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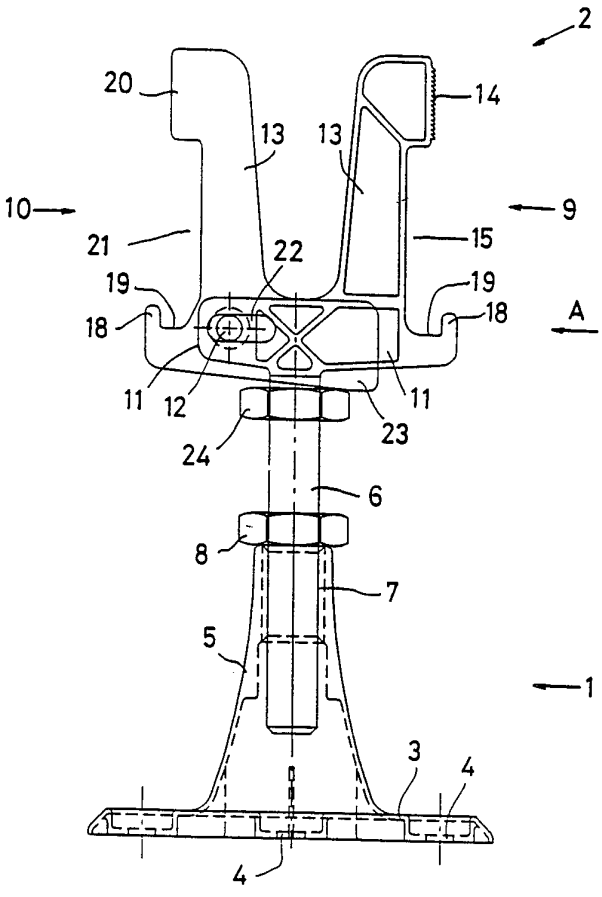
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(54) Title: A DEVICE FOR INSTALLATION OF A RADIATOR

(57) Abstract

A device for the free-standing installation of such a radiator as having a channel (16) along one edge, and an edge portion (17) projecting outside this channel, includes a foot (1) secured in a substrate. The foot carries, via a vertically adjustable bar (6), a fixed backing portion (9) and a pivotal clamping portion (10). Both the backing portion (9) and the clamping portion (10), which are approximately mirror images of one another, are provided with fixing devices (18) for abutting against opposing sides of the edge portion (17) and engagement portions (14, 20, respectively) for abutement against opposing sides of the radiator over the channel (16), the fixing devices (18) and the engagement portions (14, 20) on both the backing portion (9) and the clamping portion (10), being located on opposing sides of the radiator. The clamping portion (10) is, by means of a clamping nut (24) on the bar (6), pivotal for abutting against the radiator, the backing portion (9) forming a back-up on such abutment.



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# A DEVICE FOR INSTALLATION OF A RADIATOR

## TECHNICAL FIELD

The present invention relates to a device for installation of or for securement of an object in such type of single or multiple section radiators as, in each included radiator section, has a channel along one edge, and an edge portion projecting along the side thereof facing away from the main portion of the radiator, the edge portion including a foot arrangement for securement on a substrate or for carrying the object, and bracket means for retentive cooperation with the radiator.

## BACKGROUND ART

Anchorages for the free-standing floor installation of radiators are previously known in the art, for both single section radiators and double and multiple section radiators. As a rule, such anchorages have a footplate for securement to the floor. The footplate serves for anchoring a vertical bar or rail on which different types of fixing devices are then adjustably mounted for cooperation with the radiator proper.

As a rule, the radiators which are installed in this manner are not standardized in respect of dimensions or design and construction. This implies that a radiator anchorage which is to be anything like universally applicable must be capable of adjustment in innumerable ways in order thereby to fit radiators of different heights, different spacing between included sections, radiators with and without convector plates, and so on.

According to prior art techniques, these problems have been overcome in such a manner that the radiator anchorage in question is composed of a number of standardized components, while still retaining generous adjustment possibilities. This entails that every radiator anchorage must include a large number of small parts, which will be expensive in manufacture, assembly and use as well.

Because of the numerous adjustment possibilities and compositions from a plurality of different small components, a radiator anchorage of this type will not be sufficiently stable. This lack of stability is extremely serious in modern construction engineering, given that the radiators' connection pipes are of flimsy dimensions and, for example, may consist of plastics and, as a result, by no means can contribute in the fixing and retention of the radiator in place.

## PROBLEM STRUCTURE

The present invention has for its object to realise a device of the type mentioned by way of introduction, the device being designed in such a manner as to obviate the problems inherent in prior art designs and constructions. In particular, the present invention has for its object to realise a device which is versatile in its field of use so that, as a result, cooperation may be achieved with radiators of different makes and dimensions. The present invention further has for its object to realise a device which provides extremely good mechanical strength in the retention of the radiator. The present invention yet further has for its object to realise a device which is composed of but a small number of parts and which is simple and economical in both manufacture and use.

## SOLUTION

These and other objects forming the basis of the present invention will be attained if the device disclosed by way of introduction is characterized in that the bracket means include a fixing device which, by accommodation of or engagement with the edge portion of the radiator or a radiator section, respectively, is disposed to positionally fix this in directions transversely of the plane of extent of the radiator, and a clamping device which is applicable against the radiator or radiator section, respectively, on that side of the channel facing away from the edge portion, and a backing member which is disposed for abutment against the radiator or a radiator section on that side of the channel turned to face away from the edge portion.

According to the invention, the clamping device is also suitably pivotal about an axis which is substantially parallel with the longitudinal direction of the edge portion.

It further suitably applies according to the invention that the fixing device includes an abutment portion for abutment against that side of the edge portion which is opposite to that side of the radiator or radiator section, respectively, against which the clamping device is applicable.

Given that the device according to the present invention cooperates with such parts of the radiator as have dimensions which are only determined by double the thickness of the sheet material from which the radiator is manufactured, one and the same anchorage device may be employed for a large number of otherwise differently dimensioned and designed radiators.

Further advantages will be afforded according to the invention if the device according to the present invention is also given one or more of the characterizing features as set forth in appended Claims 2 and 3, as well as 6 to 12.

## BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

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

Fig. 1 is a vertical side elevation (seen in the longitudinal direction of a radiator) of the device according to the present invention in one embodiment intended for a double radiator;

Fig. 2 is a vertical side elevation of the device of Fig. 1 seen in the direction shown by the arrow A in this Figure;

Fig. 3 is a view corresponding to that of Fig. 1 at the commencement of the installation of a radiator;

Fig. 4 is a view corresponding to that of Fig. 3 when the installation of the radiator is completed;

Fig. 5 shows one embodiment of the device according to the present invention intended for a single radiator in a view corresponding to that of Fig. 3; and

Fig. 6 is a view corresponding to that of Fig. 5 in which the radiator is installed in place.

## DESCRIPTION OF PREFERRED EMBODIMENT

Figs. 1 - 4 show a first embodiment of the device according to the present invention which is intended for installing a double radiator which is composed of two radiator sections which are each designed as panel radiators and which are provided, along upper and lower edges, with channels outside of which there are located projecting edge portions. Between these upper and lower channels, there extend vertical flow passages or columns in the radiator, alternating with portions where the sheet material of the radiator is welded together and, thus, displays double material thickness in the same manner as the above-mentioned edge portions.

It will be apparent from Fig. 1 that the device according to the present invention includes a foot arrangement 1 and a bracket arrangement 2. In this embodiment, the bracket arrangement is designed to cooperate with a double radiator which may be provided with convector plates, but which may also lack such plates. The mutual spacing between the two radiator sections included in this double radiator may vary within certain limits so that thereby the device according to the present invention may cooperate with as good as any double radiator of the type under consideration here.

The foot arrangement 1 has a mounting plate 3 which has a number of apertures 4 for anchorage members by means of which the mounting plate can be anchored to a substrate such as a floor, a ceiling or the like.

While the device according to the present invention is principally intended to hold a radiator a distance above a floor by cooperation with a lower edge area of the radiator, the device according to the present invention may of course also be secured, in the inverted state, to the upper edge portion of the radiator and, for example, serve for suspending a shelf, window sill or the like.

A tubular body 5 extends upwards from the mounting plate 3, and a substantially vertical bar 6 cooperates vertically adjustably with the body 5. In that the tubular body 5 extends upwards above floor level a considerable distance, and in that the vertical bar overlaps this upwardly extending portion in a vertical direction, possibilities will be created for vertical adjustment within a large adjustment range.

In order to achieve the above-described adjustment in the vertical direction, the upwardly directed tubular body 5 has an internal thread 7 which cooperates with a corresponding thread on the vertical bar. In that the mounting plate 3 is suitably circular in shape and provided with four apertures 4 of uniform spacing and distribution, this implies that a rotation of the mounting plate a quarter of a revolution corresponds to the minimum vertical adjustment which can be achieved with the adjustment arrangement. In practice, this means that the minimum adjustment step lies in the order of magnitude of half a millimeter.

For locking the selected vertical adjustment position, the vertical bar 6 has a locknut 8 which can be tightened against the upper end surface of the tubular body 5.

As is apparent from the Drawing, the bracket arrangement 2 is disposed on the upper end of the vertical bar 6 and comprises a fixed bracket which serves the function of backing portion 9 in order, via an installed radiator, to hold against that movement which is generated by a movable clamping portion 10. In the illustrated embodiment, the backing portion is, thus, rigidly connected to, or possibly of one piece manufacture with the vertical bar 6 and, in addition, serves for journalling and supporting the movable clamping portion 10.

The backing portion 9 has a lower, horizontal portion 11 which is secured in the upper end of the vertical bar 6 and which serves for journalling a pin 12 which pivotally supports the clamping portion 10. An arm 13 extends upwardly from the horizontal portion 11 and is provided at its upper end with a laterally, outwardly projecting engagement portion 14. Beneath engagement portion 14, the arm 13 has a recess 15 which serves to accommodate at least a part of the lower channel 16 of the radiator (see Figs. 3 and 4). The engagement portion 14 is intended to abut against the radiator above this channel and may be toothed or be of some other frictional material which prevents or at least impedes the radiator from being raised upwardly when the engagement portion 14 is urged laterally against the material of the radiator. That position on the radiator where the engagement portion 14 is located is disposed between two vertical columns in the radiator and, therefore, consists of a welded portion in the radiator where the sheet metal material of the radiator is of double thickness. Given that the recess 15 is larger than the channel 16 with some margin, the device according to the present invention may cooperate with radiators whose channel is of varying dimensions and designs.

At the right-hand end of the lower horizontal portion 11 of the backing portion 9 in Fig. 1, this is provided with a fixing device 18 in the form of an upwardly directed catch which is intended to engage laterally with the projecting edge portion 17 which the radiator displays beneath the channel 16 (see Figs. 3 and 4). Furthermore, the fixing device 18 is provided with a support surface 19 on which rests the lower edge surface of the edge portion 17.

If a line is drawn along the abutment surface of the engagement portion 14 and is extended downwardly to the region of the fixing devices, the distance between this line and the inside of the upwardly directed catch 18 will roughly correspond to twice the sheet metal thickness of the radiator, which is one of the few dimensions which is constant irrespective of the make and model of the radiator.

It will be apparent from the foregoing description that the backing portion engages with the radiator at such positions where the sheet metal material

is of double thickness and is welded together, for which reason the mechanical strength in these portions is good. In addition, the engagement portion 14 and the catch 18 abut against the opposing sides of the double sheet metal material in the radiator.

The clamping portion 10 may be of a design which entails that it is approximately a mirror image of the above-described backing portion and has, thereby, in its upper end a laterally projecting abutment portion 20, a recess 21 located beneath this portion corresponding to the recess 15 on the backing portion, and an upwardly directed catch 18 or a fixing device which, in respect of positioning and dimensioning, fully corresponds to that described above with reference to the fixing device of the backing portion 9.

As has been mentioned previously, the clamping portion 10 is pivotal about the pin 12 disposed in the backing portion 9 and, in addition, is displaceable in a direction which is transversely directed in relation to the plane of extent of the installed radiator, in that the clamping portion 10 has an elongate aperture 22 for accommodating the pin 12. Hereby, the device according to the present invention may readily be adapted to such radiators as display different distances between the included radiator sections, i.e. to radiators which are of varying widths.

For actuating the clamping portion 10, this is provided with an actuator portion 23 which may consist of a downwardly directed ramp or cam surface on a part of the clamping portion 10 which would approximately correspond to the lower horizontal portion of the backing portion 9. Furthermore, the vertical bar 6 is provided with a nut 24 which, by upward screwing, cooperates with the actuator portion 23 and thereby pivots the entire clamping portion 10 in counterclockwise (in Fig. 1) direction. On such tightening (screwing in an upward direction) of the nut 24, the abutment portion 20 and the engagement portion 14 will urge against the inner surfaces of the radiator interiorly and in directions away from one another in such positions where the inner surfaces consist of welded together double sheet metal portions.

Fig. 3 (mirror reversed in relation to Fig. 1) illustrates the commencement of the installation cycle when a double radiator is to be installed on the device according to the present invention. It will be apparent that the double radiator is, as mentioned above, composed of two radiator sections which are designed as mutual mirror images and which, as described above, have lower channels 16 from which downwardly extend projecting edge portions 17 consisting of double, welded sheet metal material.

In the illustrated position, the radiator is inclined somewhat in the lateral direction, and the clamping portion 10 is displaced in a direction towards the backing portion 9 and is pivoted partly in a counterclockwise direction, with the upper end in a direction towards the backing portion. It will further be apparent that both the recess 21 of the backing portion 9 and the recess 15 of the clamping portion 10, respectively, are sufficiently large to accommodate at least a part of the channels 16 of the radiator sections so that thereby the engagement portion 14 and the abutment portion 20 may come into engagement with the radiators on that side of the channel 16 facing away from the edge portion 17.

When the radiator which is in the process of being installed is pivoted in a clockwise direction, this entails that the clamping portion 10 will be pivoted in a clockwise direction until the abutment portion 20 comes into abutment against the inner side of the radiator, at the same time as the fixing device 18 comes into engagement against the outside of the edge portion 17. If, in this position, the nut 24 is screwed in an upward direction into abutment against the actuator portion 23, the clamping portion 10 will be subjected to a torque in a clockwise direction. This implies that the upper end of the clamping portion 10 urges the radiator in a direction to the right, for which reason it will be displaced in the same direction so that engagement thereby occurs between the backing portion and the inside of the opposing radiator section. Further, the radiator is prevented from being pivoted in a clockwise direction in that the fixing device of the backing portion is urged in the lateral direction against the outside of the edge portion 17. On tightening of the nut 24 in an upward direction, the backing portion and the clamping portion, therefore, urge, interiorly and in directions away from one another, against the insides of the double radiator, at the same time as the fixing

devices grasp about the outsides of the downwardly directed edge portions 17. Fig. 4 shows this fully installed position.

By being both pivotal and displaceable in the lateral direction, the clamping portion 10 will adjust itself to a position where it abuts interiorly against the radiator with the abutment portion 20 and exteriorly with the catch 18. Corresponding engagement positions for the backing portion are symmetrically located (mirror-reversed). On tightening of the nut 24, the entire union will, therefore, be adjusted such that its loading becomes uniformly distributed; the two catches 18 will have equal but counter-directed loadings, which also applies to the abutment portion 20 and the engagement portion 14.

It will be apparent from Fig. 4 that the channels 16 do not follow the contours of the recesses 15 and 21 which the backing portion 9 and the clamping portion 10 have. However, as an alternative to the described design and construction, the recesses can be given a contour which is at least partly complementary to the form of the channels 16 so that the channels thereby engage against these contour portions and are prevented from being displaced in an upward direction when the radiator is installed. Hereby, improved safety will be afforded against the radiator being unintentionally lifted out of its installed position.

## DESCRIPTION OF ALTERNATIVE EMBODIMENTS

Figs. 5 and 6 show one embodiment which is intended for installation of a single radiator, which, as is apparent from the Drawing, may be provided with convector plates 25.

In the embodiment according to Figs. 5 and 6, the same reference numerals have been employed for such constructional details as are also to be found in, or have close counterparts in, the constructional elements in the above-described embodiment.

It will be apparent from the Figures that the orientation of the backing portion 9 and the clamping portion 10 is reversed in relation to that which applied in

the above-described embodiment and, furthermore, the clamping portion is pivotal in a direction in towards the backing portion. Further, the fixing device 18 is disposed between the backing portion 9 and the clamping portion 10. As a result, the edge portion 17 will be accommodated or tensioned in the recess which is formed by the fixing device, whereby the edge portion is positionally fixed in directions which are transversely directed in relation to the plane of extent of the radiator.

When installing a radiator on an embodiment of the present invention as shown in Figs. 5 and 6, the radiator is inserted as shown in Fig. 5 somewhat obliquely inclined until the channel 16 is accommodated in the recesses 15 and 21, and the edge 17 is located between the catches 18 on the backing portion 9 and the clamping portion 10. In this position, the radiator is pivoted in a clockwise direction until it comes into abutment against the backing portion 9. In this position, the nut 24 is screwed in an upward direction into engagement with the actuator portion 23 so that the clamping portion 10 is thereby subjected to a torque in a counterclockwise direction. Hereby, the portion of the radiator located above the channel 16 will be laterally clamped from opposing directions between the backing portion 9 and the clamping portion 10, at the same time as the lower end portion of the clamping portion 10 strives to move in a direction to the right so that the edge portion 17 will thereby be tensioned in position as well.

The fully tensioned position is shown in Fig. 6.

In the above-described embodiments, the backing portions 9 were rigidly connected to the vertical bar 6. However, it is also possible to dispose both the backing portion 9 and the clamping portion 10 to be pivotal. In such an embodiment as corresponds to the embodiment according to Figs. 1 - 4, the bar 6 is provided, at its upper end, with a crosspiece whose opposingly projecting portions serve for journalling the backing portion 9 and the clamping portion 10. In this alternative, the backing portion 9 has an actuator portion in the same manner as the clamping portion 10 is provided with the actuator portion 23. On installing a radiator on such an embodiment of the present invention, the backing portion and the clamping portion are moved towards one another in between the two radiator sections and are

permitted to fall outwardly against the insides thereof. When the downwardly directed edge portions 17 of the radiator subsequently come into engagement with the fixing devices 18 and the support surfaces 19, this entails that both the backing portion 9 and the clamping portion 10 will, with their upper end portions, be pivoted away from one another. Tightening of the nut 24 will amplify this pivoting away from one another of the backing portion and the clamping portion and, at the same time, prevent a synchronous pivoting of these parts, so that the radiator thereby becomes fixed in a vertical plane.

In the above-described embodiment, it is suitable that only one of the backing portion or the clamping portion be displaceable by being provided with an elongate aperture 22.

As a counterpart to the version according to Figs. 5 and 6, the crosspiece on the bar 6 may be dispensed with and the journal pin 12 may be secured direct on the bar so that both the backing portion 9 and the clamping portion are pivotal about the same journal pin.

According to the invention, it is also possible to arrange the clamping portion 10 to be displaceable in the transverse direction of the plane of extent of the radiator, for example in that it has a sliding guide or the like in relation to the backing portion 9 or a corresponding installation part on the upper end of the bar 6.

Further modifications are possible within the spirit and scope of the appended Claims.

## WHAT IS CLAIMED IS:

1. A device for installation of or for securement of an object in such a single or multiple section radiator as has, in each included radiator section, a channel (16) along one edge, and an edge portion (17) projecting along the side thereof facing away from the main portion of the radiator, the edge portion including a foot arrangement (1) for securement on a substrate or for carrying the object, and bracket means (2) for retentive cooperation with the radiator, **characterized in that** said bracket means (2) include a fixing device (18) which, by accommodation of or engagement with the edge portion (17) of the radiator or a radiator section, respectively, is disposed to positionally fix this in directions transversely of the plane of extent of the radiator, and a clamping device (10) which is applicable against the radiator or radiator section, respectively, on that side of the channel (16) facing away from the edge portion (17), and a backing device (9), which is disposed for abutment against the radiator or a radiator section on that side of the channel (16) turned to face away from the edge portion (17).

2. The device as claimed in Claim 1, **characterized in that** the backing device (9) is disposed to be stationary.

3. The device as claimed in Claim 1, **characterized in that** the backing device (9) is moveably disposed in one direction which is opposed to the direction of movement of the clamping device.

4. The device as claimed in any one of Claims 1 to 3, **characterized in that** the clamping device (10) is pivotal about a shaft (12) which is substantially parallel with the longitudinal direction of the edge portion (17).

5. The device as claimed in any one of Claims 1 to 4, **characterized in that** the fixing device (18) includes an abutment portion for abutment against that side of the edge portion (17) which is opposed to that side of the radiator or radiator section, respectively, against which the clamping device (10) is applicable.

6. The device as claimed in Claim 5, **characterized in that** the clamping device (10) and the backing portion (9) are provided, between their portions (20; 14, respectively) designed for abutment against the radiator or radiator section, respectively, and the fixing device (18), with a recess (21; 15, respectively) for accommodating at least a part of the channel (16).

7. The device as claimed in Claim 6, **characterized in that** the recess (15, 21) is, at least along a part of its contour, of a configuration which is complementary to the configuration of an adjacent portion of the channel (16).

8. The device as claimed in any one of Claims 1 to 7, **characterized in that** the foot arrangement (1) is, at its end facing towards the clamping device (10), provided with locking means (24) movable into cooperation with an actuator portion (23) on the clamping device (10) for actuation thereof towards its abutment position and for locking thereof in said position.

9. The device as claimed in Claim 8, **characterized in that** said locking means (24) is provided with a thread in engagement with a corresponding thread on the foot arrangement (1), whereby said locking means is movable along the foot arrangement.

10. The device as claimed in any one of Claims 4 to 9, **characterized in that** the clamping device (10) is, at its pivot axis (12), displaceable in a direction which is transversely directed to the plane of extent of the radiator.

11. The device as claimed in any one of Claims 1 to 10 and designed for cooperation with a single radiator, **characterized in that** the clamping portion (10) and the backing portion (9) are located on opposite sides of the radiator; **and that** the clamping portion (10) is urgeable against the backing portion.

12. The device as claimed in any one of Claims 1 to 10 and designed for cooperation with a double or multiple radiator, **characterized in that** the clamping portion (10) and the backing portion (9) are disposed on the insides of the two outer radiator sections; **that** the clamping portion is

applicable away from the backing portion; **and that** the fixing device (18) is in engagement with the edge portions (17) of the same radiator sections.

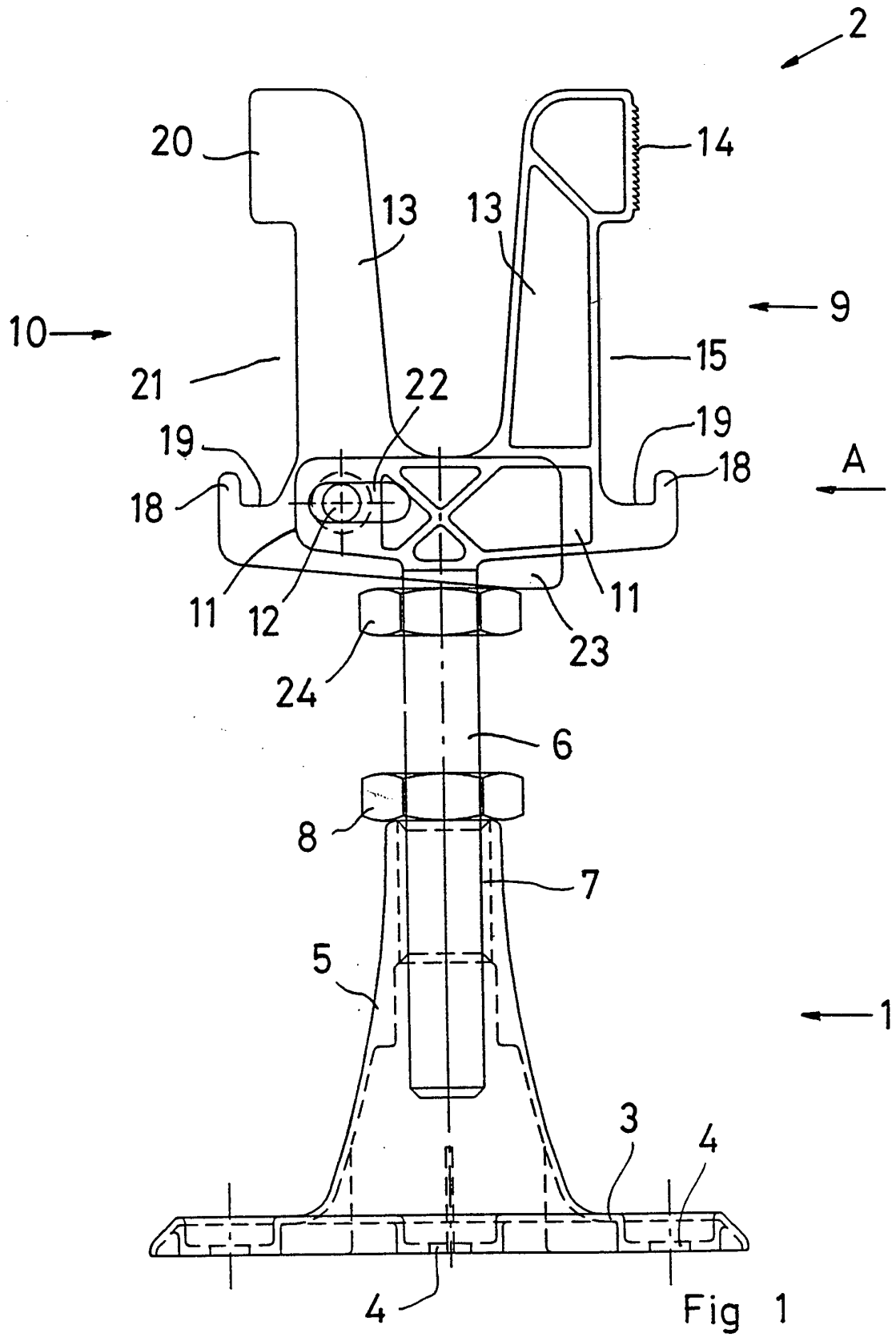



Fig 1

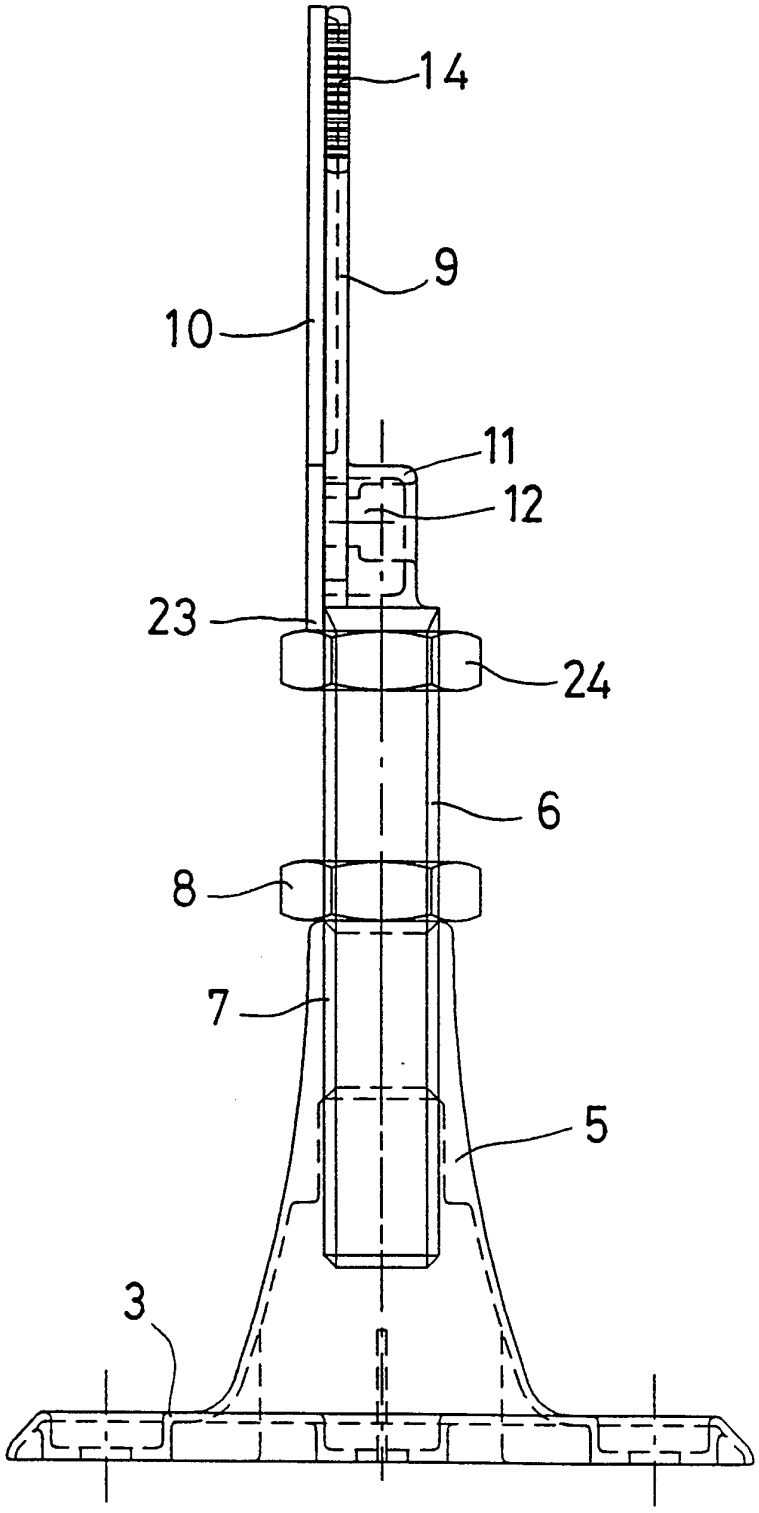



Fig 2

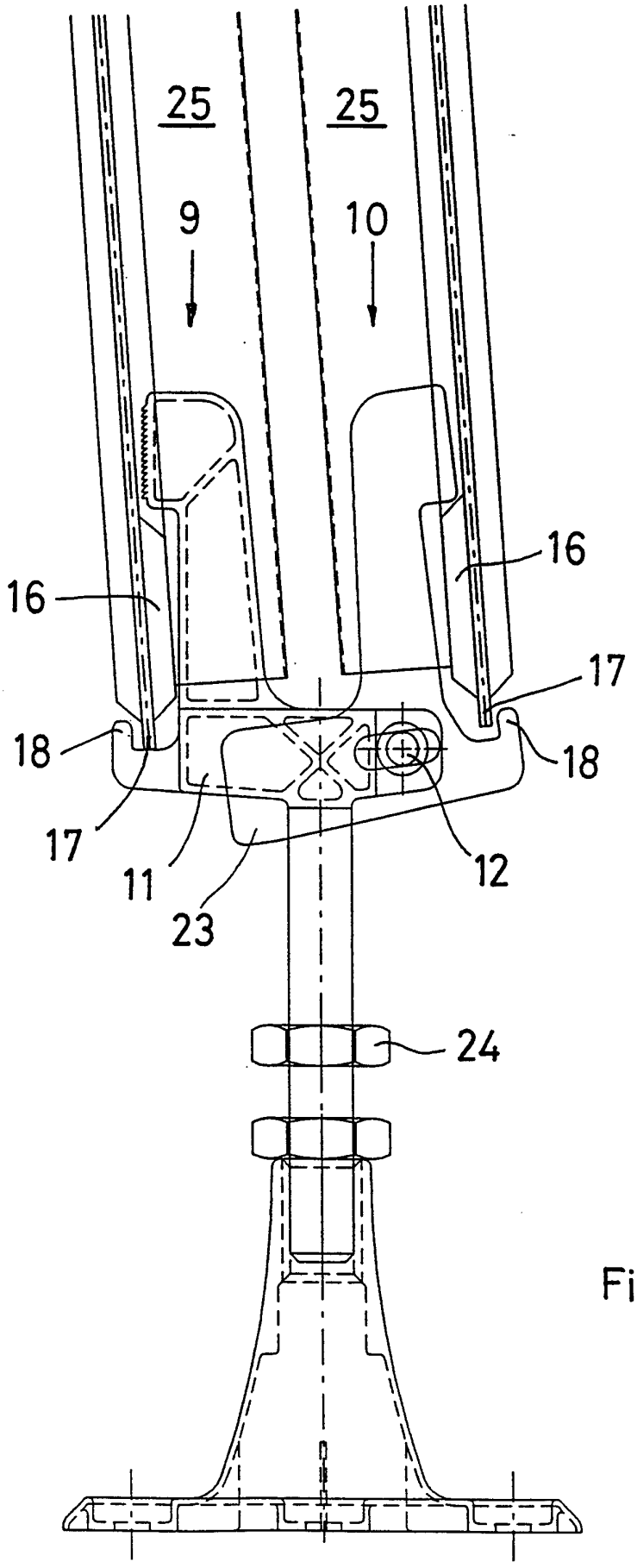



Fig 3

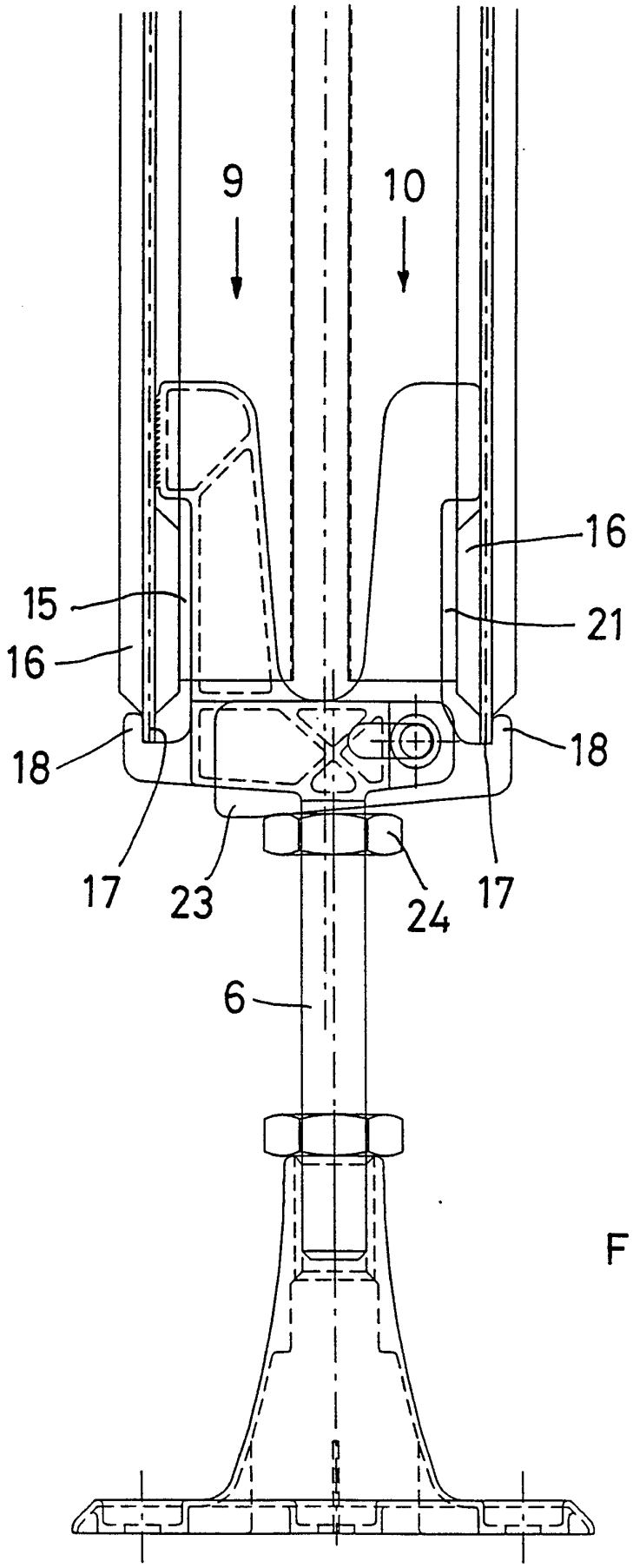



Fig 4

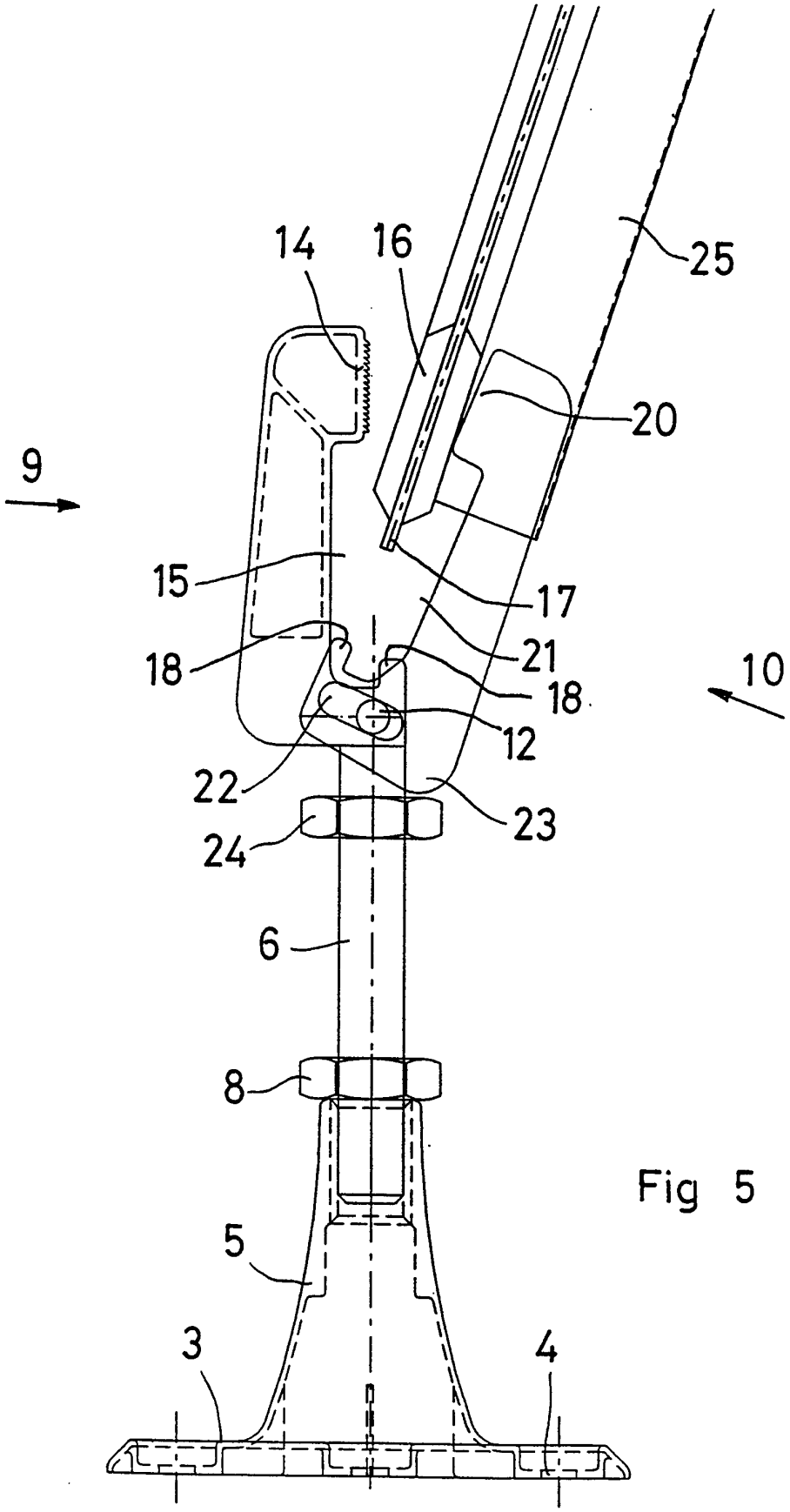



Fig 5

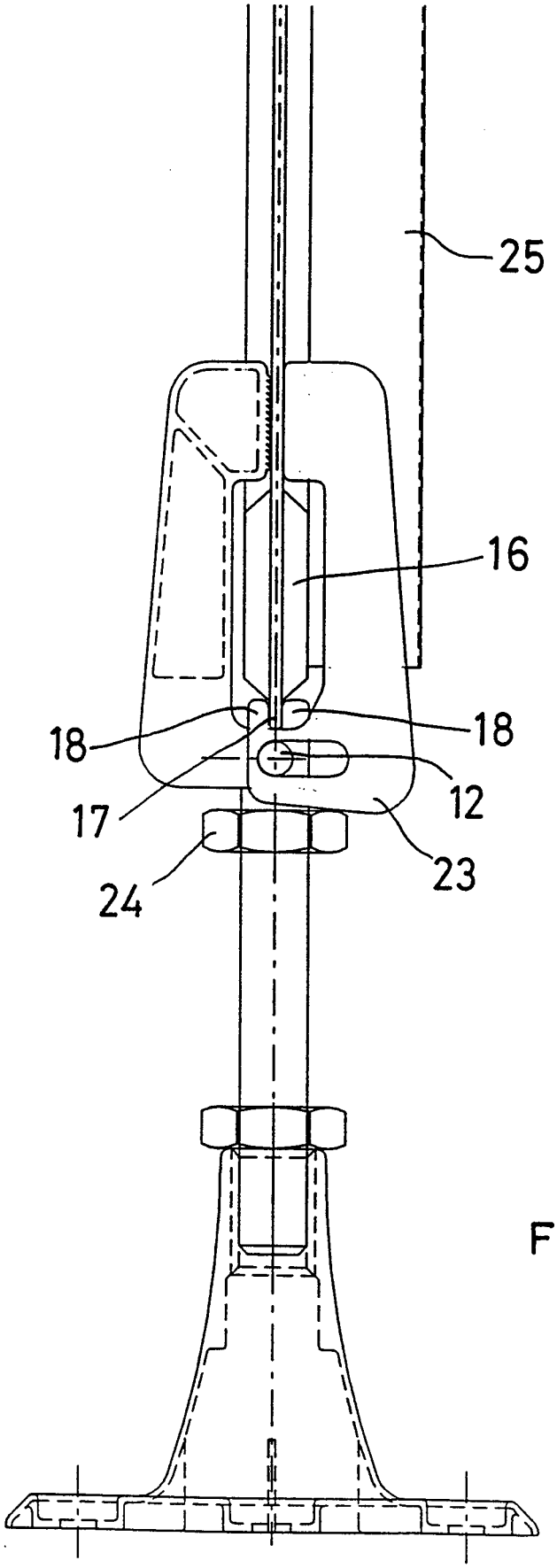



Fig 6

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 93/00585

## A. CLASSIFICATION OF SUBJECT MATTER

IPC5: F24D 19/02
According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: F24D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | DE, A1, 3245555 (SCHÄFER WERKE GMBH), 30 June 1983 (30.06.83), page 4 - page 6, figure 1 | 1,2 |
| Y | | 8-9 |
| A | | 3-7,10-12 |
| | -- | |
| X | DE, C2, 2839355 (HANS GERD GOTTBEHüT GMBH & CO. KG), 28 October 1982 (28.10.82), page 11 - page 13, figure 2 | 1,2 |
| Y | | 8,9 |
| A | | 3-7,10-12 |
| | -- | |

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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| Date of the actual completion of the international search | Date of mailing of the international search report |
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| Name and mailing address of the ISA/<br>Swedish Patent Office<br>Box 5055, S-102 42 STOCKHOLM<br>Facsimile No. +46 8 666 02 86 | Authorized officer<br><br>Inger Löfving<br>Telephone No. +46 8 782 25 00 |

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International application No.
PCT/SE 93/00585

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