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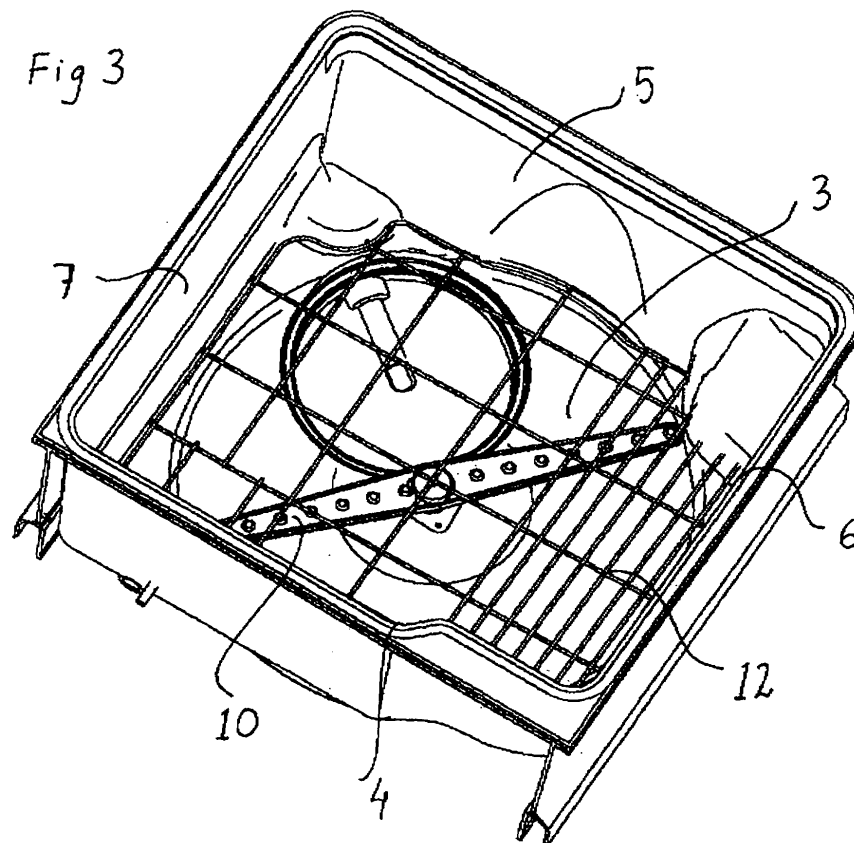
(54) **Dishwasher**

(57) A dishwasher having a washing tub (2) comprising:

a dish rack (12) for receiving at least one object that is to be washed, and a sprinkler arrangement (9) for adding water to the dishwasher. The sprinkler arrangement (9)

is arranged in a bottom (3) of the washing tub (2).

The sprinkler arrangement (9) has a substantially horizontal direction of extension. The dish rack (12) is supported by a fixed part (11) of the sprinkler arrangement (9).



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Description

Technical Field

[0001] The present disclosure relates to a dishwasher having a washing tub comprising a dish rack for receiving at least one object that is to be washed, and a sprinkler arrangement for adding water to the dishwasher. The sprinkler arrangement is arranged in a bottom of the washing tub.

Background

[0002] Drawer dishwashers are known from e.g. US 6,460,555B1 and US 6,447,081B1. When designing dishwashers, there are space constraints imposed by standards for kitchen appliances, cabinetry, etc. For example, a dishwasher cabinet may need to fit within a space that is 817.5-877.5 mm high, 595 mm wide and 570 mm deep.

[0003] In order to maximize the amount of objects that can be washed in a dishwasher, there is a general need for space saving arrangements in respect to the possibility of loading a dish rack full of objects that are to be washed.

[0004] EP 1 358 834 shows an in-sink dishwasher, i.e. it has an open top for receiving dishes to be washed just like in a drawer dishwasher. The sink has a bottom wall and side walls that collectively define a wash chamber having an open top for receiving dishes to be washed. A basket is provided and is removably mounted within the chamber through the top. A sprayer is mounted to the basket and has a liquid inlet through which liquid is introduced into the sprayer for subsequent spraying throughout the wash chamber. In the arrangement according to EP 1 358 834 the sprayer is mounted on the basket and consequently while removing the basket from the wash chamber the sprayer follows. Furthermore the sprayer takes up a lot of space from the wash chamber.

[0005] US 5,709,237 shows a prior art drawer dishwasher, wherein a dish chamber is slidably movable from a cabinet of a dishwasher unit by being mounted in form of a drawer. Providing a rack on the bottom of the washing chamber facilitates the positioning of dishes in the washing chamber. The rack is arranged in the chamber by means of slots or notches provided on at least one side wall of the washing chamber. A spray arm is arranged in the bottom of the washing chamber.

[0006] US 5,427,129 shows a conventional dishwasher wherein a rack has a fixed tower mounted on the rack with a rotatable spray tower journaled inside. A rotatable spray arm is mounted on the outlet of the pump and is movable vertically into and out of engagement with the rotatable spray tower, with a spray arm having a downwardly extending collar carrying a seal that slides vertically on the outlet tube, while the wash arm rotates about the seal.

[0007] In the arrangement according to US 5, 427, 129

a fixed tower is mounted on the rack and in the washing position the tower connects to and interacts with the top of the spray arm. The spray tower extends upwardly in the tub. This arrangement is very space demanding

[0008] Compared to the prior art arrangements there is still a need for an arrangement that saves space and makes it possible to load the dishwasher full with objects that are to be washed.

[0009] As a result of the heavy weight of the plates, etc., the dish rack may bend down in the middle when full of objects. The dish rack may even prevent the rotatable sprinkler from moving freely.

Summary

[0010] In order to solve the above problems and yet to keep a small distance between the dish rack and the sprinkler in order to maximize the space in the dishwasher a dishwasher according to the preamble of claim 1 is provided and which is characterized in that the sprinkler arrangement has a substantially horizontal direction of extension, and that the dish rack is supported by a fixed part of the sprinkler arrangement.

[0011] By providing the dishwasher with a sprinkler arrangement that has a substantially horizontal direction of extension, the sprinkler arrangement takes up as little space as possible from the washing tub. And by providing the sprinkler arrangement with a fixed part, it is possible to allow the dish rack to be supported by this fixed part. This arrangement makes it possible to load the dish rack full of objects without the risk that the dish rack will bend down in the middle.

[0012] An arrangement according to claim 1 is with advantage provided in a drawer dishwasher.

[0013] By attaching the sprinkler to the bottom of the washing tub with an attachment element, it is possible to let the dish rack be supported by the fixed attachment element and the rotatable sprinkler can move freely around the attachment element. Hence, the dish rack can manage heavy objects without bending down in the middle and by that preventing the sprinkler from moving freely.

[0014] By providing an attachment element that has a projection that protrudes above the sprinkler it is possible to let the dish rack be supported by the projection.

[0015] By providing the dish rack with a support surface, and wherein the support surface is at least partially supported by the projection of the attachment element, the dish rack is additionally strengthened and can therefore manage heavy load.

[0016] In one embodiment of the invention the dish rack is divided into a first part and a second part, the first part is detachably arranged and the second part is at least partially supported by the sprinkler arrangement. By providing a divided dish rack wherein one part is detachably arranged to the bottom of the washing tub, it is possible to remove that part of the dish rack from the washing tub in an easy way, for example when cleaning

the bottom area of the washing tub.

[0017] By arranging the detachable part of the dish rack adjustable around a horizontal axle, it is possible to adjust the angle of inclination. By adjusting the angle an advantageous draining angle is achieved, which improves the drying result.

[0018] In one embodiment of the invention the front part of the dish rack (the part closest to the front wall of the washing tub) is detachable and the rear part of the dish rack (the part closest to the rear wall of the washing tub) is attached to the bottom of the washing tub and rest against the projection of the attachment element. By arranging the front part of the dish rack detachably in the washing tub, it is easy to remove it from the dishwasher, and to reach, for example the bottom area of the washing tub, when cleaning or that like.

Brief Description of the Drawings

[0019]

Fig 1 schematically illustrates a cross section of a side view of a dishwasher drawer according to the invention.

Fig 2 schematically illustrates a cross section of a side view of a sprinkler arrangement according to the invention.

Fig 3 schematically illustrates a top view of a dishwasher drawer in an open state.

Fig 4 schematically illustrates a top view of a the dishwasher drawer in an open state according to an embodiment of the invention.

Fig 5 schematically illustrates a dish rack according to an embodiment of the invention.

Description of Embodiments

[0020] Fig 1 illustrates a dishwasher drawer 1 according to an embodiment of the invention. Two drawers may be arranged on top of each other and may be arranged in a dishwasher. However, configurations with one or more drawers are contemplated.

[0021] A washing tub 2 is arranged inside the drawer 1 for receiving plates, cutlery, glasses, bowls, etc. that are to be washed. The washing tub 2 is upwardly open, to allow for access to it from above. The washing tub 2 is defined by a bottom 3, a front wall 4, a rear wall 5 and two side walls 6 and 7 (see fig 3).

[0022] In one embodiment of the invention the bottom 3 of washing tub 2 has an inclined horizontal plane.

[0023] In one embodiment the bottom 3 is inclined from the front portion 4 of the washing tub 2 towards the rear portion 5 of the washing tub 2, to allow larger objects to be placed in the rear portion 5 of the washing tub 1 than in the front portion 4 of the washing tub 2.

[0024] Below the bottom 3 of the washing tub 2, there is an enclosure 8 formed for receiving functional components of the dishwasher, such as e.g. a filter arrange-

ment, a heater, a pump, a softener, control electronics, valves etc.

[0025] A sprinkler arrangement 9 is fixed arranged in the bottom 3 of the washing tub 2. The sprinkler arrangement 9 comprises a rotatable sprinkler 10 for adding water to the dishwasher drawer 1. The sprinkler arrangement 9 further comprises an attachment element 11 for attaching the sprinkler 10 to the bottom 3 of the washing tub 2.

[0026] The attachment element 11 comprises a vertically arranged axle 11a. The axle 11a is provided as bearing axis for the centre axis of the rotatable sprinkler 10. The axle 11a is preferably made of steel. The attachment element 11 further comprises a projection 11b that protrudes above the sprinkler 10. In one embodiment of the invention the projection 11b is a mounting nut. The nut 11b is preferably made of ceramics. Nuts made of plastic or steel can also be used. The head of the nut 11b can with advantage be quite flat-shaped, to save place. The head of the nut 11b is preferably 2-5 mm high, most preferably around 4 mm high.

[0027] A dish rack 12 is arranged in the bottom 3 of the washing tub 2 and provided for receiving objects that are to be washed. In one embodiment of the invention the dish rack 12 consists of plastic coated steel wires, but can also consist of other suitable materials. The bottom of the dish rack 12 is totally plane and has no edges. A dish rack 12 with another, for the purpose, suitable form can also be used according to the invention.

[0028] The dish rack 12 is supported by the sprinkler arrangement 9. Particularly the dish rack 12 is supported by the fixed part 11 of the sprinkler arrangement. More particularly, the head of the mounting nut 11b supports the dish rack 12.

[0029] In one embodiment of the invention the dish rack 12 is provided with a support surface 13 (see fig 5) for the purpose of making the dish rack 12 extra stable. In that embodiment the support surface 13 is arranged to rest against the head of the mounting nut 11b.

[0030] In one embodiment of the invention the dish rack 12 is divided into a first part 12a and a second part 12b (see fig 4 and 5). The second part 12b is supported by the sprinkler arrangement 9. The first part 12a of the dish rack 12 is detachably arranged to the bottom 3 of the washing tub 2. The part 12a is detachably arranged to at least one horizontal axis 14. The part 12a is with advantage detachably arranged to two horizontal axes 14, see fig 5. The axes 14 are fixed in the bottom 3 of the washing tub 2, for example by means of a screw, through welding or by other suitable means or methods. The first part 12a can for example be detachably arranged to the axis 14 by means of a snap connection, or by other for the purpose suitable connections. The first part 12a is further adjustable around the horizontal axes 14, which make it possible to adjust the angle of inclination. By adjusting the angle of the first part 12a of the dish rack an advantageous draining angle is achieved, which improves the drying result.

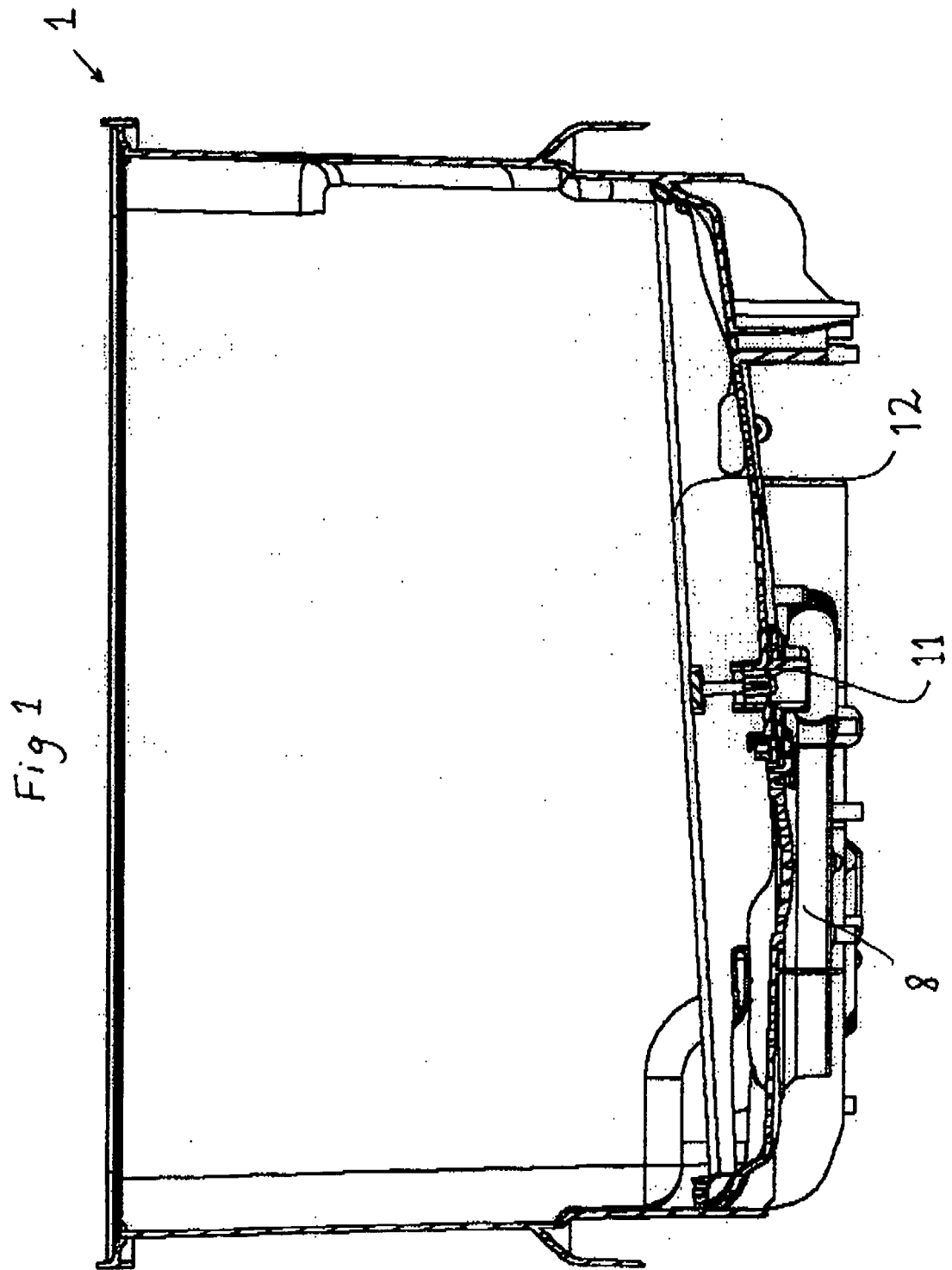
[0031] In one embodiment of the invention the first part 12a is the front part of the dish rack 12, the part closest to the front wall 4 of the washing tub 2. The second part 12b is the rear part of the dish rack 12, the part closest to the rear wall 5 of the washing tub 2.

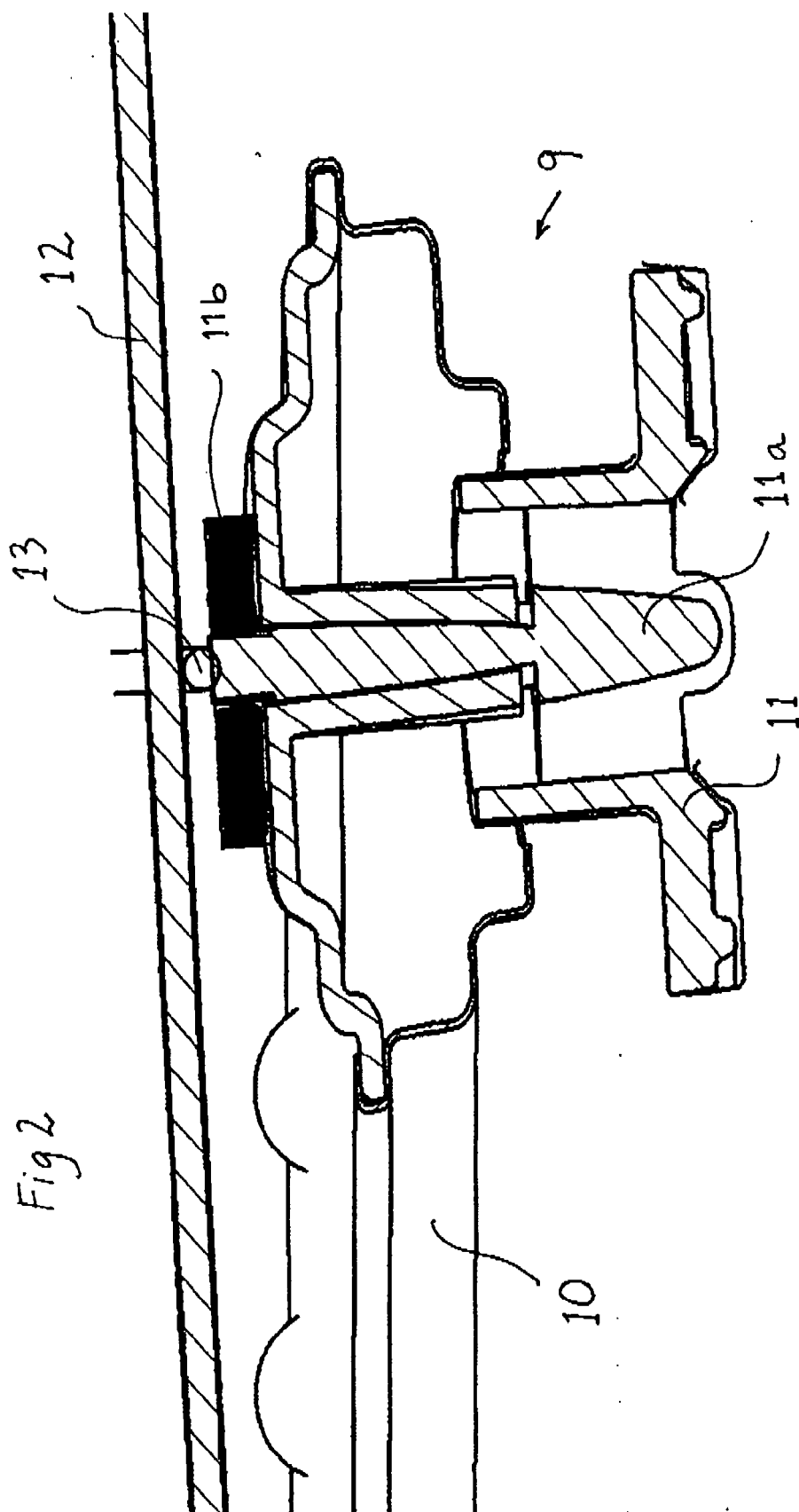
[0032] The arrangement according to the present invention can with advantage be used in a drawer dishwasher, but can also be used in conventional dishwashers, table-top dishwasher and in built in dishwashers or that like.

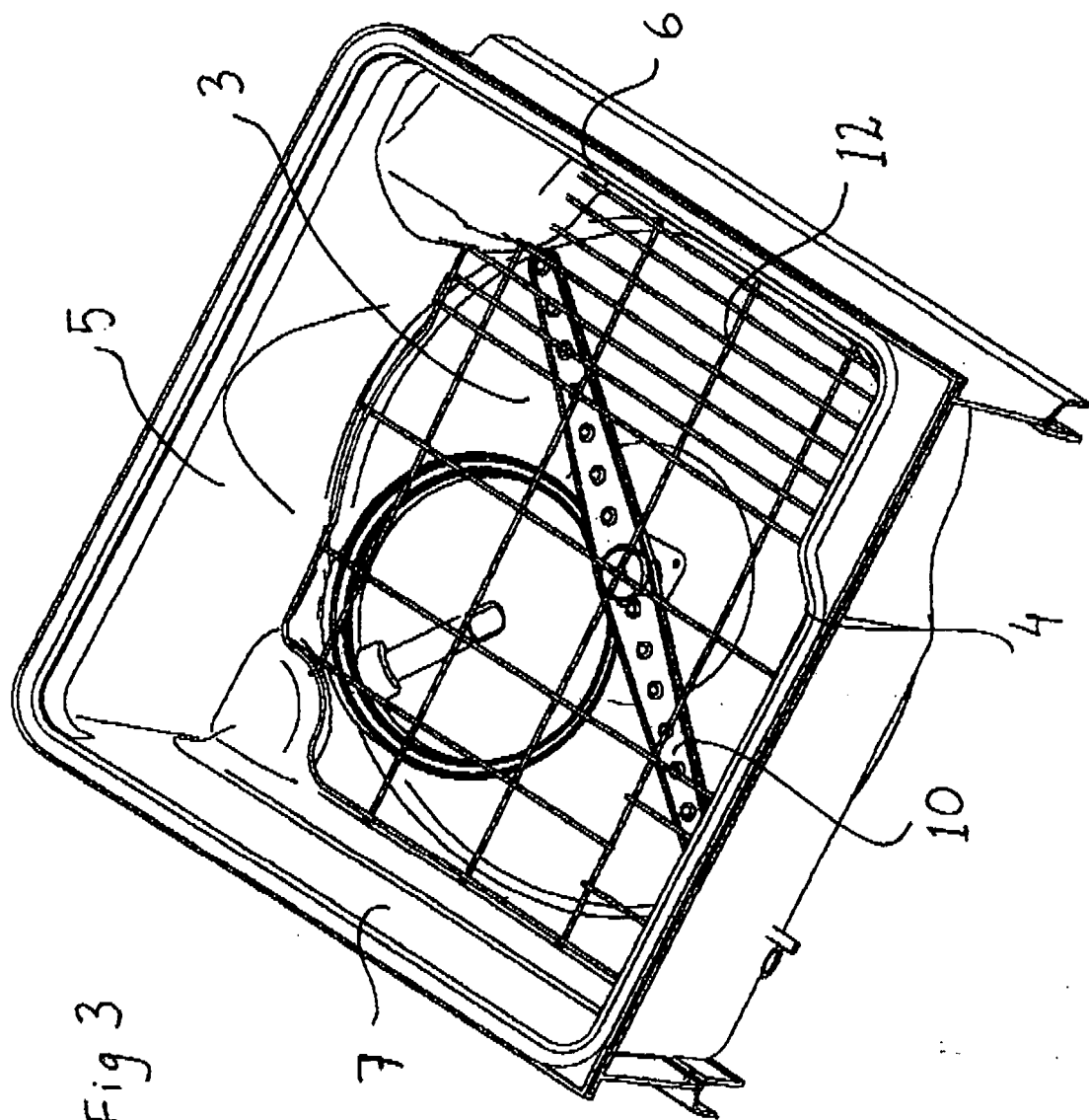
[0033] In the drawings and specification, there have been disclosed preferred embodiments and examples of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for the purpose of limitation, the scope of the invention being set forth in the following claims.

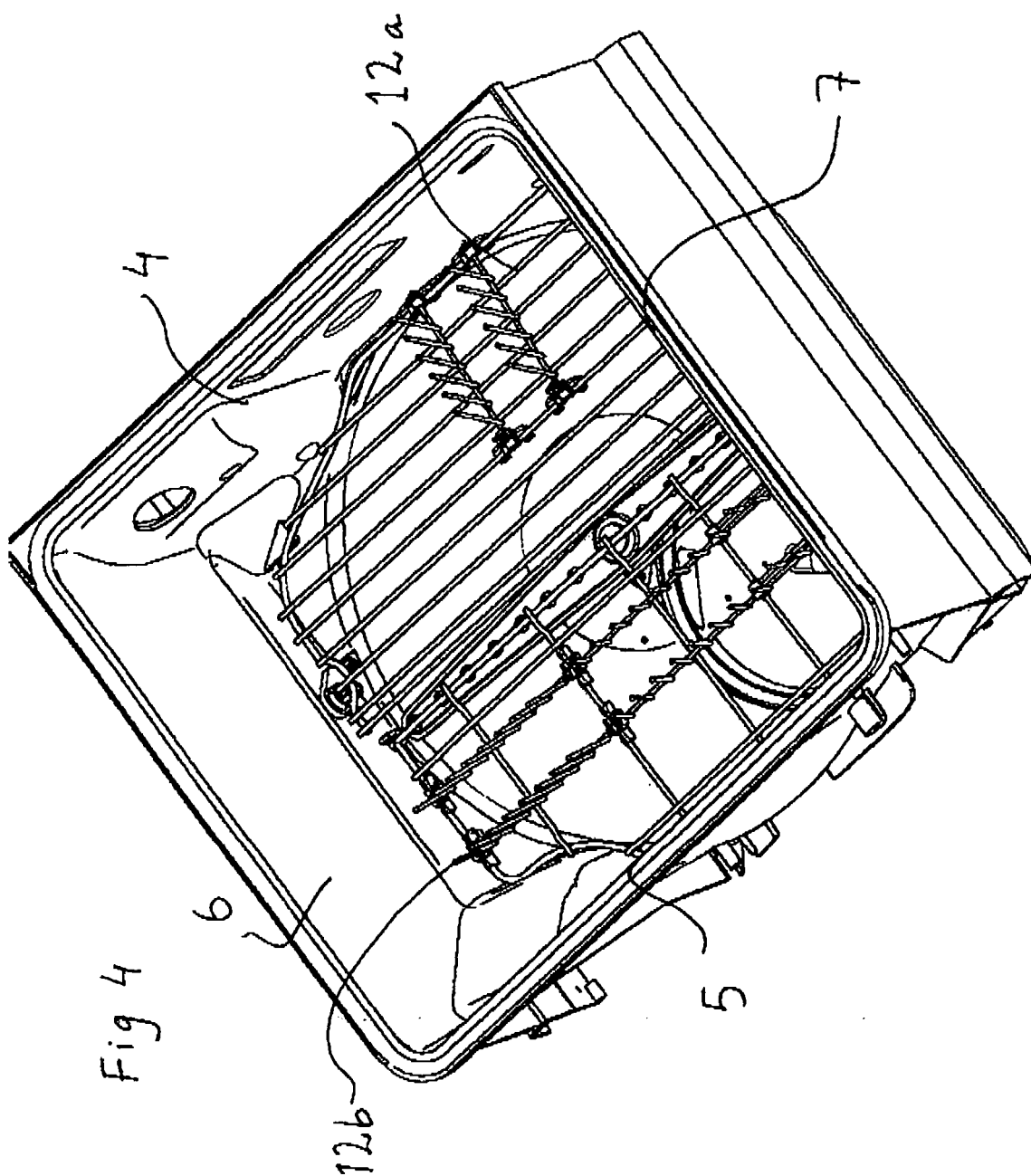
Claims

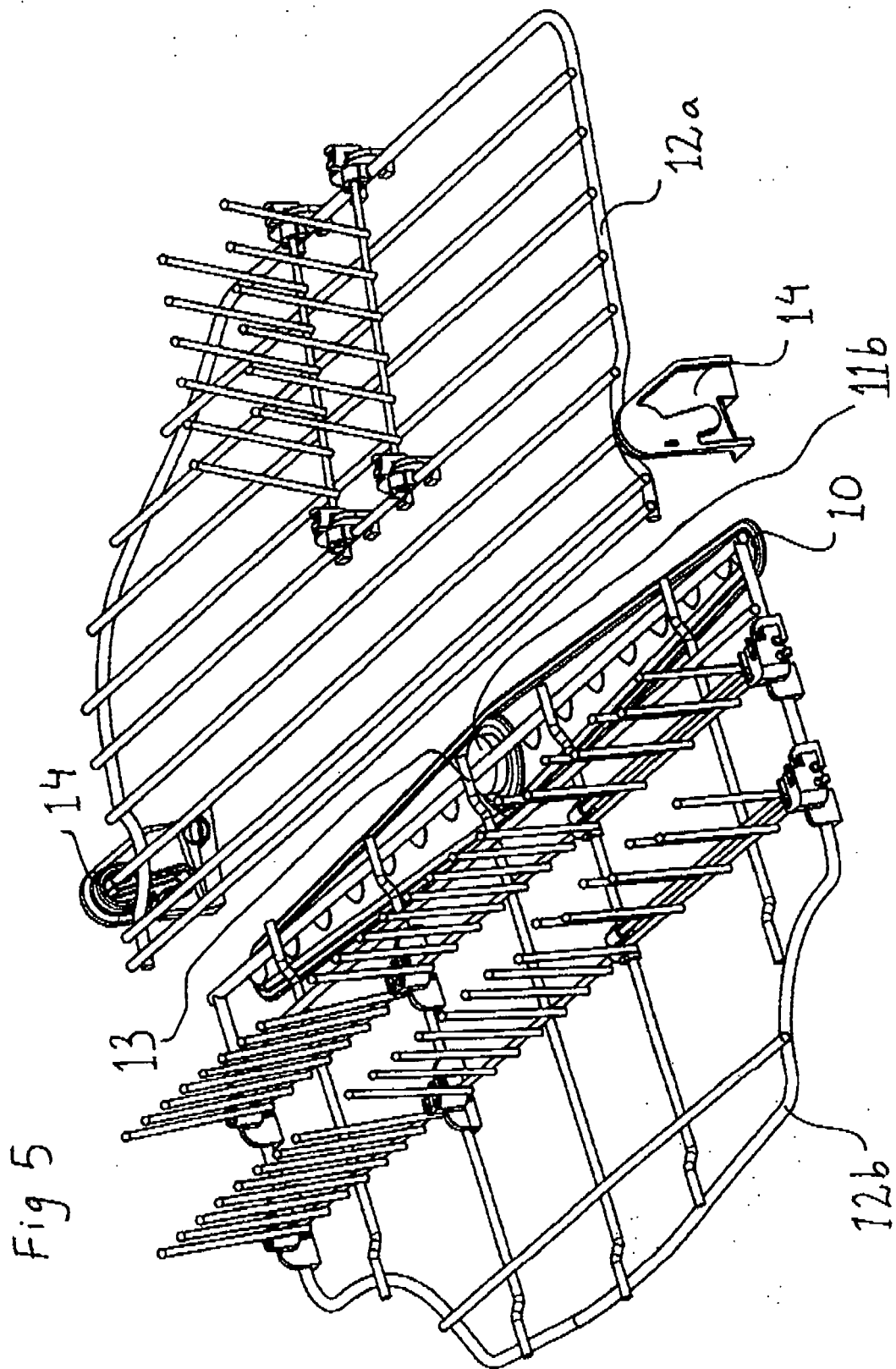
1. A dishwasher having a washing tub (2) comprising: a dish rack (12) for receiving at least one object that is to be washed, and a sprinkler arrangement (9) for adding water to the dishwasher, the sprinkler arrangement (9) is arranged in a bottom (3) of the washing tub (2), **characterized in that** the sprinkler arrangement (9) has a substantially horizontal direction of extension, and that the dish rack (12) is supported by a fixed part (11) of the sprinkler arrangement (9).
2. The dishwasher as claimed in claim 1, wherein the dishwasher is a drawer dishwasher.
3. The dishwasher as claimed in claim 1-2, wherein the sprinkler arrangement (9) comprises a rotatable sprinkler (10) and an attachment element (11) for attaching the sprinkler (10) to the bottom (3) of the washing tub (2), and wherein the dish rack (12) is supported by the attachment element (11).
4. The dishwasher as claimed in claim 3, wherein the attachment element (11) has a projection (11b) that protrudes above the sprinkler (10).
5. The dishwasher as claimed in claim 1-4, wherein the dish rack (12) is provided with a support surface (13), and wherein the support surface (13) is supported by the projection (11b) of the attachment element (11).
6. The dishwasher as claimed in any of the preceding claims, wherein the dish rack (12) is divided into a first part (12a) and a second part (12b), wherein the first part (12a) is detachably arranged to the bottom (3) of the washing tub (2), and wherein the second part (12b) is supported by the sprinkler arrangement (9).
7. The dishwasher as claimed in claim 6, wherein the first part (12a) of the dish rack (12), is adjustable around a horizontal axis (14).
8. The dishwasher as claimed in claim 6-7, wherein the first part (12a) is the front part of the dish rack (12), the part closest to the front wall (4) of the washing tub (2), and wherein the second part (12b) is the rear part of the dish rack (12), the part closest to the rear wall (5) of the washing tub (2).













European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 06 02 5206

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 1 591 422 A (DANJOU, PHILIPPE) 27 April 1970 (1970-04-27)	1-5	INV.
A	* page 1, line 1 - line 13 *	6-8	A47L15/23
A	* page 2, line 29 - page 3, line 27 *	6-8	A47L15/50
	* figure 1 *		

A	EP 1 358 834 A (WHIRLPOOL CO [US]) 5 November 2003 (2003-11-05)	1-8	
	* abstract; figures 1,2 *		

			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		16 July 2007	FAYMANN, L
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 02 5206

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16-07-2007

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FR 1591422	A	27-04-1970	NONE	

EP 1358834	A	05-11-2003	US 2003205248 A1	06-11-2003
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- US 6447081 B1 [0002]
- EP 1358834 A [0004] [0004]
- US 5709237 A [0005]
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