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(54) Dishwasher with "half load" function

(57) A dishwasher with half load function includes two sprinklers that receive water from a washing pump (1) that sucks in water from the collecting sump (2) through a suction duct (3) and delivers it to the lower sprinkler through a first delivery pipe in two parts (4/5), between which there is arranged a shut-off valve (6), and to the upper sprinkler through a second delivery pipe (7). When the half load function is selected, the valve (6) is

activated so as to shut off the flow to the lower sprinkler and simultaneously cause the opening of an alternative outlet (9) and the return of the water to the sump (2) through a return line (10). The alternative outlet (9) and the return line (10) are sized so as to assure the same head loss that is present downstream of the valve (6) in full load washing condition, so that the working point of the pump (1) remains unchanged and it is therefore possible to use a synchronous motor pump.

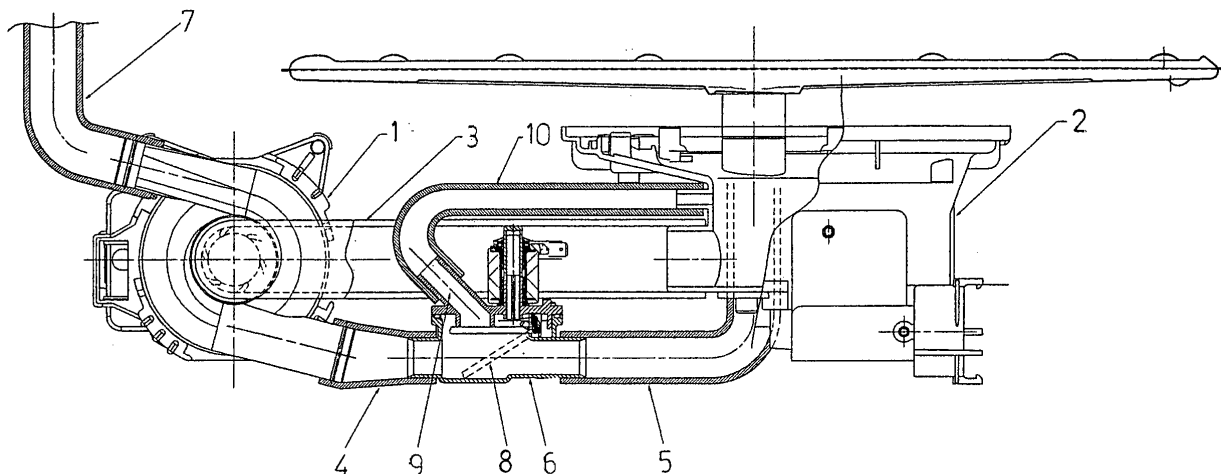


Fig. 1

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Description

[0001] The present invention relates to dishwashers, and in particular to a dishwasher provided with the "half load" function.

[0002] It is known that in modern dishwashers the user is often offered the possibility of running a half load, i.e. a washing cycle in which only one of the sprinklers is used. This function is usually obtained through a double-delivery washing pump and a flow-shutting valve, said valve being controlled by the control unit of the machine to shut off the water flow to the -upper or lower sprinkler.

[0003] On the other hand, the use of washing pumps with synchronous motor is getting widespread in dishwashers since this type of motor in its "mechanical" version, i.e. without any electronic control of the direction of rotation, is particularly cheap. However, the absence of electronic control poses some limitations in that, in order to assure the correct operation of the motor and therefore the correct direction of rotation of the pump, it is necessary that the working point in a flow rate-pressure diagram be almost constant.

[0004] This makes the synchronous pump unsuitable for use in a dishwasher with half load function, since when the shut-off valve shuts off the flow to one of the sprinklers the working point of the pump obviously changes since the flow rate is reduced to half.

[0005] Therefore the object of the present invention is to provide a dishwasher which overcomes said limitation to the use of synchronous pumps also on machines with half load function. This object is achieved by means of a dishwasher in which the shut-off valve is provided with an alternative outlet connected to a return line that returns the water to the collecting sump.

[0006] The main advantage of the dishwasher according to the present invention is exactly that of allowing to use a synchronous pump also on a dishwasher with half load function. This results in a greater reliability and a lower cost both in manufacturing and operating the machine, since synchronous pumps absorb less power, are less bulky and more reliable than the asynchronous pumps that are usually employed.

[0007] Another advantage stems from the fact that these results are achieved through changes that do not significantly increase the cost, complexity and bulkiness of the hydraulic circuit of the dishwasher.

[0008] These and other advantages and characteristics of the dishwasher according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof with reference to the only drawing, annexed as fig.1, that diagrammatically illustrates the hydraulic circuit of a dishwasher with half load function achieved by shutting off the flow to the lower sprinkler.

[0009] It is clear that what will be said hereafter is readily applicable with obvious changes also to the shutting off of the flow to the upper sprinkler, and that a dishwasher could include two shut-off valves to leave up to the user

the selection of the rack on which the half load washing is to be performed. It is also clear that the reference to an upper sprinkler and a lower sprinkler also applies to a horizontally extending dishwasher with two sprinklers arranged on the same plane.

[0010] With reference to said figure, there is seen that a dishwasher conventionally includes a washing pump 1 that receives the water from a collecting sump 2 through a suction duct 3. The washing pump 1 then delivers the water to the lower sprinkler through a delivery pipe made in two parts 4 and 5, between which there is arranged the shut-off valve 6, and to the upper sprinkler (not illustrated) through a delivery pipe 7.

[0011] When the half load function is selected, valve 6 is activated so that its shutter 8, a baffle in this case, moves from the rest position (in continuous line) to the working position (in broken line) where it shuts off the passage to pipe 5.

[0012] The novel aspect of the present dishwasher is the presence of an alternative outlet 9, formed in valve 6, connected to a return line 10 that returns the water to the collecting sump 2.

[0013] In practice, the shifting of shutter 8 to the shut-off position of pipe 5 simultaneously causes the opening of the alternative outlet 9 and the return of the water to sump 2 through line 10, thus creating a suitable recirculation. Outlet 9 and line 10 are sized so as to assure the same head loss that is present downstream of valve 6 in full load washing condition, so that the working point of pump 1 remains unchanged and it is therefore possible to use a synchronous motor pump.

[0014] It is clear that the above-described and illustrated embodiment of the dishwasher according to the invention is just an example susceptible of various modifications. In particular, size and shape of the various connecting piping 3, 4, 5, 7, 9, 10 can be changed according to specific needs, and the shut-off valve 6 can be any kind of valve.

Claims

1. A dishwasher including two sprinklers that receive water from a washing pump (1) through respective delivery pipes, a shut-off valve (6) being arranged in at least one of said delivery pipes, on the bottom of the washing tank there being arranged a collecting sump (2) from which a suction duct (3) branches out to convey the water to said washing pump (1), **characterized in that** said washing pump (1) is a synchronous pump and said at least one shut-off valve (6) has an alternative outlet (9) connected to a return line (10) that returns the water to said collecting sump (2), said alternative outlet (9) being opened when the valve (6) is activated to shut off the flow to one of said two sprinklers.
2. A dishwasher according to claim 1, **characterized**

in that the shut-off valve (6) is arranged between two parts (4, 5) of the delivery pipe that delivers water to the lower sprinkler.

3. A dishwasher according to claim 1 or 2, **characterized in that** the shut-off valve (6) includes a baffle shutter (8).

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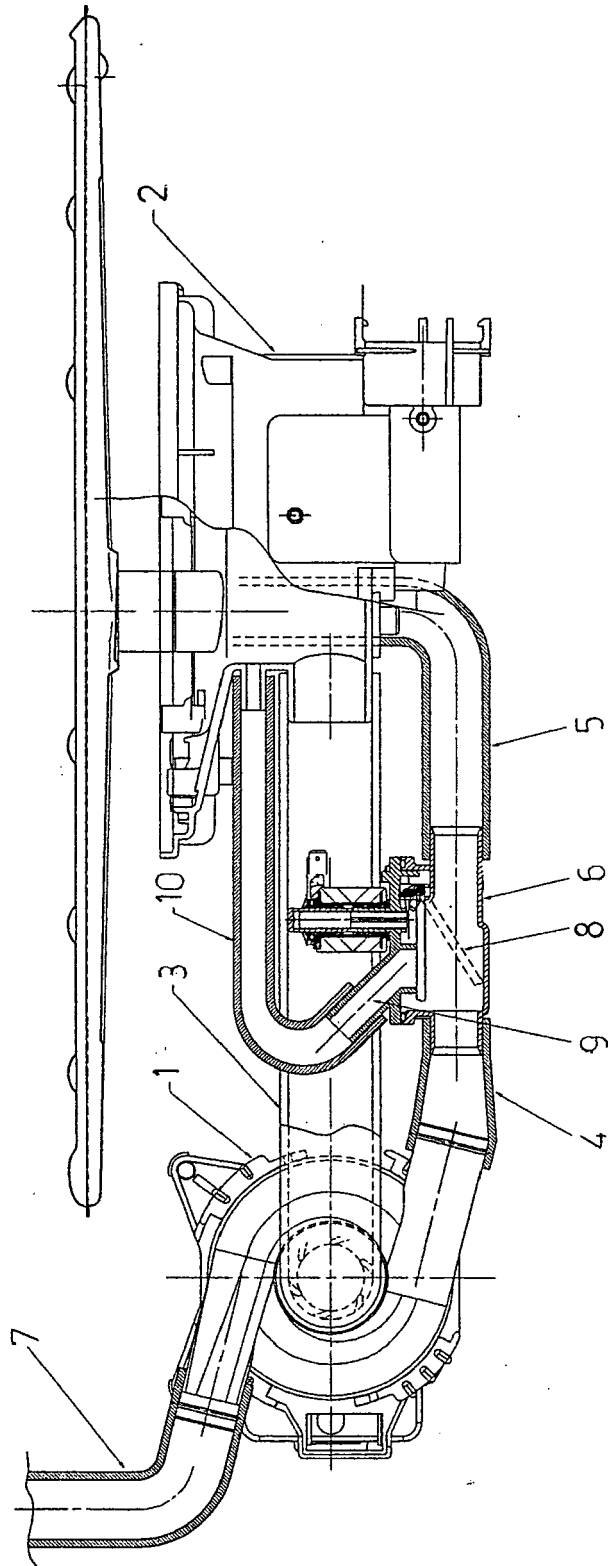


Fig. 1



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EUROPEAN SEARCH REPORT

Application Number
EP 05 42 5361

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A	US 2004/103926 A1 (HA JAE HOON [KR]) 3 June 2004 (2004-06-03) * paragraph [0061] - paragraph [0080]; figures 5A-5D * * paragraph [0006] - paragraph [0020]; figures 1,2 *	1-3	A47L15/42
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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 26 October 2005	Examiner Clarke, A
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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