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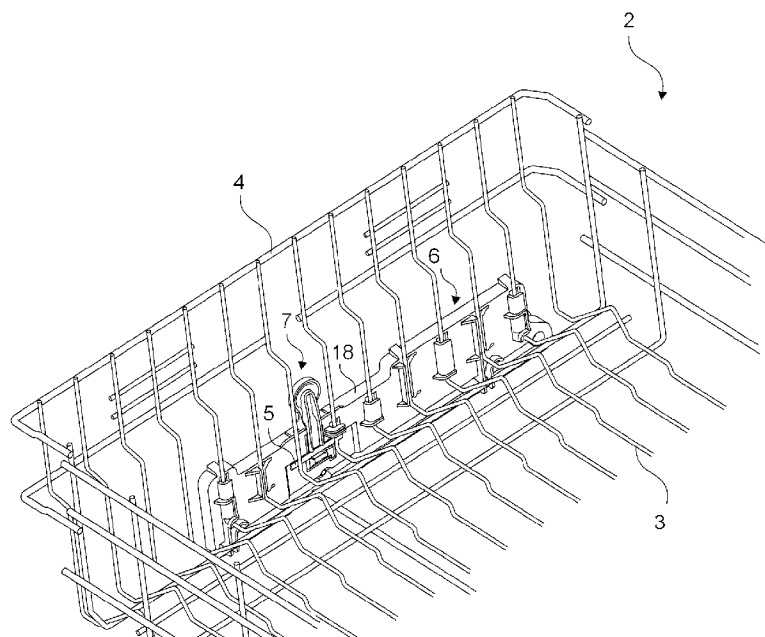
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(54) Title: HEIGHT ADJUSTABLE RACK FOR A DISHWASHER

Figure 4



(57) Abstract: The present invention relates to a height adjustable basket (2) for a dishwasher (1), wherein items to be washed are emplaced, having a base (3) and side walls (4) that enclose the base (3), at least one lock wire (5) secured horizontally to the side wall (4) and a height adjustment mechanism (6) having a body (18) whereon the basket (2) is mounted, the basket (2) moving up and down on the body (18) for the height to be adjusted.

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Description**HEIGHT ADJUSTABLE RACK FOR A DISHWASHER**

- [0001] The present invention relates to a dishwasher wherein the basket height can be adjusted.
- [0002] As is known, dishwashers generally comprise upper and lower baskets, for placing kitchen utensils therein, which are disposed in the washing tub. Each basket is moved outwards from the washing tub to load the utensils in the basket or to remove from the basket.
- [0003] The distance between the upper basket and lower basket is determined by taking certain standards into consideration. When the upper basket is made immovable, various problems arise in placing the big sized items in the dishwasher. In order to overcome this type of problems, the upper basket is configured to be both position and height adjustable thereby allowing items of various sizes to be easily emplaced in the upper and lower baskets. Height adjusting mechanisms, preferably on both sides of the basket, are used so that the user can adjust the position of the upper basket and secure at various levels. The height adjusting mechanisms are disposed on the vertical wires forming the side wall of the basket, to be movable up and down along these wires and enable the height of the basket to be adjusted particularly when the basket is loaded.
- [0004] In the state of the art European Patent No EP1351599, a height adjustment mechanism disposed on both sides of the rack is explained. This height adjustment mechanism provides the rack to move and stay at the adjusted position when a force is applied directly on the rack or on the locking mechanism.
- [0005] In the state of the art United States of America Patent Application No US2005/0133469 an adjustable rack assembly configured to couple to a sidewall of a dishwasher rack having at least one vertical wire member, to be movable vertically on these vertical wires is explained. The adjustable rack assembly includes a bracket on one side of the sidewall, and a support plate on another side of the sidewall, the support plate coupled to the bracket, the support plate having at least one arm with a catch member on a distal end thereof for receiving at least one horizontal wire

member in a second rack position.

- [0006] In the state of the art United States of America Patent Application No US2005/0001524 in a dishwashing machine a height adjustment device used for a dishware basket is explained. The height adjustment device includes a swivel-mounted handle and a catch hook arranged on said handle to engage on the vertical wires horizontally so that the user can control the adjustment device.
- [0007] In both of the state of the art embodiments, extra support plates are used for supporting the weight when the basket is loaded.
- [0008] The state of the art Switzerland Patent Application No CH690488 also relates to a basket height adjustment mechanism. In this mechanism, the point whereon the user exerts pressure for activating or deactivating the lock is the same point that supports the basket. This makes it hard for the user to use the mechanism and the basket to be supported.
- [0009] The aim of the present invention is the realization of a dishwasher comprising a height adjustable basket.
- [0010] The dishwasher realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a height adjustment mechanism having a body, a housing formed at the upper side of the body and a lever arm fitted into this housing. The pressing element, the carrying element and the support of the lever arm are virtually disposed on the same vertical plane. The pressing element is outside of the body and the carrying element remains in the housing. Since the lever arm is disposed in the vertical direction, the pressing element is situated uppermost, the carrying element is below the pressing element at the same level and the carrying surface is at the same level under the support.
- [0011] Thus when the basket is at the upper position, the weight of the basket is supported by both the lever arm and the body.
- [0012] The carrying element moves in the housing without contacting the body.
- [0013] The carrying surface has an inclined surface. Thus, while the basket moves from the lower position to the upper position, the user does not require actuating the pressing element.

- [0014] In another embodiment of the present invention, the distance of the pressing element to the support is different from the distance of the carrying element to the support. This provides the user opening force to be different from the releasing force. Accordingly, the releasing force is greater due to the lever arm and the user opening force is less.
- [0015] In another embodiment of the present invention, the lever arm comprises a protrusion extending along the pressing and carrying elements. This protrusion supports the pressing and carrying elements, preventing these elements from deformation.
- [0016] In yet another embodiment of the present invention, the lever arm comprises a stopper behind the carrying element, limiting the movement of the lever arm. Accordingly, the lever arm is prevented from stretching further and breaking.
- [0017] By means of the present invention, the basket is brought to the lower or higher position and kept at that position in a more balanced manner.
- [0018] A dishwasher realized in order to attain the aim of the present invention is illustrated in the attached figures, where:
- [0019] Figure 1 – is the perspective view of a dishwasher.
- [0020] Figure 2 – is the rear perspective view of a lever arm and the height adjustment mechanism.
- [0021] Figure 3 – is the front perspective view of a lever arm and the height adjustment mechanism.
- [0022] Figure 4 – is the perspective view of the basket, the lever arm and the height adjustment mechanism when the basket is in the higher position.
- [0023] Figure 5 – is the perspective view of the basket, the lever arm and the height adjustment mechanism when the basket is in the lower position.
- [0024] Figure 6 – is the sectional view of the basket, the lever arm and the height adjustment mechanism when the basket is in the higher position.
- [0025] Figure 7 – is the sectional view of the basket, the lever arm and the height adjustment mechanism as the pressing element is pressed when the basket is in the higher position.
- [0026] The elements illustrated in the figures are numbered as follows:
1. Dishwasher

2. Basket
3. Base
4. Side wall
5. Lock wire
6. Height adjustment mechanism
7. Lever arm
8. Support
9. Pressing element
10. Carrying element
11. Wheel
12. Securing member
13. Locking member
14. Rail
15. Protrusion
16. Stopper
17. Latch
18. Body
19. Housing

[0027] The dishwasher (1) of the present invention comprises a basket (2) wherein items to be washed are emplaced, having a base (3) and side walls (4) that enclose the base (3), formed preferably of wires vertical to the base plane, at least one lock wire (5) secured horizontally to the side wall (4) and a height adjustment mechanism (6) having a body (18) whereon the basket (2) is mounted, the basket (2) moving up and down on the body (18) for the height to be adjusted (Figure 1, Figure 2 and Figure 3).

[0028] The height adjustment mechanism (6) comprises a lever arm (7) having

- a housing (19) that opens to the upper edge of the body (18),
- a pressing element (9) that extends outwards from the body (18),
- a carrying element (10) emplaced in the housing (19) and
- a support (8) between the pressing element (9) and the carrying element (10), forming a moment axis situated on the same vertical level as the carrying element (10), fastened to the side of the housing (19) thereby

maintaining the carrying element (10) to move in the housing (19), in a direction across from the pressing element (9).

- [0029] The support (8) and the carrying element (10) being on the same vertical level, prevents all the load to affect the carrying element (10) particularly when the basket (2) is loaded and the lock wire (5) to be dislodged by stretching of the carrying element (10). Thus, the basket (2), when at the higher position, is supported both by the lever arm (7) and the body (18). Moreover, the pressing element (9), the support (8) and the carrying element (10) being on the same vertical plane and the support (8), forming the moment axis of the pressing and carrying elements (9 and 10), being disposed between the pressing element (9) and the carrying element (10), allows the lever arm (7) to be configured using a shorter moment arm and the basket (2) to be enlarged to be closer to the washing tub.
- [0030] The housing (19) prevents the sides of the body (18) from contacting and rubbing against the carrying element (10), thereby making the movement of the carrying element (10) easier. The inner surfaces of the housing (19) do not contact the carrying element (10). The lever arm (7) is mounted on the body (18) such that the carrying element (10) is surrounded by the said housing (19). The lever arm (7) stays suspended in the housing (19) by means of the support (8).
- [0031] The portion of the carrying element (10) whereon the lock wire (5) is seated is flat and the lower portion is inclined. By means of this inclined surface, the user does not need to actuate the pressing element (9) while the basket (2) passes from the lower position to the higher position. The inclined surface contacts the lock wire (5) during the motion of the basket (2) and stretches by the pushing of the lock wire (5) and after passing over the lock wire (5) resumes the initial position maintaining the lock wire (5) to be seated on the carrying element (10).
- [0032] The height adjustment mechanism (6) is at the highest point of the side wall (4) when the basket (2) is at the lower position and the upper edge of the side wall (4) is seated on the body (18).
- [0033] When the basket (2) is wanted to be brought to the higher position, the basket (2) is slid upwards on the body (18). During this movement, the

inclined surface of the carrying element (10) contacts the lock wire (5) and stretches towards the washing tub around the support (8) wherewith the lever arm (7) is mounted on the body (18). In the continuance of this movement, the carrying element (10) passes over the lock wire (5) and resumes its initial position. Thus, the carrying element (10) is made to pass under the lock wire (5). In this position, the lock wire (5) is seated on the carrying element (10) and the basket (2) is supported by the body (18) and the carrying element (10). The support (8), the carrying element (10) and the lock wire (5) are situated virtually on the same vertical plane and the entire weight of the basket (2) is supported by the lever arm (10) by means of the carrying element (10) and by the body (18) by means of the support (8). Since this operation can be performed without exerting any force on the pressing element (9) due to the inclined surface, thereby the basket (2) does not require to be partially or entirely removed from the washing tub (Figure 4 and Figure 6).

- [0034] When the basket (2) is wanted to be brought to the lower position from the higher position, a force is exerted on the pressing element (9) (towards the basket (2)) by the user. With the effect of this force, the carrying element (10) rotates around the support (8) in the opposite direction of the force and is removed from under the lock wire (5) (Figure 7). In this position, the basket (2) is lowered until abutting to the upper edge of the body (18), either by its own weight or by the user and reaches the lower position. When the force exerted on the pressing element (9) is released, the carrying element (10) again resumes its initial position (Figure 6).
- [0035] The dishwasher (1) furthermore comprises at least two rails (14) arranged oppositely on the side walls of the washing tub and at least two wheels (11) mounted on the front surface of the body (18) to be seated on the rails (14). The wheels (11) are seated on the rails (14) and the basket (2) can be moved to and fro in the washing tub along the rails (14).
- [0036] In another embodiment of the present invention, the distance of the pressing element (9) to the support (8) is different from the distance of the carrying element (10) to the support (8). This provides the opening force the user exerts on the pressing element (9) for pulling the carrying element

(10) from under the lock wire (5) to be different from the lateral force affecting as the basket (2) is pulled to and fro or the releasing force required for the lock wire (5) to be released by itself from the carrying element (10) by the vibrations of the dishwasher (1). Accordingly, the releasing force is greater due to the lever arm (7) and the opening force is less.

- [0037] In another embodiment of the present invention, the lever arm (7) comprises one or more protrusions (15) that extend along the pressing and carrying elements (9 and 10). The protrusions (15) support the pressing and carrying elements (9 and 10), preventing breakage and deformation.
- [0038] In another embodiment of the present invention, the lever arm (7) comprises a stopper (16) behind the carrying element (10) that limits the movement of the lever arm (7). Accordingly, the lever arm (7) is prevented from breaking since the lever arm (7) cannot be stretched further. The stopper (16) prevents the lever arm (7) from stretching further by contacting the rail (14) or the wall of the washing tub.
- [0039] In another embodiment of the present invention, dishwasher (1) comprises more than one securing member (12) disposed on the rear surface of the body (18) so that the height adjustment mechanism (6) can be mounted on the side wall (4) and the basket (2) can slide on the body (18) and more than one locking member (13) for the body (18) to be locked to the side wall (4) so that the body (18) can slide only in the vertical direction without separating from the side wall (4).
- [0040] The securing member (12) is configured as a groove and maintains the height adjustment mechanism (6) to slide in one direction in the horizontal and to be mounted on the side wall (4).
- [0041] The locking member (13) comprises a latch (17) that is stretched by the height adjustment mechanism (6) passing over the wires forming the side wall (4), while being mounted to the side wall (4) and resumes its initial position after passing, preventing the side wall (4) wire to be dislodged from the body (18).
- [0042] By means of the present invention, the height of the basket (2) can be

adjusted effectively.

Claims

1. A dishwasher (1) that comprises a basket (2) wherein items to be washed are emplaced, having a base (3) and side walls (4) that enclose the base (3) and at least one lock wire (5) secured horizontally to the side wall (4) **and characterized by** a height adjustment mechanism (6) comprises a lever arm (7) having
 - a body (18) whereon the basket (2) is mounted,
 - a housing (19) that opens to the upper edge of the body (18),
 - a pressing element (9) that extends outwards from the body (18),
 - a carrying element (10) seated in the housing (19) and
 - a support (8) between the pressing element (9) and the carrying element (10), forming a moment axis situated on the same vertical level as the carrying element (10), fastened to the side of the housing (19) thereby maintaining the carrying element (10) to move in the housing (19), in a direction opposite to the pressing element (9).
2. A dishwasher (1) as in Claim 1, **characterized by** a carrying element (10) having a flat portion whereon the lock wire (5) is seated and an inclined lower portion.
3. A dishwasher (1) as in Claim 1, **characterized by** a housing (19) that prevents the sides of the body (18) from contacting and rubbing against the carrying element (10) and surrounding the carrying element (10) without contacting thereof.
4. A dishwasher (1) as in any one of the above Claims, **characterized by** a lever arm (7) wherein the distance of the pressing element (9) to the support (8) is different from the distance of the carrying element (10) to the support (8).
5. A dishwasher (1) as in any one of the above Claims, **characterized by** a lever arm (7) comprising one or more protrusions (15) that extend along the pressing and carrying elements (9 and 10).
6. A dishwasher (1) as in any one of the above Claims, **characterized by** a lever arm (7) comprising a stopper (16) behind the carrying element (10) that limits the movement of the lever arm (7).

Figure 1

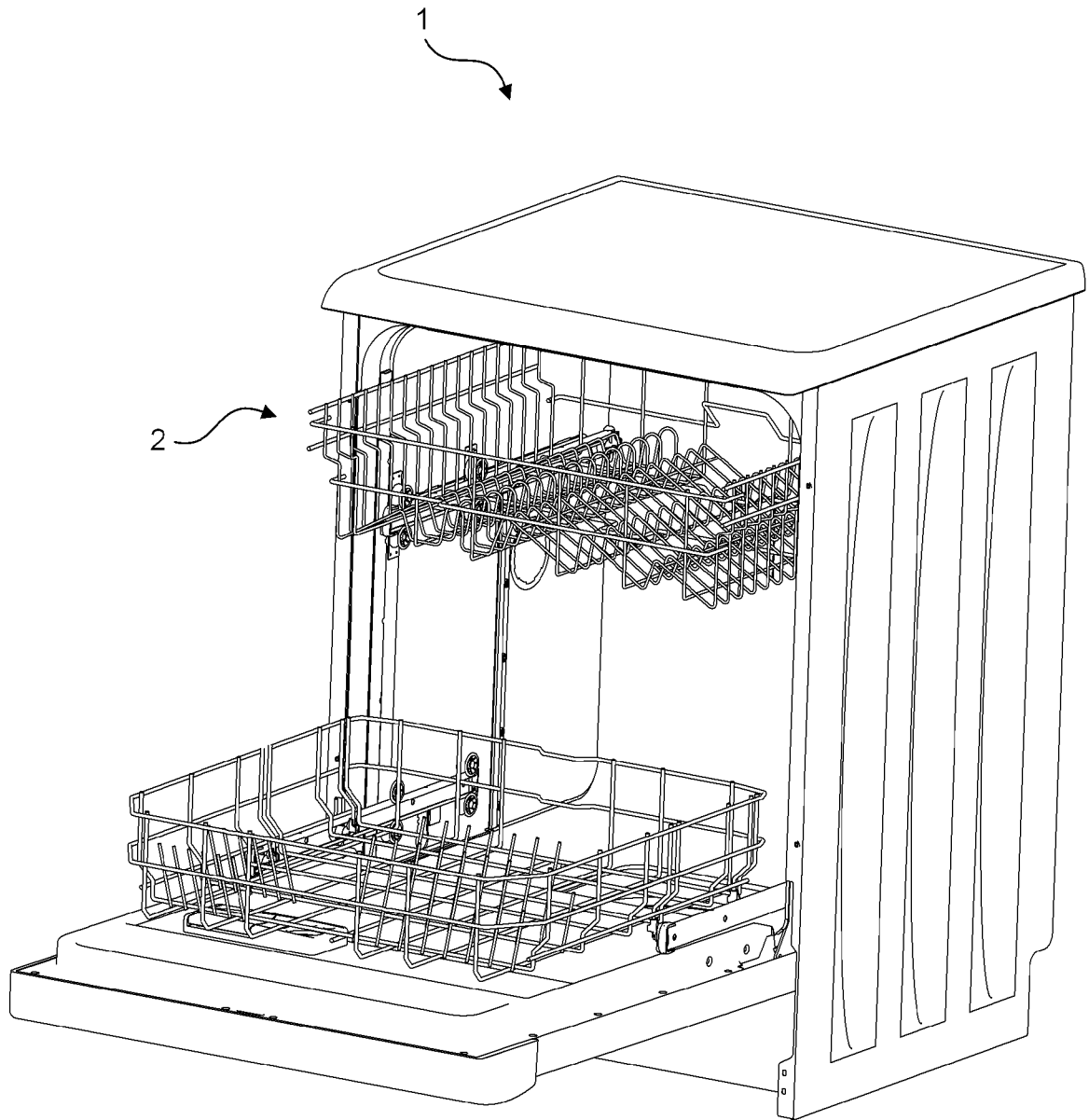


Figure 2

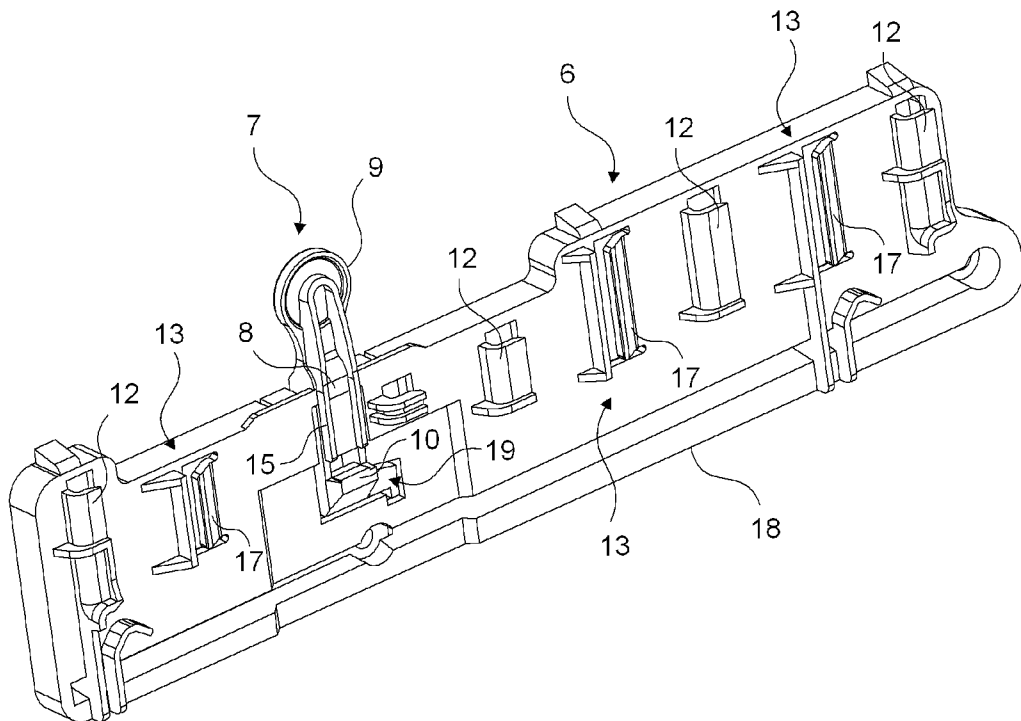


Figure 3

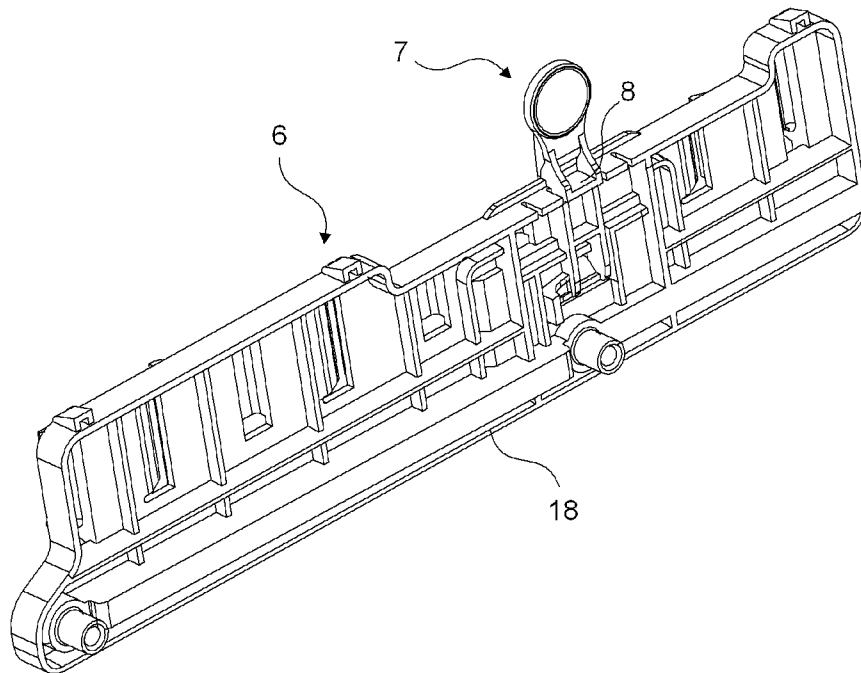


Figure 4

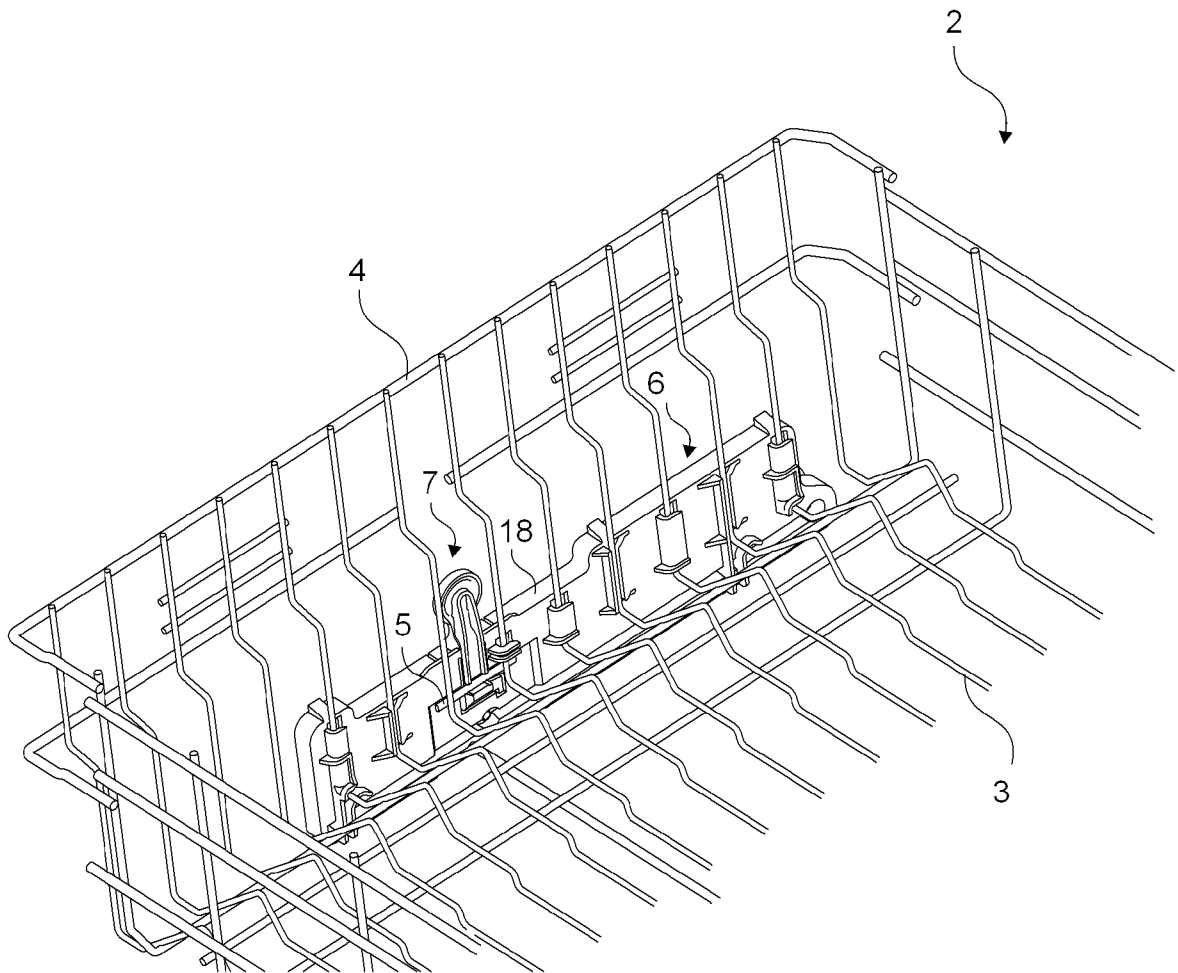


Figure 5

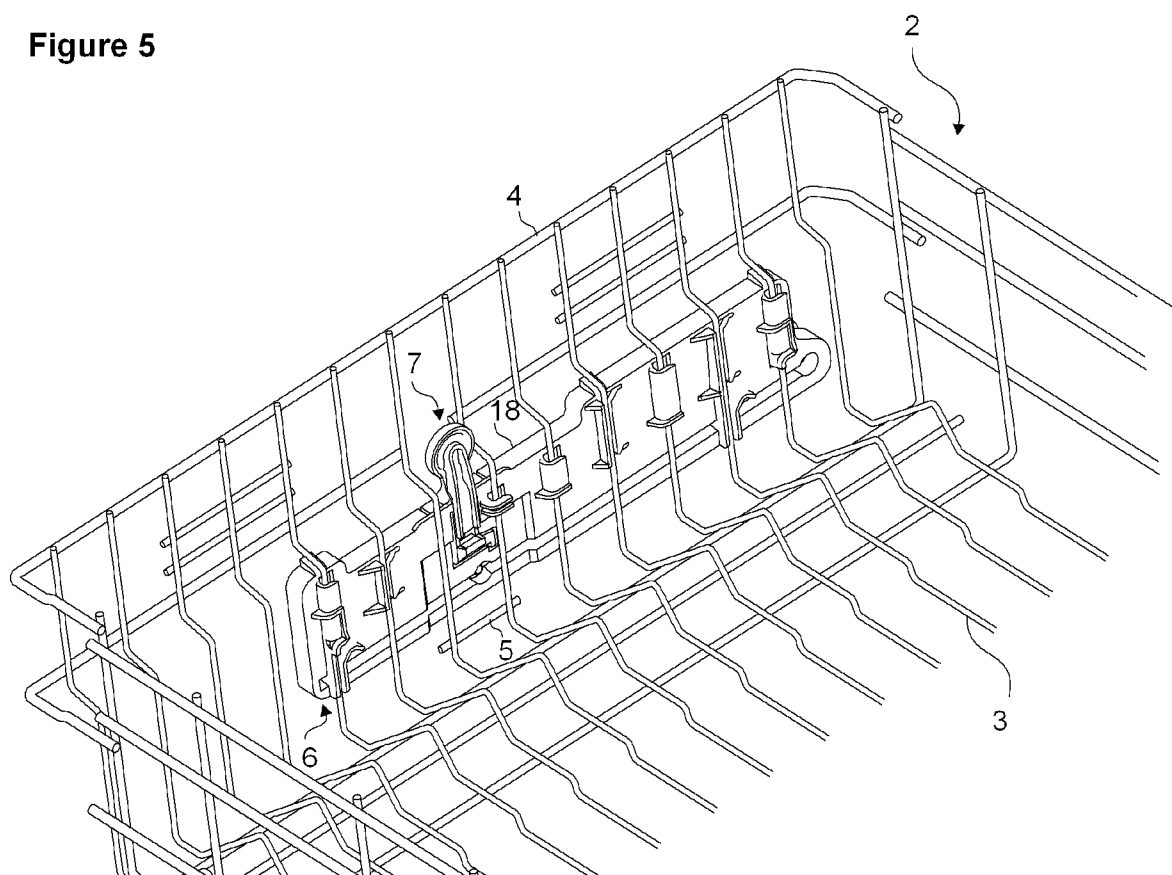


Figure 6

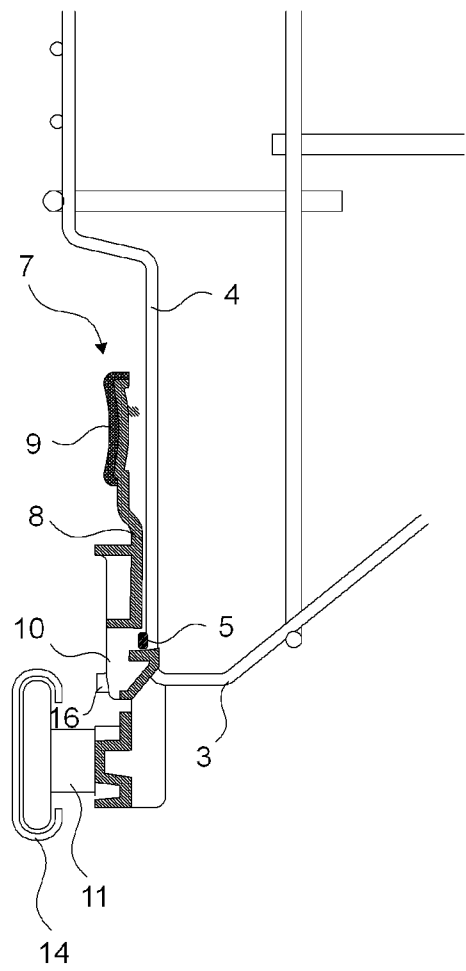
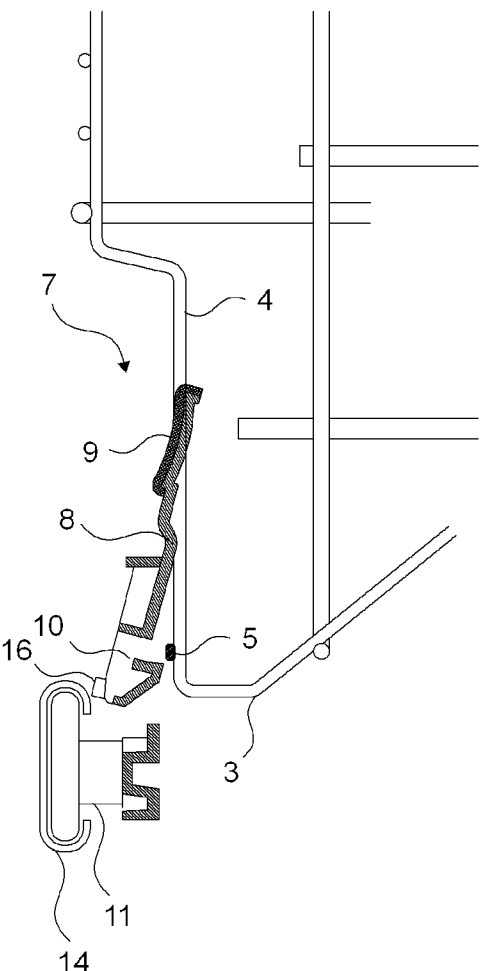


Figure 7



INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/066968

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L15/50

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)
A47L

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2005/133469 A1 (MERSCH MATTHEW D [US] ET AL MERSCH MATTHEW DAVID [US] ET AL) 23 June 2005 (2005-06-23) cited in the application paragraphs [0014], [0018] - [0023], [0025], [0026]; figures 2-6	1-6
A	EP 0 848 930 A (SMEG SPA [IT]) 24 June 1998 (1998-06-24) column 2, lines 1-28; figures	1-6
A	EP 1 508 293 A (LG ELECTRONICS INC [KR]) 23 February 2005 (2005-02-23) paragraphs [0026] - [0040]; figures	1-6
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/066968

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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