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(54) **Shelf height adjustment apparatus**

(57) The present invention relates to a dishwasher rack system (A) comprising a dishwasher basket (3); vertical and horizontal wires (4, 5) constituting the body of said basket (3); at least one rack (2) that is foldable and displaceable up- and downwardly; and at least one height-adjustment apparatus (1), which allows the fixation of said rack (2) in different heights while said rack (2) is in its horizontal and vertical positions, and is fastened to the vertical and horizontal wires (4, 5) of said basket (3). Said apparatus (1) comprises snap fits (14, 17) attached to the horizontal wires (5) of the basket (3); at least one horizontal support piece (12) separating the interior of said apparatus (1) body (11) into a number of parts; and at least one settlement channel (19), wherein said wires (4) are settled, and which separates said snap fits (14, 17) and pieces (12) vertically.

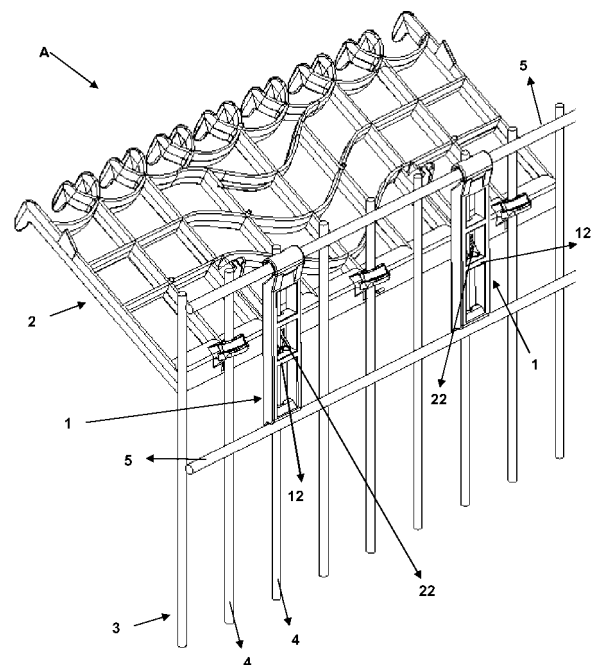


Figure - 2

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Description

Technical Field

[0001] The present invention relates to a dishwasher containing an apparatus used for adjusting the height of crockery (e.g. cups, glasses) racks.

Prior Art

[0002] With respect to the prior art, movable racks are frequently used as cup and/or glass racks in dishwashers, such racks being placed into the dishwasher basket and brought to open (horizontal) and closed (vertical) positions. Since objects of very different sizes are placed into dishwasher baskets, it has become a necessity to produce such racks both in a foldable (between horizontal and vertical positions), and in an up- and down-movable manners. The published patent application WO 0187133, for instance, discloses accordingly a rack system, which can be folded, and of which the height can be adjusted. In this system, spacer pieces are used, which, on one hand, can move vertically after being fastened to the vertical wires of the dish basket, and which, on the other hand, ensure the folding of rack once being fastened to the cup rack. Said system requires one extra horizontal wire as well, in order to adjust the rack's height between the vertical wires of the dish basket. The rack's rear part is supported by this horizontal wire so as to maintain the rack at that height, but said horizontal wire actually is not provided in standard dish baskets and is used merely in the basket of said patent application. According to this disclosed system, the rack can only be maintained at upper and lower positions, and no multi-height positions are provided therein. Additionally, the up- and downward (i.e. vertical) displacements are avoided of the rack, which is brought to a vertical position in said system. In other words, there is not provided any solution in this system to maintain the rack in a fixed vertical position, without said rack being becoming dislocated vertically.

[0003] Another published patent application WO 2005037050 discloses a rack system that can both be folded, and vertically adjusted with respect to its height. In this rack system, some apparatus are used attached to the basket's vertical wires. Additionally, hook-like holding elements with upward-facing ends are provided on said apparatus. A movable rack is attached to said holding elements and positioned to different heights. Since said holding elements on said apparatus, however, extend into the interior of the crockery basket, the inner utilization volume of the basket is decreased. Neither is provided there any element to avoid the rack attached to said apparatus from displacing from its vertical position and from coming loose. Supporting arms provided on the lower side of the rack also decreases the basket's inner utilization volume, when the rack is brought to the vertical position. As another drawback, the rack must be entirely

detached (i.e. detached from the holding element already attached to) from an existing position and be attached to another holding element in order to make height adjustment in this system. In such height adjustment carried out by means of holding elements provided at two lateral sides of the rack, there is the risk that the user unintentionally places the rack with one side placed on an upper holding element relative to the holding element at the opposite site. This circumstance comes from the fact of detaching the rack entirely, when it is to be adjusted.

Brief Description of Invention

[0004] In the present rack system, a standard dish or crockery basket is used, as distinct from the abovementioned examples. The cup rack's height adjustment is performed by means of an apparatus attached to the vertical wires of this basket. Said apparatus does not decrease the basket's inner volume, and does not require the detachment of rack from the apparatus or from the basket while the rack's height adjustment is made. In addition, the rack height can be adjusted to many positions, and once it is brought to a complete vertical position, its horizontal displacement is prevented. Furthermore, since it is fastened to the basket wires on the vertical position, it does not become loose in an uncontrolled manner.

Objective of Invention

[0005] The objective of the present invention is to provide a rack system with an adjustable height in horizontal and vertical positions for use in dishwasher baskets.

[0006] Another objective of the present invention is to prevent such a rack system from decreasing the utilizable inner volume of such dishwasher basket.

[0007] A further objective of the present invention is to ensure the height adjustment of the rack be made without detaching it from the basket.

[0008] Yet a further objective of the present invention is to avoid the case that the rack's right and left sides are caught at different heights while height adjustment is performed.

[0009] Still a further objective of the present invention is to ensure the use of the present rack system in any kind of dishwasher baskets; put differently, to ensure the use of this rack system without necessitating any modifications be made on existent dishwasher baskets.

Brief Description of Figures

[0010] An exemplary dishwasher according to the present invention is illustrated in annexed figures as described below in brief.

Figure 1 is a perspective view of a dishwasher's rack system.

Figure 2 is another perspective view of the dishwasher's rack system.

Figure 3 provides front and rear perspective views of the rack height adjustment apparatus.

Figure 4 is a perspective view of the rack.

Figure 5 is a side view of a dishwasher's rack system.

[0011] The parts in said figures are individually enumerated as described below.

Dishwasher rack system (A)
 Height adjustment apparatus (1)
 Rack (2)
 Dishwasher basket (3)
 Vertical wires (4)
 Horizontal wires (5)
 Body (11)
 Horizontal support piece (12)
 Front surface (13)
 Lower holding snap fit (14)
 Rear part (15)
 Rear surface (16)
 Upper holding snap fit (17)
 Gap (18)
 Channel (19)
 Hook (21)
 Snap fit (22)
 Snap fit (23)

Detailed Description of Invention

[0012] A dishwasher rack system (A), as shown in figures 1 and 2, comprises a dishwasher basket (3); vertical and horizontal wires (4 and 5) making up the body of the basket (3); at least one rack (2) that is foldable and movable up- and downwardly; and at least one height-adjustment apparatus (1), which allows the fastening of said rack (2) in different heights both while said rack is in its open (horizontal) position and in its closed (vertical) position.

[0013] Said height-adjustment apparatus (1), as shown in Figure 3, is an apparatus that can be fastened both to vertical wires (4) and horizontal wires (5) of the basket (3). The apparatus (1) body (11) has the form of a hollow frame. At least one horizontal support piece (12) is included in the apparatus (1) to separate the interior of the body (11) into multitude parts. A lower holding snap fit (14) extending downwardly along the front surface (13) of the apparatus (1) is provided on the lower section of said body (11). The rear part (15) of the lower holding snap fit (14) is formed so as to rest against a horizontal wire (5) of the basket (3). An upper holding snap fit (17), commencing from the rear surface (16) of the apparatus (1) and becoming folded like a hook towards the front is provided on the upper section of said body (11). The gap

(18) left within the interior of this snap fit (17) represents the form whereto one horizontal wire (5) of the basket (3) can rest. On the front surface (13) of said apparatus (1), at least one settlement channel (19) is provided which separates vertically and downwardly the lower holding snap fit (14), horizontal support piece (12), and upper holding snap fit (17). Said settlement channel (19) is made so that the basket's (3) vertical wire (4) can be placed therein (19).

[0014] In order to assemble the apparatus (1) to the basket (3) (an assembled view is given in figures 1 and 2), the lower holding snap fit (14) is attached at first to a vertical wire (4) of the basket so that the wire (4) is inserted into the channel (19). Then, the apparatus (1) is brought to a vertical position and all other channels (9) on the body (11) are brought to a position allowing said channels to clutch the wire. Thereafter, the upper holding snap fit (17) is brought right above one horizontal wire (5). In this position, the lower holding snap fit (14) is brought above another horizontal wire (5). When the apparatus (1) is depressed downwardly, the upper holding snap fit (17) is flexed and the horizontal wire (5) is settled into the gap (18) in the snap fit (17). Meanwhile, the rear section (15) of the lower holding snap fit (14) is brought to a position to settle on another horizontal wire (5). (The number of apparatus (1) can be altered in line with the number and width of rack(s) (2) to be used).

[0015] In Figure 4 is given a perspective view of an exemplary rack (2) to be used in the present invention. At least one hook (21) attached to the vertical wires (4) of the basket (3) is provided at the rear section of the rack (2). Said hooks (21) are embodied so that the rack (2) can move vertically (i.e. up- and downwardly) on said wires (4), and can be turned over so as to become opened/closed. This movement opportunity of hooks (21) on the vertical wires (4) allows the rack's (2) height adjustment be made without detaching said rack from the basket (3). This opportunity of making the adjustment without detaching the rack (2) from the basket avoids the rack (2) from becoming attached with right and left sides at different heights. At least one snap fit (22) is provided at the rear section of the rack (2), said snap fit being embodied so as to clutch the vertical wires (4) -by means of tight engagement- while the rack (2) is in horizontal position. The rack's (2) height adjustment is made by dislocating (i.e. gliding) the rack along the vertical wires (4), whereas the rack's (2) position is fixed when said snap fits (22) clutch said wires (4) in a tight manner and said snap fits (22) are settled on horizontal support pieces (12). (As shown in Figure 2, the form of said snap fits (22) allows them (22) to become inserted to the apparatus (1)).

[0016] The number of horizontal support pieces (12) included in the present apparatus (1) determines the number of distinct height positions of the rack (2). In other words, the number of horizontal support pieces (12) corresponds to the number of vertical positions of the rack (2).

[0017] After the snap fits (22) are detached from vertical wires (4), it becomes possible to position the rack (2) vertically (i.e. up- and downwardly) along the vertical wires (4) under the guidance of hooks (21), and the rack (2) is turned over and closed at a desired position. In order to fix the rack (2) at the position it is closed, at least one snap fit (23) is provided at the upper section of the rack (2), said snap fit being embodied so as to clutch the vertical wires (4) -by means of tight engagement. Said rack (2) can be fixed in a number of heights in its vertical position -as was the case of its horizontal position-when said snap fits (23) clutch the vertical wires (4). Since the lower sections of snap fits (23) will rest on support pieces (12) of the apparatus (1) when said snap fits (23) are attached to the vertical wires (4), the rack's (3) downward and vertical dislocation is prevented.

[0018] As is illustrated in Figure 5, the apparatus (1) has an extension towards the interior of the basket (3). As mentioned above, the apparatus (1) is attached to the basket (3) so that a vertical wire (4) is settled into the channel (19). In this case, the horizontal wires (5) are attached to the lower and upper holding snap fits (14 and 17) and so the apparatus (1) is assembled to the basket (3). Since the apparatus (1) does not have any part extending into the interior of the basket (3), it (1) does not decrease the inner volume of the basket (3).

[0019] Another feature of the present invention is the applicability of the present rack system (A) to any kind of dishwashers. Put differently, said rack (2) and apparatus (1) can be used without necessitating any modifications be made on existing baskets and do not require any special basket structure. In brief, it shall be feasible to use height-adjustable and foldable crockery (e.g. cups, glasses) racks in currently-used dishwashers with only altering the rack (2) and providing the present apparatus (1), without having to change the baskets.

Claims

1. A dishwasher rack system (A) comprising a dishwasher basket (3); vertical and horizontal wires (4, 5) constituting the body of said basket (3); at least one rack (2) that is foldable and movable up- and downwardly; and at least one height-adjustment apparatus (1), which allows the fixation of said rack (2) in different heights both while said rack (2) is in its horizontal and in its vertical position, and which is fastened both to the vertical wires (4) and horizontal wires (5) of the basket (3), said rack system (A) being **characterized in that** said apparatus (1) comprises at least one horizontal support piece (12) that separates the interior of the body (11) -with a hollow frame formation- of said apparatus (1) into multitude parts;
a lower holding snap fit (14) at the lower section of said body (11) -said snap fit (14) extending downwardly along the front surface (13) of the apparatus

(1), and having a rear part (15) formed so as to rest on a horizontal wire (5) of the basket (3);
an upper holding snap fit (17) at the upper section of said body (11) -said snap fit (17) commencing from the rear surface (16) of the apparatus (1) and becoming folded like a hook towards the front, and having a gap (18) in its interior where another horizontal wire (5) of said basket (3) can rest on; and
at least one settlement channel (19), wherein a vertical wire (4) of the basket (3) can be placed, and which separates vertically and downwardly the lower holding snap fit (14), horizontal support piece (12), and upper holding snap fit (17).

2. A system (A) according to Claim 1, **characterized in that** at least one hook (21) is comprised on the rear part of the rack (2), said hook being attached to the vertical wires (4) of the basket (3) and embodied so as to allow said rack (2) to displace up- and downwardly on said wires (4) and be turned over so as to become opened/closed.
3. A system (A) according to Claim 1, **characterized in that** at least one snap fit (22) is provided at the rear section of the rack (2), said snap fit being embodied so as to clutch the vertical wires (4) -by means of tight engagement- while the rack (2) is in horizontal position, and to settle on said horizontal support pieces (12).
4. A system (A) according to Claim 1, **characterized in that** at least one snap fit (23) is provided on the upper section of the rack (2), said snap fit (23) being embodied so as to clutch the vertical wires (4) -by means of tight engagement- while the rack (2) is in vertical position, and to settle on said horizontal support pieces (12).

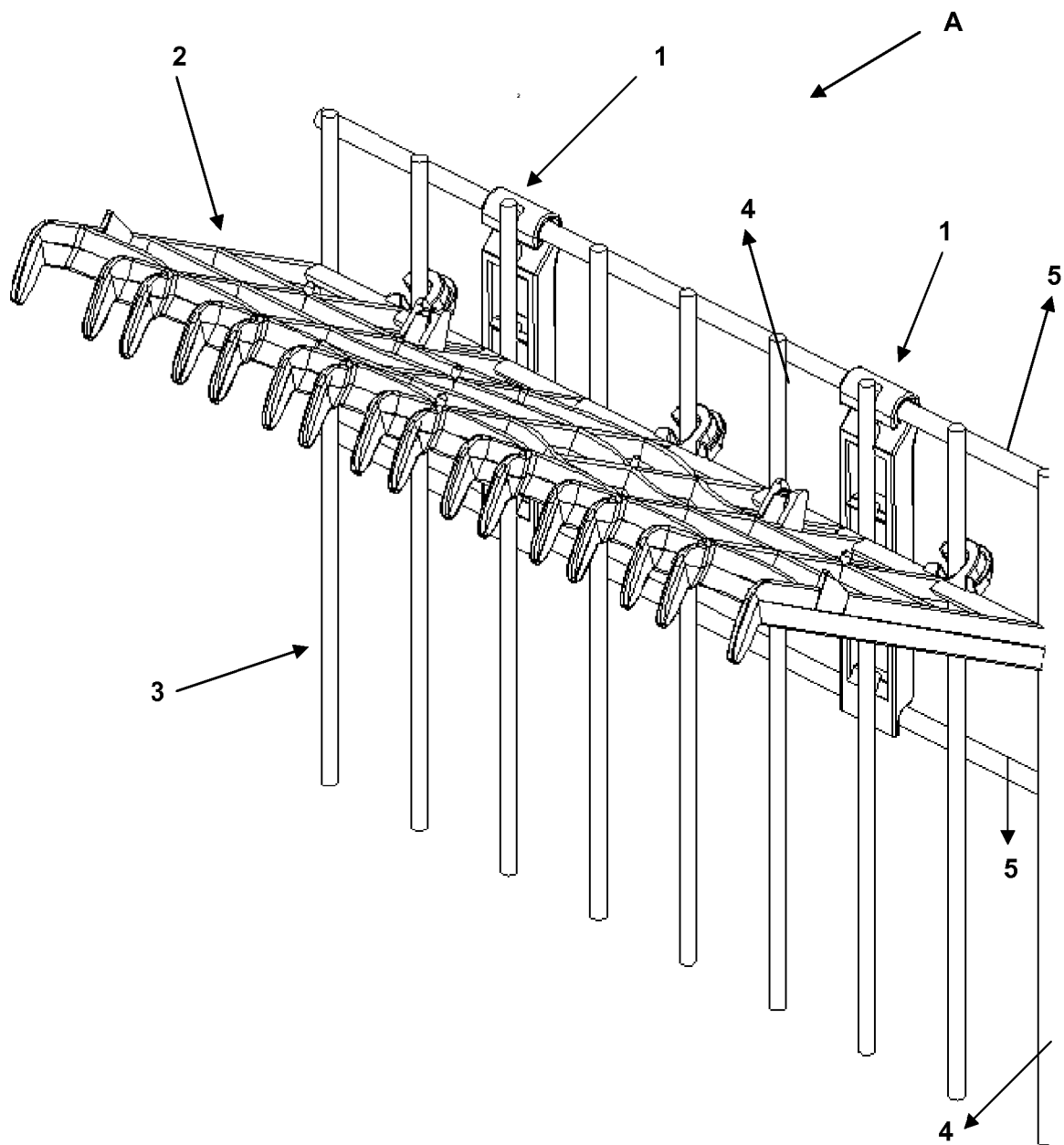


Figure – 1

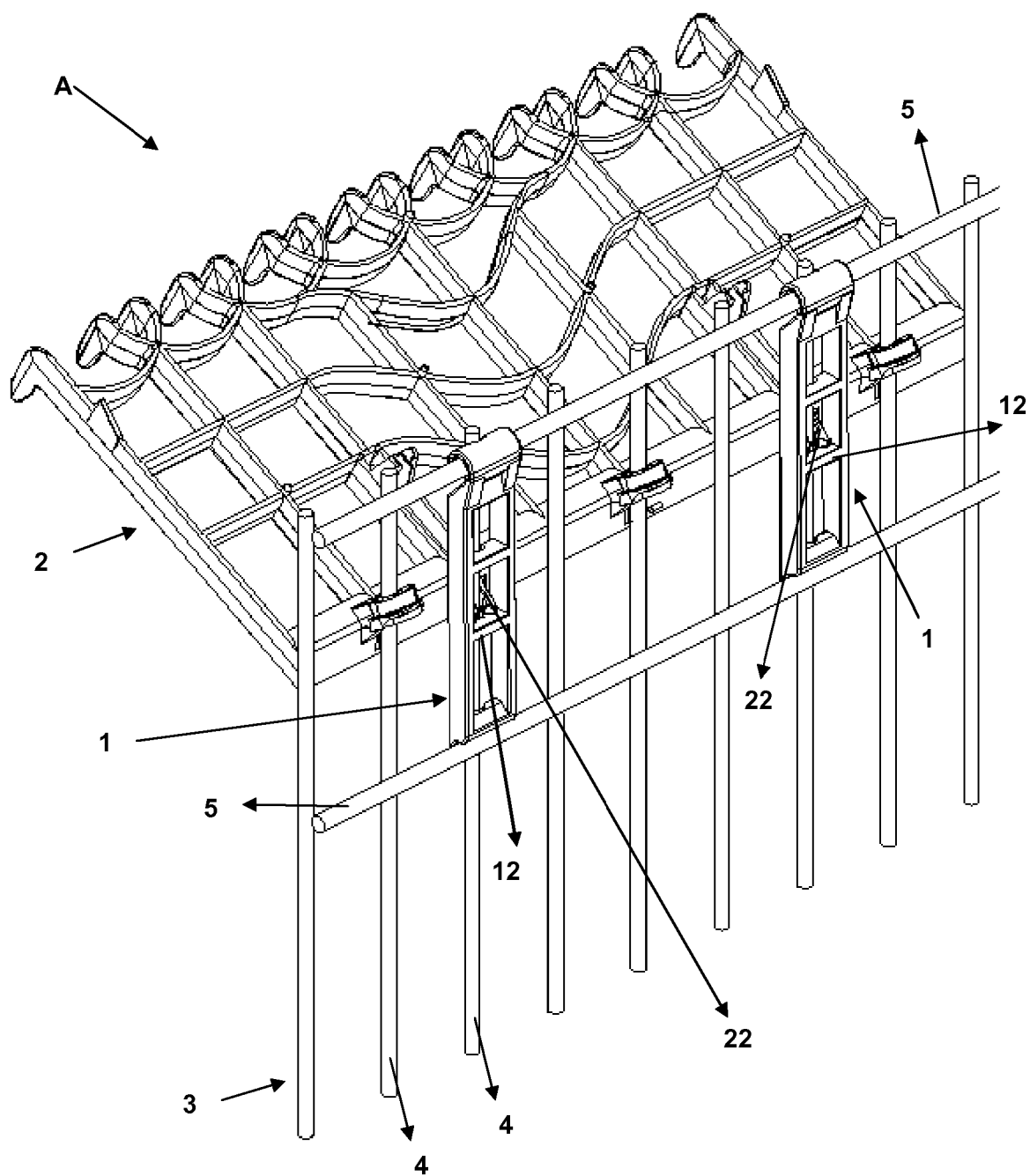


Figure – 2

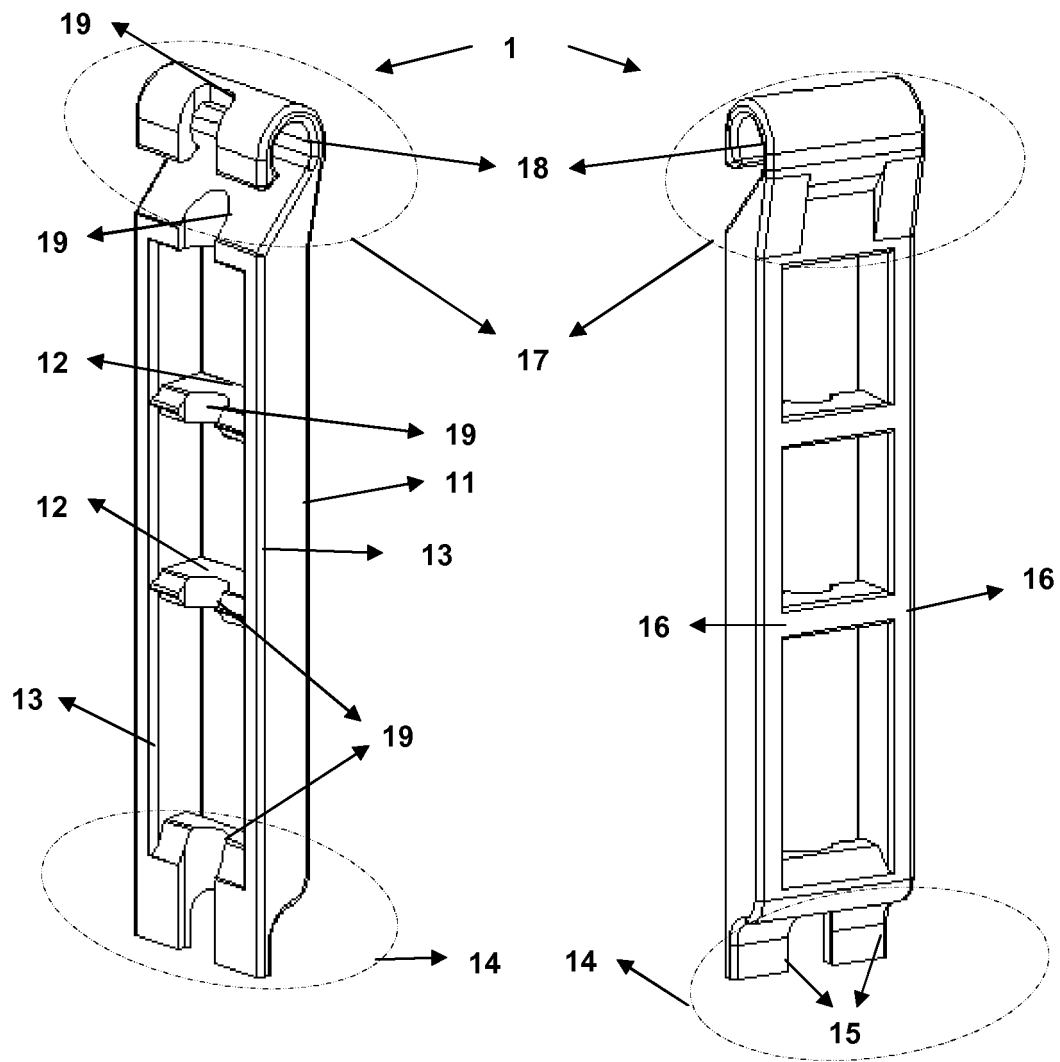


Figure – 3

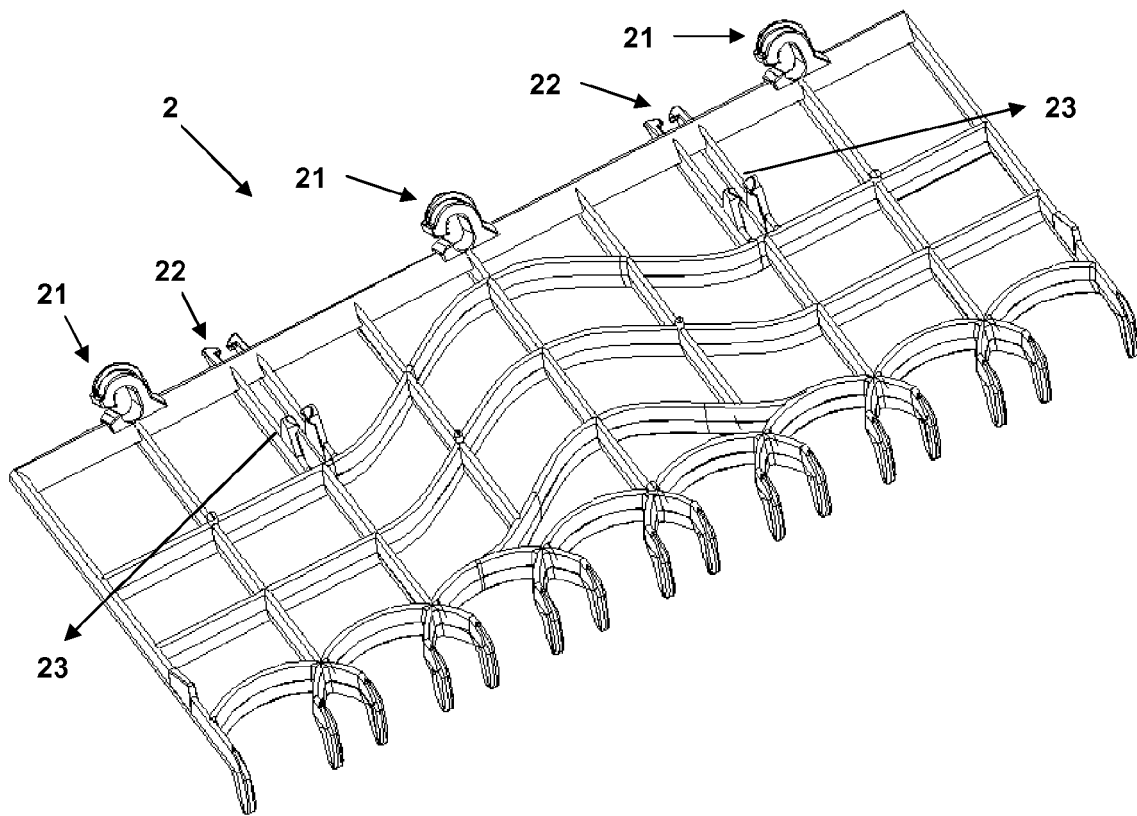


Figure - 4

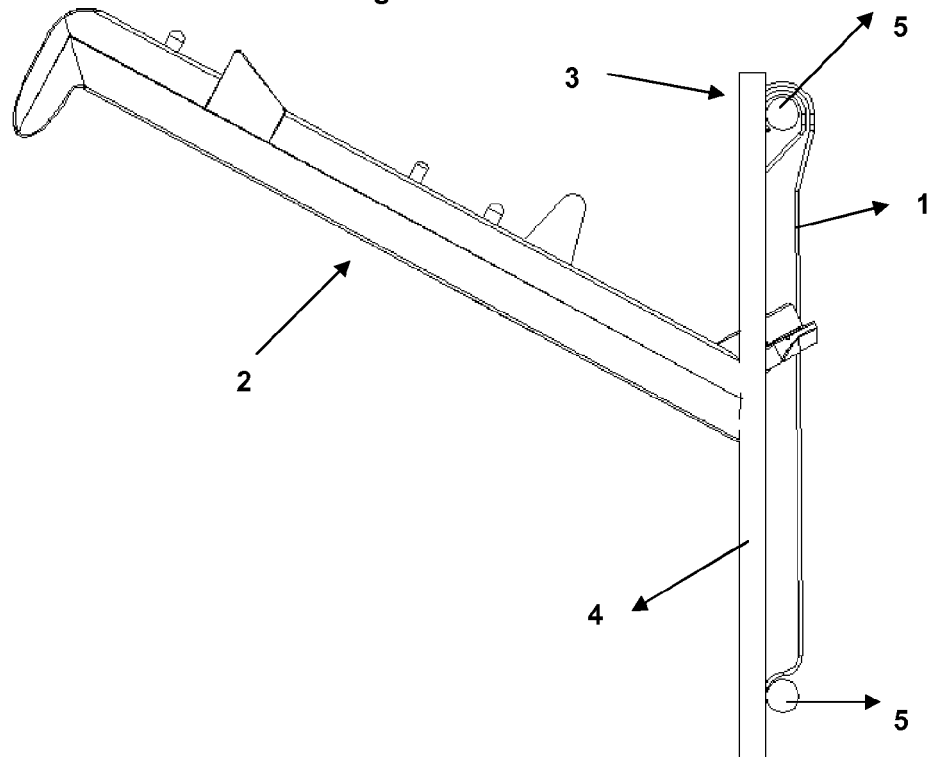


Figure - 5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 11 4166

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 January 2008	Examiner Hannam, Martin
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 07 11 4166

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