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(54) **A method of filtering the washing and/or rinsing liquid in a dishwasher and apparatus for implementing the method**

Verfahren und vorrichtung zum Filtrieren von Wasch- und/oder Spülflüssigkeit in einer Geschirrspülmaschine

Procédé et dispositif pour filtrer le liquide de lavage et/ou de rinçage dans un lave vaisselle

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## Description

**[0001]** The present invention relates to a method of filtering the washing liquid in a dishwasher comprising a tank for holding the items to be washed, the flow of washing liquid being drawn from the tank by a main recycling pump drawing from the bottom of the tank and being admitted to the tank through a plurality of spray nozzles for a predetermined period of time, the flow being passed through a circuit comprising a primary screen disposed in the bottom of the tank and a perforated basket for retaining the large particles of dirt removed from the items to be washed, and a chamber disposed beneath the primary screen, at least partially surrounding the perforated basket, and having a filtering element for retaining fine dirt particles.

**[0002]** The invention also relates to apparatus for implementing the method.

**[0003]** The term "washing liquid" is intended to define in the following description any solution with detergent for use in a dishwasher during the actual washing stages as well as the water used during the rinsing stages which take place after and between the washing stages.

**[0004]** As is known, dishwashers of the type mentioned above provide for various operating cycles to be selected by the user according to the amount of food residues present on the dishes, this definition including plates, glasses, cutlery, pots and kitchen utensils.

**[0005]** The greater the degree of soiling of the dishes and the more efficient the cycle selected for removing the dirt, the greater is the degree of contamination of the circulated washing liquid.

**[0006]** In fact, although the primary screen and the perforated basket in the bottom of the tank can retain the larger particles of dirt and the other smaller particles are retained by the further filtering means commonly known as micro-filters, a quantity of finely reduced and pulverized particles continues to be passed through the tank.

**[0007]** These particles are therefore deposited not only on the dishes, leaving undesired marks, but also on the walls of the tank and of the members responsible for the circulation, leading, in time, to the formation of blockages.

**[0008]** To eliminate this problem, the use of a large number of rinsing stages has been proposed, but without achieving acceptable elimination of the fine particles of food residues which sometimes remain obstinately caught even in the small areas of contact between the dishes arranged in the tank.

**[0009]** The increase in the number of rinsing stages leads, amongst other things, to a considerable increase in water consumption, which is contrary to the norms in force which require consumption to be limited.

Methods based on very sophisticated filtering devices including filtering surfaces which can retain even very fine dirt particles, combined with devices for washing the filtering surfaces with a counter-flow so as to keep them

as effective as possible by frequent cleaning operations, have also been proposed.

**[0010]** According to EP 0774 230, for filtering the washing liquid in a dishwasher of the above specified type, a filter is installed at the inlet conduit connected to the main recycling pump. Said filter has meshes that are increasingly smaller the more the washing liquid is subjected to recycling, in order to trap the greatest amount of dirt that is in suspension in the washing liquid itself, avoiding at the same time that such dirt, being less diluted, obstruct either the inlet or the outlet conduit of the washing pump. It is thus indispensable to clean the filter periodically. According to EP 0774 230 the filter is cleaned by means of a cleaning step at the end of the wash cycle, wherein this cleaning step comprises at least one substep for supplying clean water and part of this clean water is not discharged but reused in a subsequent washing cycle.

**[0011]** US 4346723 describes a dishwasher having a wash chamber for containing the items to be cleaned, a main circuit operated by a recycling pump and a soil collecting circuit with a drain pump. The soil collecting circuit includes a soil collector body attached to the underside of the wash chamber bottom and a fine mesh cylindrical screen, mounted between the soil collector body interior and an upward opening into the wash chamber. The interior of the collector body and the fine mesh screen define a soil collecting compartment for separating the food soil debris from the washing liquid. A drain pump discharges the washing liquid through a fluid inlet conduit and outlet conduit of the collector body, carrying the collected soil out the drain. Since it is to be expected that there will remain nevertheless some food soil debris in the washing liquid, a relatively fine filter must be provided in the fluid inlet path for the recycling pump and the spray arms. Otherwise the food soil debris would lead to clogging of the recycling pump and the spray arms.

**[0012]** The subject of the applicant's European patent publication EP0976359 represents an example of a technical solution to the problem inherent in the filtration of the washing and/or rinsing liquid in dishwashers, although this is also not free of problems such as limited filtration efficiency and the risk of rapid clogging of the micro-filter surfaces disposed in the main circuit of the washing liquid.

**[0013]** In fact, according to the prior art mentioned above, the entire quantity of washing liquid circulated by the main recycling pump is filtered during the working cycles as it passes from the tank to the filtering members and from these back into the tank.

**[0014]** The particles which are not retained by the filtering members therefore continue to circulate together with the washing liquid during the working stages with the risk that even the fine particles retained by the filtering members may be detached therefrom and go back into circulation.

**[0015]** A filtering method according to the preamble

of claim 1 is known from US 5,601,660.

**[0016]** The object of the present invention is to provide a filtering method which as far as possible eliminates all of the residues and dirt from the washing liquid during the circulation thereof, also avoiding the risk of premature clogging of the filtering members fitted in the working circuit for the flow of washing liquid.

**[0017]** This object is achieved by the method and the apparatus defined by the following claims.

**[0018]** The invention will now be described in greater detail with reference to a preferred embodiment thereof, illustrated by way of non-limiting example, in the appended drawings, in which:

Figure 1 is a schematic vertical cross-section of a dishwasher provided with a first embodiment of the filtering apparatus for implementing the method of the invention,

Figure 2 is a schematic vertical cross-section of a dishwasher provided with a second embodiment of the filtering apparatus for implementing the method of the invention,

Figure 3 is schematic view similar to that of Figure 2 with the valve members arranged in the position for washing the filtering elements with a counter-flow,

Figure 4 is a schematic vertical cross-section of the bottom portion of a dishwasher provided with a third embodiment of the filtering apparatus for implementing the method of the invention,

Figure 5 is a schematic section similar to that of Figure 4 with the valve members arranged in the position for washing the filtering elements with a counter-flow.

**[0019]** With reference to the above-mentioned drawings and in particular to Figures 1, 2 and 3, the washing tank of a conventional dishwasher is indicated as 1 and is equipped with at least two baskets 2 and 3 for the arrangement, in conventional manner, of the dishes to be washed, and at least two rotors 4 and 5 each having nozzles, schematically indicated 6, for spraying the washing liquid, according to the stage of the cycle, against the items to be washed, not shown in the drawings.

**[0020]** The rotors 4 and 5 are freely rotatable on respective support pillars 7 and 8, in conventional manner.

**[0021]** The bottom 9 of the tank 1 has a primary screen 10 in the centre of which there is a perforated basket 11 which can be removed manually.

**[0022]** The primary screen 10 and the basket 11 have respective holes through which the washing liquid can pass and which can retain the large particles of food residues which are removed from the items during washing.

**[0023]** In a position below the primary screen 10, the apparatus comprises a first chamber 12 which communicates axially, by means of an annular opening 13, with a further chamber which will be referred to further below. A second chamber 14 is arranged concentrically with the basket 11 and with the first chamber 12.

**[0024]** The chamber 14 has a cylindrical wall 15 with an inner surface covered by a filtering element 16. This filtering element 16 blocks the passage of very fine dirt particles which would otherwise remain in suspension in the washing water.

**[0025]** Around the second chamber 14, as mentioned above, the apparatus has a third chamber 17 which extends axially as far as the wall 18 constituting the base of the first chamber 12, with which the third chamber 17 communicates via the aforementioned annular opening 13.

**[0026]** The connection with the wall 18 is formed, in the embodiment illustrated, by means of an annular seal 19 inserted between a collar 20 fixed to the wall 18 and an opposed collar 21 fixed to the wall 22 which constitutes the periphery of the chamber 17.

**[0027]** The third chamber 17 is connected by means of an opening 23 to the intake duct 24 of the main recycling pump 25 of which the output, not shown, supplies the nozzles 6 on the rotors 4 and 5 in known and conventional manner.

**[0028]** The base 26 of the second chamber 14 has a duct 27 which puts the chamber 14 into communication with the intake duct 28 of a pump 29 which has an output 30 and which, as will be explained below, can act as a drain pump and, alternatively, as a further recycling pump, in the implementation of the filtration method of the present invention.

**[0029]** The base 26 also has a nozzle 31 connected permanently to the water supply coming from the water mains, by means of an on/off solenoid valve 32 disposed in a pipe 33 and controlled by the operating cycle of the dishwasher.

**[0030]** In the embodiment illustrated, the nozzle 31 is positioned on the base 26 in a position coaxial with the chamber 14 and with the basket 11 so as to direct its jet against the cylindrical filtering surface of the filtering element 16 of the chamber 14 and against the basket (11).

**[0031]** With particular reference to the embodiment of Figure 1, the apparatus comprises an additional filtering member 34 having, in its interior, filtering walls 35 with filtering elements for retaining very fine dirt particles.

**[0032]** The filtering member 34 is positioned vertically adjacent the rear wall of the tank 1 and is connected to the output 30 of the pump 29 by means of a pipe 36. The outlet pipe 37 of the filtering member 34 opens directly into the tank 1 in the vicinity of the bottom 9. Instead of discharging into the filtering member 34, the pipe 36 may be reversed towards the drain as indicated schematically at 36a.

**[0033]** During the working cycle of the dishwasher, whilst the washing liquid is circulated by the main recy-

cling pump 25, a portion of the washing liquid is drawn off by the pump 29 through the duct 28 and is sent to the filtering member 34 through the pipe 36.

**[0034]** After it has passed through the filtering walls 35 and left the fine dirt particles present in suspension in the washing liquid on the filtering elements thereof, the washing liquid is re-admitted directly to the tank 1 through the pipe 37. This additional filtration step performed on a portion of the total flow of washing liquid lightens the work of the filtering element 16 of the chamber 14 which, in contrast, is struck by the entire flow of washing liquid throughout the working cycle.

**[0035]** The result is more effective washing by the dishwasher.

**[0036]** Alternatively, the additional filtration step by means of the filtering member 34 may take place periodically during corresponding pauses of the main recycling pump 25, that is, during pauses in the working cycle.

**[0037]** It is clear from the foregoing that, during the working cycle, whilst the large particles of food residues removed from the items being washed are retained by the primary screen 10 and collected in the basket 11, the remaining particles broken up and pulverized during the various movements from the tank 1 to the nozzles 6 under the action of the main recycling pump 25 are retained by the filtering element 16 disposed on the internal surface of the cylindrical wall 15 of the second chamber 14 as well as by the filtering elements provided on the filtering walls 35 of the additional filtering member 34.

**[0038]** The path of the washing liquid during circulation is illustrated by the arrows of Figure 1.

**[0039]** Upon completion of the circulation stage, the pump 29 can be operated as a drain pump and the washing liquid can be directed towards the end 36a of the pipe 36 opening outside the filtering member 34. Clean water can advantageously be admitted to the second chamber 14 through the nozzle 31 during the drain stage by a suitable command imparted to the solenoid valve 32 by the cycle control.

**[0040]** The jet of clean water from the nozzle 31 helps to wash the filtering element 16 and also the basket 11 with a counter-flow.

**[0041]** With reference to Figures 2 and 3, the filtration method already described with reference to Figure 1 is implemented with the variation that the flow filtered by the member 34 is no longer admitted directly to the washing tank 1 but is sent back into the duct 28 immediately upstream of the intake of the pump 29.

**[0042]** The output pipe from the filtering member 34 has been indicated 37a in Figure 2 and 3.

**[0043]** The filtering member 34 in the embodiment shown in Figures 2 and 3 comprises a three-way valve 38 which enables the pipe 37a to be put into communication with the annular inner portion 39 of the filtering member 34, where the washing liquid filtered by the filtering walls 35 collects, as shown in Figure 2, or with the

axial inner chamber 40, as shown in Figure 3.

**[0044]** The latter position of the valve 38 enables the additional filtering member 34 to be washed by a counter-flow, removing the impurities retained by the filtering walls 35.

**[0045]** During this washing stage, clean water may be admitted not only through the nozzle 31 but also directly into the filtering member 34 through an additional nozzle 41.

**[0046]** The apparatus of Figures 2 and 3 comprises a further pump 42 for draining the washing liquid. This pump 42 is connected to the chamber 14 by an intake duct 43 via the duct 27 formed in the base 26 of the chamber 14.

**[0047]** Drain from the dishwasher takes place through a duct 44.

**[0048]** It can be appreciated from the foregoing description that, with the embodiment of the apparatus of Figures 2 and 3, the filtration method also comprises a step in which a portion of the flow coming from the tank 1 is drawn off by the pump 29 during the execution of a working cycle in which the main recycling pump 25 is active, and is sent, via the duct 30, to the additional filtering member 34.

**[0049]** From there, after filtration, the said portion of the flow is made to join the main flow in the chamber 17 which is directly in communication with the duct 28.

**[0050]** The filtration step performed by the pump 29 with the additional filtering member 34 may take place simultaneously with the operation of the working cycle implemented by the main recycling pump 25, or during predetermined pauses thereof.

**[0051]** A further embodiment of the apparatus for implementing the above-described filtration method can be seen in Figures 4 and 5.

**[0052]** The additional filtering member 34a is constituted by a structure comprising a primary screen 10a, a perforated basket 11a, a chamber 14a with a filtering wall 15a, with a base 26a, and ducts 27a formed therein.

**[0053]** The structure of the additional filtering member is disposed beneath the bottom 9 of the tank 1 in a position adjacent the main filtering structure 11, 15 associated with the primary screen 10.

**[0054]** This structure further comprises a chamber 17a which is not described further since it has characteristics similar to those of the chamber 17.

**[0055]** A nozzle 31a is provided for performing the washing of the additional filtering member 34a and this nozzle is disposed in the base 26a of the additional filtering member 34a.

**[0056]** The chamber 14a is put into communication with a manifold 28a which leads into the pump 29a, corresponding to the pump 29 of the embodiments described above, into which the duct 28 coming from the main filtering member also leads.

**[0057]** The output 30a of the pump 29a is connected to a three-way valve 38a which, in a first position, puts the pump 29a into communication with a duct 37b which,

in the embodiment illustrated, opens directly into the washing tank 1 in the vicinity of the bottom 9 thereof.

**[0058]** In the other position, the valve 38a puts the pump 29a into communication with a pipe 44a leading to the outlet, as shown in Figure 5.

**[0059]** This position of the valve 38a is used during the washing of the filters 16, 15a when clean water is admitted through the nozzles 31 and 31a respectively.

**[0060]** The filtration method implemented by the apparatus of Figures 4 and 5 corresponds substantially to that implemented by the apparatus shown in Figure 1, in which the washing liquid coming out of the additional filtering member 34a is admitted directly to the tank 1.

**[0061]** According to the invention, the result of an ability to perform washing and rinsing cycles in a dishwasher with circulating washing liquids which are substantially free of dirt particles in suspension is thus achieved.

## Claims

1. A method of filtering the washing and/or rinsing liquid in a dishwasher comprising a tank (1) for holding the items to be washed, the flow of washing liquid being drawn from the tank (1) by a main recycling pump (25) drawing from the bottom (9) of the tank (1) and being admitted to said tank (1) through a plurality of spray nozzles (6) for a predetermined period of time, said flow being passed through a circuit comprising a primary screen (10) disposed in the bottom (9) of the tank (1) and a perforated basket (11), both of them, for retaining the large particles of dirt removed from the items to be washed, and a chamber (14) disposed beneath the primary screen (10), at least partially surrounding the perforated basket (11), and said chamber (14) having a filtering element (16) for retaining fine dirt particles, wherein it includes a step in which a portion of the flow of washing liquid is drawn off at a point in said circuit downstream of said filtering element (16) and/or of said primary screen (10), the portion of washing liquid drawn off is sent to an additional filtering member (34, 34a) for retaining fine dirt particles and, after filtration, the portion is returned to the flow of washing liquid, **characterized in that** said step is carried out by means of a suitable auxiliary pump (29, 29A).
2. A method according to Claim 1, **characterized in that** the portion of the flow of washing liquid drawn off by the auxiliary pump (29, 29a) is returned, after the additional filtration, into the flow of washing liquid passing through the tank (1) containing the items to be washed.
3. A method according to Claim 1, **characterized in that** the portion of the flow of washing liquid drawn off by the auxiliary pump (29, 29a) is returned, after

additional filtration, into the flow of washing liquid immediately upstream of the point in said circuit at which the portion was drawn off.

4. A method according to any of the Claims 1 to 3, **characterized in that** the step of the drawing-off, the additional filtration, and the return of the portion of the flow of washing liquid into the flow of washing liquid takes place simultaneously with the circulation of the washing liquid performed by the main recycling pump (25).
5. A method according to Claim 4, **characterized in that** the step of the drawing-off, the additional filtration, and the return of the portion of the flow of washing liquid into the flow takes place for intermittent periods of time shorter than that imparted by the main recycling pump (25).
6. A method according to any of the Claims 1 to 3, **characterized in that** the stage of the drawing-off, the additional filtration, and the return of the drawn portion of washing liquid takes place during a pause of the main recycling pump (25).
7. A method according to any of the Claims 1 to 6, **characterized in that** it includes a step in which the additional filtering member (34, 34a) is washed in a counter-flow, the washing liquid used being drained outside the tank (1).
8. Apparatus for implementing the method according to any of the Claims 1 to 7, comprising a tank (1) for holding the items to be washed, a main recycling pump (25) for drawing the flow of washing liquid from the bottom (9) of the tank (1) and admitting it to the tank (1) through a plurality of spray nozzles (6) for a predetermined period of time, a primary screen (10) disposed in the bottom (9) of the tank (1) and a perforated basket (11), both of them for retaining the large particles of dirt removed from the items to be washed, and a chamber (14) disposed beneath the primary screen (10), at least partially surrounding the perforated basket (11), and said chamber (14) having a filtering element (16) for retaining fine dirt particles, wherein it includes an additional filtering member (34, 34a) for retaining fine dirt particles, arranged downstream of said filtering element (16) and/or primary screen (10) **characterized in that** it includes an auxiliary pump (29, 29a) for drawing off a portion of the flow of washing liquid and for sending it to said additional filtering member (34, 34a), and means for returning it to the flow of washing liquid.
9. Apparatus according to Claim 8, **characterized in that** the additional filtering member (34, 34a) has filtering walls (15a, 35) for retaining fine dirt parti-

cles.

10. Apparatus according to any of the Claims 8 and 9, **characterized in that** the additional filtering member (34a) is disposed beneath the bottom (9) of the tank (1) for holding the items to be washed. 5
11. Apparatus according to Claim 8, **characterized in that** the additional filtering member (34) is disposed along the rear vertical side of the tank (1) for holding the items to be washed. 10
12. Apparatus according to any of the Claims 8 to 11, **characterized in that** it includes a valve (38) for reversing the direction of the flow in the additional filtering member (34) and washing it with a counter-flow. 15
13. Apparatus according to any of the Claims 8 to 12, **characterized in that** it includes a nozzle (41, 31a) for the supply of clean water for washing the additional filtering means (34, 34a) from the exterior. 20

#### Patentansprüche 25

1. Verfahren zum Filtern der Wasch- und/oder Spülflüssigkeit in einem Geschirrspüler, der einen Behälter (1) zum Aufnehmen der zu waschenden Gegenstände umfasst, wobei der Strom von Waschflüssigkeit aus dem Behälter (1) durch eine Haupt-Umwälzpumpe (25) gesaugt wird, die vom Boden (9) des Behälters (1) absaugt, und über eine Vielzahl von Sprühdüsen (6) über einen vorgegebenen Zeitraum in den Behälter (1) eingeleitet wird, und der Strom durch einen Kreislauf geleitet wird, der ein Primär-Sieb (10), das sich im Boden (9) des Behälters (1) befindet, und einen perforierten Korb (11), wobei beide dazu dienen, die großen Schmutzteilchen, die von den zu waschenden Gegenständen entfernt werden, zurückzuhalten, und eine Kammer (14) umfasst, die sich unterhalb des Primär-Siebes (10) befindet und den perforierten Korb (11) wenigstens teilweise umgibt, und die Kammer (14) ein Filterelement (16) zum Zurückhalten feiner Schmutzteilchen aufweist, wobei es einen Schritt einschließt, bei dem ein Teil des Stroms von Waschflüssigkeit an einem Punkt in dem Kreislauf stromab von dem Filterelement (16) und/oder dem Primär-Sieb (10) abgesaugt wird, wobei der abgesaugte Teil der Waschflüssigkeit zu einem zusätzlichen Filterelement (34, 34a) geleitet wird, um feine Schmutzteilchen zurückzuhalten, und der Teil nach dem Filtern zu dem Strom von Waschflüssigkeit zurückgeführt wird, **dadurch gekennzeichnet, dass** der Schritt mittels einer geeigneten Zusatzpumpe (29, 29a) ausgeführt wird. 30  
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2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** der Teil des Stroms von Waschflüssigkeit, der durch die Zusatzpumpe (29, 29a) abgesaugt wird, nach dem zusätzlichen Filtern in den Strom von Waschflüssigkeit zurückgeführt wird, der durch den Behälter (1) hindurchtritt, der die zu waschenden Gegenstände enthält.
3. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** der Teil des Stroms von Waschflüssigkeit, der durch die Zusatzpumpe (29, 29a) abgesaugt wird, nach zusätzlichem Filtern in die Waschflüssigkeit unmittelbar stromab von dem Punkt in dem Kreislauf zurückgeführt wird, an dem der Teil abgesaugt wurde.
4. Verfahren nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** der Schritt des Absaugens, des zusätzlichen Filterns und des Zurückführens des Teils des Stroms von Waschflüssigkeit in den Strom von Waschflüssigkeit gleichzeitig zum Umwälzen der Waschflüssigkeit stattfindet, das durch die Haupt-Umwälzpumpe (25) durchgeführt wird.
5. Verfahren nach Anspruch 4, **dadurch gekennzeichnet, dass** der Schritt des Absaugens, des zusätzlichen Filterns und des Zurückführens des Teils des Stroms von Waschflüssigkeit in den Strom über intermittierende Zeiträume stattfindet, die kürzer sind als die durch die Haupt-Umwälzpumpe (25) eingesetzten.
6. Verfahren nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Phase des Absaugens, des zusätzlichen Filterns und des Zurückleitens des abgesaugten Teils von Waschflüssigkeit während eines Stillstands der Haupt-Umwälzpumpe (25) stattfindet.
7. Verfahren nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** es einen Schritt einschließt, bei dem das zusätzliche Filterelement (34, 34a) in einem Gegenstrom ausgespült wird, wobei die verwendete Ausspülflüssigkeit ausserhalb des Behälters (1) abgeleitet wird.
8. Vorrichtung zum Durchführen des Verfahrens nach einem der Ansprüche 1 bis 7, die einen Behälter (1) zum Aufnehmen der zu waschenden Gegenstände, eine Haupt-Umwälzpumpe (25) zum Absaugen des Stroms von Waschflüssigkeit vom Boden (9) des Behälters (1) und zum Einleiten desselben in den Behälter (1) über eine Vielzahl von Sprühdüsen (6) über einen vorgegebenen Zeitraum, ein Primär-Sieb (10), das sich im Boden (9) des Behälters (1) befindet, und einen perforierten Korb (11), wobei beide dazu dienen, die großen Schmutzteilchen zu-

rückzuhalten, die von den zu waschenden Gegenständen entfernt werden, und eine Kammer (14) umfasst, die unterhalb des Primär-Siebes (10) angeordnet ist und den perforierten Korb (11) wenigstens teilweise umgibt, und die Kammer (14) ein Filterelement (16) zum Zurückhalten feiner Schmutzteilchen aufweist, und wobei sie ein zusätzliches Filterelement (34, 34a) zum Zurückhalten feiner Schmutzteilchen enthält, das stromab von dem Filterelement (16) und/oder dem Primär-Sieb (10) angeordnet ist, **dadurch gekennzeichnet, dass** sie eine Hilfspumpe (29, 29a) zum Absaugen eines Teils des Stroms von Waschflüssigkeit und zum Leiten desselben zu dem zusätzlichen Filterelement (34, 34a) sowie eine Einrichtung zum Zurückführen desselben zu dem Strom von Waschflüssigkeit enthält.

9. Vorrichtung nach Anspruch 8, **dadurch gekennzeichnet, dass** das zusätzliche Filterelement (34, 34a) Filterwände (15a, 35) zum Zurückhalten feiner Schmutzteilchen aufweist.
10. Vorrichtung nach einem der Ansprüche 8 und 9, **dadurch gekennzeichnet, dass** sich das zusätzliche Filterelement (34a) unterhalb des Bodens (9) des Behälters (1) zum Aufnehmen der zu waschenden Gegenstände befindet.
11. Vorrichtung nach Anspruch 8, **dadurch gekennzeichnet, dass** sich das zusätzliche Filterelement (34) an der hinteren vertikalen Seite des Behälters (1) zum Aufnehmen der zu waschenden Gegenstände befindet.
12. Vorrichtung nach einem der Ansprüche 8 bis 11, **dadurch gekennzeichnet, dass** sie ein Ventil (38) zum Umkehren der Richtung des Stroms in dem zusätzlichen Filterelement (34) und zum Ausspülen desselben mit einem Gegenstrom enthält.
13. Vorrichtung nach einem der Ansprüche 8 bis 12, **dadurch gekennzeichnet, dass** sie eine Düse (41, 31a) zum Zuführen von sauberem Wasser zum Ausspülen der zusätzlichen Filtereinrichtung (34, 34a) von außen enthält.

## Revendications

1. Procédé pour filtrer le liquide de rinçage et/ou de lavage dans un lave-vaisselle comprenant un réservoir (1) pour retenir les éléments à laver, le courant du liquide de lavage étant tiré à partir du réservoir (1) par une pompe de recyclage principale (25) tirant à partir du fond (9) du réservoir (1) et étant admis dans ledit réservoir (1) au travers d'une pluralité de buses de pulvérisation (6) pendant une durée

prédéterminée, ledit courant étant passé au travers d'un circuit comprenant un écran primaire (10) disposé dans le fond (9) du réservoir (1) et un panier perforé (11), chacun d'entre eux, servant à retenir les grandes particules de saleté retirées des éléments à laver, et une chambre (14) disposée en dessous de l'écran primaire (10), entourant au moins partiellement le panier perforé (11) et, ladite chambre (14) ayant un élément de filtrage (16) pour retenir les petites particules de saleté, dans lequel est comprise une étape au cours de laquelle une partie du courant de liquide de lavage est prélevée à un point en dudit circuit en aval dudit élément de filtrage (16) et/ou dudit écran primaire (10), la partie de liquide de rinçage vidangée est envoyée à un élément de filtrage supplémentaire (34, 34a) pour retenir les fines particules de saleté et, après filtrage, la partie est renvoyée dans le courant de liquide de lavage, **caractérisé en ce que** ladite étape est effectuée au moyen d'une pompe auxiliaire convenable (29, 29A).

2. Procédé selon la revendication 1, **caractérisé en ce que** la partie du courant de liquide de lavage prélevée par la pompe auxiliaire (29, 29a) est renvoyée, après filtrage supplémentaire, dans le courant de liquide de lavage en passant au travers du réservoir (1) contenant les éléments à laver.
3. Procédé selon la revendication 1, **caractérisé en ce que** la partie de courant de liquide de lavage prélevée par la pompe auxiliaire (29, 29a) est renvoyée, après filtrage supplémentaire, dans le courant de liquide de lavage immédiatement en amont du point sur lequel la partie a été prélevée dans ledit circuit.
4. Procédé selon l'une quelconque des revendications de 1 à 3, **caractérisé en ce que** l'étape de prélèvement, de filtrage supplémentaire et de renvoi de la partie du courant de liquide de lavage dans le courant de liquide de lavage est réalisée de manière simultanée avec la circulation du liquide de lavage effectuée par la pompe principale de recyclage (25).
5. Procédé selon la revendication 4, **caractérisé en ce que** l'étape de prélèvement, de filtrage supplémentaire, et de renvoi de la partie de courant de liquide de lavage dans le courant est effectuée pendant des durées intermittentes plus courtes que celles imparties par la pompe principale de recyclage (25).
6. Procédé selon l'une quelconque des revendications de 1 à 3, **caractérisé en ce que** l'étape de prélèvement, de filtrage supplémentaire et de renvoi de la partie prélevée de liquide de lavage est effectuée au cours d'une pause de la pompe principale de re-

cyclage (25).

7. Procédé selon l'une quelconque des revendications de 1 à 6, **caractérisé en ce qu'il** comprend une étape au cours de laquelle l'élément de filtrage supplémentaire (34, 34a) est lavé dans un contre-courant, le liquide de lavage utilisé étant drainé à l'extérieur du réservoir (1). 5
  
8. Appareil pour mettre en oeuvre le procédé selon l'une quelconque des revendications de 1 à 7, comprenant un réservoir (1) pour retenir les éléments à laver, une pompe principale de recyclage (25) pour tirer le courant de liquide de lavage à partir du fond (9) du réservoir (1) et l'admettre dans le réservoir (1) au travers d'une pluralité de buses de pulvérisation (6) pendant une durée prédéterminée, un écran primaire (10) disposé dans le fond (9) du réservoir (1) et un panier perforé (11), chacun d'entre eux servant à retenir les grandes particules de saleté retirées des éléments à laver, et une chambre (14) disposée en dessous de l'écran primaire (10) entourant au moins partiellement le panier perforé (11), et ladite chambre (14) ayant un élément de filtrage (16) afin de retenir les fines particules de saleté, dans lequel il comprend un élément de filtrage supplémentaire (34, 34a) afin de retenir les fines particules de saleté, agencé en aval dudit élément de filtrage (16) et/ou un écran primaire (10) **caractérisé en ce qu'il** comprend une pompe auxiliaire (29, 29a) pour prélever une partie du courant de liquide de lavage et pour l'envoyer dans ledit élément de filtrage supplémentaire (34, 34a), et un moyen pour le renvoyer dans le courant du liquide de lavage. 10  
15  
20  
25  
30  
35
  
9. Appareil selon la revendication 8, **caractérisé en ce que** l'élément de filtrage supplémentaire (34, 34a) est muni de parois de filtrage (15a, 35) pour retenir les fines particules de saleté. 40
  
10. Appareil selon l'une quelconque des revendications 8 et 9, **caractérisé en ce que** l'élément de filtrage supplémentaire (34a) est disposé en dessous du fond (9) du réservoir (1) pour retenir les éléments à laver. 45
  
11. Appareil selon la revendication 8, **caractérisé en ce que** l'élément de filtrage supplémentaire (34) est disposé le long du côté vertical arrière du réservoir (1) afin de retenir les éléments à laver. 50
  
12. Appareil selon l'une quelconque des revendications 8 à 11, **caractérisé en ce qu'il** comprend une vanne (38) pour renverser la direction du courant dans l'élément de filtrage supplémentaire (34) et le laver avec un contre-courant. 55
  
13. Appareil selon l'une quelconque des revendications

8 à 12, **caractérisé en ce qu'il** comprend une buse (41, 31a) pour fournir une eau propre pour laver le moyen de filtrage supplémentaire (34, 34a) à partir de l'extérieur.



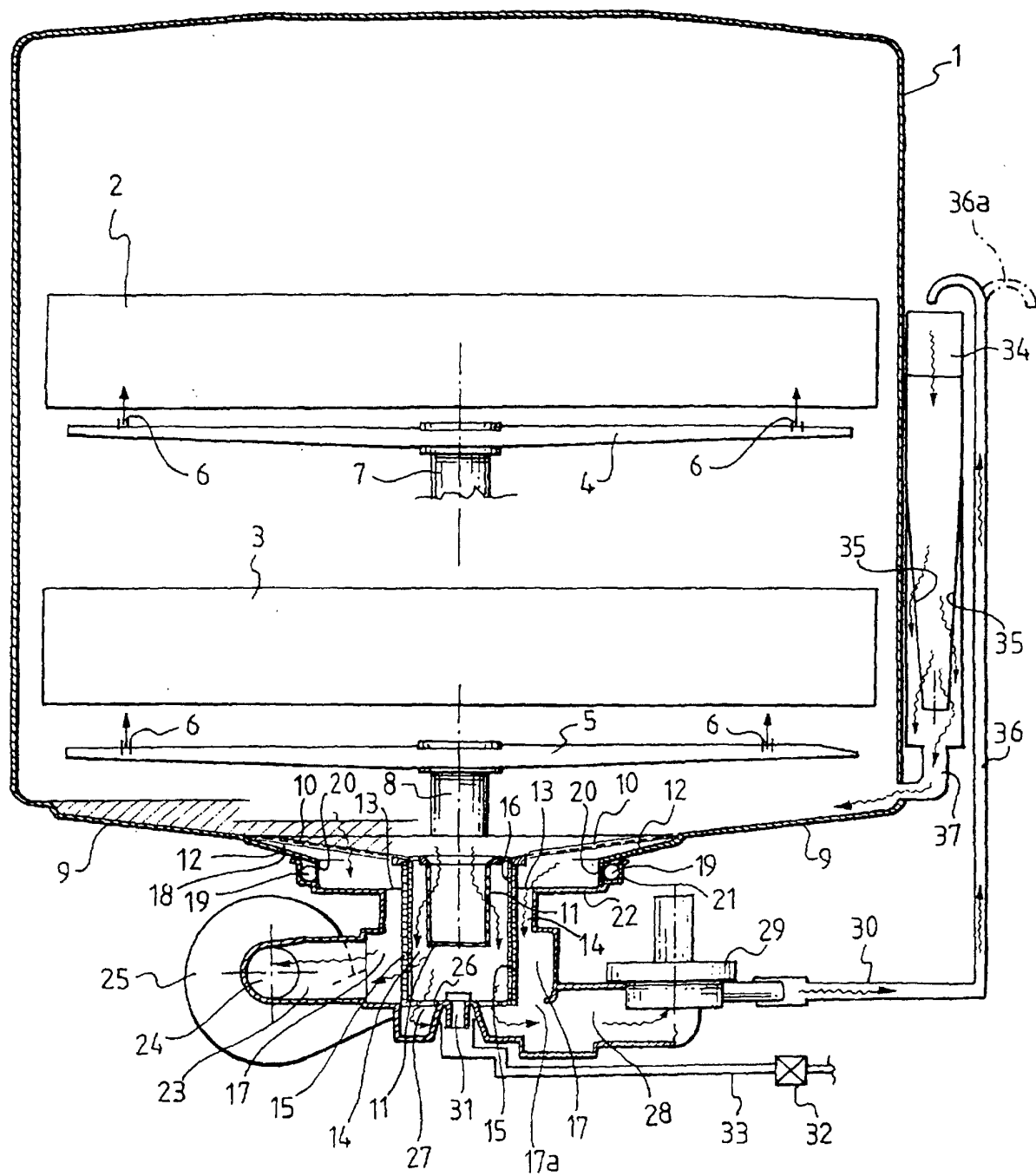


FIG.1

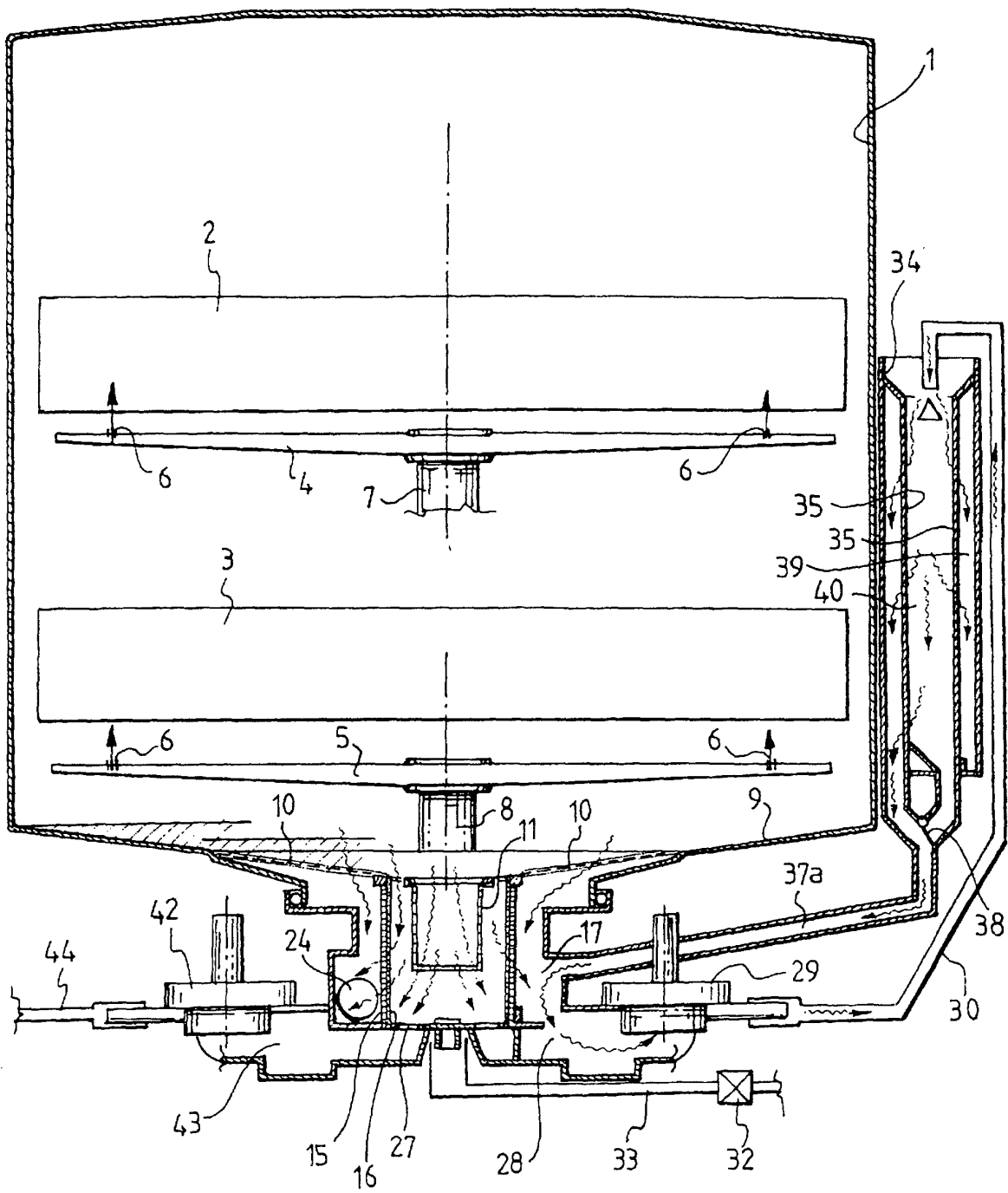


FIG. 2

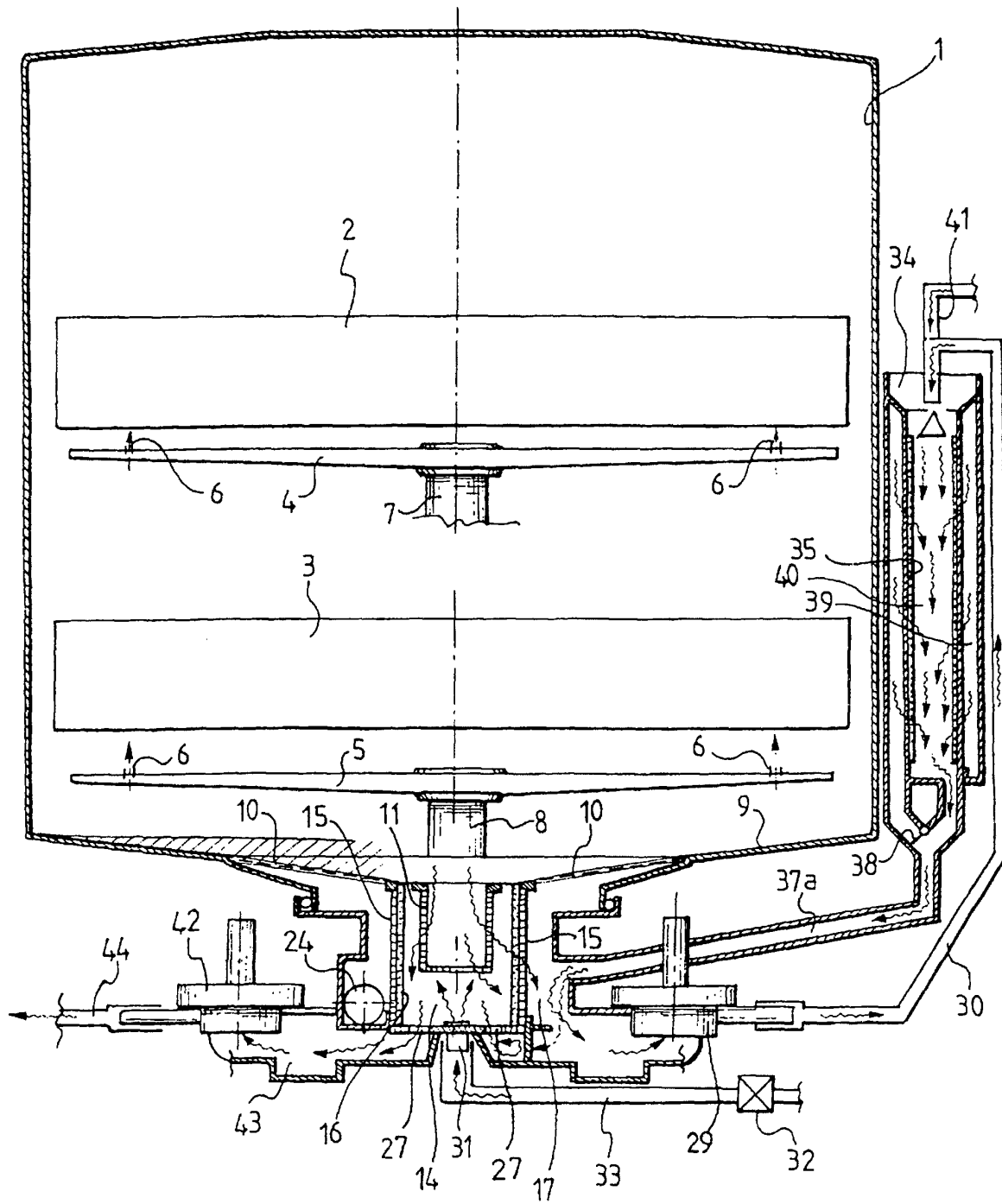


FIG.3

