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

(57) An arrangement for mounting a radiator (1) with a vertical, downwardly open accommodation space (6), includes a base section (8), an upright (10), two anchorages (15, 16), a locking device and spring means (21). The base section (8) is fixable in a substrate (7). The upright (10) extends upwards from the base section (8) and into the accommodation space (6). The one anchorage (15) is supported by the upright (10) and is designed for cooperation with a first portion of the radiator (1). The second anchorage (16) is intended to cooperate with a second portion of the radiator (1), located above the first portion. The second anchorage (16) has an open position and a locking position. The locking device locks the second anchorage (16) in the locking position and has an operating device (23) outside the accommodation space (6). The spring means (21) imparts a pre-tensioning to the second anchorage (16) in a direction towards the locking position.

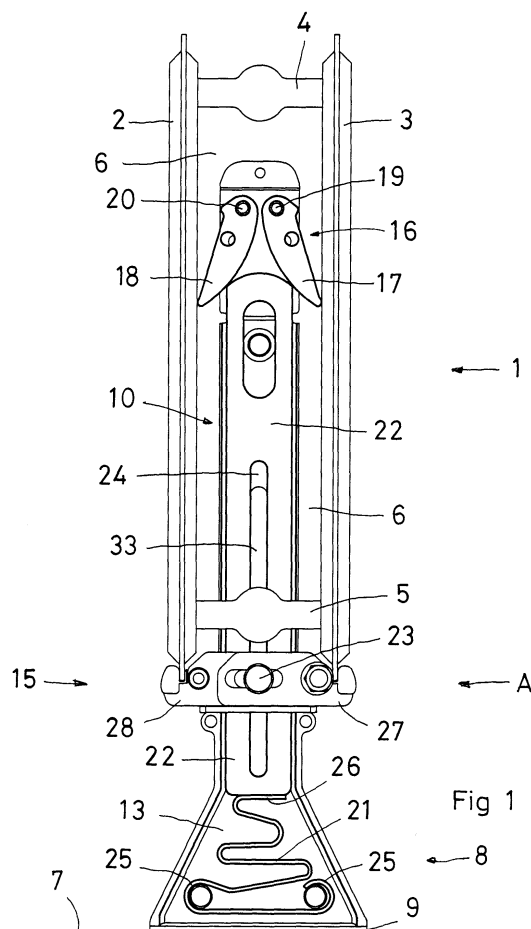


Fig 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to an arrangement for mounting a radiator on a substrate, the arrangement having a downwardly open accommodation space extending in the vertical direction of the radiator, the arrangement including: a base section fixable in the substrate, an upright extending upwards from the base section and disposed to extend up into the accommodation space, a first anchorage supported by the upright and designed for cooperation with a first portion of the radiator, a second anchorage which may be accommodated in the accommodation space for cooperation with a second portion of the radiator, the second portion being located above the first portion, and the second anchorage having an open position and a locking position for positionally fixing cooperation with the radiator, and a locking device for locking the second anchorage in the locking position, the locking device having an operating member located outside the accommodation space.

BACKGROUND ART

[0002] Radiators for water-borne heat can be designed as single element radiators or be composed of a plurality of radiator elements to form duplex radiators, triplex radiators, etc. A single element radiator and each radiator element has upper and lower, substantially horizontal water channels between which extend vertical water channels. The spacing between the vertical water channels is, as standard, 25, 33 or 40 mm. In composite radiators, it is a common occurrence that convactor plates are provided in between the radiator elements, as a rule one set for each radiator element. Correspondingly, the single element radiator generally displays convactor plates on its rear side. The design of the convactor plates may vary greatly from one manufacturer to another, for which reason both their dimensioning and location may vary. Furthermore, there are many designs and constructions in which the convactor plates take up considerable space and are located closely together so that the available space for inserting, in a composite radiator between its radiator elements, an anchorage device for securing the radiator may be extremely limited.

[0003] Radiators of the type under consideration here are often provided with safety plates along their vertical side edges and on the upper side. This implies that if an anchorage device for mounting the radiator on the substrate is located concealed in between the radiator elements, it cannot be accessed from the side walls of the radiator or its upper side.

[0004] Furthermore, the radiators are generally supplied ready-painted and packed in a protective transport package out to the worksite. When the radiators are mounted in place, the intention is to retain the transport packaging on the radiator, preferably even after the ra-

diator has been mounted in place. Consequently, there is a considerable need in the art that the anchorage arrangement must be able to be pushed straight through the transport packaging at the underside of the radiator and up into an accommodation space interiorly in the radiator, where the accommodation space may be limited or defined by radiator elements or convactor plates included in the radiator. Thus, in the mounting operation, the aim is that the transport packaging should not be unnecessarily damaged or need to be removed.

[0005] The anchorage arrangement according to EP 723 118 A1 has a base section fixable in a substrate and from which an upright extends upwards and, in its upper end, has an upper anchorage. The upper anchorage is insertable from beneath into an accommodation space in the radiator and has an open position and a position which secures the radiator. The upper anchorage is manoeuvrable by the intermediary of a rod shiftably disposed in the upright which, by means of a gear wheel arrangement at the lower end of the upright, is displaceable in the vertical direction in the upright.

[0006] The anchorage arrangement according to the above publication further displays a lower anchorage secured in the upright which cooperates with a lower edge portion of the radiator.

[0007] The anchorage arrangement further has a locking mechanism which is intended for locking the upper anchorage in its locking position but also for locking the lower anchorage in a position chosen and adjusted for it in response to the dimensions of the radiator.

[0008] The above-outlined construction functions satisfactorily in many contexts, but because of the separate operating device for the upper anchorage, it is necessary, on mounting a radiator in place, to employ two different tools at the same time. First, the operating device for the upper anchorage must be activated so that the upper anchorage is brought to its locking position and retained there. Secondly, the upper and lower anchorages must be locked in locking position and in chosen adjustment position, respectively, before the radiator may be considered as mounted in place.

PROBLEM STRUCTURE

[0009] The present invention has for its object to develop the anchorage arrangement described by way of introduction such that its operation and use are simplified without jeopardising its reliable function. Further, the present invention has for its object to realise an anchorage arrangement which is simple and economical in manufacture.

SOLUTION

[0010] The objects forming the basis of the present invention will be attained if the anchorage arrangement intimated by way of introduction is characterized by spring means for pre-tensioning the second anchorage

in a direction towards its locking position.

[0011] As a result of this distinguishing feature, the need for a special operating device for transferring the upper anchorage between its open position and its locking position is obviated.

[0012] According to one preferred embodiment of the present invention, it moreover applies that the locking device is located outside the accommodation space and is functionally interconnected to the second anchorage via a transmission device.

[0013] It further suitably applies according to the present invention that the locking device is common to both the first and the second anchorage.

[0014] As a result of the above-considered features, the advantages afforded will be convenience in the operation of the arrangement according to the present invention and also simple design and construction.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

[0015] The present invention will now be described in greater detail hereinbelow, with particular reference to the accompanying Drawings. In the accompanying Drawings:

- Fig. 1 shows a duplex radiator mounted on the arrangement according to the present invention which, for the purpose of clarity, is shown in a partly cut-away view;
- Fig. 2 is a vertical view of the arrangement according to the present invention in which the first anchorage device is fully pivoted outwards;
- Fig. 3 is a side elevation of a part of the arrangement according to the present invention according to the arrow A in Figs. 1 and 2; and
- Fig. 4 is a cross section through the arrangement according to the present invention taken along the section line B-B in Fig. 2.

DESCRIPTION OF PREFERRED EMBODIMENT

[0016] In Fig. 1, reference numeral 1 relates to a duplex radiator which is seen from its end wall and which is composed of two radiator elements 2 and 3. The two radiator elements 2 and 3 are interconnected with each other by the intermediary of pipe couplings 4 and 5 so that there is formed between an accommodation space 6 which is at least open downwards. The radiator 1 is secured by means of the arrangement according to the present invention a distance above a substrate 7.

[0017] In Fig. 1, a duplex radiator is shown which, according to the Figure, has no convector plates. However, there are generally also provided on duplex radiators convector plates which are disposed on the sides of the

two radiator elements 2 and 3 turned to face towards one another. This implies that the accommodation space 6 may have varying configuration and, in the longitudinal direction of the radiator, at right angles to the plane of the paper of Fig. 1, be quite narrow. In any event, the accommodation space is defined or limited by two substantially vertical and mutually approximately parallel surfaces which, in the embodiment according to Fig. 1, are to be found on the two radiator elements 2 and 3.

[0018] In such radiators as display the above-mentioned convector plates, the accommodation space may, however, also be limited by a radiator and a convector plate or possibly between two convector plates. According to the present invention, it is of no major importance how the accommodation space is limited or defined, as long as it has two opposing sides with which the arrangement according to the present invention may engage and as long as it is sufficiently large for accommodating at least an upper portion of the arrangement according to the present invention.

[0019] Taken from Figs. 1 and 4 together, it will be apparent that the arrangement according to the present invention has a lower base section 8 which, via an anchorage plate 9, is secured in the substrate 7. From the base section 8, an upright 10 extends upwards and is at least partly accommodated in the accommodation space 6. The upright 10 is composed of two plates 11 and 12 which form a space between them. The plates abut against each other along their vertical side edges and are joined together at the side edges, at least partly along their longitudinal extent.

[0020] The base section 8 is also formed by the two above-mentioned plates 11 and 12, and the base section also has an inner space 13 whose purpose will be described below. In the lower edge of the base section 8, the plates 11 and 12 included in the base section are outwardly flared from one another so that the above-mentioned anchorage plate 9 is thereby formed. It will be apparent from the foregoing that the upright, the base section and the anchorage plate are manufactured from two mutually joined plate parts. It will further be apparent from Fig. 4 that the anchorage plate 9 has an embossing 14 for purposes of rigidification.

[0021] The upright 10 supports or serves as an anchorage for a first anchorage 15 which is disposed for cooperation with a first portion of the radiator. In one preferred embodiment, the first anchorage is a lower anchorage and cooperates with lower edge portions of the radiator 1.

[0022] According to the present invention, the anchorage arrangement also has a second anchorage which is insertable in the accommodation space 6 and which there cooperates with a second portion of the radiator 1. The second anchorage 16 is located vertically above the first anchorage, and so the second portion of the radiator is also located over its first or lower portion.

[0023] The lower anchorage 15 is adjustable in re-

sponse to the dimensions of the radiator and is thus vertically adjustable, depending upon the vertical extent of the radiator, along the longitudinal extent of the upright 10. Furthermore, the first anchorage is adjustable in the width direction, corresponding to the width of the radiator, transversely of the longitudinal direction of the upright 10 so that the first anchorage 15 may thereby cooperate with radiators in which the distance between the radiator elements 2 and 3 may vary. The first anchorage may further be designed in such a manner that it engages with lower portions of convector plates (not shown in the Drawings). Combinations may also occur in which the lower anchorage engages with, on the one hand, a radiator element and, on the other hand, with a convector plate or possibly with anchorages specifically provided on the radiator.

[0024] The second anchorage 16, which, thus, in the preferred embodiment is placed at an upper portion of the upright 10, has a locking position for positionally fixing cooperation with the radiator 1, and an open position in which the radiator may be mounted on the arrangement according to the present invention. In its most generic form, the present invention entails that the second anchorage is spring-biased towards the locking position and is fixedly lockable in this position by means of a locking device which is actuatable from outside the accommodation space 6 and is preferably a slight distance under it.

[0025] The second, or upper, anchorage 16 includes two pivotal arms 17 and 18 which, by the intermediary of joints 19 and 20, are secured in the upright 10. The arms 17 and 18 are pivotal in opposite directions away from one another and laterally out from the upright 10 between a retracted position where the distance between the lower ends of the arms 17 and 18 is less than that shown in Fig. 1, to a wholly outwardly pivoted position which is approximately apparent from Fig. 2. The force which realises the above-mentioned counter-directed pivoting of the arms, the outward pivoting of them, is generated by spring means 21, as will be described in greater detail below.

[0026] Expressed generally, the second or upper anchorage is expandable laterally in relation to the upright 10 under the action of the spring means 21 in order thereby to be able to engage with the surfaces in the radiator 1 which limit the accommodation space 6.

[0027] Interiorly in the upright 10, there is provided a rail 22 which is shiftable in its longitudinal direction and is movable in the vertical direction of the upright 10. The upper end of the rail 22 is in engagement with the mutually facing surfaces of the two arms 17 and 18, whereby an upwardly directed movement of the rail 22 causes pivoting of the arms away from one another, while a downwardly directed movement of the rail permits the arms to be pivoted in towards one another, i.e. in a direction from the position illustrated in Fig. 2 to the position illustrated in Fig. 1, or further.

[0028] It was mentioned above that the lower anchorage

15 is adjustable. For fixedly locking the lower anchorage, this cooperates with a locking device which includes a screw 23 which extends through the upright 10 and through an elongate aperture 24 in the rail 22. On activation of the locking device, the lower anchorage 15 is locked in the adjusted position at the same time as the rail 22 is blocked in the vertical direction. This implies that, with the rail blocked in the vertical direction, the two arms 17 and 18 cannot be pivoted towards one another since they are in engagement with the upper end of the rail. Consequently, the rail 22 acts as a transmission device which functionally interconnects the upper anchorage 16 with the locking device which includes the screw 23 and which is located easily accessible outside the accommodation space 6 and preferably a slight distance under it.

[0029] As will have been apparent from the foregoing, spring means 21 are provided in the base section 8 in the form of a substantially zig-zag shaped spring which, with one end 25 is supported in the base section 8, and which, with its other end 26, abuts against the lower end of the rail 22 and urges the rail upwards. That the rail is urged upwards entails, by cooperation between the upper end of the rail 22 and the two pivotal arms 17 and 18, that these strive to be pivoted away from one another in a direction towards the locking position of the upper anchorage 16.

[0030] On mounting of radiator 1 on the anchorage arrangement illustrated in Figs. 1 and 2, the radiator is pressed down over the upright 10, the two outwardly spring-biased arms 17 and 18 being urged in towards one another, whereby the rail 22 is pressed downwards and the spring 21 is compressed. When the radiator has subsequently come to the correct position and rests on the lower anchorage 15, both of the arms 17 and 18 are spring-biased away from one another and into abutment against those surfaces in the radiator which limit or define the accommodation space 6. On tightening of the screw 23 included in the locking device, and which serves the purpose of manoeuvring device for the locking function of the second anchorage 16, the two plate parts 11 and 12 in the upright are pressed towards one another by the action of the screw and in such a manner that they clamp the rail 22 fast between them, the rail being thereby locked in position in relation to the upright. This also entails that the two pivotal arms 17 and 18 are effectively prevented from being pivoted back towards the open position of the anchorage 16. As a result, a positionally fixing contact without play prevails between the two arms 17 and 18 and the radiator.

[0031] Fig. 3 shows, on a larger scale, the first or lower anchorage 15. It will be apparent from Figs. 2 and 3 together that the lower anchorage includes two arms 27 and 28 which are displaceable in relation to one another and whose longitudinal direction is transversely directed in relation to the longitudinal direction of the upright 10. The arms 27 and 28 have elongate apertures through which the screw 23 extends. In the outer ends, the two

arms have upwardly open recesses 29 and 30 which are intended for accommodating the lower edge portions of the two radiator elements 2 and 3. The two arms 27 and 28 are accommodated in a U-shaped stirrup 31 which, with its rear side, abuts against one of the two plates 11 and 12 of which the upright 10 is composed. On that side of the upright which is opposite to the two arms 27 and 28, as, well as the stirrup 31, there is provided a nut 32 which, on tightening of the screw 23, is urged against the one 11 of the two plates of which the upright 10 is composed. Finally, the lower anchorage 15 also has a lug 34 on each side of the upright for guiding the U-shaped stirrup 31 in the transverse direction of the upright 10.

[0032] In the foregoing, it was mentioned that the lower anchorage 15 is adjustable in the vertical direction, i. e. in the longitudinal direction of the upright 10. This is achieved in that the upright 10 has an elongate aperture 33 along which the screw 23 is slidable in the vertical direction of the upright. On tightening of the screw 23, the lower anchorage 15 is therefore positionally fixed in the vertical direction of the upright 10, at the same time as the two arms 27 and 28 are locked in relation to one another in the transverse direction of the upright. As a result, both of the anchorages 15 and 16 share a common locking device.

DESCRIPTION OF ALTERNATIVE EMBODIMENTS

[0033] As an alternative to the spring means 21 provided in the base section 8 of the arrangement according to the present invention, a spring serving the same function may be placed, in principle, anywhere whatever in the construction. By way of example, mention might be made that one or possibly two springs may be provided for directly acting on the two pivotal arms 17 and 18. Furthermore, the spring may be designed as an elongate, helical spring which, with its one end, abuts against the rail 22 and with its other end abuts against the upright 10.

Claims

1. An arrangement for mounting a radiator (1) on a substrate (7), the arrangement having a downwardly open accommodation space (6) extending in the vertical direction of the radiator, comprising:
 - a base section fixable in the substrate;
 - an upright (10) extending upwards from the base section and disposed to extend up into the accommodation space;
 - a first anchorage (15) supported by the upright and designed for cooperation with a first portion of the radiator;

a second anchorage (16) which may be accommodated in the accommodation space for cooperation with a second portion of the radiator, the second portion being located above the first portion, and the second anchorage having an open position and a locking position for positionally fixing cooperation with the radiator;

a locking device for locking the second anchorage in the locking position, the locking device having an operating member (23) located outside the accommodation space,

characterized by

spring means for pre-tensioning the second anchorage (16) in a direction towards its locking position.

2. The arrangement as claimed in Claim 1, **characterized in that** the locking device is functionally interconnected with the second anchorage (16) by the intermediary of a transmission device.
3. The arrangement as claimed in Claim 2, **characterized in that** said spring means is operative to actuate the second anchorage (16) by the intermediary of the transmission device.
4. The arrangement as claimed in Claim 1 or 2, **characterized in that** said spring means is disposed to directly act on the second anchorage (16).
5. The arrangement as claimed in any of Claims 1 to 4, **characterized in that** the first anchorage (15) is adjustable in response to the dimensions of the radiator (1) and has a locking device for fixedly locking the first anchorage in a chosen position of adjustment.
6. The arrangement as claimed in Claim 5, **characterized in that** the first anchorage (15) is adjustable in the vertical direction along the upright (10).
7. The arrangement as claimed in Claim 5 or 6, **characterized in that** the first anchorage (15) is adjustable in the width direction transversely of the vertical direction of the upright (10).
8. The arrangement as claimed in any of Claims 5 to 7, **characterized in that** the locking device is common to the first (15) and the second (16) anchorage.
9. The arrangement as claimed in any of Claims 2 to 8, **characterized in that** the transmission device includes an elongate rail (22) which is slidable in its longitudinal direction in the vertical direction in relation to the upright (10).

10. The arrangement as claimed in Claim 9, **characterized in that** the locking device includes a screw (23) which extends through the upright (10) and the rail (22) and which, on tightening, is disposed to clamp the rail fast between wall portions (11, 12) included in the upright. 5
11. The arrangement as claimed in any of Claims 1 to 10, **characterized in that** the second anchorage (16) includes arms (17, 18) pivotally secured in the upright (10) said arms being outwardly pivotal in opposite directions from the upright (10). 10
12. The arrangement as claimed in any of Claims 2 and 3 and 11 to 15, **characterized in that** said spring means comprises a substantially zig-zag shaped spring (21) which, with its one end (25), is supported in the base section (8) and which, with its other end (26) extends upwards for cooperation with the transmission device. 15 20
13. The arrangement as claimed in any of Claims 1 to 12, **characterized in that** the first portion of the radiator (1) is its lower edge portion. 25

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