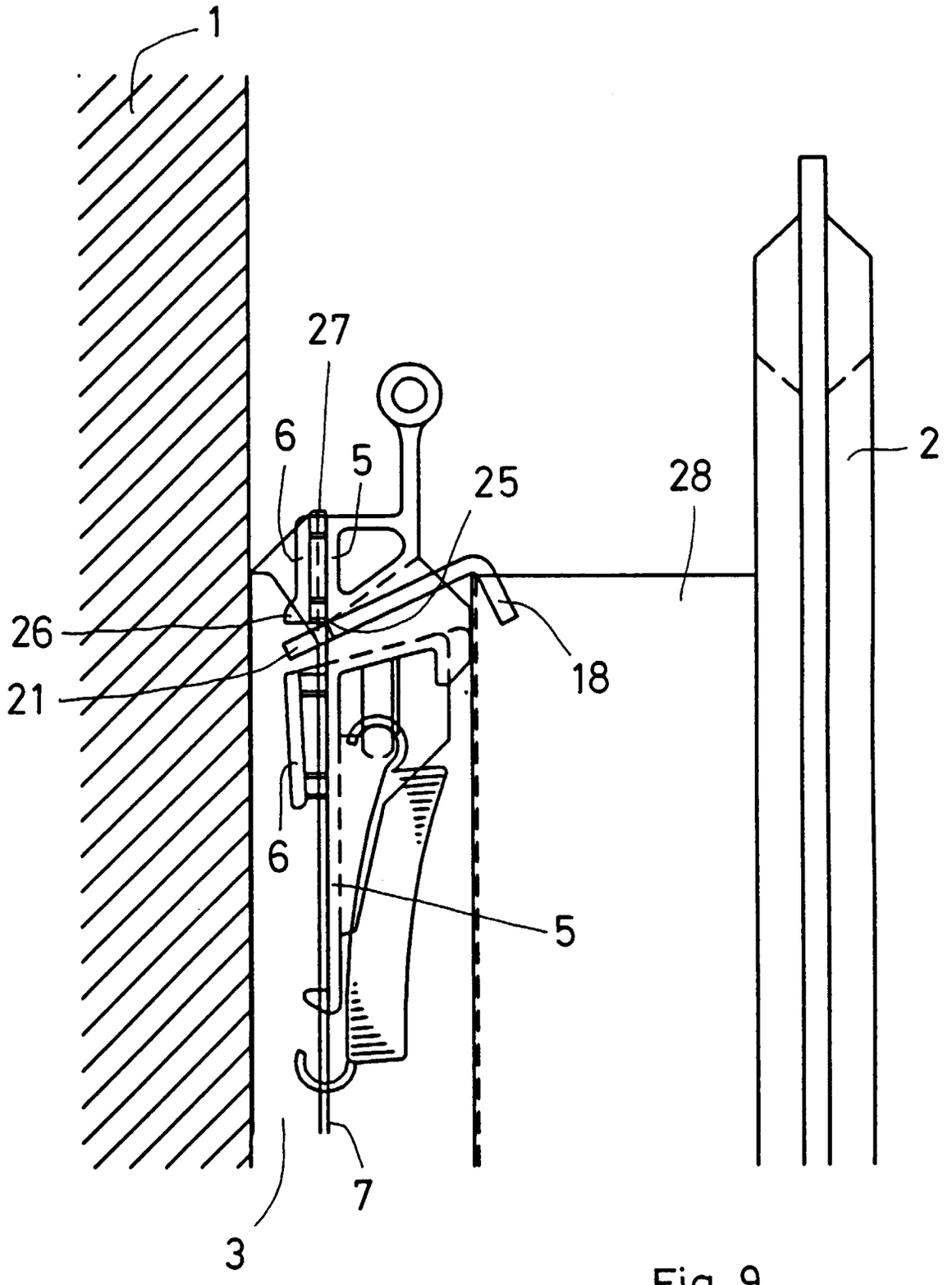

Fig 9

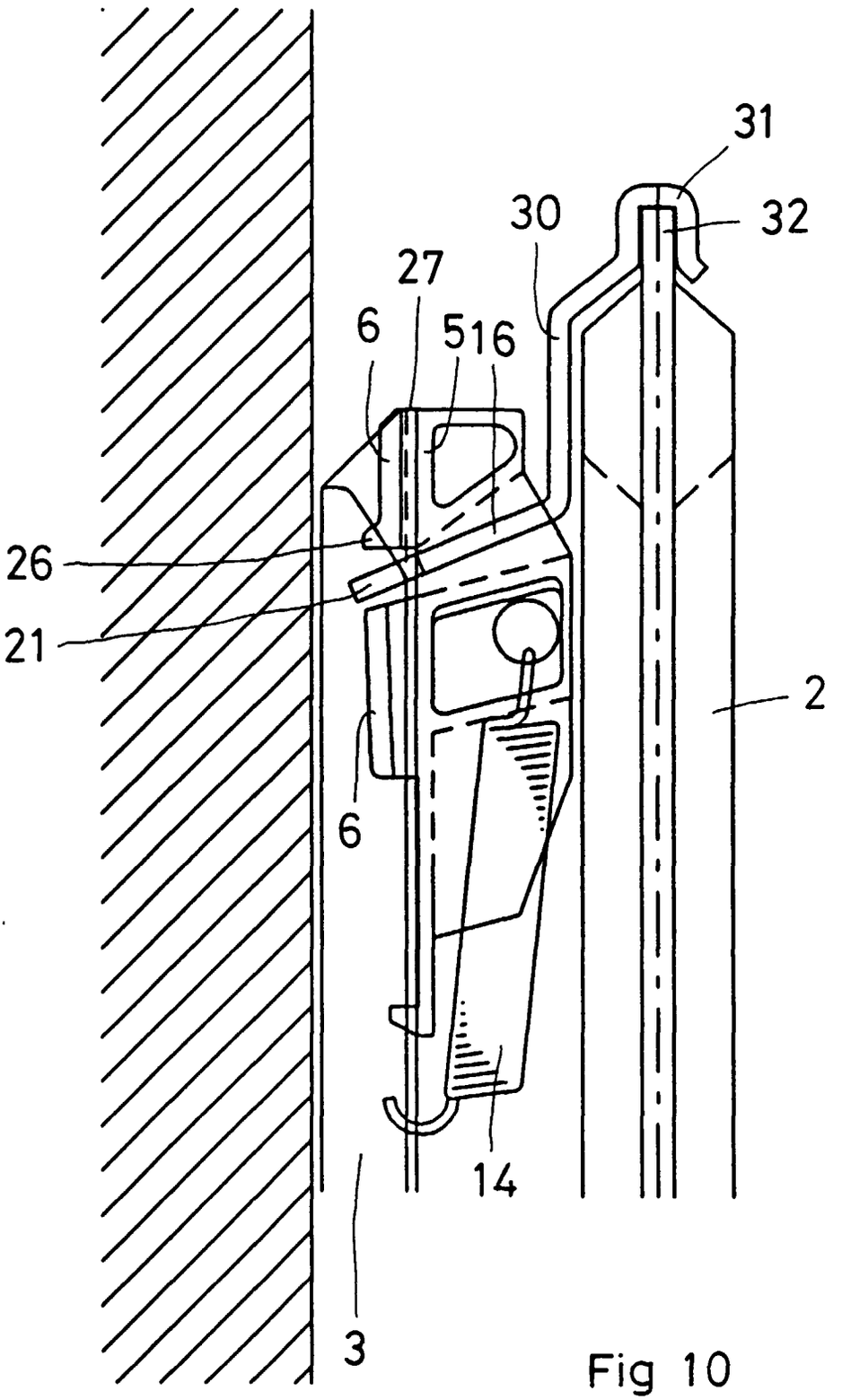

Fig 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 85 0056

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE 297 15 031 U (GOTTBEHUET HANS GERD GMBH) 18 December 1997 * page 8, paragraph 4 - page 11, paragraph 1; figures 7-12 *	1-4	F24D19/02
A,D	WO 87 05091 A (SIGARTH IND AB) 27 August 1987		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

F24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	8 September 1998	Van Gestel, H

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)