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(54) Improved dishwashing machine.

(57) The present invention relates to an improved dishwashing machine, comprising a cabinet housing a washing chamber, means to wash the dishes that comprises organs for spraying the dishes with a washing liquid and organs for the circulation of the washing liquid, being drawn from the bottom of the washing chamber and in turn supplying the liquid to the spraying organs of the dishes, means to filter the washing liquid and block the residues removed from the dishes before supplying the spraying organs.

The characterising principles of the invention are constituted by the fact that means for cleaning the filter of residues and impurities detained during the washing are foreseen, that become operative at the end of at least one washing phase of the foreseen wash cycle, after the washing liquid has been discharged from the washing chamber utilised during the washing phase and that the filters cleaning means are fed with clean water coming from the water mains.

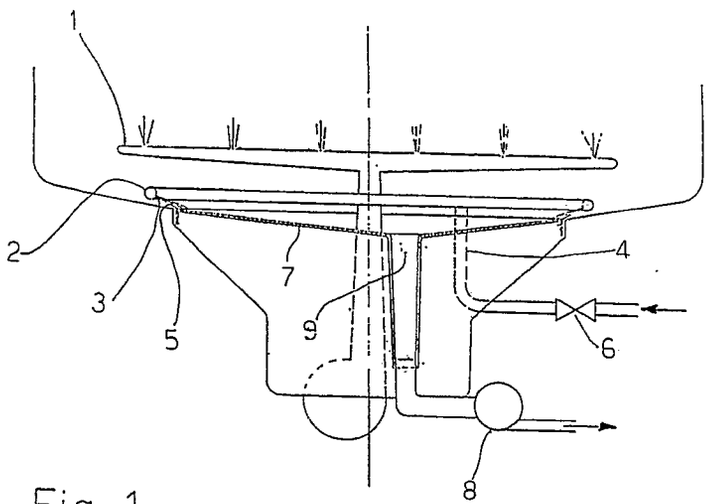

Fig. 1

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The present invention relates to an improved dishwashing machine, comprising a cabinet that houses a washing chamber, means to wash the dishes that comprises spraying organs for the spraying of the dishes with a washing liquid and organs for the circulation of the washing liquid, being drawn from the bottom of the washing chamber and in turn supplying the liquid to the spraying organs of the dishes, means to filter the washing liquid and to block the residues removed from the dishes before supplying the spraying organs.

It is known that dishwashers are furnished with one or more rotating collectors that spray the dishes with the washing liquid, which are fed with water under pressure by a respective washing pump situated in the base of the machine.

The water that is sprayed on the dishes by means of the rotating collectors, finishes on the bottom of the washing chamber where it is collected in a sump situated in the base of the machine from here it is pumped by means of the pump that then sends the water under pressure to the rotating collectors.

Consequently the water contains all of the impurities and food residues that have been removed from the dishes during the washing.

To avoid the residues being continuously circulated together with the washing liquid, dishwashing machines are furnished with means to filter the water before it is pumped by the washing pump to the rotating collectors.

Said water filtering means must be periodically cleaned of the residues contained in them.

The cleaning must be carried out in order to avoid the accumulation of said residues on the filter, which would cause a loss in efficiency. Infact, if the water used for the rinsing of the dishes is not perfectly clean, being sprayed on the dishes by means of the rotating collectors, this could cause the depositing of the residues and impurities previously collected by the filter during the washing cycle and circulated again with the introduction to the machine of the rinsing water on the freshly washed dishes.

There are known various systems for the cleaning of the filters of dishwashers.

The system most commonly used in recent years is that of furnishing the dishwasher with a removable filter. In this way, after every or numerous complete washing cycles the filter can be removed and cleaned of the residues contained in it.

This system allows for the cleaning of the filter, but depends upon the frequency with which this operation is carried out and also presents the disadvantage that this operation is typically carried out at the end of the washing and above all when it is not really necessary: that is before carrying out the rinsing cycle.

Infact, after discharging the washing liquid, a quantity of residues remain on the filter, because this had not been re-cleaned of the residues that had accumulated during the real washing phase, such residues and impurities can be re-circulated with the water used for the rinsing, causing deposits again on the dishes.

To make this system efficient, the cleaning of the filter should be carried out after the washing phase but before the rinsing cycle.

In this way though, it is necessary to intervene by stopping the machine, opening the door, removing the basket containing the wet and dripping dishes, remove and wash the filter and then repeat the procedure once again in an inverse sense before starting the machine a second time.

All of these operations take time and require a person to be present during the functioning of the machine, thus making useless the advantages of a dishwasher; that of saving time and personal energy with a completely automatic wash.

Another known system, used with modern dishwashing machines, is to furnish the rotating collector above the filter, with nozzles also present in the inferior section.

In this way, during the washing phase, the collector apart from spraying water on the dishes, in order to wash them, by means of nozzles present on the superior section, with the nozzles present on the inferior section also sprays water on the filter conveying the residues in a small tank which is discharged at the end of every washing phase by means of a discharging pump.

With this system, during the functioning of the dishwashing machine, the filter must not be covered by the washing water otherwise the inferior nozzles would spray water on to the surface of the underlying water covering the filter without removing the underlying residues, instead of spraying water over the residues covering the filter.

With this system one is obliged to wash with a small quantity of water in the cabinet which could interfere with the final results of the operation.

Moreover, increasing the nozzles that spray the water, in parity with the power of the wash pump, would lead to a decrease in the pressure and capacity of the jets of water coming from the nozzles dedicated to the washing of the dishes, thus leading to a decrease in the efficiency of the washing.

To maintain the same pressure and capacity of the jets of water, asks for an increase in the pumps potential, with an increase in costs and energy consumption.

The aim of the present invention is to indicate a dishwashing machine furnished with an improved system for the cleaning of the filter that does not

present the inconveniences of the type known.

To obtain such aims the present invention has as its object an improved dishwashing machine, comprising a cabinet that houses a washing chamber, means to wash the dishes that comprises spraying organs for the spraying of the dishes with a washing liquid and organs for the circulation of the washing liquid, being drawn from the bottom of the chamber and in turn supplying the liquid to the spraying organs of the dishes, means to filter the washing liquid and to block the residues removed from the dishes before supplying the spraying organs, characterised by the fact that means for cleaning the filter of residues and impurities detained during the washing are foreseen, that become operative at the end of at least one wash phase of the foreseen wash cycle, after the the washing liquid has been discharged from the washing chamber utilised during the the washing phase and that the filters cleaning means are fed with clean water taken from the water mains.

Further aims and advantages of the present invention are clearly shown in the following detailed description and annexed drawings by way of an explicative and non limiting example, wherein:

- Figure 1 represents a cross section view of the inferior section of an improved dishwashing machine according to the invention;
- Figure 2 represents a plan elevation of the inferior section of an improved dishwashing machine according to the invention;
- Figure 3 represents a plan elevation of an improved dishwashing machine according to one of the variations of the invention.

In the figures, that represent an improved dishwashing machine furnished with a device for the cleaning of the filter realised according to precepts of the present invention, in which the reference number 1 indicates an inferior rotating collector of the dishwasher; a water pipe of a metal or plastic material is indicated by the reference number 2, modelled in a ring shaped form, in which the liquid can pass.

Said ring 2 has a diameter slightly larger than that of the filter 7 and is positioned above the filter at the inferior section of the washing chamber.

A certain number of apertures or nozzles indicated by the number 3 are present on this ring 2.

These apertures or nozzles 3 are utilised for sending jets of liquid on the filter 7.

Said apertures or nozzles, are of a dimension and positioned either downwardly or towards the inside of the ring 2, in such a way that the jets of liquid, indicated with the reference number 5, spray the complete surface of the filter and send the residues to the sump 9 and in turn to the small tank that is in communication with the discharge pump 8.

Said ring 2 incorporates a connector, indicated with the reference number 4, which permits the supply of water to the ring.

Said connector is connected to the water supply by means of an electric valve 6.

The characteristics of the dishwashing machine and of the device described become clear from the effected description and annexed drawings.

The device functions in the following way:

At the end of the washing phase, before the rinsing, the programmer, for simplicity sake not mentioned in the figures, activates the discharge pump 8, to discharge the water present at the bottom of the washing chamber, and also activates the electric valve 6.

Said electric valve 6 opens a passage of water from the water supply to the filter cleaning device.

The water that reaches the device, is released from the apertures or nozzles 3 present on the ring shaped water pipe 2, creating jets of water aimed at the filter 7.

These jets of water remove the residues deposited on the filter and convey them to a small tank and from here to a sump from which they become discharged by the discharge pump 8.

Naturally, the quantity of water taken from the water mains must be smaller than the quantity that the pump 8 can discharge, in such a way that during the operation of cleaning the filter 7, it always remains in contact with the jets of water.

After a programmed time the electric valve 6 becomes disactivated by the programmer, closing in this way the passage of water supplied to the device for cleaning the filter, which also disactivates the discharge pump 8.

Immediately afterwards the programmer activates the cycle of the dishwashing machine, that can complete its several programmed rinsing phases with really clean water.

This operation for cleaning the filter may take place several times during the washing cycle, for example after the prewash phase and again at the end of the washing phase before the rinsing.

Moreover, it may be repeated after every rinsing phase.

The advantages of the dishwashing machine object of the present invention become clear from the detailed description.

In particular the advantages are represented by the fact that the cleaning of the filter takes place whilst the washing liquid is being discharged, leaving the filter exposed; that the water utilised by the machine is always taken directly from the water mains and this operation can be programmed after every eventual discharge of the water.

Furthermore, to improve the cleaning of the filter 7, the ring shaped pipe 2 can also be used for the charging of the water necessary for the wash-

ing and the rinsing of the dishes.

In this way a further spraying of the filter 7 is obtained with clean water so that any residue particles still present on the surface of the filter 7, can be conveyed to the sump 9 that leads to the discharge pump and therefore does not intefere with the rinsing.

It is clear that numerous variations are possible of the improved dishwashing machine furnished with a filter cleaning device for a dishwasher object of the present invention, one of which is represented in Figure 3, regarding an alternative way to realise a ring shaped pipe 2 of the liquid for producing the jets of water for spraying the filter 7.

Regarding the observation that often, even with small tanks of a circular shape, the filter does not completely cover the circular area for constructive reasons, for which a part is covered with a non perforated section of the filter, in such cases the pipe 2 is not necessarily ring shaped.

In the present variation of realisation it is possible to modify the previous solution and reduce the obstructions, substituting the complete ring with two almost semicircular elements, indicated with the reference numbers 2a and 2b, simultaneously fed, and furnished with apertures or nozzles suitably positioned so as that the jets of water can clean the whole useful surface of the filter.

A further variation could be that of joining the two almost semicircular elements at their extremities, so as to form a pipe following a "C" shape, joining the two extremities that face the active part of the filter as shown with the piece of pipe indicated by the dotted line in figure 3.

In this way the water supply is simplified, as it can be obtained by the use of a single connector.

A further variation may consist in feeding a filter cleaning device, not with water directly obtained from the water main, but suitably forced by the wash pump. In this way, the water under pressure coming from the pump, will provide for a more efficient removal of the residues from the filter.

To those skilled in the art it will be clear that various other changes can be made to the device described as an example, without however departing from the scope of the novelty of the present invention.

Claims

1. Improved dishwashing machine, comprising a cabinet housing a washing chamber, means to wash the dishes comprising spraying organs for spraying the dishes with a washing liquid and organs for the circulation of the washing liquid, being drawn from the bottom of the washing chamber and in turn supplying the washing liquid to the spraying organs of the dishes, means to filter the washing liquid and to block the residues removed from the dishes before supplying the spraying organs, characterised by the fact that said means (2,4,6) for cleaning the filter (7) of residues and impurities detained during the washing are foreseen, that become operative at the end of at least one wash phase of the foreseen wash cycle, after the washing liquid has been discharged from the washing chamber utilised during the washing phase and that the means (2,4,6) for cleaning the filter (7) are fed with clean water coming from the water mains.

2. Improved dishwashing machine according to claim 1, characterised by the fact that discharging means (8) of the washing liquid are foreseen that become operative at the end of at least one wash phase and before the functioning of the means (2,4,6) for the cleaning of the filter (7).

3. Improved dishwashing machine according to claim 1, characterised by the fact that means (4 and 6) are foreseen for the introduction of clean water for the cleaning of the filter (7).

4. Improved dishwashing machine according to claim 1, characterised by the fact that said means (2,4,6) for the cleaning of the filter (7) comprise a pipe preferably shaped in the form of a ring (2).

5. Improved dishwashing machine according to claim 4, characterised by the fact that on said formed pipe (2) apertures or nozzles (3) are foreseen for the passing of water.

6. Improved dishwashing machine according to claim 4, characterised by the fact that said formed pipe (2) has a diameter larger than that of the filter (7).

7. Improved dishwashing machine according to claim 4, characterised by the fact that said formed pipe (2) is realised by means of two almost semicircular elements (2a and 2b).

8. Improved dishwashing machine according to claim 4, characterised by the fact that said formed pipe (2) presents the form of a "C".

9. Improved dishwashing machine according to claim 4, characterised by the fact that the rate of flow of liquid from the formed pipe (2) is less than the rate of discharge of the discharging means (8).

10. Improved dishwashing machine according to claim 1, characterised by the fact that the means (2,4,6) for the cleaning of the filter (7) can be activated during every discharge of the washing or rinsing liquid.

11. Improved dishwashing machine according to claim 1, characterised by the fact that for increasing the efficiency of the cleaning of the filter (7), the formed pipe (2) is also used for the charging of water at the beginning of every washing or rinsing phase.

12. Improved dishwashing machine according to claim 4, characterised by the fact that the formed pipe (2) can be realised in metal or plastic.

13. Improved dishwashing machine according to one or more of the previous claims, characterised by the fact that the means (2,4,6) for cleaning the filter (7) are commanded by a programming device which governs the machines functioning.

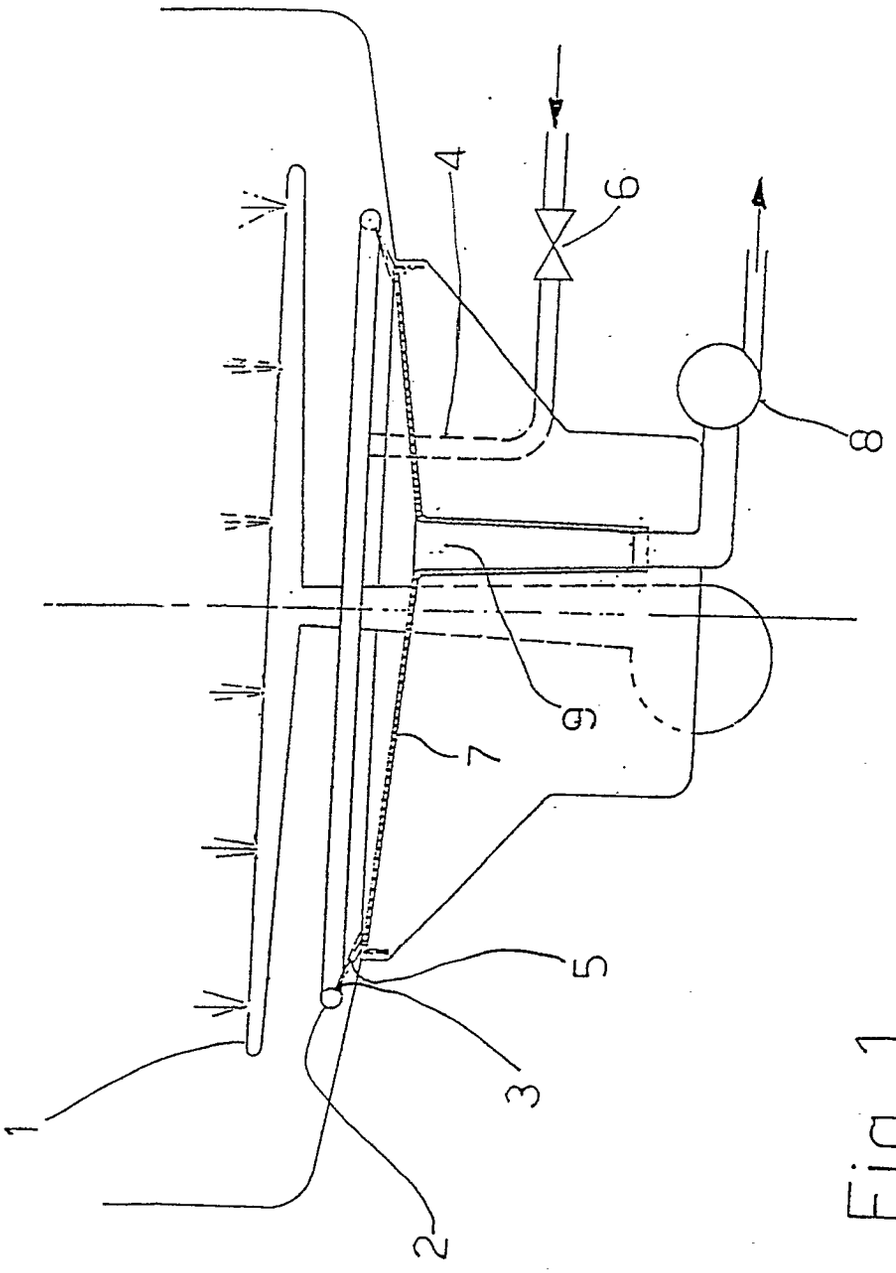

Fig. 1

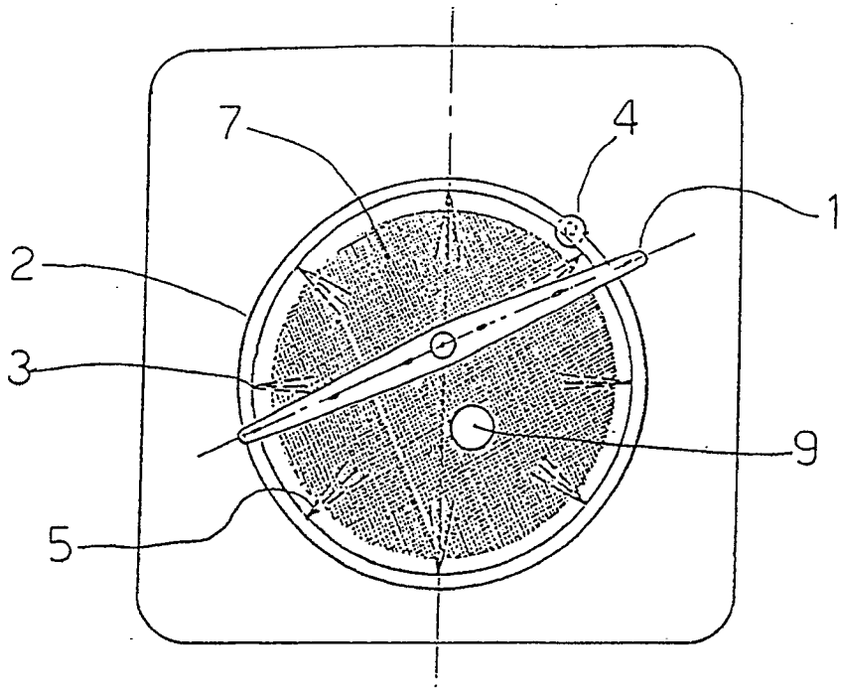

Fig. 2

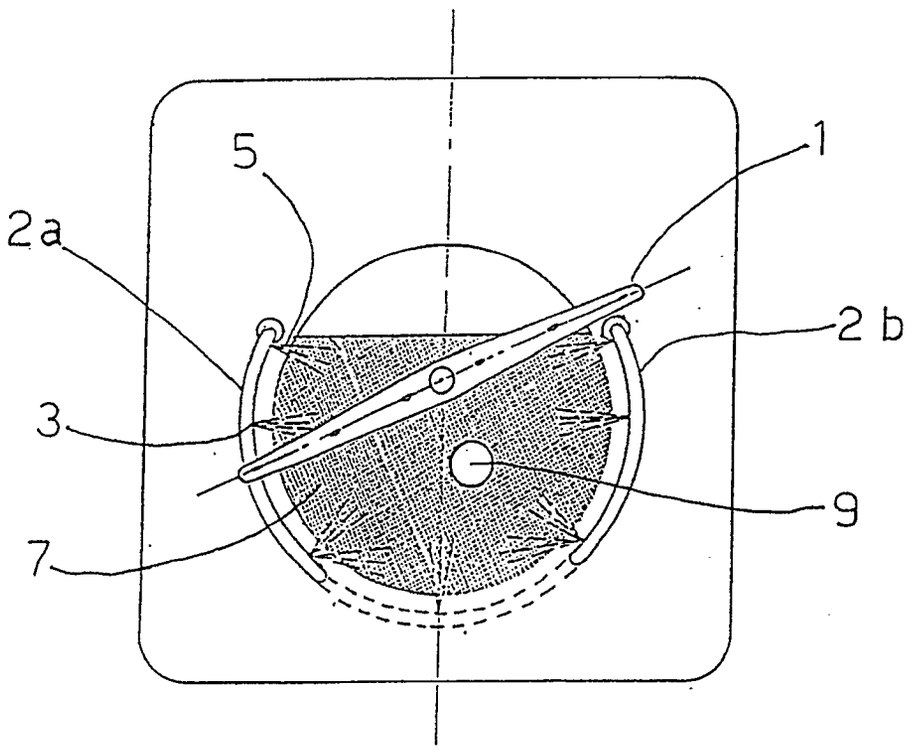

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number EP 91106760.1

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.5)
A	EP - A1 - 0 082 592 (HOBART CORPORATION) * Claim 1 * --	1	A 47 L 15/08 A 47 L 15/42
A	EP - A2 - 0 234 675 (THE STERO COMPANY) * Totality * --	1	
A	EP - A2 - 0 341 766 (UNILEVER NV) * Totality * --	1	
A	DE - A1 - 3 114 663 (BOSCH-SIEMENS) * Totality * --	1	
A	GB - A - 2 161 699 (BOSCH-SIEMENS) * Totality * --	1	
A	US - A - 4 243 431 (WHIRLPOOL CORP.) * Totality * --	1	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	US - A - 3 491 780 (KALDENBERG) * Totality * ----	1	A 47 L 15/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	26-07-1991	HANSI

CATEGORY OF CITED DOCUMENTS

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