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(54) **Domestic dishwasher**

(57) The invention concerns a domestic dishwasher (10) with a spray vessel, fitted into which are one lower and one upper crockery basket each with its own spray device and in which a roof spray device is arranged above the upper crockery basket, wherein the spray devices (13) located on the lower crockery basket are supplied directly from a circulation pump (12) and the spray device located on the upper crockery basket and the roof spray device are supplied with spray fluid from the circulation pump (12) through flow pipes. In order to supply the spray devices with washing fluid separately,

whilst still being able to use a simple flow system with low component and assembly expenditure, the invention specifies that the flow pipes for the spray devices assigned to the upper crockery basket and for the roof spray device are preferably formed as a single-component twin-pipe (20), which is fitted with two connection lugs for attaching to the circulation pump (12) and in the area of the spray device assigned to the upper crockery basket, has at least one connection opening in the first pipe and is guided with the second pipe up to the roof spray device and which has one connection opening for the roof spray unit.

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Description

[0001] The invention concerns a domestic dishwasher with a spray vessel, fitted into which are one lower and one upper crockery basket each with its own spray device and in which a roof spray device is arranged above the upper crockery basket, wherein the spray devices located on the lower crockery basket are supplied directly from a circulation pump and the spray device located on the upper crockery basket and the roof spray device are supplied with spray fluid from the circulation pump through flow pipes.

[0002] Almost all current models of modern domestic dishwashers are fitted with spray devices at the three levels, as disclosed in DE 44 34 235 C1. Thus, there is increasingly more movement away from the parallel operation of the spray devices, towards the supply being handled by one or a combination of spray devices through the control system of the domestic dishwasher, wherein the choice of program can be specified. However, this requires a separate flow pipe originating in the circulation pump for each spray device. The independent impact of the washing fluid on the spray devices leads to considerable expense in terms of components and assembly for the flow pipe system.

[0003] The task of the invention, in the case of a domestic dishwasher of the type mentioned above, is to achieve a separate supply to the spray devices with reduced expenditure in terms of components and assembly.

[0004] This task is solved in accordance with the invention, in that the flow pipes for the spray devices assigned to the upper crockery basket and for the roof spray device are preferably formed as a single-component twin-pipe, which is fitted with two connection lugs for attaching to the circulation pump, has at least one connection opening in the first pipe in the area of the spray device assigned to the upper crockery basket, and which is laid with the second pipe up to the roof spray device and which has one connection opening for the roof spray unit.

[0005] This twin-pipe formed as a single component achieves an independent flow of washing fluid to the spray device assigned to the upper crockery basket and to the roof spray device. Thus, the required connection to the circulation pump can be achieved by looping the electrically controllable valves into the connection from the circulation pump to the spray device assigned to the lower crockery basket and into the connection from the circulation pump to the first and second pipes of the twin-pipe.

[0006] The quantity of washing fluid supplied can easily be adjusted, since the cross-section of the first pipe is greater than that of the second.

[0007] To save space, the twin-pipe can be fitted into the washing vessel without the crockery basket or the spray device assigned to it being affected, in that the twin-pipe is formed essentially as a clamp, the centre

section of which is laid vertically in the washing vessel, the lower section of which is laid horizontal to the circulation pump and the upper section of which is laid horizontal to the roof spray device.

[0008] The connections to the circulation pump and the upper spray device and also to the roof spray device are created in that the lower section at the free end is transferred to the vertical connection lugs angled downwards and also in that the connection openings for the spray device assigned to the upper crockery basket are arranged on the inner side of the clamp-based twin-pipe, and also in that the connection opening for the roof spray device is arranged on the inner side of the upper section of the twin-pipe, which is angled towards the lower section.

[0009] The invention is explained in more detail by way of one of the design examples illustrated in the drawings. The following are shown:

Fig. 1: an exploded front view of the washing vessel of a domestic dishwasher with integrated twin-pipe as a washing fluid twin-pipe,

Fig. 2: an exploded front view of the twin-pipe integrated into the washing vessel as shown in Fig. 1, and

Fig. 3: an exploded rear view of the twin-pipe.

[0010] As the view in Fig. 1 shows, fitted into the machine frame 10 is a washing vessel 11, which below the base carries a circulation pump 12, which extracts washing fluid from the sump of the washing vessel 11. One lower crockery basket and one upper crockery basket can be inserted into the washing vessel. Arranged as a spray device below the lower crockery basket is a lower spray arm 13, which is connected to the outlet of the circulation pump 12 by means of a flow pipe with an integrated, electrically controllable valve. The valve is controlled by the machine's program control system. This valve is superfluous if in any program, the lower spray arm is supplied from the circulation pump 12. It is then sufficient to switch on the circulation pump 12. Arranged below the upper crockery basket is a further spray device, which can also be designed as a rotating spray arm that is moved in the direction of rotation by the washing liquid in accordance with the Segner principle. Two spray arms can also be assigned to the upper crockery basket. Finally, a roof spray device is arranged below the roof of the washing vessel 11. The spray arms of the upper crockery basket and the roof spray device are supplied with washing fluid by a clamp-based, single-component twin-pipe 20. The lower section uS of the twin-pipe 20 is aligned horizontally and guided below the lower spray arm 13 to the circulation pump 12, wherein the connection lugs 22 and 25 at the free end of the lower section uS lead to the outlets angled downwards and assigned to the circulation pump 12, wherein these con-

nections run via electrically controllable valves so that they can be switched separately, as shown in Fig. 2. The centre section mS of the clamp-based twin-pipe shows two connection openings 23 of the first pipe 21, to which the spray device assigned to the upper crockery basket can be connected. The two superimposed connection openings allow the spray device with crockery basket to be connected at two different levels. As the views in Figs. 2 and 3 show, only the second pipe 24 is guided up to the connection opening 26 of the upper section oS and ends in the connection opening 26 for the roof spray device. The connection openings 23 for the spray device, which are assigned to the upper crockery basket, are arranged on the inner side of the centre section mS, whilst the connection opening 26 for the roof spray device is arranged on the inner side of the upper section oS angled towards the lower section uS.

[0011] The upper end of the twin-pipe 20 has a lug 27, by which it can be fixed into the machine frame.

[0012] It should also be mentioned that the cross-section of the first pipe 21, through which the spray devices assigned to the upper crockery basket are supplied with washing fluid, is larger than the cross-section of the second pipe 24, through which the roof spray device is supplied.

[0013] As shown by Fig. 1 the clamp-based twin-pipe 20 is fitted flush to the outside of the centre section mS in the area of the rear wall of the washing vessel 11 and the sections uS and oS angled forwards are guided to the circulation pump 12 and to the roof spray device arranged below the roof of the spray container 11. In this assembly position, the connection openings 23 for the spray device assigned to the upper crockery basket are angled forwards, in order to facilitate connection.

[0014] The twin-pipe 20 can be produced as a single component by the plastic blow moulding process or can consist of two pipe components fitted tightly together.

Claims

1. Domestic dishwasher with a washing vessel, fitted into which are one lower and one upper crockery basket each with its own spray device and in which a roof spray device is arranged above the upper crockery basket, wherein the spray devices located on the lower crockery basket are supplied directly from a circulation pump and the spray device located on the upper crockery basket and the roof spray device are supplied with spray fluid from the circulation pump through flow pipes, characterised in that the flow pipes (21, 24) for the spray device assigned to the upper crockery basket and for the roof spray device formed preferably as a single-component twin-pipe (20), which is fitted with two connection lugs (22, 25) for connecting to the circulation pump and in the area of the spray device assigned to the upper crockery basket, has at least one connection opening (23) in the first pipe (21) and is laid with the second pipe (24) up to the roof spray device and which has one connection opening (26) for the roof spray unit.
2. Domestic dishwasher in accordance with Claim 1, characterised in that the cross-section of the first pipe (21) is greater than that of the second pipe.
3. Domestic dishwasher in accordance with Claim 1 or 2, characterised in that the twin-pipe (20) is designed essentially as a clamp, the centre section (mS) of which occupies a vertical position in the washing vessel (11) and the lower section of which (uS) is laid approximately horizontally to the circulation pump and the upper section (oS) of which is laid horizontal to the roof spray device.
4. Domestic dishwasher in accordance with one of the Claims 1 to 3, characterised in that the lower section (uS) on the free end is transferred to the vertical connection lugs (22, 25) angled vertically downwards.
5. Domestic dishwasher in accordance with one of the Claims 1 to 4, characterised in that the connection openings (23) for the spray devices assigned to the upper crockery basket are arranged on the inner side of the clamp-based twin-pipe (20).
6. Domestic dishwasher in accordance with one of the Claims 1 to 5, characterised in that the connection opening (26) for the roof spray device is arranged on the internal side of the upper section (oS) of the twin-pipe (20) angled towards the lower section (uS).
7. Domestic dishwasher in accordance with one of the Claims 1 to 6, characterised in that electrically controllable valves are looped into the connection from the circulation pump to the spray device assigned to the lower crockery basket and the connection from the circulation pump to the first and second pipes (21, 24) of the twin-pipe (20).

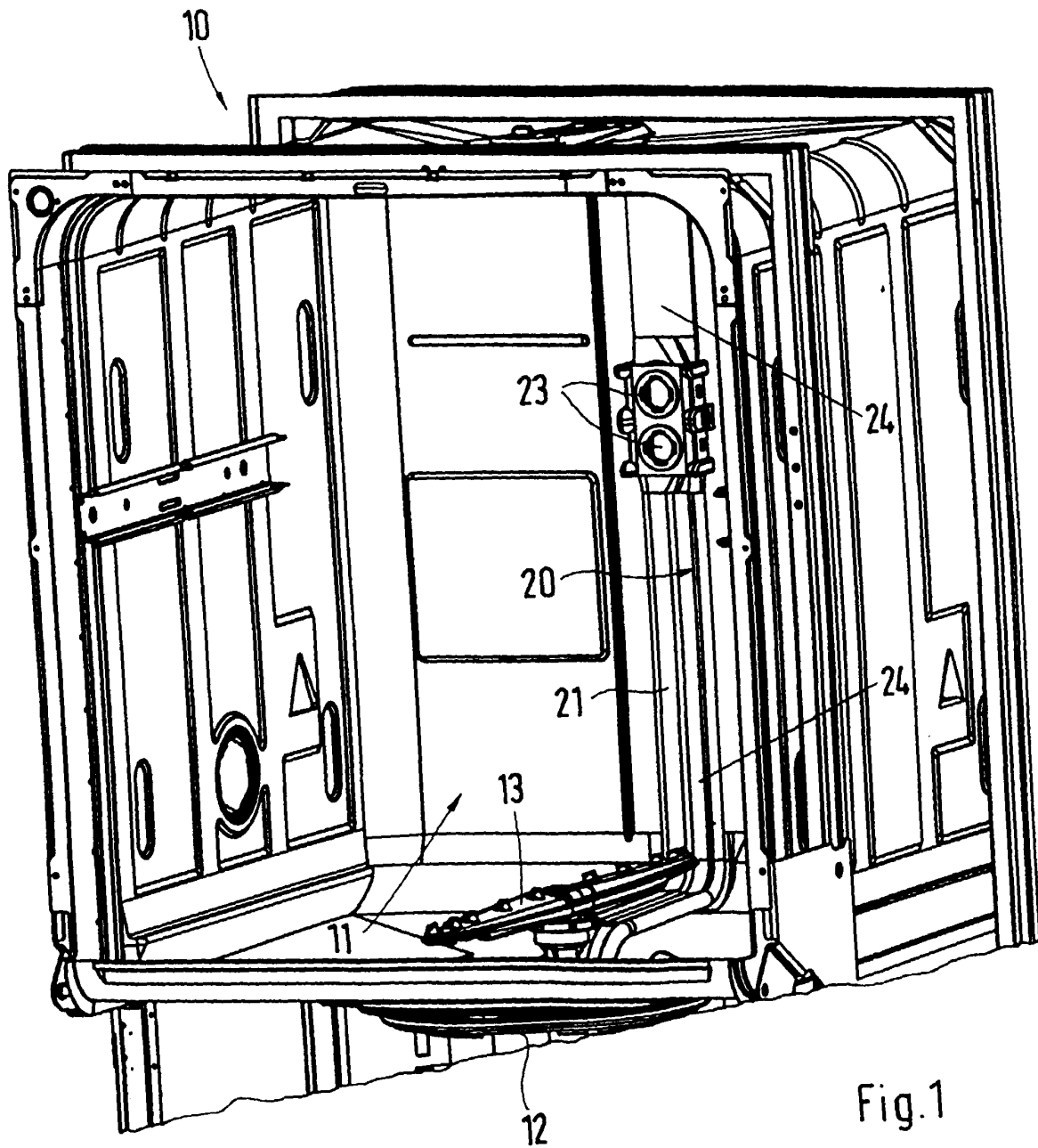


Fig.1

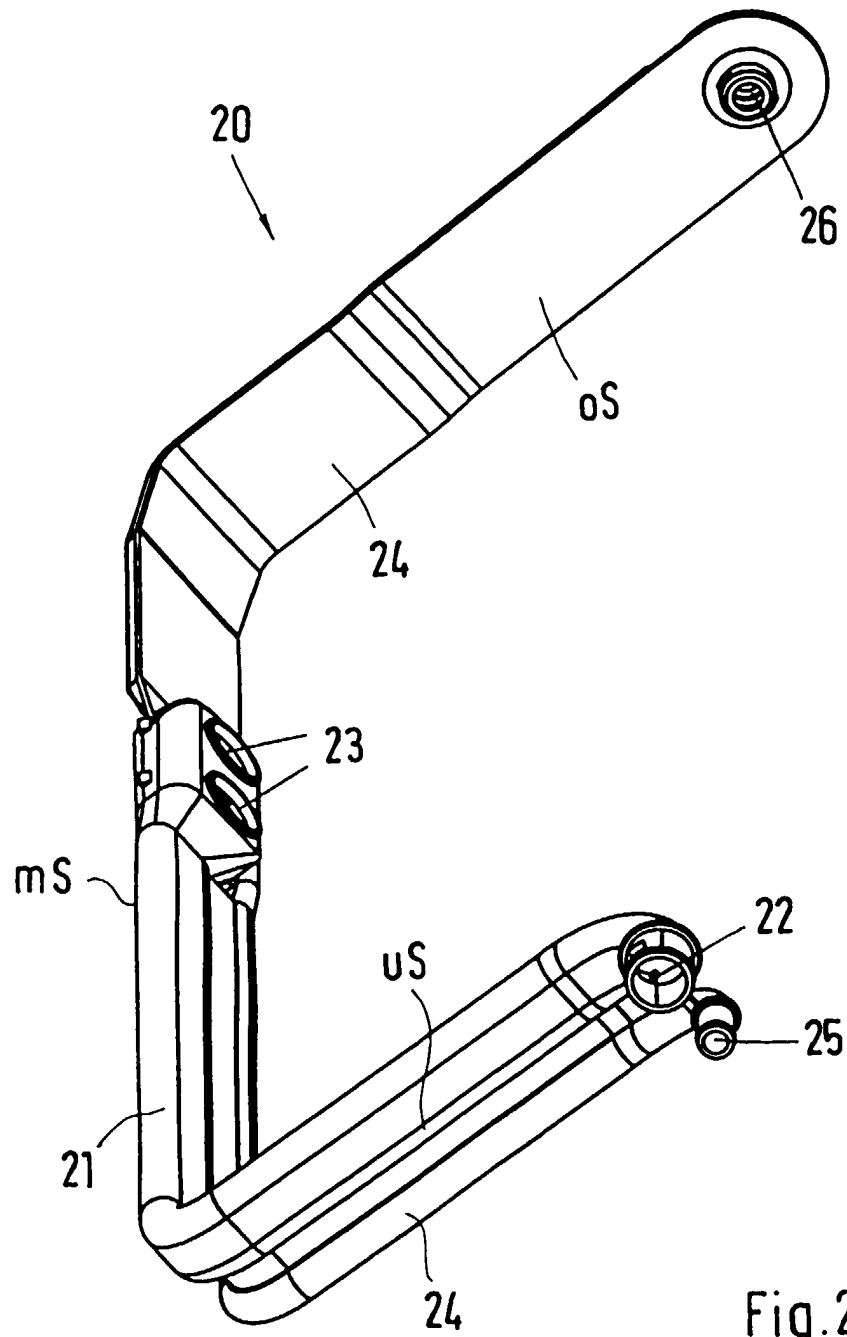


Fig.2

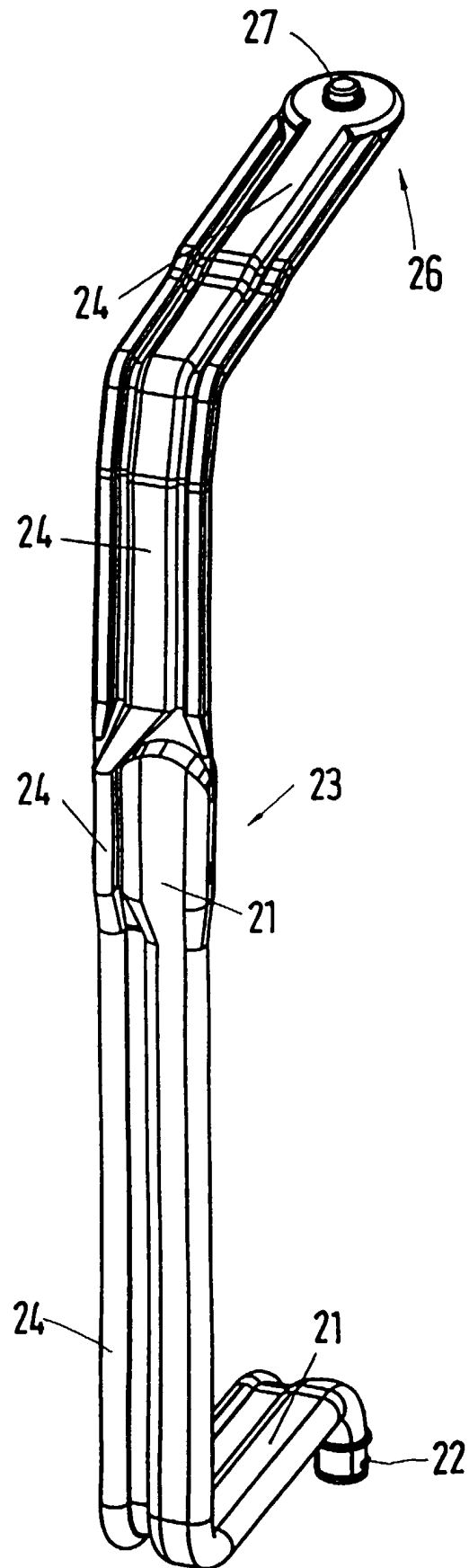


Fig.3



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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 3838

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A	* page 4, column 5, line 33 - column 6, line 50 * * figures 1,3 *	2-7	
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 April 2001	Examiner Fairbanks, S
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 12 3838

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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19-04-2001

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82