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### (54) A WASHING MACHINE

WASCHMASCHINE

MACHINE À LAVER

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## Description

**[0001]** The present invention relates to a washing machine that comprises a washing agent dispenser.

**[0002]** In washing machines, e.g. in clothes or dish washing machines, the washing agent required for the cleaning process is emplaced in a washing agent dispenser. The washing water taken in from the water inlet and heated if required is directed into the washing agent dispenser. The dissolved-melted washing agent passes into the washing tub together with water. The washing agent dispenser frequently includes compartments wherein the powder and/or liquid washing agents are emplaced.

**[0003]** Particularly in washing machines, the washing agent dispenser comprises at least one compartment wherein the liquid washing agent (e.g. softener) is emplaced. In order to hold under control the time for dispensing the liquid washing agent into the tub, the hole has to be positioned at a point above the level of the softener. This necessitates additional arrangements for conveying the softener up to the hole above at the time required by the washing program.

**[0004]** In state-of-the-art washing agent dispensers, the softener is sucked into the hole by the siphon effect and is transferred to the tub therefrom. In this implementation, a cylinder is provided that rises up from the base of the compartment, with its lower end extending into the washing tub, the upper end extending into the compartment. A concentric cartridge with a wider diameter is fitted over this cylinder such that the upper end is not covered. The lower side of the cartridge is higher than the base of the compartment. Accordingly, the liquid washing agent emplaced in the compartment still communicates with the cylinder inside the cartridge. After water is started to be taken in, when the level of the water-washing agent mixture goes above the height of the cylinder, the mixture entering from the top end of the cylinder starts flowing into the tub from inside the cylinder. When the water-washing agent mixture goes below a certain level, the siphon effect ends. In this implementation, some amount of the washing agent is left in the compartment.

**[0005]** In state-of-the-art patent documents Japanese no. JP3041997, European no. EP211463 and Great Britain no. GB2022622, siphon mechanisms are described.

**[0006]** In another state-of-the-art washing machine group, particularly in dishwashers, a hole is positioned below the liquid washing agent level in the liquid washing agent (e.g. rinsing aid) compartment and this hole is controlled by a valve by opening or closing.

**[0007]** In state-of-the-art European patent no. EP 1379156, the explanation is given for a washing agent dispenser device provided in a dishwasher which comprises an exit hole that is opened or closed by an actuator.

**[0008]** The object of the present invention is the realization of a washing machine comprising a washing agent dispenser that provides a more effective use of the liquid washing agent contained therein.

**[0009]** The washing machine designed to fulfill the object of the present invention is explicated in the attached claims. In the washing agent dispenser used in the said washing machine, at least one hole is provided on the base of the compartment that opens to the washing tub. However, the liquid washing agent mass having a certain viscosity at a certain level does not flow down the hole since its surface tension in the vicinity of the hole balances the pressure at that depth due to the dimensions and shape of the hole. While the washing program goes on, water is taken into the compartment when the liquid washing agent has to be delivered to the tub. As soon as it starts mixing with the water, on one hand the level of the liquid washing agent starts to increase -and hence its pressure in the vicinity of the hole - and on the other hand its viscosity starts to decrease, it begins to flow from the hole into the tub as its pressure overcomes its surface tension. Consequently a washing machine comprising a washing agent dispenser is provided by taking advantage of the surface tension without necessitating the use of any siphon devices or valves. The production of the said washing agent dispenser is easy, has a low cost since it comprises holes only on its base.

**[0010]** The washing machine realized in order to fulfill the objectives of the present invention is illustrated in the attached figures, where:

**[0011]** Figure 1 - is the schematic view of a washing machine.

**[0012]** Figure 2 - is the schematic view of a washing agent dispenser.

**[0013]** Figure 3 - is the top view of a washing agent dispenser in an embodiment of the present invention.

**[0014]** Figure 4 - is the detailed perspective view of a washing agent dispenser in an embodiment of the present invention.

**[0015]** The elements shown in figures are numbered as follows:

1. Washing machine
2. Tub
3. Washing agent dispenser
4. Compartment
5. Hole
6. Water inlet

**[0016]** The washing machine (1) is utilized for the cleaning of the items like dishes and laundry by means of washing with water.

**[0017]** The washing machine (1) of the present invention comprises,

- a tub (2) wherein the washing process is carried out,
- a washing agent dispenser (3), having at least one compartment (4) into which the liquid washing agent is put to be delivered to the tub (2), and
- a water inlet (6) allowing water to be taken into the compartment (4) (Figure 2).

**[0018]** The washing agent dispenser (3) comprises holes (5) disposed on the base of the compartment (4). Each hole (5) is sized such that the pressure of the washing agent having a certain depth (h) and a certain viscosity at the level of the hole (5) is enough to balance its surface tension over the hole (5) (Figure 3 and figure 4). Accordingly, when poured into the compartment (4) up to the maximum level determined by the producer, the liquid washing agent does not flow down the holes (5).

**[0019]** In a phase of the washing program predetermined by the producer, the water inlet (6) is opened, water starts to be taken into the compartment (4), the pressure of the water-liquid washing agent mixture at the level of the hole (5) overcomes its surface tension over the hole (5), and it starts flowing down the holes (5) into the tub (2).

**[0020]** In this embodiment of the present invention, the producer determines the maximum amount of liquid washing agent to be poured into the compartment (4) and designs the size and shape of the holes (5) such that this amount of liquid washing agent does not flow into the tub (2) at an undesired time. The user pours in the required amount of liquid washing agent into the compartment (4) suitable for the selected washing program. While the washing program goes on, the water inlet (6) is opened when the time comes for the step of taking in the liquid washing agent. The water starting to fill in the compartment (4) begins mixing with the washing agent. At the same time, the density and the viscosity of the liquid washing agent starts to decrease, when its pressure on the base of the compartment (4) gets higher than its surface tension on the hole (5), the water- liquid washing agent mixture starts flowing down the holes (5) towards the tub (2). It is possible to deliver the entire liquid washing agent into the tub (2) since the holes (5) are arranged on the base of the compartment (4).

**[0021]** In an embodiment of the present invention, the entire base of the compartment (4) is perforated with holes (5).

**[0022]** In another embodiment of the present invention, the holes (5) are clustered in a certain region on the base of the compartment (4) (Figure 3 and Figure 4). The hole (5) cluster preferably is arranged on the rear side of the compartment (4). Hence when the user opens the washing agent dispenser (3) to pour in the washing agent into the compartment (4), there are no holes (5) on the base where the washing agent hits relatively hard. The washing agent slowly flowing on the base of the compartment (4) from the front side to the rear, spreads slowly over the holes (5) grouped at the rear side. Consequently when the washing agent is first poured into the compartment (4), it is prevented from directly hitting the holes (5), the breaking of its surface tension when the washing agent is just poured into the compartment (4) and the washing agent directly flowing into the tub (2). In this embodiment, the hole (5) cluster is situated preferably on a recessed in area on the base of the compartment (4). Accordingly, as much of the washing agent as pos-

sible poured in to the compartment (4) reaches the holes (5) and is discharged from the holes (5).

**[0023]** In another embodiment of the present invention, the base of the compartment (4) is inclined, and the dimensions of the holes (5) change depending on the depth of the compartment (4). Since the pressure of the washing agent is more in the deeper region, the dimensions of the holes (5) here are smaller. By way of the slope, the liquid washing agent is provided to flow better after the surface tension is overcome.

**[0024]** In the washing machine (1) of the present invention, the viscosity of the liquid washing agents used, e.g. softeners, at a temperature of 20°C is around 0.8-1.3 cs. It is observed that a softener having this viscosity poured to a level of 2-3 cm over a hole (5) having a diameter of 0.1-0.3 cm. does not flow down from the hole (4). However, when about 2-3 cm. height of water is added over the softener, it is observed that the surface tension at the hole (5) is overcome and the water-liquid washing agent mixture starts flowing down the holes (5). It is also possible to use these holes (5) together with a siphon arrangement.

**[0025]** By way of the washing machine (1) of the present invention, a washing agent dispenser (3) is provided that does not require a complex arrangement such as a siphon in the compartment (4) into which the washing agent is put. Since the said washing agent dispenser (3) has a simple configuration comprising holes (5) only on its base, its production is easy and has a low cost.

## Claims

1. A washing machine (1) utilized for cleaning items such as clothes or dishes by washing with water comprising: a tub (2) wherein the washing process is carried out, - a washing agent dispenser (3) having at least one compartment (4) wherein the liquid washing agent is put to be delivered to the tub (2), and - a water inlet (6) that allows water to be taken into the compartment (4), and **characterized by** a washing agent dispenser (3) comprising holes (5) situated on the base of the compartment (4), with each hole (5) having a size such that a surface tension is created that is greater than the pressure of the washing agent having a certain depth and a certain viscosity on the base of the compartment (4) thus preventing the washing agent poured into it from flowing out, and at a predetermined phase of the washing program, as the height of the water-liquid washing agent mixture increases when water is taken into the compartment (4), allowing it to flow out as its pressure overcomes its surface tension.
2. A washing machine (1) as in Claim 1, **characterized by** a compartment (4) with its entire base perforated with holes (5).

3. A washing machine (1) as in Claim 1, **characterized by** holes (5) clustered in a certain region on the base of the compartment (4). 5

4. A washing machine (1) as in Claim 3, **characterized by** a compartment (4) wherein the hole (5) cluster is situated on its rear side. 10

5. A washing machine (1) as in Claim 4, **characterized by** a compartment (4) wherein the hole (5) cluster is situated on its recessed in portion. 10

6. A washing machine (1) as in any one of the above claims, **characterized by** a compartment (4) having a sloping base and the dimensions of the holes (5) changing with the depth of the base. 20

### Patentansprüche

1. Wasch-/Spülmaschine (1) zum Reinigen von Gegenständen wie z.B. Kleidung oder Geschirr mit Wasser, umfassend: - einen Laugenbehälter (2), in dem der Wasch-/Spülvorgang ausgeführt wird, - einen Wasch-/Spülmittelspender (3) mit wenigstens einem Fach (4), in das das flüssige Wasch-/Spülmittel gegeben wird, das an den Laugenbehälter (2) bereitgestellt werden soll, und - einen Wassereinlauf (6), der das Aufnehmen von Wasser in das Fach (4) ermöglicht, **dadurch gekennzeichnet, dass** der Wasch-/Spülmittelspender (3) Öffnungen (5) umfasst, die am Boden des Fachs (4) angeordnet sind, wobei die einzelnen Öffnungen (5) derart abgemesen sind, dass eine Oberflächenspannung erzeugt wird, die größer ist als der Druck von Wasch-/Spülmittel einer bestimmten Tiefe und einer bestimmten Viskosität am Boden des Fachs (4), wodurch verhindert wird, dass eingegossenes Wasch-/Spülmittel ausfließt, und wodurch während einer vorbestimmten Phase des Wasch-/Spülprogramms, wenn die Höhe des Gemisches aus Wasser und Wasch-/Spülmittel zunimmt, da Wasser in das Fach (4) aufgenommen wird, dieses herausfließen kann, da sein Druck die Oberflächenspannung überwindet. 20

2. Wasch-/Spülmaschine (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der gesamte Boden des Fachs (4) mit Öffnungen (5) perforiert ist. 25

3. Wasch-/Spülmaschine (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Öffnungen (5) sich in einer bestimmten Region am Boden des Fachs (4) konzentrieren. 30

4. Wasch-/Spülmaschine (1) nach Anspruch 3, **dadurch gekennzeichnet, dass** die Öffnungen (5) des Fachs (4) sich an seiner Rückseite konzentrieren. 35

5. Wasch-/Spülmaschine (1) nach Anspruch 4, **dadurch gekennzeichnet, dass** die Öffnungen (5) des Fachs (4) sich an seinem vertieften Abschnitt konzentrieren. 5

6. Wasch-/Spülmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Fach einen geneigten Boden aufweist, und die Abmessungen der Öffnungen (5) sich mit der Tiefe des Bodens verändern. 10

### Revendications

15. 1. Une machine à laver (1) utilisée pour le nettoyage des objets tels que vêtements ou vaisselles en les lavant avec de l'eau, comprenant : -une cuve (2) dans lequel le processus de lavage est effectué, - un distributeur d'agent de lavage (3) ayant au moins un compartiment (4) où l'agent liquide de lavage est mis pour être transmis à la cuve (2), et - une entrée d'eau (6) qui permet à l'eau de passer dans le compartiment (4), et **caractérisée par** un distributeur d'agent de lavage (3), comprenant des trous (5) situés sur la base du compartiment (4), chaque trou (5) ayant une taille de façon à créer une tension superficielle, qui est supérieure à la pression de l'agent de lavage ayant une certaine profondeur et une certaine viscosité sur la base du compartiment (4), empêchant ainsi l'agent de lavage y étant versé par la sortie d'écoulement, et à une phase déterminée du programme de lavage, comme la hauteur du mélange de l'eau-agent de lavage liquide augmentée, quand l'eau pénètre dans le compartiment (4), lui permettant ainsi de s'écouler de telle façon que sa pression vainque sa tension superficielle. 20

2. Une machine à laver (1) selon la Revendication 1, **caractérisée par** un compartiment (4) avec toute sa base perforée de trous (5). 25

3. Une machine à laver (1) selon la Revendication 1, **caractérisée par** des trous (5) regroupés dans une certaine région sur la base du compartiment (4). 30

4. Une machine à laver (1) selon la Revendication 3, **caractérisée par** un compartiment (4) dans lequel le groupe de trous (5) est situé sur la face arrière. 35

5. Une machine à laver (1) selon la Revendication 4, **caractérisée par** un compartiment (4) dans lequel le groupe de trous (5) est situé encastré sur la une partie. 40

6. Une machine à laver (1) selon l'une quelconque des revendications précédentes, **caractérisée par** un compartiment (4) ayant une base en pente et des dimensions de trous (5) changeant en fonction de la 45

profondeur de la base.

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Figure 1

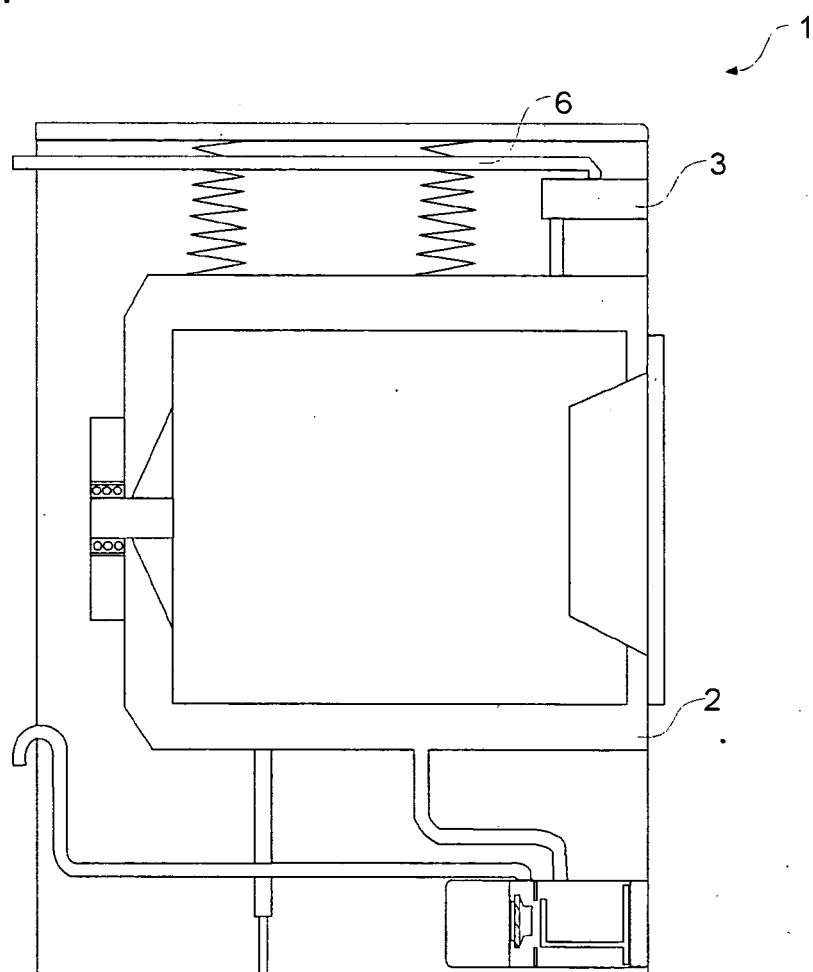


Figure 2

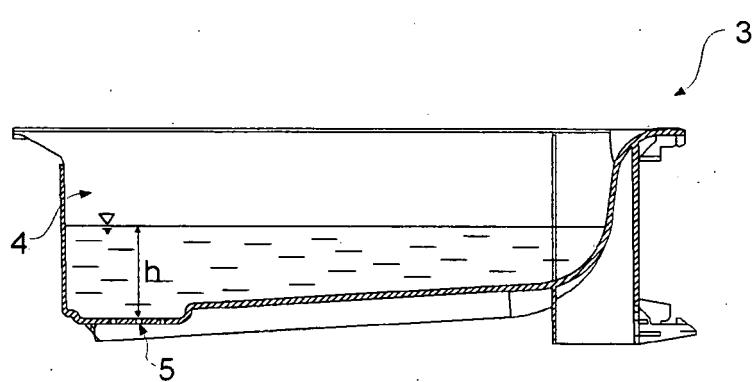


Figure 3

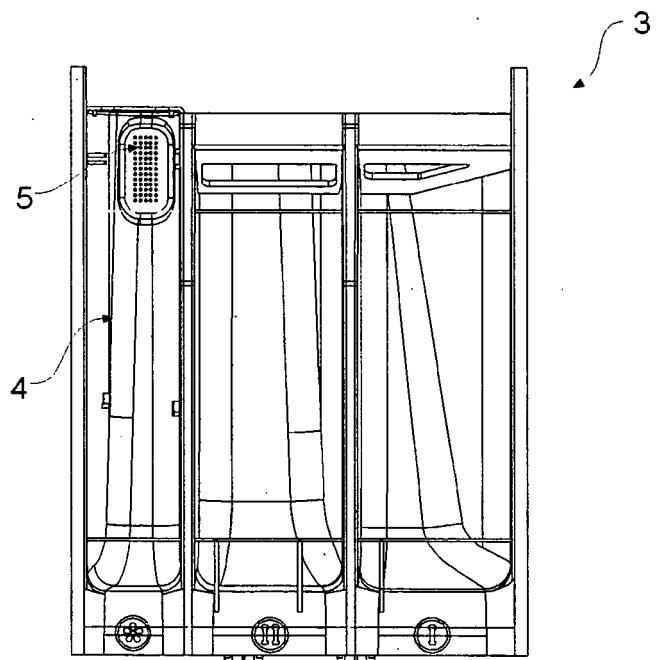
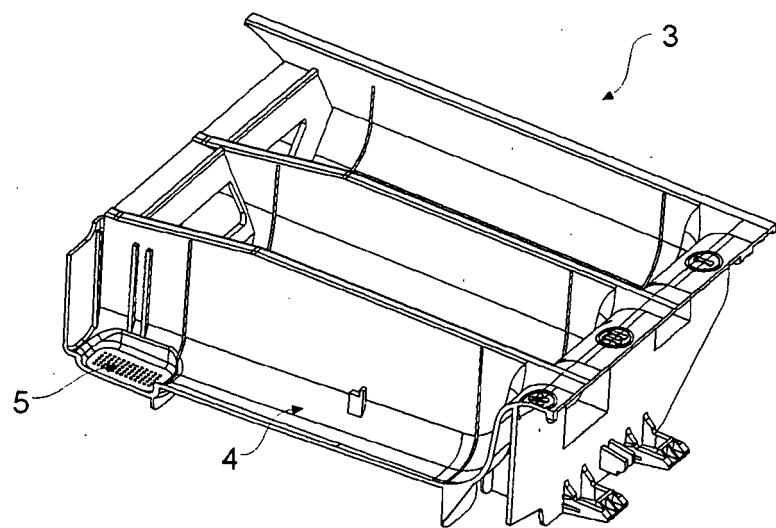


Figure 4



**REFERENCES CITED IN THE DESCRIPTION**

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