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(54) **Filter for dishwasher and dishwasher comprising said filter**

(57) A filter for dishwasher comprises a cylindrical structure provided with holes in the top base for the inflow of the water to be filtered and with a close-mesh net on its curved lateral surface, said cylindrical structure being provided with two radial channels (3, 3') dividing it into two cylindrical sectors (4, 5) each of which is provided with a close-mesh net both on its curved lateral surface

(4a; 5a) and on its internal surfaces (4b, 4c; 5b, 5c) that define said radial channels (3, 3'). In this way the present filter has, with the same diameter, a filtering surface that is greater by at least about 50% with respect to a conventional cylindrical filter and by at least about 25% with respect to a pleated cylindrical filter, with a structure that is simpler, cheaper and stronger with respect to the latter.

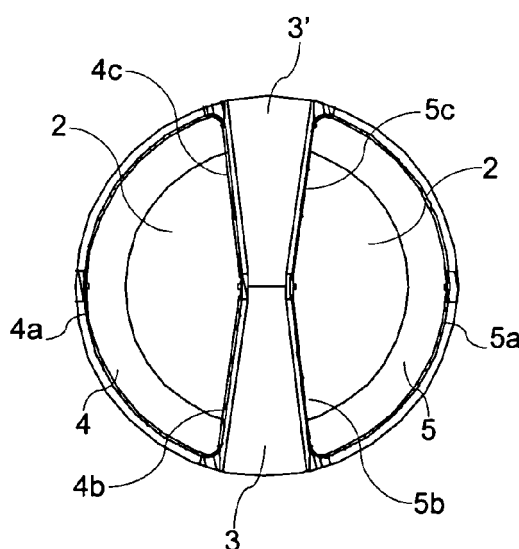


Fig.4

Description

[0001] The present invention relates to dishwashing machines, and in particular to a filter with a close-mesh net ("microfilter" hereafter) to be used in said machines.

[0002] It is known that in dishwashers for domestic use there is a filtering group on the tank bottom which provides the retention both of the larger residues removed from the dishes, to prevent them from blocking the drain and wash pumps, and of the smaller particles which could be re-deposited on the dishes, thus reducing the washing effectiveness.

[0003] To this purpose, the filtering group generally includes a plane filter with a comparatively large-mesh net (1-2 mm.) located on the tank bottom and having a concave shape. Therefore this filter conveys a portion of the water towards a lower central area, where there is arranged an assembly of at least two vertical concentric filters with progressively smaller passage ports.

[0004] A first filter intended to capture the larger dirt particles is usually made from steel or plastic and has holes with a diameter of about 0,8-1 mm. Then there is a second filter with a close-mesh net, the "microfilter", which usually has almost square holes with a 0,2 mm side and is intended to capture even the smallest dirt particles to guarantee a great cleanliness of the wash and rinse water and thus assure an optimum cleaning of the dishes.

[0005] Microfilters almost always have a simple circular cylindrical structure, although in some cases they have a frustoconical shape or a lateral surface with a wavy pleating. The use of these alternative shapes serves the purpose of increasing the filtering surface with respect to a cylindrical microfilter, since the greater is the filtering surface the greater is the washing effect because the impurities are removed from the water in a shorter time.

[0006] However, the frustoconical shape implies an increase in the diameter of the microfilter that is therefore bulkier, while the pleated lateral surface, with the same external size, allows to increase the filtering surface only by about 20% and implies a higher manufacturing complexity and therefore a higher cost of the filter.

[0007] It should be noted that it is not possible to achieve a greater increase in the filtering surface by making a deeper pleating both for the excessive manufacturing complexity and for the reason that each pleat would be too deep and with the walls too close and facing each other such that the water flow from the inside to the outside of the microfilter would be hindered. Moreover, such a surface would be very difficult to clean with a counter-current jet of water as it is periodically done to prevent clogging of the microfilter.

[0008] Therefore the object of the present invention is to provide a filter for dishwasher that overcomes the above-mentioned drawbacks. This object is achieved by means of a filter whose filtering surface is divided into at least two cylindrical sectors separated by at least two

radial channels.

[0009] The main advantage of the present filter is that of having, with the same diameter, a filtering surface that is greater by at least about 50% with respect to a conventional cylindrical filter and by at least about 25% with respect to a pleated cylindrical filter. This advantage can also be seen as that of having, with the same filtering surface, a smaller diameter that allows to make a dishwasher with a smaller collecting sump and therefore to reduce the amount of water required for the washing.

[0010] A further advantage of this filter stems from its structural simplicity, in particular with respect to a pleated filter, which results in a lower cost and a higher strength.

[0011] Further advantages and characteristics of the filter for 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 annexed drawings wherein:

Fig. 1 is a perspective view of the filter showing the outlet of one of the two radial channels;

Fig. 2 is front view showing better the aligned central (diametral) position of said radial channels;

Fig. 3 is a sectional view along line A-A of Fig. 2;

Fig. 4 is a sectional view along line B-B of Fig. 2;

Fig. 5 is a diagrammatic front view of a dishwasher provided with the present filter showing the position of the filter inside the collecting sump; and

Fig. 6 is a diagrammatic top plan view of said dishwasher with the filter seen in cross-section along line C-C of Fig. 5.

[0012] With reference to figures 1 to 4, there is seen that a filter according to the present invention has a conventional cylindrical shape with a plastic structure provided with holes 1 in the top base for the inflow of the water to be filtered and with openings 2 in the bottom base to drain the accumulated dirt when the filter is washed by a counter-current jet.

[0013] The novel aspect of the present filter resides in the fact that said cylindrical structure is also provided with two radial channels 3, 3' that divide it into two cylindrical sectors 4, 5 each of which is provided with a close-mesh net on all its lateral surfaces, including the internal surfaces defining said channels 3, 3'. In other words, the global filtering surface of the filter is made up not only of the external curved surfaces 4a, 5a but also of the internal flat surfaces 4b, 4c, 5b, 5c defining the radial channels 3, 3' that are preferably formed aligned at a central position, i.e. along a diameter.

[0014] It should be noted that the diametral position of channels 3, 3' is preferred for the sake of manufacturing simplicity, so as to obtain two identical cylindrical sectors 4 and 5, and because it provides the maximum increase in filtering surface. However, it would be possible to form channels 3, 3' even along two radiuses that are not aligned along a diameter thus obtaining two different cylindrical sectors, while still achieving the same increase

in filtering surface by about 50%.

[0015] In fact it is clear that, once the cylinder height is set, the internal flat surfaces 4b, 4c, 5b, 5c provide an increase equal to about twice the filter diameter whereby, taking into account the decrease in the external curved surface due to the outlets of channels 3 and 3', the overall increase is about of $\pi/2$ times the diameter, i.e. 50% more with respect to a conventional cylindrical filter whose curved lateral surface is equal to π times the diameter.

[0016] Moreover, it is clear that a greater number of radial channels can divide the filter into a greater number of cylindrical sectors and allows to achieve a greater increase in filtering surface, since every channel provides an increase equal to about 3/4 of the diameter. For example, the addition of a third channel so as to divide the filter into three cylindrical sectors, i.e. with three channels arranged in a Y rather than the two above-mentioned channels arranged in an I or a V, allows to substantially double the filtering surface (obviously to the detriment of a greater complexity and cost of the filter).

[0017] As clearly shown in figures 2 and 4, the radial channels 3, 3' preferably have a trapezium cross-section with the shorter base at the center because said shape makes easier the filter manufacturing, the flow of water through the flat surfaces 4b, 4c, 5b, 5c (since they are not parallel but diverge outwards) and also the cleaning of the latter by means of a counter-current jet of water.

[0018] Referring now to figures 5 and 6, there is seen that a filter according to the present invention is introduced in the collecting sump 6 of a dishwasher, where water is filtered prior to being drawn out by a wash pump 7 that sends it to a sprinkler 8. The filter is introduced in sump 6 such that the outlet of at least one of the radial channels 3, 3' is preferably arranged facing the inlet of the suction duct 9 connecting the collecting sump 6 to the wash pump 7.

[0019] In this way, especially in the preferred embodiment illustrated in the figures, the diametral channel 3, 3' that receives the water filtered by the flat internal surfaces is oriented towards the suction zone so as to facilitate the flow of water through the filter.

[0020] It is clear that the above-described and illustrated embodiment of the filter for dishwasher according to the invention is just an example susceptible of various modifications. In particular, the radial channels may be more than two, even differently shaped and arranged, as long as they divide the filter into at least two cylindrical filters.

least two cylindrical sectors (4, 5) each of which is provided with a close-mesh net both on its curved lateral surface (4a; 5a) and on its internal surfaces (4b, 4c; 5b, 5c) that define said radial channels (3, 3').

2. Filter for dishwasher according to claim 1, **characterized in that** said at least two radial channels (3, 3') are formed along a diameter.
3. Filter for dishwasher according to claim 1 or 2, **characterized in that** said at least two radial channels (3, 3') have a trapezium cross-section with the shorter base at the filter center.
4. Dishwasher comprising a collecting sump (6) where the water is filtered prior to being drawn out by a wash pump (7), **characterized in that** a filter according to any of the preceding claims is introduced in said collecting sump (6).
5. Dishwasher according to the preceding claim, **characterized in that** the filter is introduced in the collecting sump (6) such that the outlet of at least one of the radial channels (3, 3') is arranged facing the inlet of a suction duct (9) connecting said collecting sump (6) to the wash pump (7).

Claims

1. Filter for dishwasher comprising a cylindrical structure provided with holes (1) in the top base for the inflow of the water to be filtered and with a close-mesh net on its curved lateral surface, **characterized in that** said cylindrical structure is provided with at least two radial channels (3, 3') dividing it into at

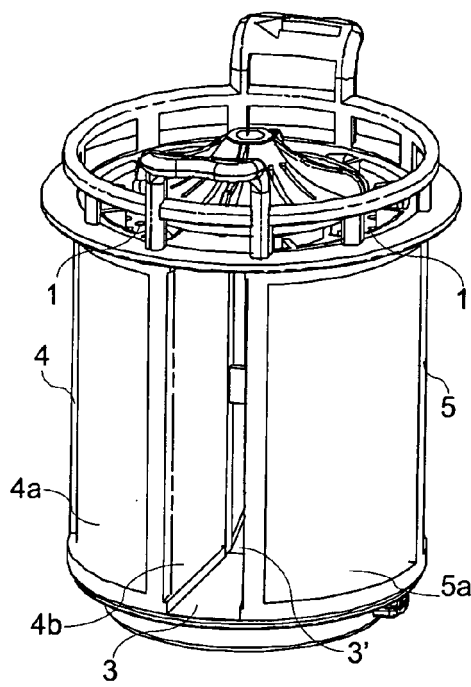


Fig.1

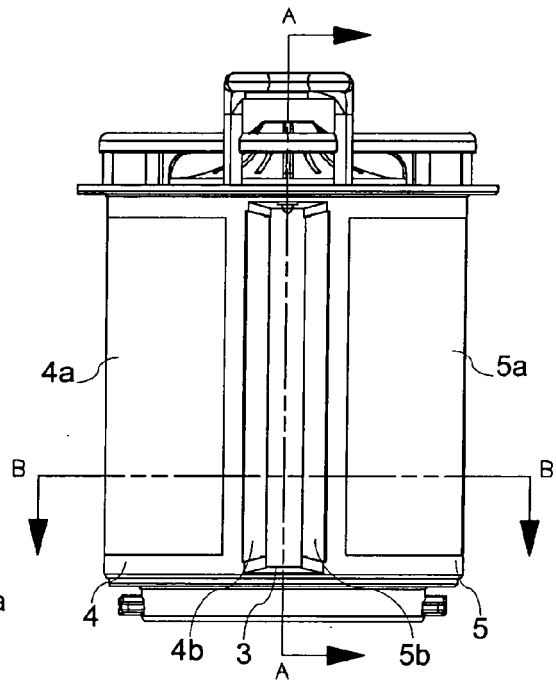


Fig.2

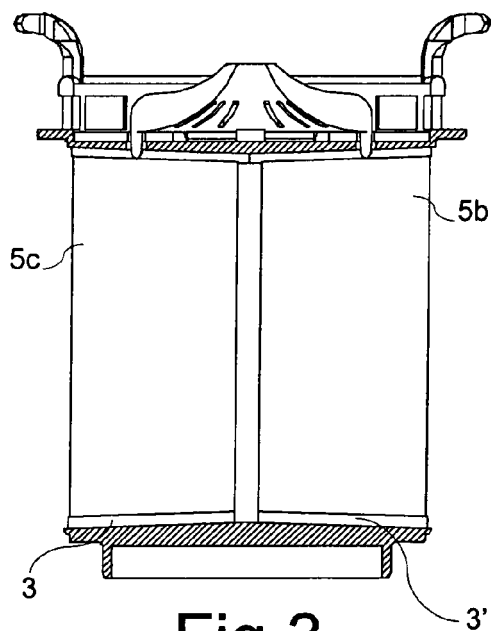


Fig.3

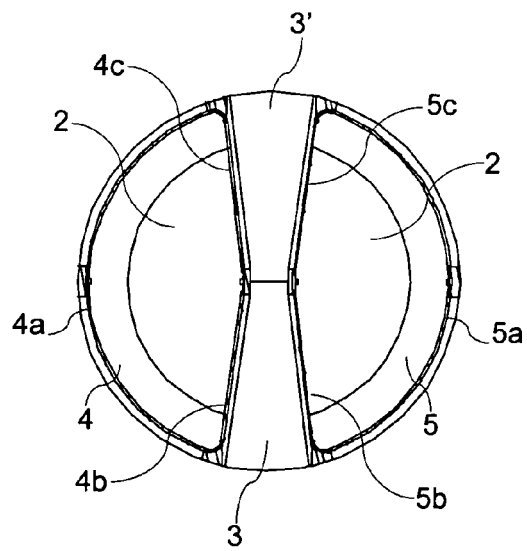


Fig.4

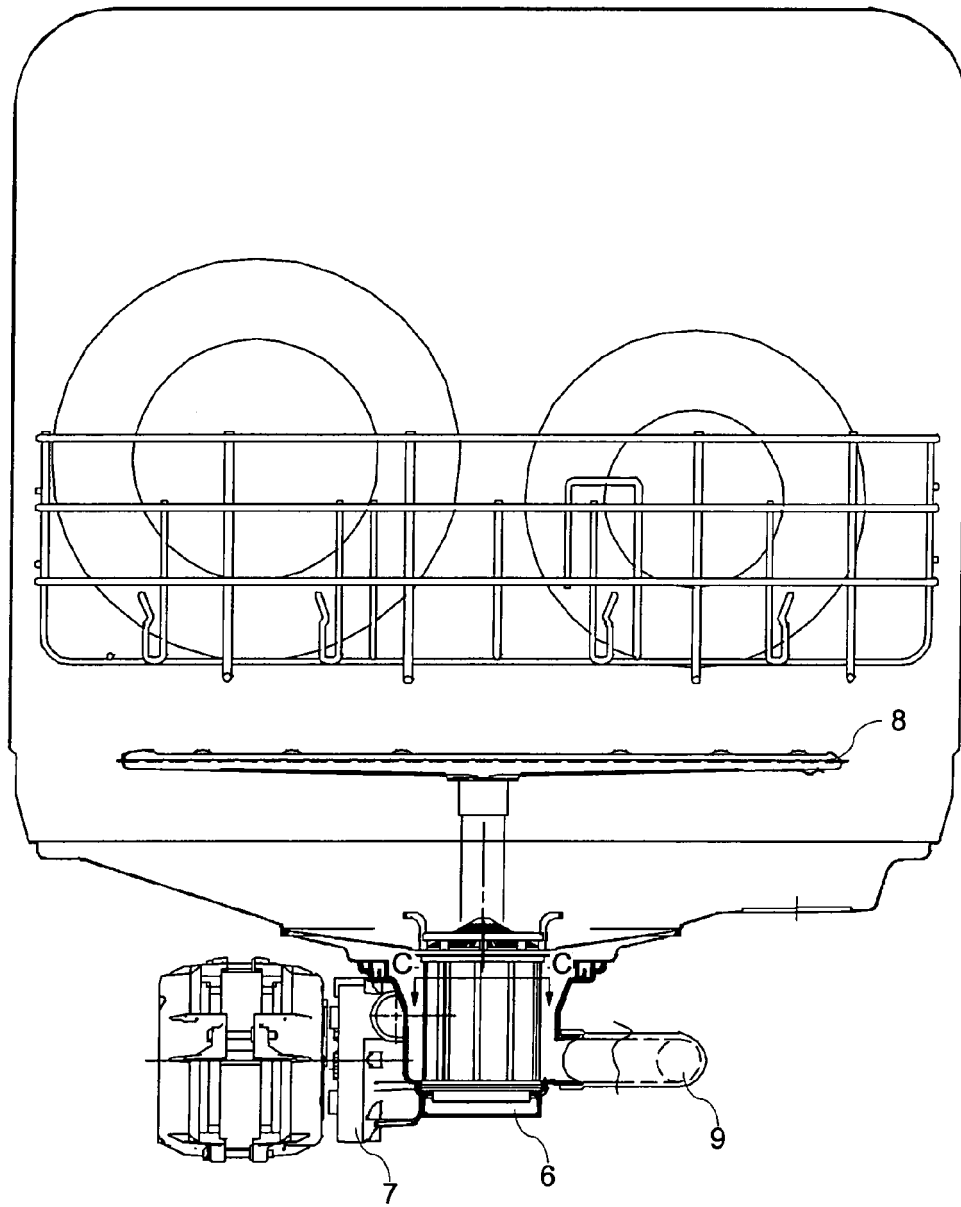


Fig.5

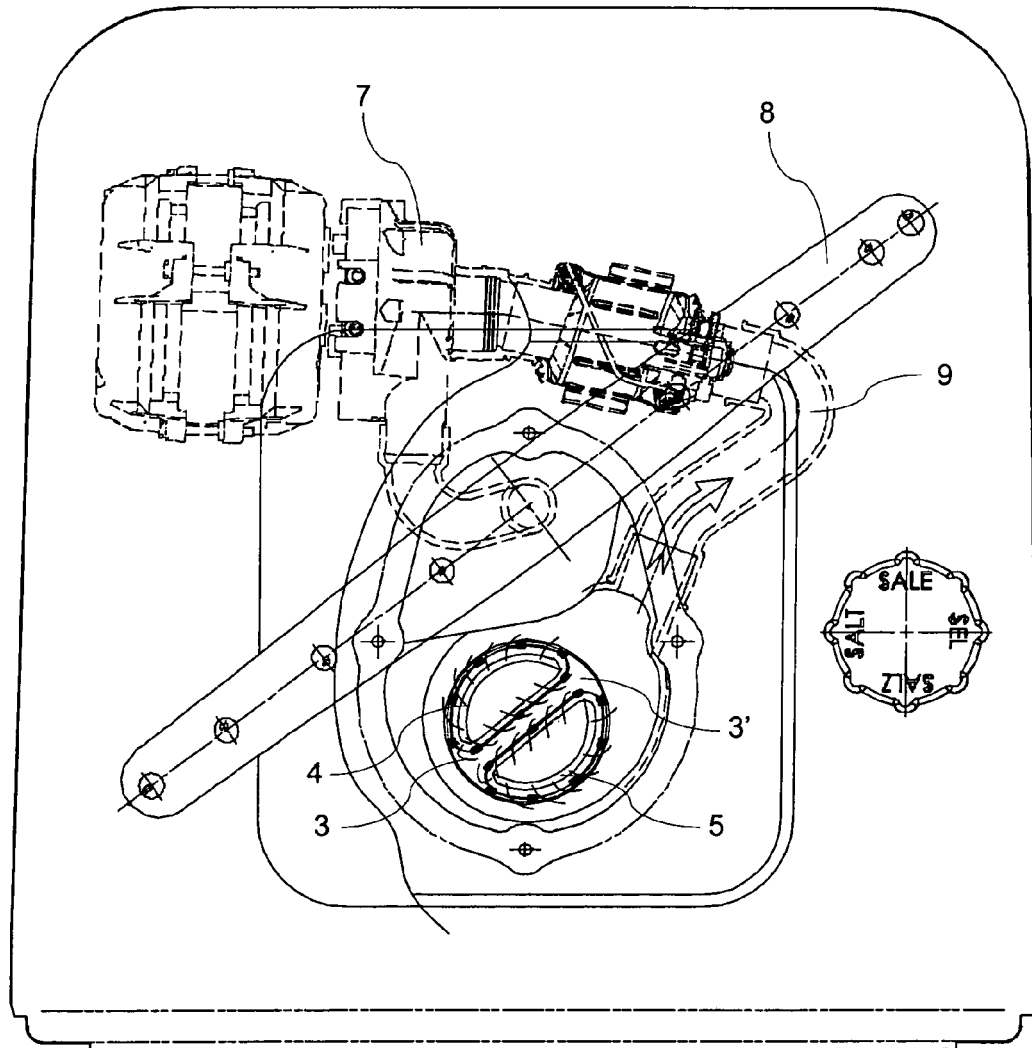


Fig.6



EUROPEAN SEARCH REPORT

Application Number
EP 11 42 5292

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	EP 2 236 073 A2 (LG ELECTRONICS INC [KR]) 6 October 2010 (2010-10-06) * the whole document *	1-5	INV. A47L15/42
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			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 July 2012	Examiner Jezierski, Krzysztof
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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EP 11 42 5292

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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30-07-2012

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