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(54) LOCKING DEVICE FOR A RADIATOR BRACKET AND A RADIATOR BRACKET COMPRISING SUCH LOCKING DEVICE

(57) Disclosed is a locking device (1) for a radiator bracket and a radiator bracket (20, 120) comprising such locking device (1). The radiator bracket (20, 120) comprises support means (24) for supporting a radiator (30) or stirrup member (31) disposed thereon, and the locking device (1) prevents unintentional dismounting of the radiator (30) from the bracket (20, 120) in a locking position by means of a locking lug (6, 14). The locking device (1) is pivotally disposed on the bracket (20, 120) by means of a pivot pin (4) and is pivotable between an open position and locking positions. A spring means (5) enables automatic snap fastening and a holder arm (7) and a pin protrusion (10) enables a safe but still pivotable attachment of the locking device (1) to the bracket (20, 120).

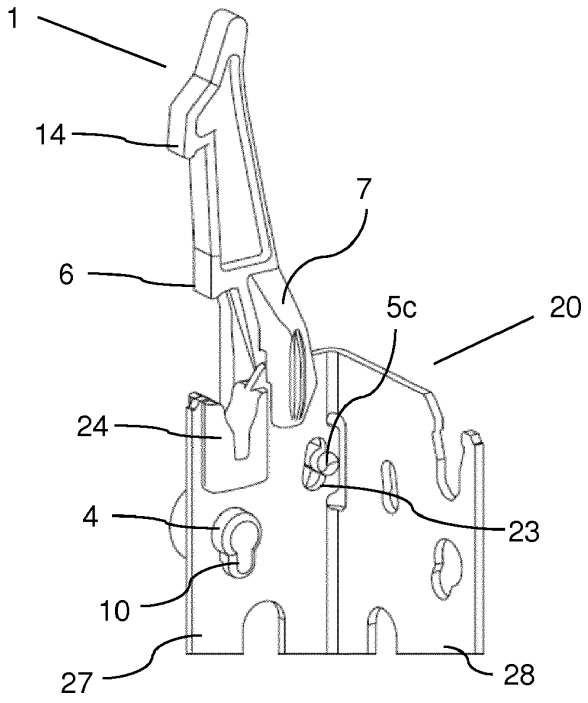

Fig. 3b

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Description

Technical field

[0001] The invention considers a locking device for a radiator bracket and a radiator bracket comprising such locking device. The radiator bracket further comprises support means for supporting from beneath a radiator or stirrup member disposed thereon, and the locking device prevents unintentional dismounting of the radiator from the support means in a locking position. The locking device is pivotally disposed on the bracket about a pivot axis and is pivotable between an open position (dismounting position) and one or several locking positions.

Background art

[0002] It is previously known to use different kind of brackets for mounting radiators and similar apparatuses on walls, which brackets engage with upper and lower parts of the radiator or for example brackets or the like mounted on the backside of the radiator such as sheet metal stirrups.

[0003] One ordinary type of bracket is constructed from an elongate metal sheet which has been bent in its longitudinal direction, such as forming an angled L-shaped bracket with two shanks. The two shanks normally are of different length to create an option of which distance the radiator should have to the wall, since one of the shanks is disposed to lie substantially flush against the wall, while the other shank is transversely directed in relation to the wall and extends outwards from it to create a space between the radiator and the wall. By having different length-dimension of the shanks, a flexible use of the bracket is achieved. This type of elongate bracket normally has one upper and one lower support means for accommodating the upper and lower part of the radiator or the lower and upper stirrup.

[0004] Another ordinary type of bracket is also constructed from a metal sheet, in similar way as described above, but instead of one elongate part, extending between upper and lower support means, this kind of bracket actually is two brackets, one upper and one lower. Since these brackets are separated and short compared to the elongate bracket described above, these brackets may be constructed from thicker sheet metal material.

[0005] In many markets, a locking device is a mandatory demand, which, as told above, prevents the radiator from being unintentionally lifted off or jolted off the bracket. A common positioning of this locking device is at the upper support means to enable an easy operation of the locking device.

[0006] One problem in relation to different kinds of bracket or stirrups is that they may have different heights, that is, the radiator height normally differs and also the stirrups may have different heights, why the "locking solution" must be of different kinds or solve also this issue in some way.

[0007] A known example of a L-shaped bracket with a locking device is disclosed in EP 0 786 631, which shows a design with a locking device, which is adapted to fit different heights of the stirrup of the radiator. The locking device comprises spring means, which ensures that the locking device engages with the upper end of the stirrup. This construction works quite well for its purpose, but it also suffers from a number of drawbacks. One drawback is that the bracket is quite long, not least the distance from the upper anchorage for the stirrup and upwards, which entails a relatively high material consumption. Another drawback is that the spring means entails a risk of plastic deformation since the plastic spring means is always in biased against an anvil, why there is a risk of a ceased function of the lock unless plastic of extremely high quality is used, which entails an increase in the production cost of the bracket.

[0008] Another example of a L-shaped elongate bracket with a locking device is disclosed in SE 534 521 C2, which discloses a bracket with first and second support means for supporting from beneath the radiator or stirrup members, and a locking device for preventing against unintentional dismounting of the radiator. The locking device is pivotally disposed in the elongate bracket about a pivot point, which is disposed below the adjacent first support means, and the locking device is movable between a locking position and a dismounting position. The locking device comprises a spring means for counteracting the movement of the locking device between the locking position and the dismounting position in both directions. The spring means is disposed on the locking device and comprises a spring projection which is movable in a recess in the rail. The recess has a side edge with a first blocking member which forces the spring projection, on passage, to move against the spring force of the spring means during the movement of the locking device between the locking position and the dismounting position in both directions. This solution is well functioning and enables the use of a shorter elongate bracket compared to EP 0 786 631, but it is not adapted to fit different heights of the stirrup of the radiator.

[0009] Another problem with the above solutions is that the locking device in both solutions is not safely fitted on the bracket, since it is mounted one-sided on the bracket, which means that it might flex a bit sideways and even loosen from the bracket if handled incorrectly.

Summary of the invention

[0010] It is an object of the invention to address at least some of the problems and issues outlined above. It is possible to achieve these objects and others by a locking device and a bracket as defined in the attached independent claims.

[0011] According to an aspect of the invention, a locking device is arranged for mounting on a radiator bracket, and the locking device is in turn arranged for preventing against unintentional dismounting of a radiator or a stirrup

member mounted on the radiator from the bracket. The locking device comprises a first end and a second end which is distal from the first end. Relating to the locking devices' mounted position on the bracket, the locking device further comprises a first side which faces the bracket in the mounted position on the bracket, and a second side facing away from the bracket in the mounted position on the bracket. The locking device further comprises a pin arranged near the first end on the first side of the locking device, and the pin is arranged for pivotal attachment to the bracket, by that the pin is arranged to fit into a first recess of the radiator bracket. By this, the locking device is pivotable around a pin axis between at least one first locking position and an unlocked position of the radiator or stirrup member relative the bracket. Further, the locking device comprises a spring means, arranged for counteracting a movement of the locking device between the locking position and the unlocked position. To lock the part of the radiator or the stirrup member mounted on the radiator in the first locking position, a first locking lug is arranged between the first end and the second end. The first locking lug preferably has a "nose" to provide a more secure hold of the part of the radiator or stirrup member in the locking position on the bracket. Further, a holder arm is arranged on the first side of the locking device between the first locking lug and the first end, but a bit aside an imaginary line between the first locking lug and the first end, to not intrude the locking position of the radiator/stirrup on the bracket. The holder arm forms a first gap between the holder arm and the first side, which first gap is arranged to receive an upper edge of the radiator bracket, and a distance between the pin axis and a stop surface of the first gap is adopted to allow the movement of the locking device between the first locking position and the unlocked position. The locking device further comprises a protrusion, arranged transversely relative the pin, at a distal end of the pin such as forming a second gap between the first side of the locking device and the protrusion. This protrusion is arranged to retain the pin in the first recess of the bracket, and the first gap and the second gap is arranged to accommodate (hold) the bracket in a mounted position of the locking device on the bracket.

[0012] Such a solution is very cost efficient, since the locking device, preferably made of plastic, is arranged near the upper part of the bracket, which saves bracket material, and further, the locking device is securely arranged at the radiator bracket since the first side of the locking device (which faces the bracket) holds on one side and the holder arm and the protrusion at the end of the pin holds on the other side of the bracket. By this, a secure fixing of the locking device to the radiator bracket is achieved in both the locking position and the open position. Further, the spring means enables an "automatic" locking since the spring means will push the locking device towards the locking position.

[0013] According to an embodiment, a first heel is arranged on an inside of the holder arm or on the first side of the locking device, such as the first heel protrudes into the first gap, and further a second heel is arranged on an inside of the pin protrusion or on the first side of the locking device, such as the second heel protrudes into the second gap. This enables that the same locking device can be used at brackets with sheet metal materials with different thickness. For example, the first heel may be arranged on the inside of the holder arm, for example extending along at least a part of the inside of the holder arm, say approximately half the distance, from the bottom of the first gap and halfway to the end of the holder arm. And the second heel may be arranged inside the second gap, for example at the inside of the pin protrusion, and extending along at least a part of the inside of the protrusion, say approximately half the distance, from the pin and halfway to the end of the protrusion. In this way, the same locking device fits a thin sheet material, wherein the narrowest part of the first and second gap retains the bracket. The narrowest part is the part between the first heel and the first side of the locking device, respective the part between the second heel and the first side of the locking device. As the first gap of the locking device is arranged to receive the upper edge of the radiator bracket, the distance between the pin axis and the stop surface of the first gap, is the distance between the pin axis and the bottom of the first gap, wherein this distance is adopted to allow the movement of the locking device between the first locking position and the unlocked position. For a thicker bracket material, the distance from the pin axis to the stop surface of the first gap is the distance between the pin axis and an end edge of the first heel (in the first gap), wherein this distance is adopted to allow the movement of the locking device between the first locking position and the unlocked position, for a thicker bracket. The first recess of the radiator bracket, which is the recess arranged for the locking device pin, is for the thicker bracket adopted to allow a clearance for the second heel, while for the thinner bracket, this clearance is not necessary. No prior art locking devices have the possibility to fit different material thicknesses of the bracket. The inventive locking device is by that a cost efficient and flexible solution.

[0014] According to an embodiment, at least one second locking lug is arranged between the first locking lug and the second end, which second locking lug is arranged to lock - a part of the radiator or the stirrup member mounted on the radiator - to the bracket in a second locking position. The inventive locking device is by that even more flexible, since this embodiment also fits at least two different heights of stirrup members or radiator heights. By "at least one" second locking lug is meant that even more heights may be possible by arranging a number of locking lugs on the locking device between the first locking position and the open position. Also the second locking lug, preferably has a "nose" similarly with the first locking lug.

[0015] According to a preferred embodiment, the spring means comprises a first end and a second end,

which second end is distal from the first end. The first end of the spring means is fixedly attached near the first end of the locking device and the second end is a free end, which is arranged at a distance from an outer edge of the locking device, such as a spring gap is formed between the outer edge of the locking device and the second end. Since the spring means is fixedly attached near the first end of the locking device (that is at the end which is fixed to the bracket via the pivot pin), also the spring means rotates together with the locking device upon pivoting the locking device between the locking positions and the open position. By this, the spring means may abut an edge, a protrusion or the like, upon pivoting, and by that load a spring force, when the spring gap between the outer edge of the locking device and the second end is decreased. The positioning of the spring means near the pivoting pin, enables that the spring means may be short, which is a better solution compared to prior art solutions, both according to material stress, less use of material etc. but still with good spring force.

[0016] According to a preferred embodiment, the spring means comprises a transversely directed spring projection at the free end, which spring projection is arranged to be movable in a second recess of the bracket. This is a simple solution compared to have a protrusion on the bracket for cooperation with the spring means.

[0017] According to a preferred embodiment, a third heel is arranged on an inside of the holder arm or on the first side of the locking device, such as the third heel protrudes into the first gap, and further a fourth heel is arranged on an inside of the pin protrusion or on the first side of the locking device, such as the fourth heel protrudes into the second gap. This to enable use of the same locking device at even more radiator brackets with different material thicknesses.

[0018] According to a preferred embodiment, the outer edge of the locking device comprises a third recess arranged to receive the spring projection of the spring means in the open position of the locking device on the radiator bracket. In this position, the spring projection is slightly locked which means that the locking device stays in the open position. Since a radiator normally has one left and one right radiator bracket it might be difficult to have an "automatic" lock which stays open before mounting, and which clicks in during the mounting of the radiator to the bracket. By this solution, the locking device stays in the open position why the installer may open both locking devices and the mount the radiator by putting the lower part of the radiator or stirrup member on the lower support means of the bracket and then push the upper part of the radiator towards the upper support means, where the locking device clicks in automatically. Compared to prior art solutions, this is a far better solution.

[0019] According to an aspect, a radiator bracket with a locking device according to any of the embodiments above is disclosed. The radiator bracket is arranged to be mounted to a wall or the like, and the bracket comprises at least one support means for supporting from beneath a radiator or a stirrup member mounted on the radiator. The at least one support means is arranged at an upper edge of the bracket, referring to a using position of the bracket, and a first recess is arranged below the support means, substantially vertically below the support means The bracket further comprises a locking device according to any of the above described embodiments. The locking device is arranged for preventing against unintentional dismounting of the radiator or the stirrup member from the bracket. A first recess of the bracket is arranged for accommodating the pin of the locking device and thereby retaining the locking device in a mounted position on the bracket, and the locking device is pivotable in the first recess between a first locking position and an unlocked position of the radiator or stirrup member relative the bracket. A vertical distance between a center point of the first recess and the upper edge of the bracket is adopted to allow the movement of the locking device between a first locking position and an unlocked position, when the locking device is mounted on the bracket. Such a bracket is very cost-efficient and has a safer and better locking device compared to prior art solutions.

[0020] According to an embodiment of the radiator bracket, the radiator bracket further comprises a second recess arranged for the transversely directed spring projection of the locking device, and for allowing a movement of the spring projection in the second recess between the first locking position and the unlocked position of the locking device. The second recess enables good guidance of the locking device during the pivoting movement and provides clear end positions of the locking device pivoting movement.

[0021] According to an embodiment of the radiator bracket, the second recess is an elongate recess with an upper position corresponding to the first locking position of the locking device and a lower position corresponding to the unlocked position of the locking device. The second recess further comprises a side edge with a lock protrusion, which is arranged to hold the spring projection of the locking device in the lower position, which is the open position of the locking device on the bracket. The lock protrusion is arranged to force the spring means of the locking device to move towards the outer edge of the locking device upon passage of the spring projection over the lock protrusion. The lock protrusion in cooperation with the third recess arranged on the outer edge of the locking device as described above, enables the open "stand-by" position of the locking device on the bracket.

[0022] According to an embodiment of the radiator bracket, the second recess is adapted to allow a second locking position of the locking device, in which position the spring projection of the locking device is positioned between the upper position and the lock protrusion. This recess is long enough to allow the second locking position between the first locking position and the open position.

[0023] According to an embodiment of the radiator bracket, the first recess is keyhole shaped. This to enable the assembly of the locking device with its pin protrusion

which cross-section is key-shaped, where the pin protrusion and the pin is inserted into the "keyhole" and then is rotated to its mounted position on the radiator bracket, such as the pin protrusion is arranged at the circular part of the keyhole where it can't leave the first recess. Thereby, the locking device is safely fitted to the bracket, but still pivotable relative the bracket.

[0024] According to an embodiment of the radiator bracket, the radiator bracket comprises a first and a second shank, substantially perpendicularly arranged relative each other. The first shank protrudes a first shank distance from the second shank and the second shank protrudes a second shank distance from the first shank. The first and second shank are both arranged for mounting to a wall or the like, and further the first and second shank also each comprise the at least one support means, the first recess and the second recess. By such a solution, it is optional which shank should be attached to the wall or the radiator/stirrup member.

[0025] According to an embodiment of the radiator bracket, the first shank distance of the first shank is different from second shank distance of the second shank. This enables to choose the distance (of the two) between the wall and the radiator.

[0026] Further possible features and benefits of this solution will become apparent from the detailed description below.

Brief description of drawings

[0027] The solution will now be described in more detail by means of exemplary embodiments and with reference to the accompanying drawings, in which:

Fig. 1 is a side view of a radiator, attached to a wall by means of a radiator bracket with a locking device according to the invention.

Fig. 2a is a perspective view of a locking device according to the invention.

Fig. 2b is a front view of the locking device of Fig. 2a.

Fig. 2c is a side view of the locking device of Fig. 2a.

Fig. 2d is a zoomed view of a lower part of the locking device in Fig. 2b.

Fig. 3a is a perspective view of an upper part of a first type of radiator bracket according to the invention.

Fig. 3b is a perspective view of the upper part of the radiator bracket of Fig. 3a with the locking device of Fig. 2a-c mounted on the bracket.

Fig. 4a is a perspective view of second type of radiator bracket according to the invention.

Fig. 4b is a perspective view of the radiator bracket of Fig. 4a with the locking device of Fig. 2a-c mounted on the bracket.

Detailed description

[0028] Briefly described a locking device 1 and a radiator bracket 20 with such locking device 1 is provided, where the inventive locking device 1 is useable at two different heights of radiator stirrups and two different material thickness of the radiator bracket 20.

[0029] Fig. 1 is a side view of a radiator 30, attached to a wall by means of a radiator bracket 20 with a locking device 1 and an upper and a lower support member 24, according to the invention. The locking device 1 is pivotally attached to the upper end of the radiator bracket 20, and the radiator 30 comprises two stirrup members 31 mounted on it. When mounting the radiator 30 on the bracket 20, the stirrup members 31 are introduced on the upper and lower support members 24 and a locking lug 14 of the locking device 1 grips an upper edge of the stirrup member 31, by that the locking device 1 is pivoted slightly in direction towards the radiator 30.

[0030] Fig. 2a-d shows the locking device 1 in different views, which locking device 1 comprises a first end 2 and a second end 3, which is distal from the first end 2. The first end 2 is a lower end, referring to a using position of the locking device 1, and the second end 3 is thus an upper end. The second end 3 is also a maneuvering end with a grip portion at the top. Referring to a mounted position on a bracket 20 (not visible here, see fig 3a-b) the locking device 1 comprises a first side 1 a which faces the bracket 20, and a second side 1b which faces away from the bracket 20. The locking device 1 further comprises a pin 4, which is arranged at the first end 2 on the first side 1b of the locking device 1. This pin 4 is arranged for pivotal attachment to the bracket 20 (see Fig. 3b) and is pivotable around a pin axis X-X of the pin 4 when mounted on the bracket. A protrusion 10 is arranged transversely relative the pin 4, at a distal end of the pin 4 to form a second gap 11 between the first side 1a of the locking device 1 and the protrusion 10. The protrusion 10 is arranged to retain the pin 4 in a first recess 21 of the bracket 20 (see Fig. 3b).

[0031] A spring means 5, which is arranged for counteracting a movement of the locking device 1 between the locking position and the unlocked position, is fixedly arranged at the first end 2 of the locking device 1. The spring means 5 comprises a first end 5a and a second end 5b, distal from the first end 5a. The second end 5b is a free end which is arranged at a distance from an outer edge 15 of the locking device 1, such as a spring gap 16 is formed between the outer edge 15 of the locking device 1 and the second end 5b. The outer edge 15 of the locking device 1 is slightly arcuate and the spring means 5 extending along a shorter distance of the outer edge 15, also with a slightly arcuate form. The spring gap 16 enables a movement of the second end 5b of the

spring means 5 towards the outer edge 15 of the locking device 1, when a force is applied on the spring means 5. The spring means 5 further comprises a transversely directed spring projection 5c at the free end 5b, which spring projection 5c is arranged to be movable in a second recess 23 of the bracket 20 (see Fig. 3b). The outer edge 15 of the locking device 1 also comprises a third recess 17 which is arranged to receive the spring projection 5c when the spring means 5 is exposed for a force, that is when the locking device 1 is in the open position.

[0032] To lock a part of a radiator or a stirrup member to the radiator bracket in the first locking position, a first locking lug 6 is arranged between the first end 2 and the second end 3 of the locking device 1. And further, the locking device 1 comprises at least one second locking lug 14, which is arranged between the first locking lug 6 and the second end 3. The second locking lug 14 is arranged to lock the part of the radiator or the stirrup member to the radiator bracket in a second locking position. By the two locking lugs 6, 14, the same locking device 1 may be used at two different heights of the stirrup member which is good, since these stirrup members exists in different heights.

[0033] Further, a holder arm 7 is arranged on the first side 1a of the locking device 1, between the first locking lug 6 and the first end 2, but of course out of way from the area below the first locking lug 6, that is not to intrude the first locking position. The holder arm 7 forms a first gap 8 between the holder arm 7 and the first side 1a, which first gap 8 is arranged to receive an upper edge 22 of the bracket 20 (see Fig. 3b). A distance between the pin axis X-X and a stop surface 9a, 9b of the first gap 8 is adopted to allow the movement of the locking device 1 between the first locking position and the unlocked position. The first gap 8 and the second gap 11 is arranged to accommodate the bracket 20 in a mounted position of the locking device 1 on the bracket 20, wherein the first gap 8 constitutes an upper holding/guiding of the locking device 1, and the second gap 11 constitutes a lower holding of the locking device 1 to the bracket 20 (see Fig. 3b and 4b). To increase the flexibility and use of the locking device 1, it is also adopted to fit two different material thicknesses of the bracket material. This, by that the first gap 8 comprises a first heel 12 arranged on the inside of the holder arm 7, and the second gap 11 comprises a second heel 13, arranged on the inside of the pin protrusion 10. In this way, the first gap 8 has two different widths, i.e. a wider width at the entrance of the first gap 8, fitting a thick steel sheet material of the bracket, and a narrower width at the "bottom" of the first gap 8, fitting a thin steel sheet material. The stop surface 9a of the first gap 8 is the same as the "bottom" of the first gap 8, adopted for the thinner material, while the stop surface 9b is the same as the end of the first heel 12, which end 9b is directed towards the opening of the first gap 8. For the same reasons, the second gap 11 comprises the second heel 13 on the inside of the pin protrusion 10, wherein the wider width "at the entrance" of the second gap 11 fitting a thick bracket steel sheet material, and the narrower width at the "bottom" of the second gap 11, fitting a thin bracket steel sheet material. In this way, a safe and robust holding of the locking device 1 to the radiator bracket is achieved both for thick and thin brackets.

[0034] Fig.3a is a perspective view of an upper part of a first type of radiator bracket 20 according to the invention and Fig. 3b is a perspective view of the upper part of the radiator bracket 20 with the locking device 1 mounted on the bracket 20. This type of bracket 20 is made of a thinner material compared to the alternative bracket of Fig. 4a-b (see description below). The radiator bracket 20 comprises a first and a second shank 27, 28, which are substantially perpendicularly arranged relative each other, and the first shank 27 protrudes a first shank distance si from the second shank 28 and the second shank 28 protrudes a second shank distance s_2 from the first shank 27. To provide flexibility to the bracket 20, the first shank distance si of the first shank 27 is different from the second shank distance s_2 of the second shank 28, why the distance between the radiator and the wall is optionable by turning the bracket 20 such as either the first shank 27 or the second shank 28 constitutes the "wall shank". The bracket 20 further comprises at least one support means 24 arranged for supporting from beneath the radiator 30 or the stirrup member 31 mounted on the radiator 30. The at least one support means 24 is arranged at an upper edge 22 of the bracket 20, referring to a using position of the bracket 20. The bracket 20 also comprises a keyhole-shaped first recess 21 arranged below the support means 24, substantially vertically below the support means 24. The keyhole-shaped first recess 21 is designed to enable the assembly of the locking device 1 with its pin protrusion 10, which cross-section is key-shaped. During mounting of the locking device 1 to the radiator bracket 20, the pin protrusion 10 and the pin 4 is inserted into the "keyhole" 21 and the locking device 1 is then rotated to its mounted position on the radiator bracket 20. In this position, the pin protrusion 10 is arranged at the circular part of the keyhole 21, where it can't leave the first recess 21. Thereby, the locking device 1 is safely fitted to the bracket 20, but still pivotable relative the bracket 20.

[0035] Further, the radiator bracket 20 comprises the locking device 1 described above, for preventing against unintentional dismounting of the radiator 30 or the stirrup member 31 from the bracket 20. The first recess 21 is arranged for accommodating the pin 4 of the locking device 1 and thereby the locking device 1 is retained in a mounted position on the bracket 20. The locking device 1 is as mentioned above pivotable in the first recess 21 around a pin axis X-X of the pin 4, between a first locking position and an unlocked position of the radiator 30 or stirrup member 31 relative the bracket 20. A vertical distance h between a center point of the first recess 21 and the upper edge 22 of the bracket is adopted to allow the movement of the locking device 1 between the first locking position and the unlocked position, when the locking

device 1 is mounted on the bracket 20.

[0036] The radiator bracket 20 further comprises a second recess 23, which is arranged for the transversely directed spring projection 5c of the locking device 1. The second recess allows a movement of the spring projection 5c in the second recess 23, between the first locking position and the unlocked position of the locking device 1. The second recess 23 is an elongate recess with an upper position 23a, corresponding to the first locking position of the locking device 1, and a lower position 23b, corresponding to the unlocked position of the locking device 1. The second recess 23 comprises a side edge with a lock protrusion 26, which is arranged to hold the spring projection 5c of the locking device 1 in the lower position 23b, and also arranged to force the spring means 5 of the locking device 1, upon passage, to move towards the outer edge 15 of the locking device 1.The second recess 23 is further adapted to allow the second locking position of the locking device 1, that is when the second locking lug 14 engages with the part of the radiator 30 or stirrup member 31 in the second locking position. In this second locking position, the spring projection 5c of the locking device 1 is positioned between the upper position 23a and the lock protrusion 26. Thus, the second recess 23 has a length which allows the second locking position or even more locking positions.

[0037] Both the first and second shank 27, 28 are arranged for mounting to the wall or the like, as mentioned above, and further the first and second shank 27, 28 also each comprises the at least one support means 24, the first recess 21 and the second recess 23.

[0038] Fig. 4a is a perspective view of an alternative radiator bracket 120 according to the invention and Fig. 4b is a perspective view of the radiator bracket 120 of Fig. 4a with the locking device of Fig. 2a-c mounted on the bracket 120. This bracket 120 is in the preferred embodiment made of a material which is thicker than the material of the bracket of Fig. 3a-b. Also this type of radiator bracket 120 comprises a first and a second shank 127, 128, which are substantially perpendicularly arranged relative each other, but the bracket 120 is not a long bracket as the first type, visible in Fig. 1 and Fig. 3a-b. This type of radiator bracket 120 is normally used only as an upper bracket and instead of another lower bracket, an adjustable support normally is used at the lower part of the radiator. At this bracket 120, the first shank 127 is arranged for the locking device 1, while the second shank 128 constitutes the "wall shank". The bracket 120 comprises one support means 24, which is arranged for supporting from beneath the radiator 30 or the stirrup member 31 mounted on the radiator 30 (not visible). The support means 24 is arranged at an upper edge 22 of the first shank 127. The bracket 120 also comprises a first recess 21, which is substantially keyhole-shaped, and which is arranged below the support means 24, substantially vertically below the support means 24. The keyhole-shaped first recess 21 is designed to enable the assembly of the locking device 1 with its pin protrusion 10, in the same way as described in relation to the first type of bracket 20, but here the first recess also has a cut-out 29. The cut-out 29 is arranged to create clearance for the second heel 13, such as the bracket material fits between the pin protrusion 10 and the first side 1a of the locking device 1. During mounting of the locking device 1 to the radiator bracket 120, the pin protrusion 10 and the pin 4 is inserted into the "keyhole" 23 and the locking device 1 is then rotated to its mounted position on the radiator bracket 120 in the same way as for the first type of bracket described above. In this position, the pin protrusion 10 is positioned at a part of the keyhole 21 where it can't leave the first recess 21. The upper edge 22 of the first shank 127 has a chamfering just behind the support means 24, in direction towards the second shank 128, to enable clearance for the first heel 12 arranged on the inside of the holding arm 7, such as the bracket material fits between the holding arm 7 and the first side 1a of the locking device 1. Thereby, the locking device 1 is safely fitted to the bracket 120, but still pivotable relative the bracket 120.

[0039] The radiator bracket 120 comprises the locking device 1 with the same functions as described above and of course is pivotable in the first recess 21 around a pin axis X-X of the pin 4, between the first locking position and the unlocked position of the radiator 30 or stirrup member 31 relative the bracket 120. A vertical distance h between a center point of the first recess 21 and the upper edge 22 of the first shank 127 is adopted to allow the movement of the locking device 1 between the first locking position and the unlocked position, when the locking device 1 is mounted on the bracket 120. This radiator bracket 120 also comprises the second recess 23, arranged for the spring projection 5c and works in exactly the same way as described in relation to Fig. 3a-b, and therefore this is not described once again.

[0040] In Fig. 3a-b and Fig. 4a-b a plastic cap can be seen at the support means 24. This detail may be mounted on the support means 24 to reduce noise and vibrations from the radiator water system.

[0041] Reference to an element in the singular is not intended to mean "one and only one" unless explicitly so stated, but rather "one or more."

Claims

1. A locking device (1) arranged for mounting on a radiator bracket (20, 120), and the locking device (1) further being arranged for preventing against unintentional dismounting of a radiator (30) or a stirrup member (31) mounted on the radiator (30) from the radiator bracket (20, 120), the locking device (1) comprising:

   a first end (2),
   a second end (3), distal from the first end (2),
   a first side (1a) facing the bracket (20, 120) in a

mounted position on the bracket (20, 120),
a second side (1b) facing away from the bracket (20, 120) in the mounted position on the bracket (20, 120),
a pin (4), arranged near the first end (2) on the first side (1b) of the locking device (1) for pivotal attachment to the bracket (20, 120), the pin (4) is arranged to fit into a first recess (21) of the radiator bracket (20, 120), wherein the locking device (1) is pivotable around a pin axis (X-X) of the pin (4) between at least one first locking position and an unlocked position of the radiator (30) or stirrup member (31) relative the bracket (20, 120),
a spring means (5), arranged for counteracting a movement of the locking device (1) between the locking position and the unlocked position,
a first locking lug (6) arranged between the first end (2) and the second end (3), the first locking lug (6) being arranged for locking a part of the radiator (30) or the stirrup member (31) mounted on the radiator (30) to the bracket (20, 120) in the first locking position,
characterized by
a holder arm (7) arranged on the first side (1a) of the locking device (1) between the first locking lug (6) and the first end (2), the holder arm (7) forming a first gap (8) between the holder arm (7) and the first side (1a), which first gap (8) is arranged to receive an upper edge (22) of the bracket (20, 120), wherein a distance between the pin axis (X-X) and a stop surface (9a, 9b) of the first gap (8) is adopted to allow the movement of the locking device (1) between the first locking position and the unlocked position,
a pin protrusion (10) arranged transversely relative the pin (4), at a distal end of the pin (4) such as forming a second gap (11) between the first side (1a) of the locking device (1) and the pin protrusion (10), wherein the pin protrusion (10) is arranged to retain the pin (4) in the first recess (21) of the bracket (20, 120), wherein the first gap (8) and the second gap (11) is arranged to accommodate the bracket (20, 120) in a mounted position of the locking device (1) on the bracket (20, 120).

2. The locking device (1) according to claim 1, wherein a first heel (12) is arranged on an inside of the holder arm (7) or on the first side (1a) of the locking device (1) such as the first heel (12) protrudes into the first gap (8), and a second heel (13) is arranged on an inside of the pin protrusion (10) or on the first side (1a) of the locking device (1) such as the second heel (13) protrudes into the second gap (11).

3. The locking device (1) according to claim 1 or 2, wherein at least one second locking lug (14) is arranged between the first locking lug (6) and the second end (3), the second locking lug (14) is arranged to lock a part of the radiator (30) or the stirrup member (31) mounted on the radiator (30) to the bracket (20, 120) in a second locking position.

4. The locking device (1) according to any of the preceding claims, wherein the spring means (5) comprises a first end (5a) and a second end (5b) distal from the first end (5a), wherein the first end (5a) of the spring means (5) is fixedly attached near the first end (2) of the locking device (1) and the second end (5b) is a free end which is arranged at a distance from an outer edge (15) of the locking device (1), such as a spring gap (16) is formed between the outer edge (15) of the locking device (1) and the second end (5b).

5. The locking device (1) according to claim 4, wherein the spring means (5) comprises a transversely directed spring projection (5c) at the free end (5b), which spring projection (5c) is arranged to be movable in a second recess (23) of the bracket (20, 120).

6. The locking device (1) according to any of the preceding claims, wherein a third heel is arranged on an inside of the holder arm (7) or on the first side (1a) of the locking device (1) such as the third heel protrudes into the first gap (8), and a fourth heel is arranged on an inside of the pin protrusion (10) or on the first side (1a) of the locking device (1) such as the fourth heel protrudes into the second gap (11).

7. The locking device (1) according to any of claims 5 to 6, wherein the outer edge (15) of the locking device (1) comprises a third recess (17) arranged to receive the spring projection (5c).

8. A radiator bracket (20, 120) arranged for mounting to a wall or the like, the radiator bracket (20, 120) comprising:

at least one support means (24) for supporting a radiator (30) or a stirrup member (31) mounted on the radiator (30), the at least one support means (24) is arranged at an upper edge (22) of the bracket (20, 120), referring to a using position of the bracket (20, 120),
a first recess (21) arranged below the support means (24) substantially vertically below the support means (24),
a locking device (1) according to any of claims 1 - 7, wherein the first recess (21) is arranged for accommodating the pin (4) of the locking device (1) and thereby retaining the locking device (1) in a mounted position on the bracket (20, 120), and the locking device (1) being pivotable in the first recess (21) between a first locking

position and an unlocked position of the radiator (30) or stirrup member (31) relative the bracket (20, 120), and wherein a vertical distance (h) between a centre point of the first recess (21) and the upper edge (22) of the bracket (20, 120) is adopted to allow the movement of the locking device (1) between a first locking position and an unlocked position, when the locking device (1) is mounted on the bracket (20, 120).

9. The radiator bracket (20, 120) according to claim 8, wherein the radiator bracket (20, 120) further comprises a second recess (23) arranged for the transversely directed spring projection (5c) of the locking device (1), and for allowing a movement of the spring projection (5c) in the second recess (23) between the first locking position and the unlocked position of the locking device (1).

10. The radiator bracket (20, 120) according to claim 9, wherein the second recess (23) is an elongate recess with an upper position (23a) corresponding to the first locking position of the locking device (1), and a lower position (23b) corresponding to the unlocked position of the locking device (1), and which second recess (23) comprises a side edge with a lock protrusion (26) which is arranged to hold the spring projection (5c) of the locking device (1) in the lower position (23b), and which lock protrusion (26) is further arranged to force the spring means (5) of the locking device (1), upon passage, to move towards the outer edge (15) of the locking device (1).

11. The radiator bracket (20, 120) according to claim 10, wherein the second recess (23) is adapted to allow a second locking position of the locking device (1), in which the spring projection (5c) of the locking device (1) is positioned between the upper position (23a) and the lock protrusion (26).

12. The radiator bracket (20, 120) according to any of claims 8 - 11, wherein the first recess (21) is keyhole shaped.

13. The radiator bracket (20) according to any of claims 8 - 12, wherein the radiator bracket (20) comprises a first and a second shank (27, 28), substantially perpendicularly arranged relative each other, wherein the first shank (27) protrudes a first shank distance (si) from the second shank (28) and the second shank (28) protrudes a second shank distance (s_2) from the first shank (27), and wherein the first and second shank (27, 28) are arranged for mounting to a wall or the like, and further the first and second shank (27, 28) each comprises the at least one support means (24), the first recess (21) and the second recess (23).

14. The radiator bracket (20) according to claim 13, wherein the first shank distance (si) of the first shank (27) is different from second shank distance (s_2) of the second shank (28).

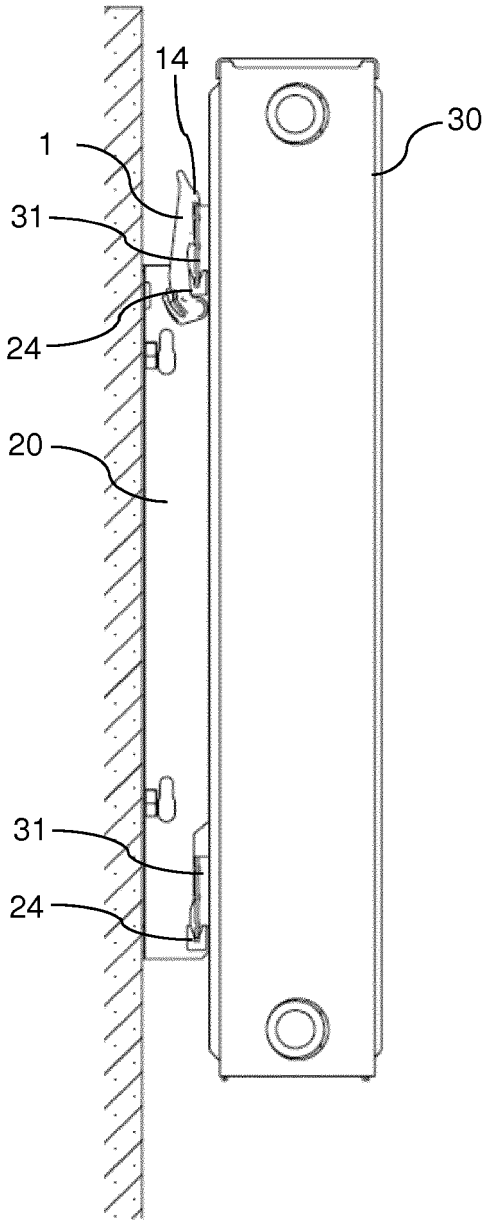

Fig. 1

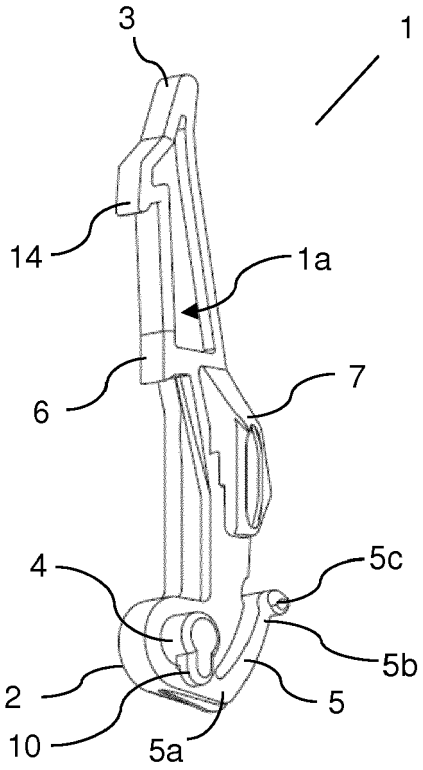

Fig. 2a

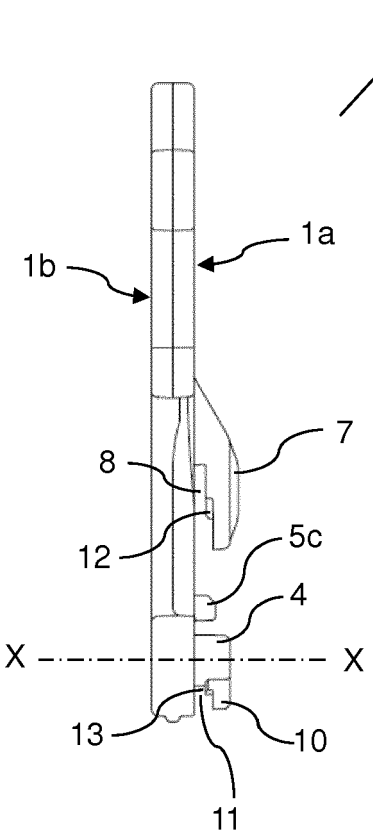

Fig. 2b

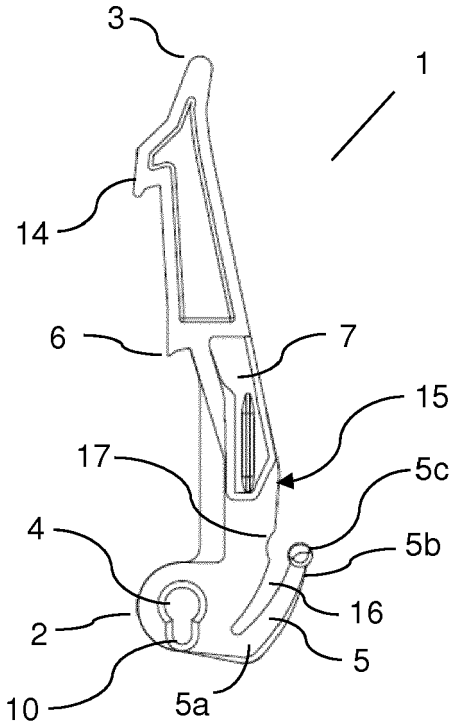

Fig. 2c

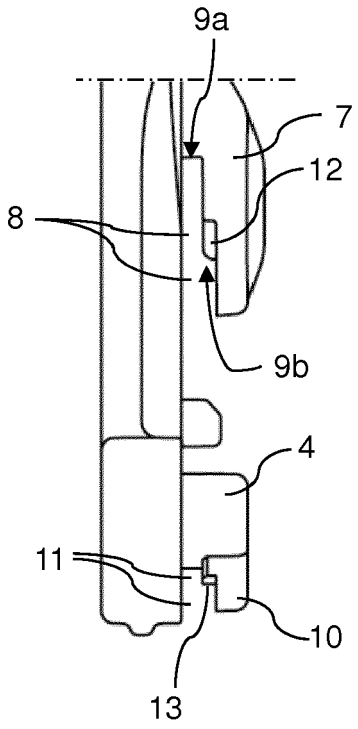

Fig. 2d

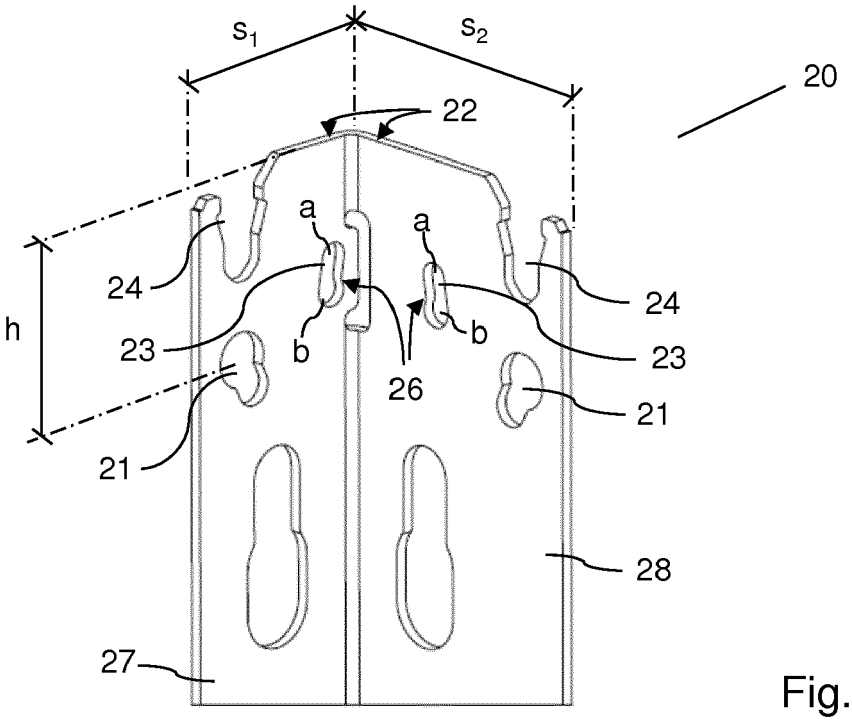
s1
s2
20
22
a
a
24
24
h
23
b
b
23
26
21
21
28
27

Fig. 3a

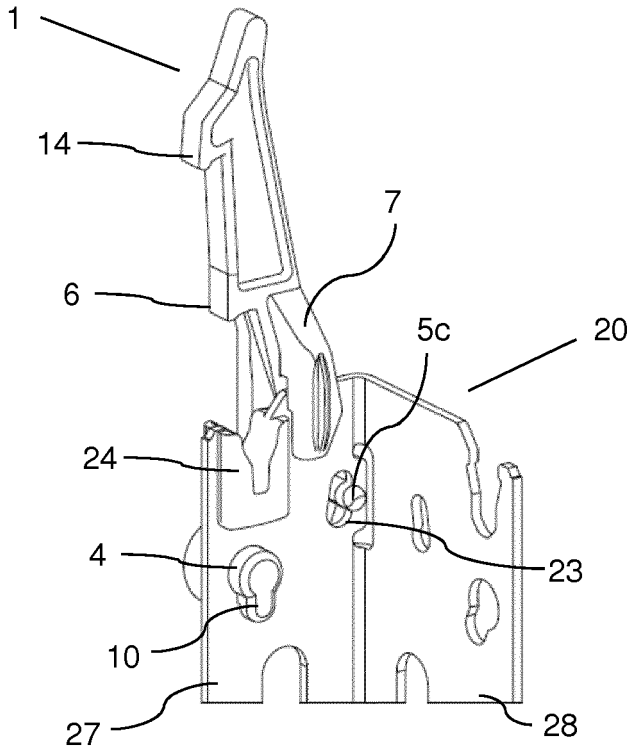
1
14
7
6
5c
20
24
4
23
10
27
28

Fig. 3b

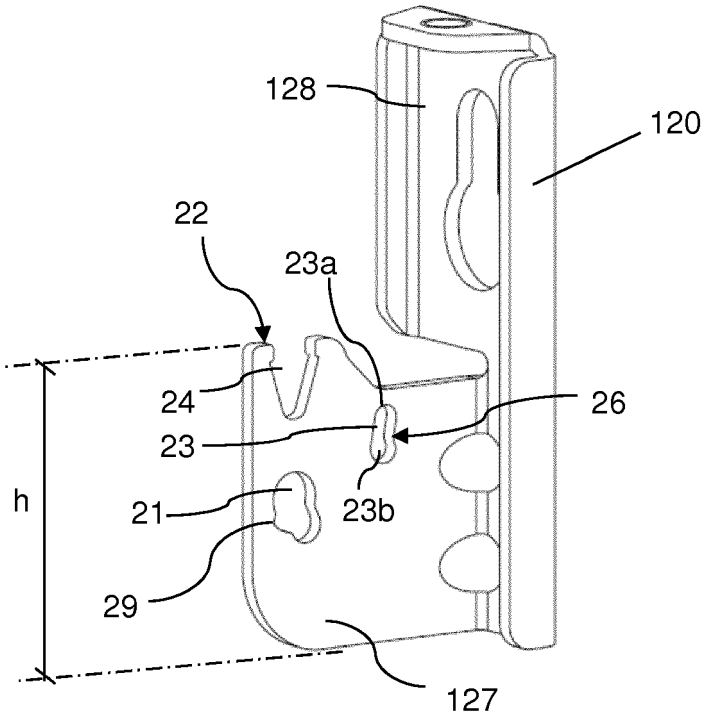
128
120
22
23a
24
26
23
h
21
23b
29
127

Fig. 4a

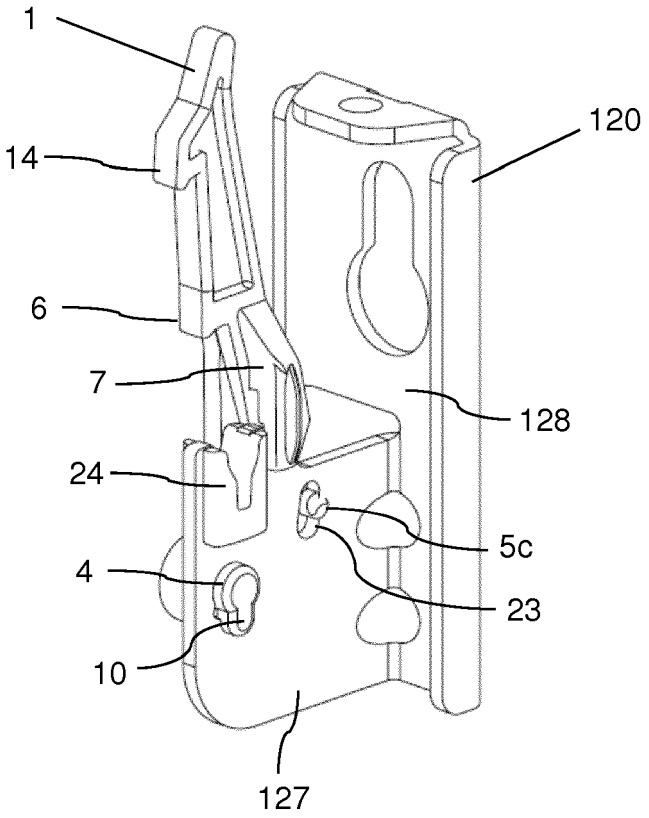
1
120
14
6
7
128
24
5c
4
23
10
127

Fig. 4b

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EUROPEAN SEARCH REPORT

Application Number
EP 19 16 1480

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F24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 August 2019	García Moncayo, O

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