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(54) Household dishwasher with upper rack partially housed in a recess of the front loading door and frontally equipped with tipping shelf

(57) Dishwasher in which a front loading door (3) is provided with an inner recess (5) surrounded by a frame (6) housing the front portion (16) of a dish-holding rack (9), the front portion of said rack is provided with a tipping shelf (21) which, when placed vertically, is a reference template for dishes and cutlery housed in the front portion and prevents the interference of said dishes and cutlery with the frame (6), when said loading door is closed.

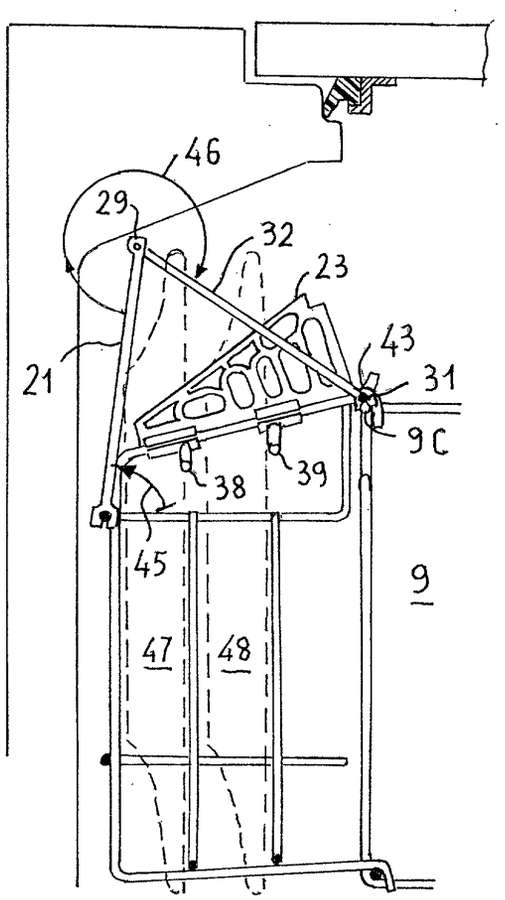

FIG.5

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Description

[0001] The present invention relates to a household dishwasher with upper rack partially housed in an inner recess of the front loading door and frontally equipped with tipping shelf.

[0002] It has been known for long, for instance from EP-143754, about household dishwashers having a washing chamber frontally closed by means of a loading door and housing a pull-out upper and lower rack, in which dishes and cutlery to be washed are arranged.

[0003] The front loading door, hinged below, is usually provided, in the lower portion of its inner surface, with a recess partially housing the lower rack and increasing the available volume of the washing chamber.

[0004] The presence of control devices and of detergent containers/dispensers in the upper portion of the loading door does not allow to extend the recess also in the upper portion of said loading door.

[0005] It has also been known for long that in order to improve loading versatility and to optimize washing, racks can be equipped with tipping shelves, as described for instance in US-3,934,728, or with movable racks, as described for instance in US-3,752,322 and US-5,601,195, which enable to suitably arrange objects of various kind.

[0006] It is also known that in order to suitably arrange small objects and cutlery in the washing chamber it can be provided for additional baskets or even housing cages to be arranged within the upper or lower rack, or frontally hanging from one of these or also housed, as described in EP-963,733, within the recess of the loading door.

[0007] Recently, particular arrangements and structures of the dispensers for detergent and additives have been suggested, in particular in EP-671,143 and in some patent applications belonging to the Applicant, which allow to extend upwards the recess obtained on the inner surface of the loading door.

[0008] It is thus possible to increase the loading volume and to house partially also the upper rack (or an additional rack secured to the upper rack) in the recess thus obtained.

[0009] It has also been suggested (in EP-02425427.8) to increase the recess depth by means of thicker loading door.

[0010] It should anyhow be pointed out that an optimal and versatile use of the larger volume thus available causes several problems.

[0011] First of all, the recess thus obtained thanks to a drawing operation on a metal panel or inner lining of the loading door, has a significant tapering.

[0012] In other words, the recess volume has the shape of a truncated pyramid with inclined walls.

[0013] Moreover, the recess size at its rim is smaller than the size of the washing chamber.

[0014] As a matter of fact, said recess should be surrounded by a frame penetrating at least partially into the washing chamber and abutting onto a waterproof seal of the washing chamber.

[0015] Secondly, whereas the lower rack has an unchangeable vertical position, the upper rack can generally be arranged in two different vertical positions.

[0016] The first problem that arises is therefore to design a versatile upper rack, which can fully exploit the available volume without interfering with the loading door, whatever its vertical position.

[0017] The second problem consists in that the upper rack can house objects vertically protruding from the latter.

[0018] Whereas the user can easily check that these objects do not interfere with the walls of the washing chamber into which the rack with dishes and cutlery is introduced, it is not as easy to check that the objects arranged in the protruding portion of the rack, which portion fits into the recess of the loading door, do not interfere with the frame surrounding the recess.

[0019] Such interference shows only closing the loading door and can break dishes and cutlery housed therein.

[0020] The present invention solves such problems and provides for an upper rack whose tapered front portion is housed in the recess of the loading door.

[0021] A tipping shelf is hinged on the rack front, which shelf has a length that at most equals the minimum width of the front portion of the rack and a width that substantially equals the recess depth.

[0022] The horizontal position of the hinging axis of the shelf is chosen so that when said rack is placed in its lower installation position and the shelf is turned vertically upwards, its free end is substantially flush with the upper side of the frame surrounding the recess and is a useful reference template for dishes and cutlery housed in the front portion of the rack.

[0023] Two substantially triangular cutlery grids are placed beside the tipping shelf on the tapered portions of the front portion of the rack, which grids are separate from the tipping shelf and preferably though not necessarily fixed, and are arranged with an inclination with respect to a horizontal plane substantially equaling the inclination of the inner surface of the upper side of the frame surrounding the recess.

[0024] The vertical position of said grids is suitably chosen so that when the rack is placed in its upper installation position, they are substantially flush with the upper side of the frame surrounding the recess and are therefore a useful reference template for objects housed under them and for objects placed above the shelf.

[0025] Preferably, though not strictly necessary, it is also provided for a C-shaped arm hinged on the free end of the shelf, which acts, depending on cases, as border for objects placed on the shelf, as reference template and prop when the shelf is in vertical position, and also as guiding and supporting grid for dishes.

[0026] Advantageously, also the cutlery grids can be hinged on the rack so as to take two positions and act

alternatively as cutlery grids and vertically supporting racks for dishes.

[0027] Eventually, for reasons of component interchangeability, all the front portion of the upper rack, with its bracket and cutlery grids, can be a removable extension simply secured to the upper rack by hooking.

[0028] The features and the advantages of the present invention will be more evident from the following description of a preferred embodiment and of variants of the latter, with reference to the enclosed drawings, in which:

- Figure 1 is a vertical front-back middle section of the upper portion of a dishwasher known at the state of the art, with loading door equipped with inner recess extending upwards;
- Figure 2 is a partial section of the dishwasher of Figure 1 according to view I-I of Figure 1;
- Figure 3 is an exploded partial perspective view of an upper rack for the dishwasher of Figures 1 and 2, carried out according to the present invention;
- figure 4 is a schematic vertical front-back partial section of the dishwasher of Figure 1, 2, housing the rack of Figure 3 in a lower operating position with the additional shelf in operating position;
- Figure 5 is a schematic vertical front-back partial section of the dishwasher of Figure 1, 2, housing the rack of Figure 3, with tipped additional shelf;
- Figure 6 is a schematic vertical front-back partial section of the dishwasher of Figure 1, 2, housing the rack of Figure 3 in an upper operating position;
- Figure 7 is an exploded perspective view of a variant of the front portion of the rack of Figure 3;
- Figure 8 is a schematic vertical front-back partial section of the dishwasher of Figure 1, 2, housing the rack of Figure 7, with tipped additional shelf and reference template arranged so as to form a positioning grid for dishes and cutlery and a prop for the additional shelf;
- Figure 9 is a schematic vertical section as the one in Figure 8, with reference template arranged only so as to prop the additional bracket.

[0029] With reference to the sections of Figures 1 and 2, a household dishwasher, designed according to the most recent techniques, comprises a washing chamber 1, housed in an outer case 2 and closed by means of a front loading door 3 hinged below.

[0030] The depth P1 in front/back direction of the case is of about 520-530 mm, so as to enable the built-in installation of the dishwasher in kitchen modules.

[0031] According to the most recent techniques the depth P2 of the dishwasher, including the thickness of the loading door 3, can be of 580-600 mm.

[0032] The loading door 3 consists of an outer panel 4 and an inner panel or lining or counter-door, shaped by drawing so as to form a recess 5 within the loading door, surrounded by a peripheral frame 6 and having a flat bottom 7 parallel to the outer panel 3.

[0033] Said peripheral frame 6 abuts against a spray-proof seal 8 mounted within the washing chamber near its loading opening.

[0034] As a consequence, the depth P3 of the recess 4 obtained within the loading door can be of 80-90 mm.

[0035] By suitably arranging the control devices and detergent dispensers, for instance within the upper side of the frame of the loading door in the volume referred to with A (or by other expedients as disclosed in the documents previously quoted), the recess 5 can be extended substantially on the whole height (and width of the loading door).

[0036] The width and height of the recess cannot however equal those of the washing chamber, and are necessarily smaller than the latter, due to the overall size of the frame that has to penetrate into the opening of the washing chamber, so as to couple sealingly with the seal 8.

[0037] Moreover, the drawing process of the inner panel of the door does not enable to obtain a recess with peripheral walls parallel to the bottom 7.

[0038] The walls are necessarily inclined of an angle α, of around 20° and not less so as to avoid the yield and breaking of the material due to the drawing operation, which reaches such a great depth of the recess.

[0039] Said recess 5 has therefore a certain tapering and is shaped like a truncated pyramid.

[0040] Conversely, the washing chamber 1 is substantially shaped as a rectangular parallelepiped.

[0041] The upper portion of the washing chamber houses a rack 9 sliding horizontally on rails, which supports below a spraying impeller 10.

[0042] As is known, dishwasher racks consist of a stiff structure, generally built with metal bars welded one to the other and then coated with plastic.

[0043] Said rack can be installed in two vertical position as chosen by the user.

[0044] In one of these positions, indicated by the solid line of Figure 1, the bottom 91 of the rack has a distance D1 from the vault of the washing chamber, or more precisely from the maximum projection of the seal 8 under the vault of the washing chamber, of around 250 mm.

[0045] In this position the rack, with its upper edge 9A at a distance D3 of around 100 mm from the maximum projection of the seal 8, can house a plurality of dishes vertically placed in a plate rack arranged on the upper edge, as exemplified by a hatched plate 10.

[0046] As a matter of fact, the diameter of table dishes is usually of 230-240 mm.

[0047] In order to provide a higher versatility of use, as for instance suggested in EP-1099404, the upper edges 9A of the rack, juxtaposed to the side walls of the washing chamber, can be coupled with a tipping shelf, which can also be divided into two independent portions 11A, 11B (Fig. 2), and which, when placed vertically or almost vertically, allows to arrange dishes in the rack, and when laid flat, though not necessarily strictly hori-

zontally, is a support for objects with a smaller vertical size placed on and under it.

[0048] Said tipping shelf 11A, 11B can be provided with a grid 12 supporting and holding cutlery, which is an integral part of said shelf.

[0049] Said shelf, extending on the whole front/back depth of the washing chamber, has a limited width of about 100 mm, so that it can be tipped in vertical position, or almost vertically, without interfering with the ceiling of the washing chamber (and with the seal 8) when the rack is pulled out or/introduced into the washing chamber.

[0050] In the other of the two positions in which the rack 9 can be placed, the latter is arranged nearer the ceiling of the washing chamber, and its upper edge is in the position indicated by the hatched line 9B at a distance of around 50-60 mm from the maximum projection of the seal 8.

[0051] Obviously, when the rack 9 is in this position, the tipping shelf 11A, 11B can only be placed in its horizontal or almost horizontal position.

[0052] Whatever the positions of the rack, the load is easily arranged in the rack and on the shelf when said rack is pulled out of the washing chamber and supported by suitable rails, which are not shown.

[0053] The overall size of the load with respect to the ceiling of the washing chamber is clearly visible and the interference of said load with the ceiling, if present, can be easily prevented.

[0054] If any interferences of the load with the seal 8 should occur when the rack is introduced into the washing chamber, the interference can be immediately detected and removed without damaging dishes and cutlery or the machine.

[0055] A different situation occurs if, in order to fully exploit the available volume, the rack is sized so as to be housed with its front portion, defined by the hatched line 13, in the recess 5.

[0056] Unavoidably, the rack should have a front portion tapered both vertically, so as to avoid interferences with the upper side of the frame in an area defined with X, at least when the rack is arranged in its upper position, and laterally (hatched line 15 of Figure 2), so as to avoid interferences with the sides of the frame.

[0057] This can obviously be done, but results in serious limitations.

[0058] Although the non-interference of dishes and cutlery housed in the front portion of the rack with the bottom side 7 and with the sides 14 of the recess 5 is ensured thanks to the front wall 13 and to the side walls 15 of the rack containing dishes and cutlery, the user, however, is not provided with any reference allowing him to check and avoid the risk of a possible interference of dishes and cutlery housed in the front portion of the rack with the upper side of the door frame.

[0059] Interferences can be checked, if present, only by closing the loading door with subsequent damages.

[0060] Another drawback occurring consists in that tipping shelves, if present, hinged on the upper edges 9A of the rack juxtaposed to the side walls of the washing chamber, cannot be extended in the front portion of the rack: their tipping would be prevented by the frame size.

[0061] The exploded perspective view of Figure 3, showing only a half of the front portion of the upper rack, shows a preferred solution to the problems disclosed above.

[0062] A front portion 16, preferably though not necessarily hooked in a removable way to a conventional upper rack 9, is added to said upper rack 9, wholly housed within the washing chamber.

[0063] The front portion 16 can also be carried out as an integral part of the rack 9, but it should be removable for reasons of modularity: said rack 9 can be used in conventional dishwashers, in which the recess within the loading door is absent or limited to the lower portion of said loading door, and at the same time it can be advantageously integrated with the front portion 16, so as to be used in dishwashers where said recess is present.

[0064] The structure of said front portion 16 is highly simple: a metal reticular structure forms a bottom 17, a front surface 18 and two tapered side surfaces, only one of which 19 is shown.

[0065] The inclination of the side surfaces is suitably the same as the side walls 14 (Fig. 2) of the recess 5 in which said front portion should be housed.

[0066] The front surface 18 ends above with a horizontal bar 20 acting as pin for a tipping bracket 21.

[0067] The side surfaces such as 19 have a much larger vertical extension and end in a bar 22, whose inclination is substantially the same as the apex of the dihedron formed by the upper wall and by the side walls of the recess 5.

[0068] The bar 22, preferably though not necessarily, acts as a pin or at least as a support for a substantially triangular cutlery grid-shaped plate 23.

[0069] The bar 22 ends with a tooth 24 hooking on the upper edge 9C of the rack 9.

[0070] Similar teeth 25, 26 are formed by the reticular structure of the bottom 17, so as to engage said bottom 17 with the reticular structure of the bottom of the rack 9.

[0071] The shelf 21 essentially consists of a rectangular grid provided on an edge 27 with forks 28 snap fitting on the bar 20.

[0072] Conveniently, the width of the shelf 21 is such that when said shelf is placed with an inclination on the horizontal plane substantially equaling the inclination of the upper side of the recess 5, the edge 29 of the shelf, opposed to the edge 27, rests, even locally only, onto a front edge 30 of the rack 9, suitably lowered with respect to the edge 9A.

[0073] At the same time the height of the bar 20 on which the shelf 21 is hinged can be chosen so that, when the rack 9 is arranged in its lower position and the shelf 21 is tipped in its vertical position, the edge 29 of the shelf is, the loading door being closed, substantially jux-

taposed, almost in contact with the upper side of the frame surrounding the recess.

[0074] The shelf 21 can extend on the whole length of the bar 20, or alternatively it can be divided into several shelves one beside the other, independent one from the other (for instance two of them as shown) for a total length not exceeding the one of the bar 20.

[0075] Conveniently, the shelf 21 can also be provided with a tipping border consisting of at least a rod 31 (or also two of them) supported by two arms 32, 33 (with supporting shoes 35) hinged on the ends of the shelf on its edge 29.

[0076] On its end beside the bar 22 the rod is provided with a supporting saddle 43 whose function shall be disclosed later.

[0077] The rod 31, beyond acting as a border, advantageously acts, as we shall see, also as a reference template when loading dishes and cutlery, as well as, if necessary, as positioning grid for dishes when the shelf 21 is tipped.

[0078] Alternatively, the function of positioning grid for dishes and cutlery can be carried out by the cutlery plate 23, hereto advantageously equipped with freely rotating release joint forks 36, 37 on the bar 22, and with pins 38, 39 arranged on a plane substantially perpendicular to the one of the plate 23 with a suitable inclination with respect to the rotation axis of said plate 23.

[0079] Alternatively, said pins 38, 39 can be independent from the plate 23 and hinged on the bar 22 by means of release forks.

[0080] In this last case the plate 23, which rests with one of its edges 40 on the upper edge 9A of the rack 9, can also be provided with release elastic locks so as to keep and support in an elevated position said pins 38, 39.

[0081] Similar pins 41, 42, independent from the shelf 21, can be hinged by release joint on the bar 20 and suitably oriented as needed.

[0082] The versatility of use and the various functions of the described devices are more evident thanks to the schematic sections of Figures 4, 5 and 6.

[0083] Figure 4 shows a partial view of the rack 9, arranged in its lower loading position.

[0084] The front portion 16 housed within the inner recess of the loading door is hooked to the rack 9 by means of the teeth 24 and supported by the upper edge 9C.

[0085] In the front portion 16 both the plate 23 and the shelf 21 are arranged in an approximately horizontal position, defined by the edge 40 resting on the edge 9C and by the edge 29 resting on the edge 30.

[0086] The plate 23 can support pieces of cutlery such as spoons and forks, whose handle is introduced into the plate openings and the active side protrudes above from the plate.

[0087] Under the shelf 21, suitably tipped for loading purposes, pieces of tableware with a given size, such as glasses and saucers, can be arranged.

[0088] Other pieces of tableware, such as coffee cups, can be arranged on the shelf 21, retained by the border formed by the rod 31, even if the shelf is slightly inclined.

[0089] The rotation of the border 31 around the axis 29 enables to check that the pieces of tableware placed on the shelf are within the surface 44 traced by rotation of said border, which surface approximately corresponds to the profile of the recess within the door.

[0090] Therefore, although the door is open, it can be checked that the load does not interfere with said door when the latter is closed.

[0091] The rod 31 therefore acts as a reference template for dishes and cutlery placed on the shelf 31 and, approximately, also for the part of cutlery projecting above the plate 23.

[0092] In Figure 5 the rack 9 is still placed in its lower loading position, but the shelf 21 is tipped in a practically vertical position in the direction indicated by the arrow 45.

[0093] The arms 32 and 33 (not shown) are turned in the direction indicated by the arrow 46, so that the rod 31 is substantially lined up with the edge 9C of the rack 9, with the saddle 43 resting on the edge 9C.

[0094] Thus, the rod 31 does not interfere with dishes and cutlery housed in the front portion 16, and the arms 32 and 33 acts as props keeping in vertical position the shelf 21, which in its turn acts as a reference template for dishes and cutlery housed in the front portion 16.

[0095] As a matter of fact, the edge 29 of the shelf is substantially flush with the upper wall of the inner recess of the loading door.

[0096] If the pieces of tableware housed in the front portion 16 are (dessert) plates 47, 48, shown with hatched lines, the vertical positioning of the latter can be ensured by tipping the cutlery plates 23 and their pins 38, 39 (or only the latter if they are independent from the plate 23).

[0097] The pins 38, 39, placed horizontally, form a distancing rack for dishes.

[0098] An alternative solution that does not require the pins 38, 39 will be described below.

[0099] In Figure 6 the rack 9 is placed in its upper loading position.

[0100] In this configuration the cutlery plate 23, necessarily oriented on a plane parallel to the upper wall 49 of the recess, is juxtaposed to said wall 49 and is a reference template for dishes and cutlery housed under the plate 23.

[0101] The same function is performed by the shelf 21, which is also necessarily arranged in an almost horizontal position.

[0102] Objects having a small size in at least one direction, such as pieces of cutlery or saucers, can be laid flat on the bracket 21 and kept on the latter by the border formed by the rod 31, which together with the plates such as 23 usefully acts as reference template for these objects.

[0103] Figures 7, 8 and 9 show an exploded perspective view in schematic front/back section, of a possible variant of the system consisting of shelf 21, cutlery plate 23 and tipping border/template 31, in which the tipping border also acts as positioning grid for dishes and cutlery.

[0104] The shelf 21, which is the same as the one taken into consideration in the previous cases, is associated with a tipping border consisting of two parallel rods 31, 50, spaced one from the other, connected one to the other on their ends by means of two bow-shaped small bars 51, 52 supported, preferably though not necessarily in intermediate position, by said two arms 32, 33 hinged on the edge 29 of the shelf.

[0105] For reasons that will be manifest in the following, the arm 32 is provided in an intermediate position with a first side projection 53.

[0106] Moreover, the rod 31 extends laterally with a pin (or saddle) 54.

[0107] In order to enable the rotation of the arms 32, 33 around their hinging axis and to enable the rotation of the shelf 21 together with its border, so that the projection 53 does not interfere with the plate 23, the edge 55 of the plate 23 is provided with a recess 58.

[0108] Two supporting saddles 56, 57 are provided on the edge 55 in a suitable position.

[0109] When the tipping border is in its rest position, as shown in Figure 8, the arms 32, 33 (the latter not shown) rest on the edge 20 of the front portion 16 within the rack, and the bow-shaped small bars 51, 52 (the latter not shown) partially jump over the edge 20, thus placing the rod 50 below the edge 20, substantially vertically lined up with the latter.

[0110] From its rest position the tipping border can be turned, as already shown in Figure 4, so as to check that the load is within the available volume and that there is no risk of interference when the loading door is closed.

[0111] Similarly to Figure 5, Figure 9 shows the tipping shelf 21 placed in vertical position and kept in said vertical position by the prop consisting of the arm 32.

[0112] In this case the projection 53 (Fig. 7), housed in the saddle 56 of the plate 23, defines such a position of the arm 32 that the rods 31 and 50 form in the front portion of the rack a positioning grid for pieces of tableware such as dishes.

[0113] Conversely, by placing the pin 54 (Fig. 7) in the saddle 57, as shown by a hatched line, the rods 31, 50 can be substantially lined up with the upper edge 9C and 30 of the rack, so as to house in the front portion of said rack bulky objects without interfering with said rods 31, 50.

[0114] It is evident that, as an alternative, in the latter case the pin 54 can be replaced by a saddle resting directly onto the edge 9C, the plate 23 (in this case provided with a recess replacing the saddle 57, as shown also in figure 3) being present or not, so that said plate 23, if needed, can be tipped in a vertical position, thus offering the maximum volume for dishes and cutlery, or kept in such position of support for cutlery.

[0115] The previous description refers to the most common case of a dishwasher in which the recess 5 is obtained by drawing a metal sheet, and is therefore necessarily tapered.

[0116] However, it is evident that the structure and the devices described can be advantageously used also when the recess 5 is not tapered, this because it is for instance formed in an inner lining of the loading door obtained by plastic moulding.

[0117] In this case the cutlery plates, such as 23, instead of being triangular, can be rectangular, or they can be left out, thus extending the length of the bracket, or brackets, on the whole width of the recess.

[0118] In the latter case the supporting saddles 56, 57 can be replaced by equivalent blocking devices for the arms 32, 33, obtained on the sides of the front portion of the rack, either on the bar 22 forming the upper edge of said sides, or on other bars forming the sides.

[0119] In quite a similar way, although it is preferable to use a multifunctional tipping border, such as 31, the latter can be replaced by a fixed bar, integral with the front of the front portion 16 of the rack 9, acting as border and reference template for the load when the rack 9 is in its upper position.

[0120] In this case the bar 20 is an intermediate bar of the front, placed at a suitable height so that the shelf 21, when tipped in vertical position, acts as reference template.

[0121] The shelf 21 can then be provided with hooking devices engaging with the upper fixed bar and ensuring the vertical tipped position of the shelf 21.

[0122] It is then evident that also the lower rack, normally present in a dishwasher, can be carried out using the same techniques as previously described and be provided with a front portion with tapered sides, if necessary, if needed hooked in a removable way to the lower rack and equipped with a shelf having an edge hinged on the front of the front side and tipping from a support position for dishes and cutlery to a vertical position.

[0123] On the sides of the shelf, or shelves, two cutlery plates can be arranged, the latter being supported by the sides, tapered if necessary, of the front portion.

[0124] In this case the reference template is not necessary and, if present, can be fixed and act only as border.

Claims

1. Household dishwasher having a washing chamber (1) frontally closed by means of a loading door (3), said door having inside a recess (5) surrounded by a frame (6) partially penetrating into said washing chamber and forming the peripheral walls of said recess, said washing chamber housing at least a first rack (9) to be pulled out horizontally and having a front portion (16) housed in said recess, **charac-**

terized in that
said front portion is provided with a shelf (21) hinged with an edge (27) on the front of said front port ion and tipping from a support position for dishes and cutlery to a substantially vertical position in which the free edge (29) of said shelf, opposed to said hinged edge (27), is substantially flush with the upper wall of said recess, so that said shelf, when placed in its vertical tipped position, is a reference template for the load housed in said front portion.

2. Dishwasher according to claim 1, in which said recess (5) and said front portion (16) of the rack are tapered and said front portion (16) comprises a pair of cutlery plates (23) supported by the tapered sides (19, 22) of said front portion.

3. Dishwasher according to claim 1 or 2, in which said cutlery plates (23) are hinged on an upper edge (22) of said sides, can be tipped from a support position to a vertical position and are provided with pins (38, 39) that are vertically arranged when said plates are in their support position, and extend horizontally within said front portion of the rack, thus forming a guiding rack for dishes and cutlery, when said plates are tipped in their vertical position.

4. Dishwasher according to any of the preceding claims, in which said tipping shelf (21) is provided with a border (31) with side arms (32, 33) hinged on the free edge (29) of said shelf so as to rotate said border (31) from a position in which said shelf vertically lies on the front (18, 20) of said front portion when said shelf is in its support positions, to at least a position in which at least one of said arms (32, 33) engages with an edge (9C) of said rack (9) or with one of said plates (23) and acts as prop so as to keep said shelf (21) in its vertical tipped position.

5. Dishwasher according to claim 4, comprising means for engaging (53, 54, 56, 57) at least one of said arms in two separate propping positions, for one of which said border (31) lies as a spacing grid for dishes in said front portion (16) of the rack, for the other one of which said border does not interfere with a load placed in said front portion.

6. Dishwasher according to claim 5, in which said spacing grid comprises two parallel rods (31, 50).

7. Dishwasher according to any of the preceding claims, in which said front portion (16) is hooked to said rack (9) in a removable way.

8. Dishwasher according to any of the preceding claims, in which said rack (9) can be installed within said washing chamber in one of two separate vertical positions, lower and upper respectively.

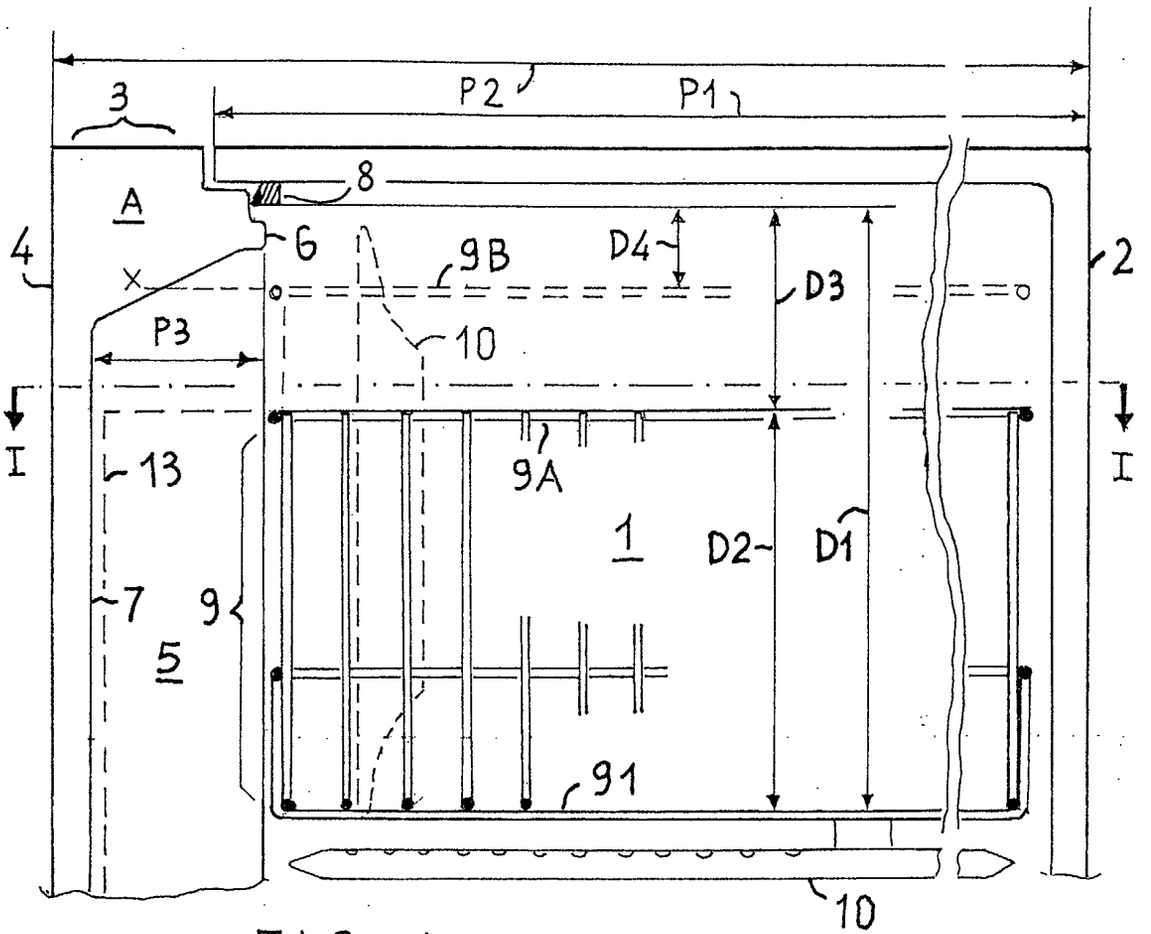
9. Dishwasher according to any of the preceding claims, comprising a second rack housed in said washing chamber below said first rack and having a front portion provided with a shelf hinged with an edge on the front of said front portion and tipping from a support position for dishes and cutlery to a substantially vertical position.

10. Dishwasher according to claim 9, comprising a pair of cutlery plates supported by the sides, tapered if necessary, of the front portion of said second rack.

11. Dishwasher according to claim 10, in which said cutlery plates, supported by the sides of the front portion of said second rack, are hinged on said sides and can be tipped from a support position to a vertical position.

12. Dishwasher according to claim 11, in which said plates, supported by the sides of the front portion of said second rack, are provided with pins extending horizontally so as to form a guiding rack for dishes and cutlery when said plates are tipped in their vertical position.

13. Dishwasher according to any of the claims 9 to 12, in which the front portion of said second rack is hooked to said second rack in a removable way.


3
P2
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D2
D1
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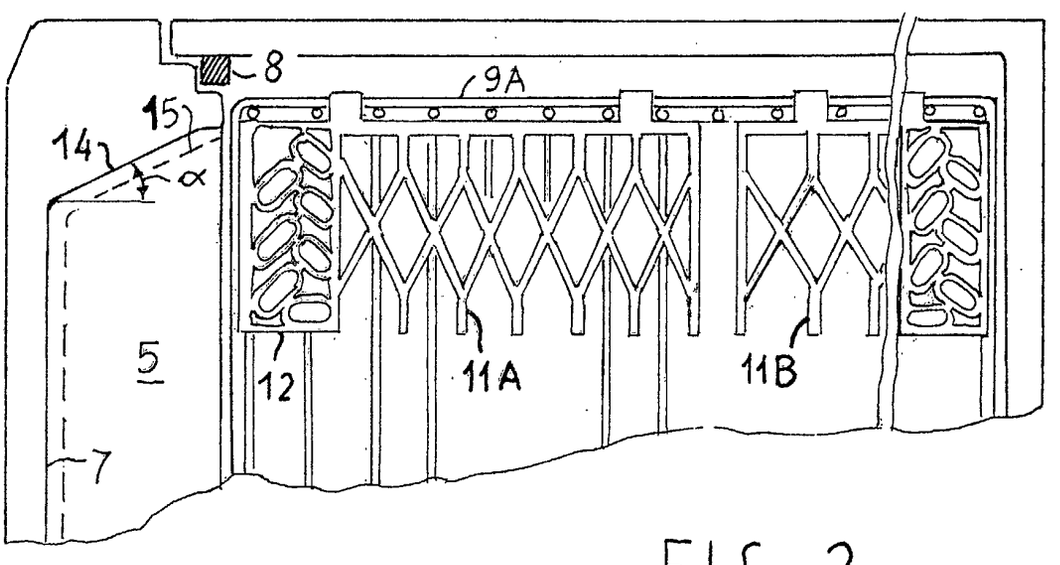
FIG. 1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11B
7

FIG. 2

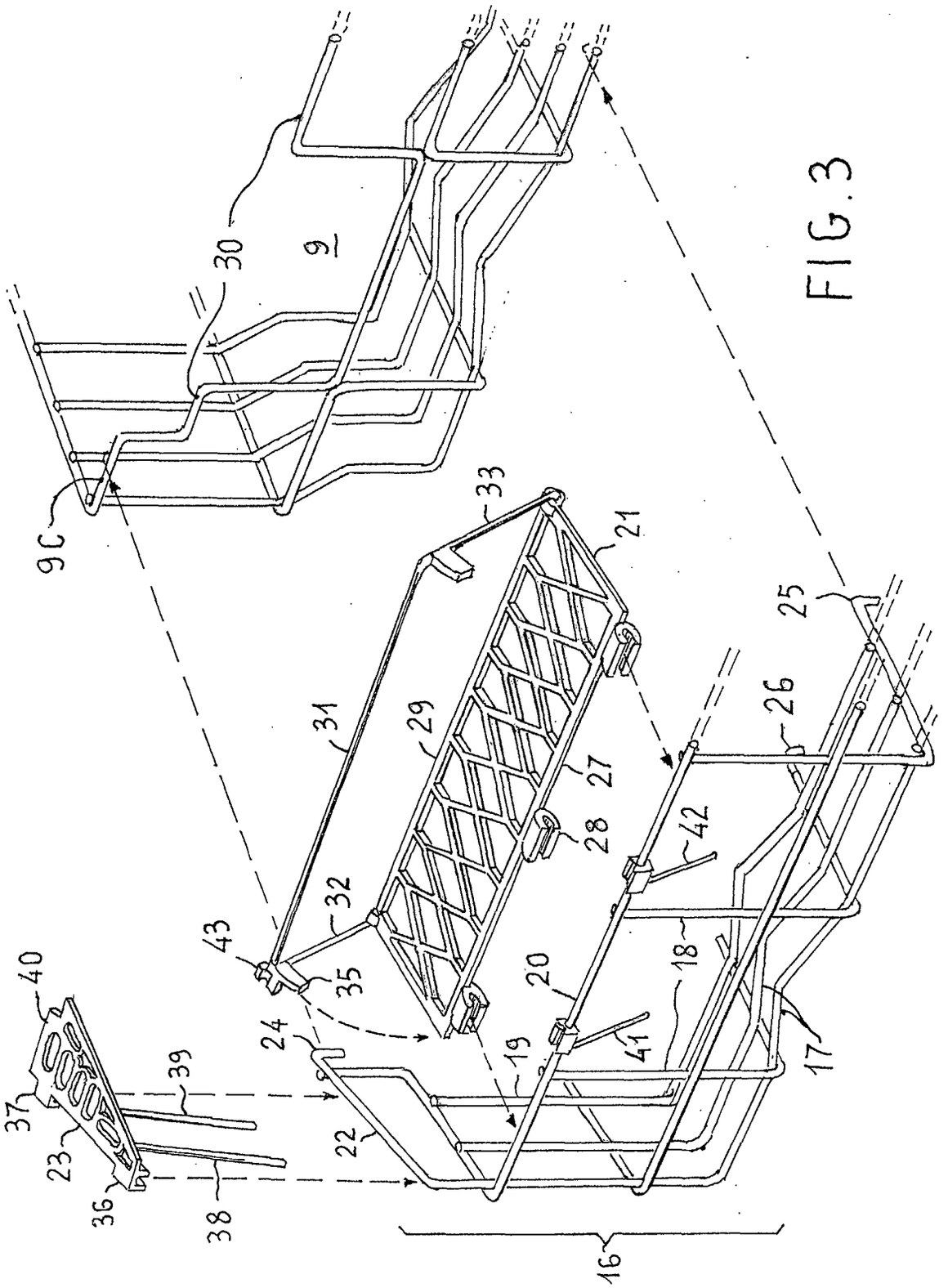
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FIG.3

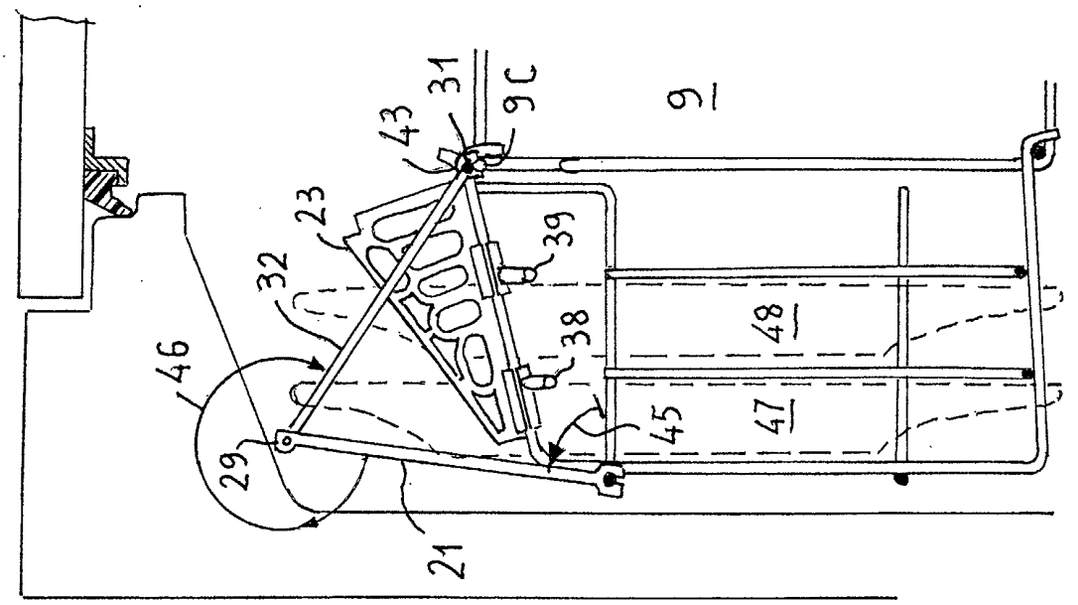
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FIG. 5

FIG. 4

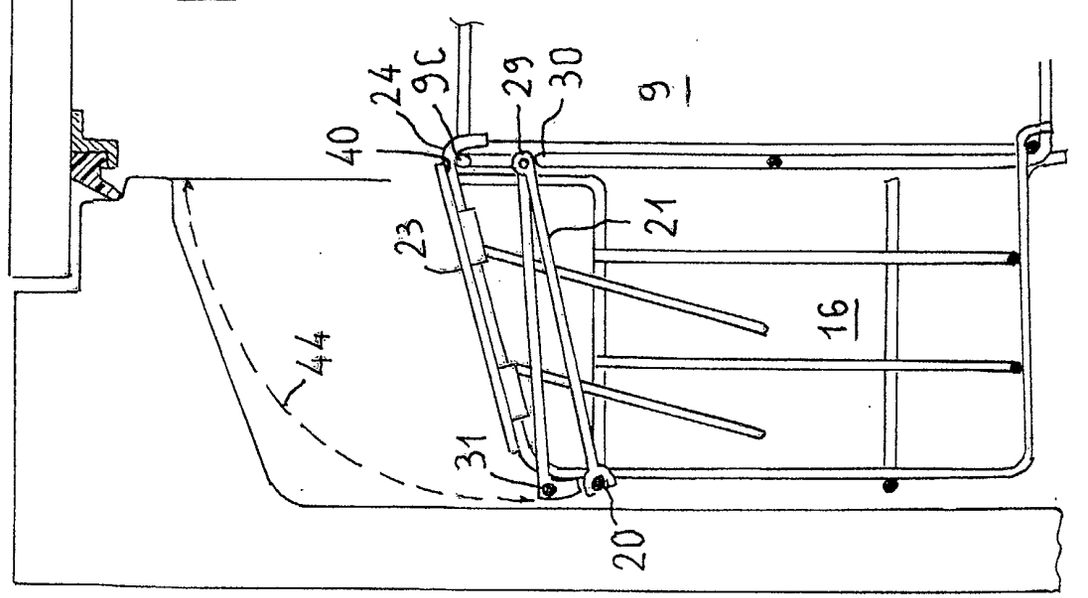
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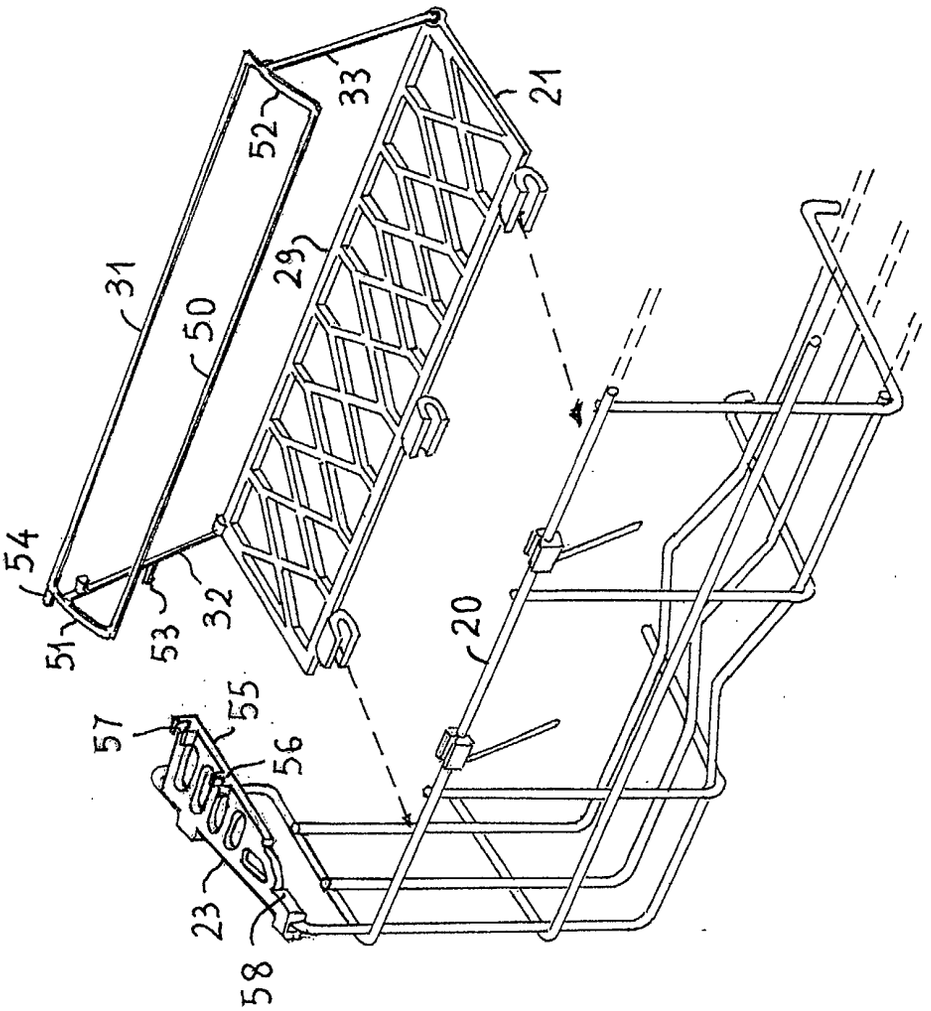
FIG. 7



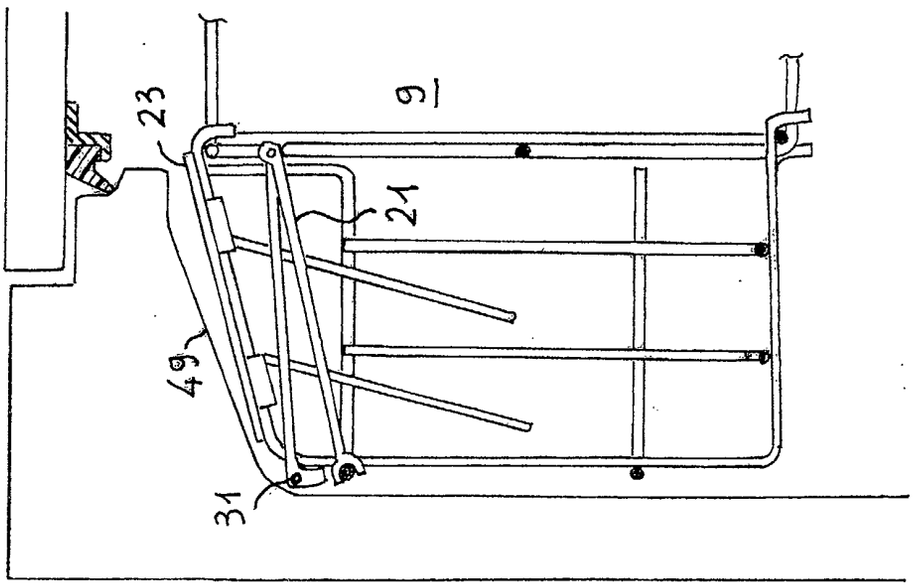


FIG. 6

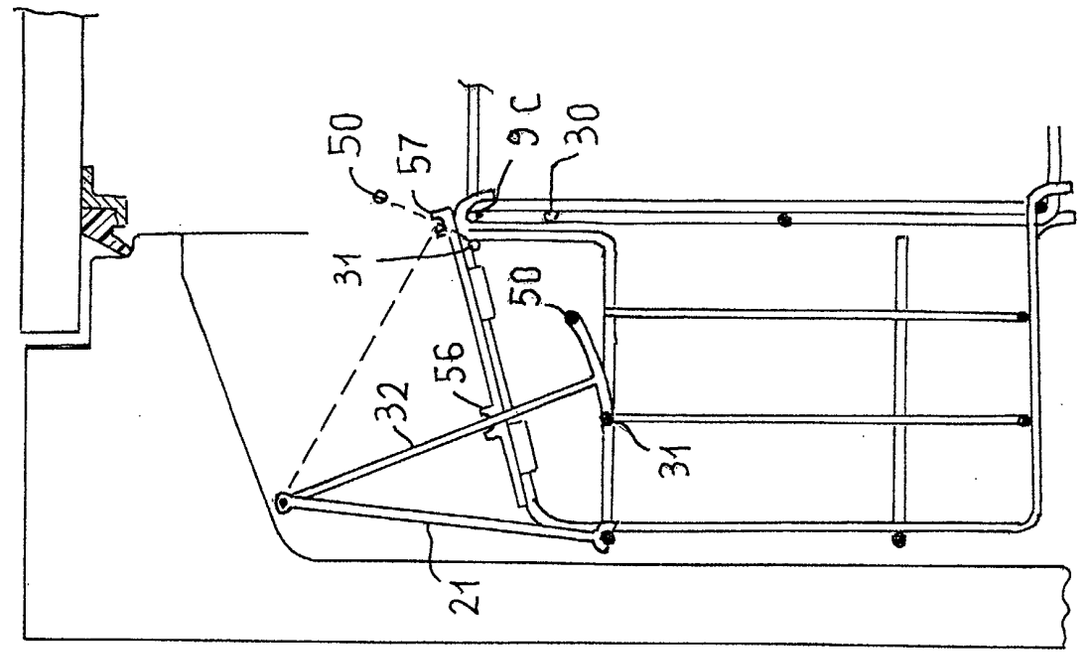
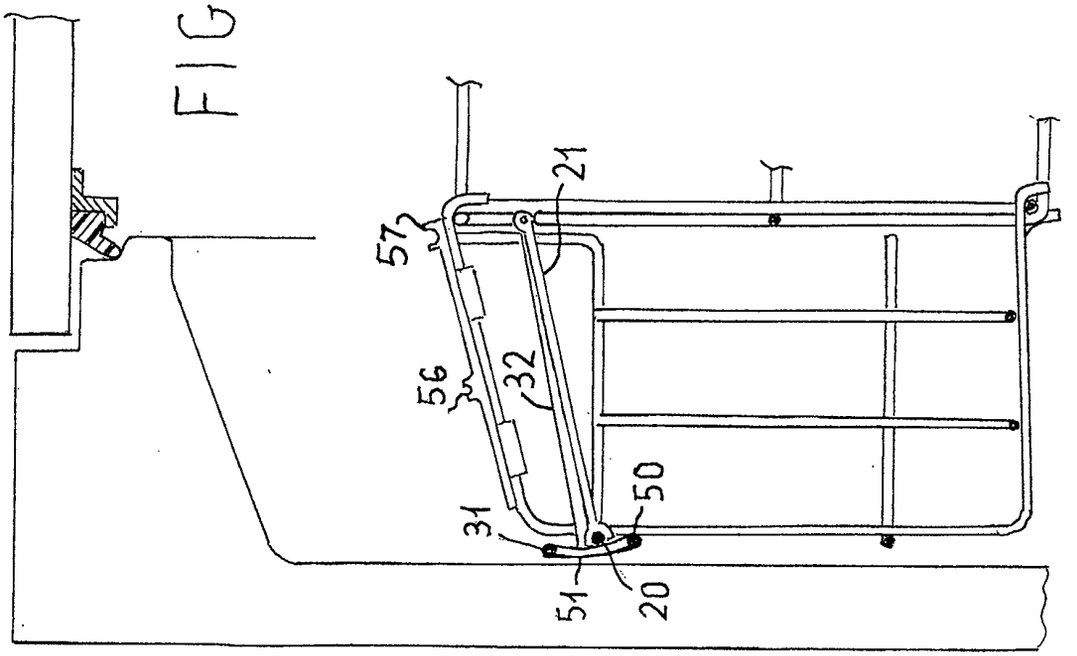


FIG. 9

FIG. 8



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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5635

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A,D	EP 0 671 143 A (ZANUSSI ELETTRODOMESTICI) 13 September 1995 (1995-09-13) * the whole document *	1	A47L15/50
A	US 4 834 125 A (INSALACO ROBERT W) 30 May 1989 (1989-05-30) * the whole document *	1	
A,D	EP 0 143 754 A (INDESIT) 5 June 1985 (1985-06-05) * the whole document *	1	
A	EP 0 937 436 A (SMEG SPA) 25 August 1999 (1999-08-25) * the whole document *	1	
A	DE 296 21 528 U (AEG HAUSGERAETE GMBH) 9 April 1998 (1998-04-09) * the whole document *	1	
A	US 2002/148494 A1 (SMITH JOHN I ET AL) 17 October 2002 (2002-10-17) * the whole document *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47L

The present search report has been drawn up for all claims

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31-03-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0671143 A	13-09-1995	IT PN940014 A1	11-09-1995
		EP 0671143 A1	13-09-1995
US 4834125 A	30-05-1989	NONE	
EP 0143754 A	05-06-1985	IT 1159635 B	04-03-1987
		EP 0143754 A1	05-06-1985
EP 0937436 A	25-08-1999	IT MI980313 A1	18-08-1999
		EP 0937436 A1	25-08-1999
DE 29621528 U	09-04-1998	DE 29621528 U1	09-04-1998
US 2002148494 A1	17-10-2002	NONE	

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