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- (71) **Applicant:** ARCELIK ANONIM SIRKETI [TR/TR]; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR).
- (72) **Inventors:** CAGLAR, Talip; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). TATAR, Hakan; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). ERDEM, Ilkan; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). KURTKAYA, Kagan; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR). CORCHES, Florin Horea; E5 Ankara Asfalti Uzeri, Tuzla, 34950 Istanbul (TR).
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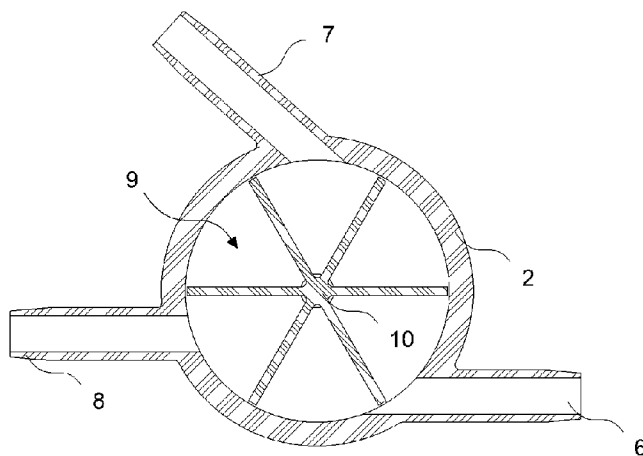
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(54) **Title:** A WASHING MACHINE WITH AUTOMATIC CLEANING AGENT DOSING FUNCTION

Figure 4



(57) **Abstract:** The present invention relates to a washing machine (1) comprising a body (2), a tub (3) disposed inside the body (2) and wherein the washing process is performed, a detergent housing (4) disposed inside the body (2) and wherein the cleaning agents are stored, and a dosing receptacle (5) that has an inlet end (6) connected to the detergent housing (4) and an outlet end (7) connected to the tub (3) and wherein the cleaning agent is transferred from the detergent housing (4) to be dosed. The washing machine further comprising a water conduit (8) that enables water to enter the dosing receptacle (5) and a wheel (10) having at least one fin (11) that enables the dosing receptacle (5) to be divided into more than one partition (9), that moves by the entry of water and enables the cleaning agent in the partition (9) to be directed to the outlet end (7).



Description**A WASHING MACHINE WITH AUTOMATIC CLEANING AGENT DOSING
FUNCTION**

- [0001] The present invention relates to a washing machine wherein the cleaning agents that interact chemically with the laundry are automatically dosed in the required amount at the start of the washing process.
- [0002] The use of liquid cleaning agent in washers like washing machines and laundry washer dryers is becoming widespread. Accordingly, in order to provide ease of utilization, automatic dosing units are developed for the liquid cleaning agent to be stored in a receptacle and to be delivered into the washing water controllably depending on the requirement of the washing program. The common characteristic of state of the art systems is having tanks that store the liquid cleaning agent, mechanisms enabling these tanks to be filled by the user and hydraulic systems that can deliver the correct amount of the cleaning agent into the washing medium. More than one solution exists in order to perform the dosing process. Several of these solutions are the submersible pumps, the peristaltic pumps that are placed into the tanks wherein liquid cleaning agents are filled and the hydraulic systems that suck the cleaning agent with the vacuum effect and transfer into the washing medium. It is also desired that the dosing operation is carried out with low cost.
- [0003] In the state of the art International Patent Application No. WO2015032656, a washing machine is disclosed wherein the liquid detergent dosing process is performed by the peristaltic pump.
- [0004] In the state of the art International Patent Application No. WO2006131206, a washing machine is disclosed wherein the liquid detergent dosing process is performed by using the Venturi effect.
- [0005] In the state of the art International Patent Application No. WO2006042631, a washing machine is disclosed wherein the liquid detergent dosing process is performed by utilizing the Venturi effect.
- [0006] In the state of the art International Patent Application No. WO2010139928, a washing machine is disclosed which enables manual dosing by means of a piston.

- [0007] The aim of the present invention is the realization of a washing machine that performs the cleaning agent dosing process with low cost.
- [0008] The washing machine realized in order to attain the aim of the present invention, and explicated in the claims, comprises a water conduit that enables water to enter into the dosing receptacle where to the cleaning agent from the detergent housing is transferred to be dosed and a wheel having at least one fin that divides the dosing receptacle into more than one partition, that moves with the effect of water and that enables the cleaning agent in the partition to be directed towards the outlet end wherefrom the cleaning agent flows into the tub. In the washing machine of the present invention, the cleaning agent from the detergent housing enters into the dosing receptacle through the inlet end of the dosing receptacle. The cleaning agent that fills into the partition inside the dosing receptacle is directed towards the tub by receiving water from the water conduit and the wheel moving by effect of water and the partition changing position to face towards the outlet end. Thus, the cleaning agent is directed to the tub actively and an effective dosing is enabled.
- [0009] In an embodiment of the present invention, the wheel moves by the effect of water entering from the water conduit into the dosing receptacle and enables the outlet end to be opened. In this embodiment, before water enters from the water conduit, the cleaning agent in the dosing receptacle is prevented from flowing into the tub by the wheel. As water is received from the water conduit, the wheel moves and allows the cleaning agent to exit from the outlet end.
- [0010] In another embodiment of the present invention, the wheel moves by the effect of water entering from the water conduit into the dosing receptacle and enables the inlet end to be closed. In this embodiment, before water enters from the water conduit, the cleaning agent from the detergent housing is enabled to flow freely into the dosing receptacle. As water is received from the water conduit, the wheel moves and prevents the cleaning agent from entering into the dosing receptacle from the inlet end.
- [0011] In another embodiment of the present invention, as water enters the dosing receptacle from the water conduit, the wheel moves and the

partition that faces the inlet end wherefrom the cleaning agent enters is enabled to be changed. Thus, the partition that is filled with cleaning agent is directed towards the outlet end and a different partition takes the position of facing the inlet end. As a different partition faces the inlet end, the cleaning agent flows into the said partition.

- [0012] In another embodiment of the present invention, the dosing receptacle is cylinder shaped. The wheel rotates by the water transferred from the water conduit into the dosing receptacle such that the fin is as long as the diameter of the cylinder base.
- [0013] In a version of this embodiment, the water conduit rotates the wheel such that the partition that faces the inlet end to first face the outlet end. In other words, the water that fills into the partition from the water conduit applies a pushing force that enables the fins to rotate so as to face the outlet end of any partition after facing the inlet end. Thus, the cleaning agent that fills into the partition is transferred into the tub by means of the outlet end before mixing with water. Therefore, the cleaning agent is prevented from foaming before being transferred to the tub.
- [0014] In another embodiment of the present invention, the wheel rotates only in one direction. As water enters the dosing receptacle, the partition filled with cleaning agent changes position as the wheel rotates and faces the outlet end and the cleaning agent therein flows from the outlet end.
- [0015] In another version of this embodiment, the liquid that enters from the inlet end and the outlet end tries to rotate the wheel towards the direction where the same cannot rotate. In this embodiment, when the cleaning agent enters from the inlet end, the wheel is enabled to rotate and thus flow of cleaning agent to the tub is prevented when dosing is not desired. In other words, the push direction of the liquid entering from the inlet end and the outlet end applied on the fins is the opposite of the push direction that water entering from the water conduit applies on the fins.
- [0016] In another embodiment of the present invention, opening/closing the water conduit is performed by means of a valve disposed on the water conduit. The valve is controlled by a control unit, in other words, opened and closed at certain intervals thus controlling the amount of water entering the

dosing receptacle. The amount of water entering the dosing receptacle determines how much the wheel rotates and the rotation amount of the wheel determines the amount of cleaning agent transferred to the tub. Therefore, the dosed cleaning agent amount is controlled by the control unit that controls the amount of water by opening/closing the valve.

- [0017] In another version of this embodiment, the control unit opens/closes the valve at intervals, thus providing the delivery of the water into the dosing receptacle intermittently, thus the partitions are enabled to turn respectively filled with water and without water. From the inlet end cleaning agent enters the empty partitions and as the wheel rotates the partition filled with cleaning agent faces the outlet end and the cleaning agent is transferred to the tub from the outlet end. The partition behind the partition filled with cleaning agent is filled with water and also faces the outlet end and water is transferred to the tub from the outlet end. Thus, as the dosing receptacle is washed and cleansed of the cleaning agent, when the wheel rotates one full tour, the amount of cleaning agent transferred to the tub is maximized. At the same time the cleaning agent in the partition is prevented from foaming before reaching the outlet end.
- [0018] In the washing machine of the present invention, the cleaning agent filled into the dosing receptacle is dosed only with the effect of water. Using pumps that operate by electricity is not required. Furthermore, as water enters into the dosing receptacle, the dosing receptacle is washed and cleaning agent residue remaining therein is prevented. Accordingly, when the washing machine is not used for a long period of time, the problems that may arise due to drying of the cleaning agent are eliminated.
- [0019] The washing machine realized in order to attain the aim of the present invention is illustrated in the attached figures, where:
- [0020] Figure 1 – is the perspective view of a washing machine.
- [0021] Figure 2a – is the schematic view of the dosing receptacle when the water conduit is closed related to an embodiment of the present invention.
- [0022] Figure 2b – is the schematic view of the dosing receptacle when the water conduit is open related to an embodiment of the present invention.
- [0023] Figure 3 – is the perspective view of the dosing receptacle related to

another embodiment of the present invention.

[0024] Figure 4 – is the cross-sectional view of the dosing receptacle related to another embodiment of the present invention.

[0025] Figure 5 – is the exploded view of the dosing receptacle related to another embodiment of the present invention.

[0026] The elements illustrated in the figures are numbered as follows:

1. Washing machine
2. Body
3. Tub
4. Detergent housing
5. Dosing receptacle
6. Inlet end
7. Outlet end
8. Water conduit
9. Partition
10. Wheel
11. Fin
12. Valve
13. Control unit

[0027] The washing machine (1) comprises a body (2), a tub (3) disposed inside the body (2) and wherein the washing process is performed, a detergent housing (4) disposed inside the body (2) and wherein the cleaning agents are stored, and a dosing receptacle (5) that has an inlet end (6) connected to the detergent housing (4) and an outlet end (7) for connection to the tub (3) and wherein the cleaning agent is transferred from the detergent housing (4) so as to be dosed.

[0028] In the washing machine (1), the liquid cleaning agents like detergent, softener are filled into the detergent housing (4). The detergent housing (4) can store cleaning agent sufficient for a large number, for example 100 washings. The cleaning agent in the detergent housing (4) flows into the dosing receptacle (5) through the inlet end (6) preferably by gravity effect. The cleaning agent filling in the dosing receptacle (5) is dosed and transferred from the outlet end (7) to the tub (3) where the washing

process is performed. The dosing receptacle (5) takes cleaning agent that is preferably sufficient for 1 to 5 washing processes. A one way valve (not shown in the figures) disposed on the inlet end (6) can be used so that cleaning agent does not pass from the dosing receptacle (5) to the detergent housing (4).

[0029] The washing machine (1) of the present invention (1) comprises a water conduit (8) that enables water to enter the dosing receptacle (5) and a wheel (10) having at least one fin (11) that enables the dosing receptacle (5) to be divided into more than one partition (9), that moves by the entry of water and enables the cleaning agent in the partition (9) to be directed to the outlet end (7).

[0030] In the washing machine (1) of the present invention (1), receiving water into the dosing receptacle (5) is performed through the water conduit (8). The wheel (10) divides the dosing receptacle (5) into smaller partitions (9) by means of the fin (11). As water enters into the dosing receptacle (5), the fin (11) moves by the effect of water and enables the cleaning agent that is filled from the inlet end (6) into the partition (9) facing the inlet end (6) is enabled to be directed towards the outlet end (7). The outlet end (7) is preferably positioned at the lower portion of the dosing receptacle (5) with respect to the floor level and the cleaning agent reaching the outlet end (7) flows towards the tub (3) by the effect of gravity. Directing is performed by the fin (11) moving and changing its position inside the dosing receptacle (5). Thus, it is not required to use an outside element that functions like a pump for transferring the cleaning agent to the tub (3), the said transfer operation is realized by the wheel (10) disposed inside the dosing receptacle (5) and the water received from the water conduit (8) into the dosing receptacle (5) that moves the wheel (10). The size of the partition (9) is selected so as to preferably take less cleaning agent than the amount of cleaning agent used in one washing process. More precise dosing can be performed by the small sized partition (9).

[0031] In an embodiment of the present invention, the wheel (10) moves as water enters from the water conduit (8) and enables the outlet end (7) to be opened. In this embodiment, the fin (11) inside the dosing receptacle (5)

closes the outlet end (7). The fin (11) closing the outlet end (7) can be realized by the fin (11) closing the outlet end (7) by default or the fin (11) moving as cleaning agent enters into the dosing receptacle (5) from the inlet end (6) and closing the outlet end (7). The operation realized by this embodiment is that as water enters from the water conduit (8) into the dosing receptacle (5), the fin (11) moves away from the front of the outlet end (7) and opens the outlet end (7). Accordingly, the cleaning agent filled into the partitions (9) is transferred to the tub (3) by passing through the outlet end (7).

[0032] In another embodiment of the present invention, the wheel (10) moves as water enters from the water conduit (8) and enables the inlet end (6) to be closed. In this embodiment, similar to the above disclosed embodiment, as water enters from the water conduit (8) into the dosing mechanism (5), the fin (11) moves and prevents the inlet end (6) from being closed and prevents the cleaning agent from entering the dosing receptacle (5). When the wheel (10) is at its default position, in other words when the water does not enter from the water conduit (8), the fin (11) leaves the inlet end (6) open and the cleaning agent is enabled to flow into the dosing receptacle (5). The fin (11) of the wheel (10) that enables the inlet end (6) to be closed can be the fin (11) that enables to open the outlet end (7) as explained in the above embodiment or can be a different fin (11) as the wheel (10) has more than one fin (11).

[0033] In another embodiment of the present invention, the wheel (10) moves as the water enters from the water conduit (8) and enables the cleaning agent to fill a different partition (9) from the inlet end (6). Preferably, there is a continuous entry of cleaning agent from the inlet end (6) to the dosing receptacle (5) and when the partition (9) facing the inlet end (6) is filled, the flow of the cleaning agent stops. As the water enters from the water conduit (8) into the dosing receptacle (5), the wheel (10) moves and the fins (11) surrounding the partition (9) facing the inlet end (6) also move and enable the partition (9) to change position so as to face the outlet end (7). Meanwhile, a different partition (9) that faces the other surface of the fin (11) changes to the position of facing the inlet end (6). Thus, the

cleaning agent is enabled to flow from the inlet end (6) again and the cleaning agent fills into the next partition (9). As the water supplied from the water conduit (8) is continuous, the explained cycle is repeated and the cleaning agent amount required for the washing process is transferred to the tub (3).

- [0034] In another embodiment of the present invention, the cross-section of the dosing receptacle (5) in the plane formed by the inlet end (6), the outlet end (7) and the water conduit (8) is circular, the wheel (10) having the fin (11), the diameter of which is almost equal to the diameter of the circle, rotates around the axis that passes from the center of the dosing receptacle (5). In this embodiment, the fin (11) divides the dosing receptacle (5) with circular cross-section into two and the center point of the fin (11) and the center of the dosing receptacle (5) coincide. The fin (11) rotates inside the dosing receptacle (5) from around its center point. As the water enters from the water conduit (8), the wheel (10) starts to rotate and the cleaning agents filling in the partitions (9) are directed towards the outlet end (7).
- [0035] In another embodiment of the present invention, the water conduit (8) is connected to the dosing receptacle (5) so that the wheel (10) is enabled to rotate in the direction that the partition (9) facing the inlet end (6) rotates to face the outlet end (7) without facing the water conduit (8). There are three openings on the dosing receptacle (5), which are the inlet end (6), the outlet end (7) and the water conduit (8) and in this embodiment, the wheel (10) that rotates with the effect of water is enabled to rotate such that the partitions (9) first face the inlet end (6) and then the outlet end (7). The wheel (10) is rotated in the said direction by connecting the water conduit (8) to the dosing receptacle (5) such that the water enables to push the fins (11) in the said direction. In this embodiment, during the transfer of the cleaning agent from the dosing receptacle (5) to the tub (3), the cleaning agent is prevented from foaming since the cleaning agent does not mix with water that enables dosing. The cleaning agent fills into the partition (9), the wheel (10) starts to rotate with the effect of water entering from the water conduit (8), the partition (9) facing the inlet end (6) changes position

to face the outlet end (7) and the cleaning agent in the partition (9) leaves from the outlet end (7) and is transferred to the tub (3). Thereafter, the water enabling the wheel (10) to rotate and filled in a different partition (9) first faces the inlet end (6), then faces the outlet end (7) as the wheel (10) continues to rotate and flows into the tub (3) from the outlet end (7). The cleaning agent does not flow from the inlet end (6) to the water filled partition (9) because the latter is filled with water and also the wheel (10) rotates swiftly.

- [0036] In another embodiment of the present invention, the wheel (10) rotates only in the direction of the water entering from the water conduit (8) rotates the same. By means of this embodiment, the cleaning agent, flowing into the dosing receptacle (5) is prevented from rotating the wheel (10) by its kinetic energy due to the flow speed and the potential energy due to its weight, thus the partition (9) filled with the cleaning agent is prevented from facing the water conduit (8) and foaming in the dosing receptacle (5) by mixing with water.
- [0037] In another embodiment of the present invention, the inlet end (6) and the outlet end (7) apply a pushing force to the fins (11) in the opposite direction of the pushing force the water conduit (8) applies on the fins (11). In this embodiment, similar to the embodiment disclosed above, the cleaning agent flow that is continuously supplied into the dosing receptacle (5), more appropriately into the partition (9), is enabled to try to rotate the wheel (10) in the direction the wheel (10) is prevented from rotating and thereby the wheel (10) is prevented from rotating by itself with the effect of the cleaning agent filling into the partition (9). Thus, the cleaning agent is prevented from flowing into the tub (3) by itself when dosing is not performed. Similarly, when there is a back flow from the outlet end (7) towards the dosing receptacle (5) for any reason, the wheel (10) is prevented from rotating.
- [0038] In another embodiment of the present invention, the washing machine (1) comprises a valve (12) disposed on the water conduit (8) and a control unit (13) that adjusts the amount of dosed cleaning agent by controlling the valve (12). The control unit (13) determines the amount of water

transferred into the dosing receptacle (5) by controlling the valve (12). The cleaning agent delivered into the tub (3) through the outlet end (7) is proportional to the number of rotations of the wheel (10). The rotation number of the wheel (10) is directly proportional to the amount of water delivered from the water conduit (8) to the dosing receptacle (5).

Therefore, the amount of cleaning agent delivered to the tub (3) is directly proportional to the amount of water flowing from the water conduit (8) into the dosing receptacle (5). The producer predetermines the amount of water that transfers a certain amount of cleaning agent to the tub (3) and the time period the valve (12) remains open for providing the required amount of water as a result of numerous experiments performed. The table of the determined cleaning agent amount – the time period the valve (12) remains open is saved in the memory of the control unit (13). The control unit (13) enables the cleaning agent to be used in the respective washing process to be dosed by opening the valve (12) according to the table in its memory.

[0039] In another embodiment of the present invention, the control unit (13) enables the water to enter into the dosing receptacle (5) intermittently by opening/closing the valve (12). As the water enters from the water conduit (8) intermittently, the partition (9) facing the water conduit (8) fills with water and enables the wheel (10) to rotate. The partition (9) filled with the water changes position and first faces the inlet end (6), then the outlet end (7) and the water flows from the outlet end (7) to the tub (3). The partition (9) therebehind remains empty and after changing to the position of facing the inlet end (6), the cleaning agent fills therein from the inlet end (6). When the water enters from the water conduit (8) again, the same cycle is repeated. As one partition (9) is filled with the water and the next partition (9) is empty, more cleaning agent can be transferred to the tub (3) in one tour of the wheel (10), thus the dosing process can be performed more swiftly.

[0040] In the washing machine (1) of the present invention, the amount of cleaning agent to be delivered to the tub (3) is controlled precisely by the wheel (10) disposed inside the dosing receptacle (5) and the water conduit

(8) that enables the wheel (10) to rotate. Energy saving is enabled since an external pump is not used in performing the automatic dosing process. At the same time, by means of the wheel (10) which is entirely mechanical in structure, the malfunctions that occur in conventional dosing units are eliminated and user satisfaction is increased by decreasing the rate of malfunctioning.

Claims

1. A washing machine (1) comprising a body (2), a tub (3) disposed inside the body (2) and wherein the washing process is performed, a detergent housing (4) disposed inside the body (2) and wherein the cleaning agents are stored, and a dosing receptacle (5) that has an inlet end (6) connected to the detergent housing (4) and an outlet end (7) for connection to the tub (3) and wherein the cleaning agent is transferred from the detergent housing (4) so as to be dosed, **characterized by** a water conduit (8) that enables water to enter the dosing receptacle (5) and a wheel (10) having at least one fin (11) that enables the dosing receptacle (5) to be divided into more than one partition (9), that moves by the entry of water and enables the cleaning agent in the partition (9) to be directed to the outlet end (7).
2. A washing machine (1) as in Claim 1, **characterized by** the wheel (10) that moves as the water enters from the water conduit (8) and enables the outlet end (7) to be opened.
3. A washing machine (1) as in Claim 1 or 2, **characterized by** the wheel (10) that moves as the water enters from the water conduit (8) and enables the inlet end (6) to be closed.
4. A washing machine (1) as in any one of the above claims, **characterized by** the wheel (10) that moves as the water enters from the water conduit (8) and enables the cleaning agent to be filled into a different partition (9) from the inlet end (6).
5. A washing machine (1) as in Claim 4, **characterized by** the dosing receptacle (5) of which the cross-section in the plane formed by the inlet end (6), outlet end (7) and the water conduit (8) is circular and the wheel (10) that can rotate around the axis that passes from the center of the dosing receptacle (5) so that the length of the fin (11) is almost equal to the diameter of the circle.
6. A washing machine (1) as in Claim 5, **characterized by** the water conduit (8) connected to the dosing receptacle (8) so that the wheel (10) is enabled to rotate in the direction that the partition (9) facing the inlet end (6) faces the outlet end (7) without facing the water conduit (8).
7. A washing machine (1) as in Claim 5 or 6, **characterized by** the wheel (10) that can rotate only in the direction that the water entering from the water conduit

(8) rotates the same.

8. A washing machine (1) as in Claim 7, **characterized by** the inlet end (6) and the outlet end (7) applying a pushing force to the fins (11) in the opposite direction of the pushing force the water conduit (8) applies on the fins (11).
9. A washing machine (1) as in any one of the above claims, **characterized by** a valve (12) disposed on the water conduit (8) and a control unit (13) that adjusts the amount of dosed cleaning agent by controlling the valve (12).
10. A washing machine (1) as in Claim 9, **characterized by** the control unit (13) that enables the water to enter the dosing receptacle (5) intermittently by opening/closing the valve (12).

Figure 1

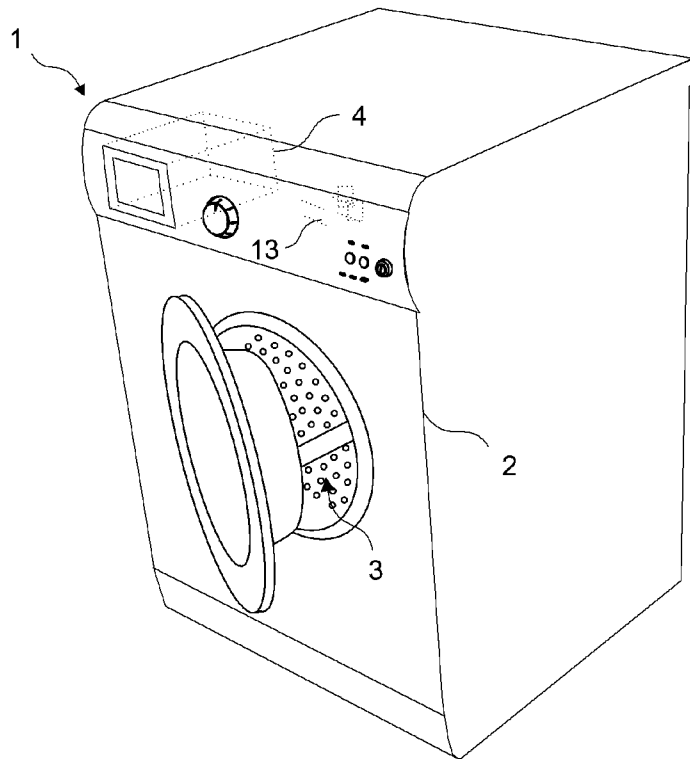


Figure 2a

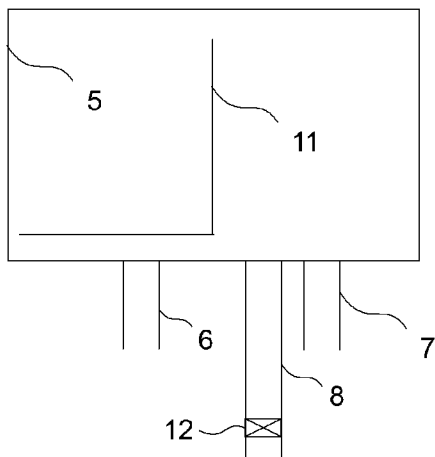


Figure 2b

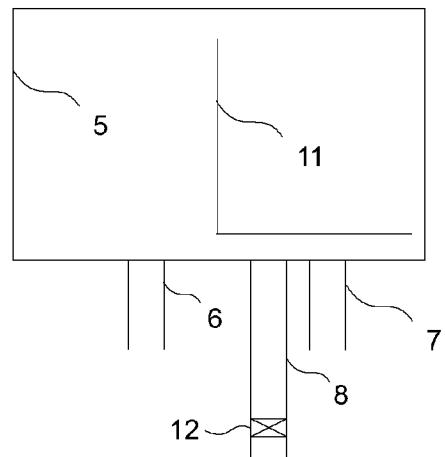


Figure 3

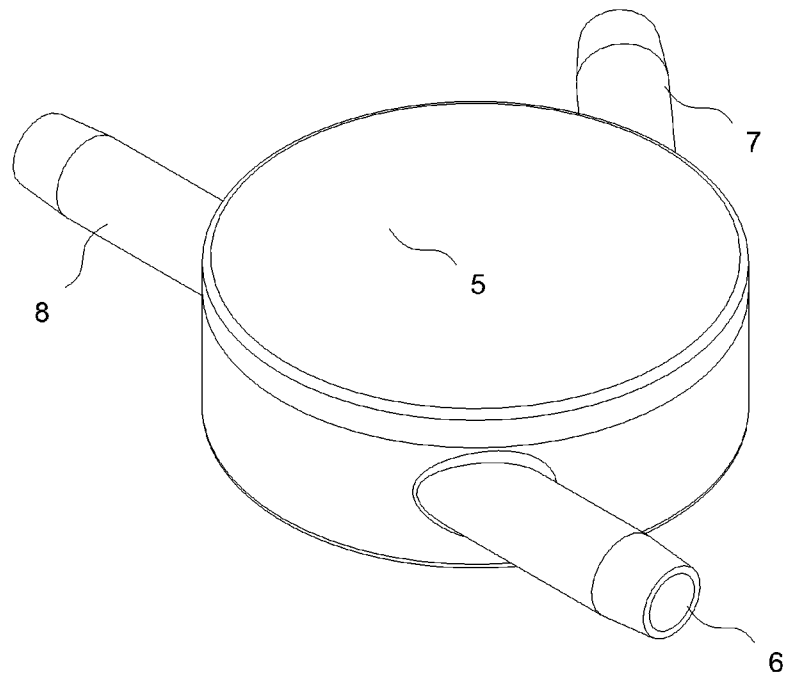


Figure 4

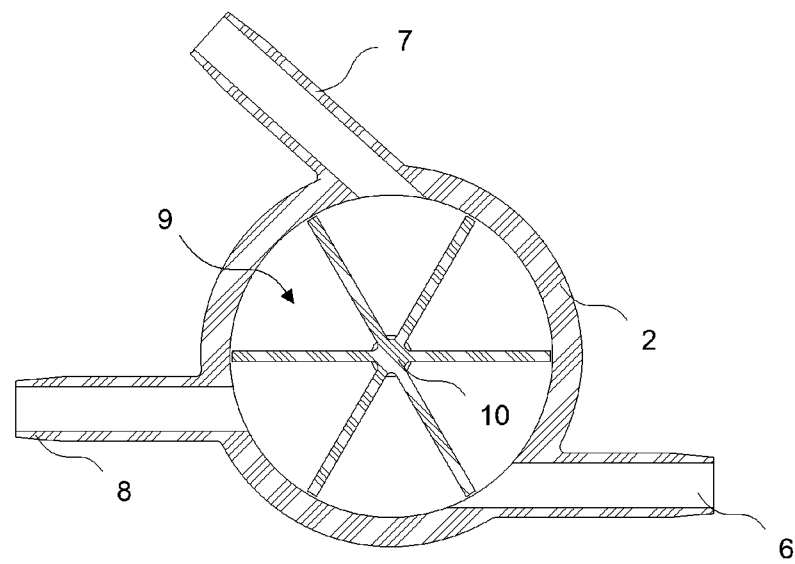
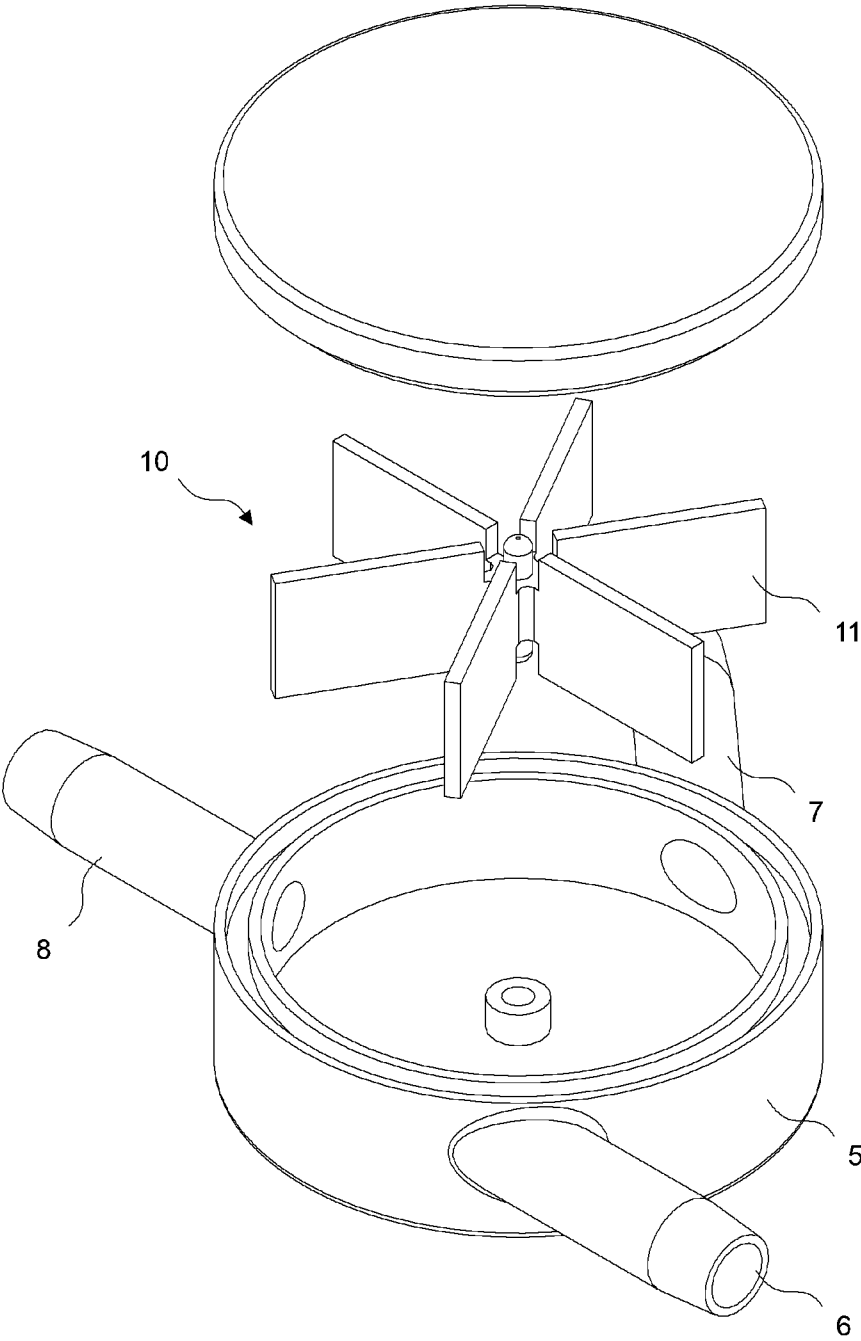


Figure 5



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/079612

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F39/02
ADD. D06F39/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D06F A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 514 000 A (KENT FREDERICK W) 4 July 1950 (1950-07-04) the whole document	1-10
X	JP 2004 222838 A (SHARP KK) 12 August 2004 (2004-08-12) abstract paragraph [0029]; figures	1,4-7,9, 10
X	EP 0 057 217 A1 (ELECTROLUX AB [SE]) 11 August 1982 (1982-08-11) the whole document	1,2,4,9, 10
X	JP H04 121884 U (-) 30 October 1992 (1992-10-30) abstract; figures	1,2,4,9, 10
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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Prosig, Christina

INTERNATIONAL SEARCH REPORT

International application No
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