(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 572 027 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
05.08.2015 Bulletin 2015/32

(21) Application number: **11733598.4**

(22) Date of filing: **16.05.2011**

(51) Int Cl.:
D06F 37/22 *(2006.01)*

(86) International application number:
PCT/EP2011/057854

(87) International publication number:
WO 2011/144558 (24.11.2011 Gazette 2011/47)

(54) A WASHING MACHINE WHEREIN THE UNBALANCED LOAD IS BALANCED

WASCHMASCHINE MIT AUSGEGLICHENER ASYMMETRISCHER LAST

MACHINE À LAVER DANS LAQUELLE LE CHARGEMENT NON ÉQUILIBRÉ EST ÉQUILIBRÉ

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **20.05.2010 TR 201004002**

(43) Date of publication of application:
27.03.2013 Bulletin 2013/13

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EP 2 572 027 B1

Description

[0001] The present invention relates to a washing machine wherein the unbalanced load inside the drum is balanced by using water.

[0002] In washing machines having drums rotating around the horizontal axis, in different steps of the washing program, the washing process is performed by the drum being rotated at different speeds. While the drum is being rotated, an uneven load distribution occurs as a result of the laundry piling up at some areas. Especially in the spin-drying step wherein the drum is rotated at high speeds, the unbalanced load resulting from the laundry and structural factors increases vibration and noise, and causes the washing machine to wear out. Furthermore, the spin-drying performance of the washing machine is adversely affected.

[0003] In the state of the art, various solutions have been developed for balancing the unbalanced load. Fixing balancing weights produced from heavy materials such as concrete or metal onto the tub of the washing machine is a commonly used method. Since the balancing weights make the transportation of the washing machine difficult, water is used to realize the balancing operation in some embodiments. Water is filled into the balancing chambers formed on the tub or the drum in order to balance the detected unbalanced load, and emptied when the unbalanced load is eliminated. Using water to balance the unbalanced load also causes some problems. Particularly, since a significant number of materials and sealing elements should be used in order to transfer water to the regions where balancing will be performed, cost increases, moreover since elements used covers much space inside the washing machine, laundry capacity may decrease. In the state of the art embodiments, water taken from the outside for the balancing operation is generally transferred to the chambers on the drum baffles by being passed through the hub of the drum and the tub where the shaft rotating the drum is supported. Water taken from the mains is delivered to the slots between the sealing elements placed in a sequence at the hub portion wherein the shaft is supported. If the number of baffles on the drum is (n) and if separate balancing process should be performed at front and rear chambers of the baffles, for (2n) front and rear balancing chambers, (2n) slots and (2n+1) gaskets are needed. For example, since there is a total of 6 front and rear balancing chambers in the washing machine having a drum with 3 baffles, 6 slots and 7 gaskets are needed to be used in order to deliver water to each balancing chamber, thereby cost increases and slots and gaskets occupy much space and volume in the drum into which the laundry is placed decreases.

[0004] In state of the art Japanese Patent Application No. JP2002136792, an additional grooved element is described which bears against the shaft bearing and which provides water to be transferred to the baffles on the drum by being directed when there is unbalanced load. This additional element does not rotate and the water in the groove is delivered to the baffles while the shaft bearing rotates by means of a channel.

[0005] In the state of the art International Patent Application No. WO2008/125498, delivering water to the baffles in the drum over the bearing wherein the drum shaft is supported for balancing is explained. The aim of the present invention is the realization of a washing machine wherein the unbalanced load in the drum is balanced precisely by using water.

[0006] The washing machine realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof comprises at least one baffle which has two balancing chambers at the front and rear thereof into which water is delivered in order to balance the unbalanced load occurring in the drum and at least one multiple-way valve rotating together with the drum, having an inlet channel and more than one outlet channel, directing water received from the inlet channel to the desired balancing chambers by means of the outlet channels.

[0007] Water taken from the mains for the balancing process in the washing machine is transferred to the tub hub where the shaft rotating the drum is supported by means of the water inlet line which is stationary together with the tub. The hub of the tub is concentrically surrounded by a housing located at the drum rear wall. The ring-shaped gaskets rotating together with the housing are placed in sequence between the hub and the housing, and the slots are disposed between the gaskets. The inlet channel of the valve is connected to the slot and the outlet channels are connected to the balancing chambers by means of the distribution lines, and more than one balancing chamber at one baffle is supplied from the same slot by means of the multiple-way valve.

[0008] In an embodiment of the present invention, the valve is of electromagnetic-type and comprises a body on which the inlet channel and the outlet channels are disposed and a piston-type magnet which closes one outlet channel by moving therein and which allows water discharge from the other outlet channel.

[0009] In another embodiment of the present invention, the washing machine comprises at least one magnetic coil which is mounted onto the rear wall of the tub so as to be opposite to the valve, which is stationary together with the tub, which has no mechanical connection with the valve, which is magnetized by the control unit applying electric current and which triggers the valve by means of the magnetic field it produces.

[0010] In another embodiment of the present invention, the washing machine comprises more than one valve which is connected to the periphery of the housing on the drum rear wall and which rotates by following a circular course with the rotation of the drum and a single magnetic coil which is connected to the tub rear wall, which is stationary together with the tub and which is commonly used by all the valves.

[0011] In another embodiment of the present invention,

the washing machine comprises a preferably "hall effect" type position sensor which is placed near the magnetic coil at the rear wall of the tub and which detects if the valves are aligned with the magnetic coil during their rotation together with the drum in the tub.

[0012] In another embodiment of the present invention, the position sensor produces different voltage values for each valve rotating by following the same course in order to distinguish the valves from each other and thus gives the control unit the information as to which valve should be triggered. In another embodiment of the present invention, the washing machine comprises more than one valve connected to the periphery of the housing on the drum rear wall at different radii and thus rotating by following different circle-shaped courses and magnetic coils with the same number as the valves, connected to the tub rear wall so that each thereof aligns with a single valve.

[0013] In the washing machine of the present invention, in case of an unbalanced load, water in an amount that compensates the unbalanced load and decreases the effect to minimum is taken from the mains and delivered to the slots between the gaskets placed at the portion where the shaft rotating the drum is supported and transferred to the balancing chambers on the baffles from the slots. By means of the valve connected to each slot, more than one chamber at one baffle is supplied by means of a single slot and saving is provided by decreasing the number of costly gaskets the production process of which is difficult. Moreover, by decreasing the space that the gasket-slot structure occupies in the drum, the laundry loading capacity of the drum is increased.

[0014] The washing machine realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the schematic view of a washing machine.

Figure 2 - is the view of detail D in Figure 1.

Figure 3 - is the schematic view of the valves placed at the drum of the washing machine and of a magnetic coil placed at the tub in an embodiment of the present invention.

Figure 4 - is the sideways view of Figure 3.

Figure 5 - is the schematic view of the valves placed at different rotation radii at the drum of the washing machine and of three magnetic coils placed at the tub in another embodiment of the present invention.

Figure 6 - is the sideways view of Figure 5.

[0015] The elements illustrated in the figures are numbered as follows:

1. Washing machine
2. Drum
3. Tub
4. Shaft
5. Hub
6. Baffle
7. Housing
8. Gasket
9. Slot
10. Water inlet line
11. Water inlet valve
12. Separator
13. 113 Chamber
14. 114 Distribution line
15. Control unit
16. Inlet channel
17. 117 Outlet channel
18. Valve
19. Body
20. Magnet
21. Magnetic coil
22. Position sensor

[0016] The washing machine (1) comprises a drum (2) rotated by a motor (M) around the horizontal axis (E), wherein the laundry is placed, a tub (3) wherein the drum (2) moves, a shaft (4) that transfers the movement received from the motor (M) to the drum (2), a hub (5) disposed at the center of the rear wall of the tub (3), which is stationary together with the tub (3) and wherein the shaft (4) is supported, at least one baffle (6) disposed at the cylindrical inner surface of the drum (2), which provides the tumbling of the laundry and wherein water is transferred in case of an unbalanced load, a cylindrical housing (7) disposed at the center of the rear wall of the drum (2), surrounding the hub (5) concentrically such that there remains a gap therebetween and rotating together with the drum (2), more than one ring-shaped gasket (8) arranged one after the other and in parallel to each other in the gap between the housing (7) and the hub (5), the outer edges of which are secured to the inner surface of the housing (7), rotating together with the housing (7) and the inner edges of which contact the cylindrical outer surface of the hub (5) so as to rotate around the hub (5) by rubbing against it, more than one slot (9) disposed between the gaskets (8) and arranged one after the other and in parallel to each to other in the space between the cylindrical inner surface of the housing (7) and the cylindrical outer surface of the hub (5), at least one water inlet line (10) which provides water taken from the water mains to be delivered to the slot (9) for the balancing process of the unbalanced load, one end of which is connected to the water mains and the other end connected to the slot (9), which passes through the tub (3) rear wall and which opens into the slot (9) by passing through the wall forming the hub (5) and which is stationary together with the tub (3), at least one water inlet valve (11) which provides water to be taken into the water inlet line (10) from the water mains in an amount sufficient for the balancing process, a separator (12) placed at the inner region of the baffle (6) and separating the inner volume of the baffle (6) into two or more parts, at least two chambers (13, 113) disposed in the baffle (6), into which water is deliv-

ered according to the unbalanced load status and that the separator (12) separates from each other, at least two distribution lines (14, 114) which provide water to be delivered to the chambers (13, 113) from the slot (9), a control unit (15) which opens/closes the water inlet valves (11) by determining the amount and position of the unbalanced load when unbalanced load is detected and which determines how much water should be delivered into which baffle (6) and chamber (13, 113).

[0017] The washing machine (1) of the present invention comprises at least one valve (18) which

- is placed at the slot (9) outlet and connected to the distribution lines (14, 114),
- guides water taken from the slot (9) to the first chamber (13) or the second chamber (113) in the baffle (6) when unbalanced load is detected by the control unit (15) and thus provides the chambers (13, 113) in the baffle (6) to be supplied from the same slot (9) (Figure 1, Figure 2).

[0018] In an embodiment of the present invention, the valve (18) is of multiple-way type and mounted onto the periphery of the housing (7) and rotates together with the drum (2).

[0019] In another embodiment of the present invention, the valve (18) has one inlet channel (16) and two outlet channels (17, 117), and the inlet channel (16) is connected to the slot (9), the first outlet channel (17) to the first distribution line (14) and the second outlet channel (117) to the second distribution line (114).

[0020] The control unit (15) detects the unbalanced load during the movement of the drum (2) and controls the operation of the valve (18). The control unit (15) provides the valve (18) to deliver water taken from the slot (9) to the first chamber (13) by means of the first outlet channel (17) and the first distribution line (14) or to the second chamber (113) by means of the second outlet channel (117) and the second distribution line (114) according to the unbalanced load status.

[0021] When the washing machine (1) is operated, the baffles (6), the housing (7), the slots (9), the distribution lines (14, 114) and the valves (18) rotate together with the drum (2) around the horizontal axis (E). When the unbalanced load is detected by the control unit (15), the amount and the position of the unbalanced load and to which baffle (6) water should be delivered is determined, then first the necessary amount of water is taken from the water mains by operating the water inlet valves (11) and water is delivered by means of the water inlet line (10) to the slot (9) in connection with the baffle (6) wherein the unbalance is detected. After water reaches the corresponding slot (9), the embodiment of the present invention is activated and the control unit (15) decides whether water should be delivered to the first chamber (13) or the second chamber (113) supplied by the same slot (9) according to the unbalanced load status. When the control unit (15) decides that water should be delivered to the first chamber (13), it provides the valve (18) to open the first outlet channel (17) connected to the first distribution line (14). Similarly, when the control unit (15) detects that water should be delivered to the second chamber (113), it provides the valve (18) to open the second outlet channel (117) connected to the second distribution line (114). The valve (18) provides that the first chamber (13) or the second chamber (113) is supplied by a single slot (9), utilization of separate slots (9) for supplying each chamber (13, 113) is no more required and thus cost is decreased by using fewer number of slots (9) and gaskets (8) in comparison with the state of the art embodiments.

[0022] In an embodiment of the present invention, the valve (18) is of electromagnetic-type and comprises a body (19) on which the inlet channel (16) and the outlet channels (17, 117) are disposed and a piston-type magnet (20) which closes one outlet channel (17, 117) by moving in the body (19) and which allows water discharge from the other outlet channel (17, 117). In this embodiment, the washing machine (1) comprises at least one magnetic coil (21) which is mounted onto the rear wall of the tub (3) so as to be opposite to the valve (18), which is stationary together with the tub (3), which has no mechanical connection with the valve (18), which is magnetized by the control unit (15) by applying electric current and which provides the magnet (20) to open/close the outlet channels (17, 117) by remotely triggering the valve (18) rotating together with the drum (2) when the valve (18) is aligned by means of the magnetic field the magnetic coil (21) produces.

[0023] When the unbalanced load is detected by the control unit (15), since the valve (18) providing water to be delivered to the first chamber (13) or the second chamber (113) rotates together with the drum (2), energy is needed to be transmitted from an stationary source which does not rotate together with the drum (2). The magnetic coil (21) which triggers the valve (18) is connected to the stationary tub (3) and is mechanically independent of the valve (18). When unbalanced load occurs while the drum (2) is rotating and the valve (18) is needed to be triggered, electric current is applied to the magnetic coil (21) by the control unit (15). The magnetic coil (21) forms a magnetic field and the valve (18) rotating together with the drum (2) is triggered when aligned with the magnetic coil (21), the magnet (20) in the valve (18) moves forwards or backwards in the body (19) according to the magnetic field applied by the magnetic coil (21). The magnetic coil (21) to which electric current is applied by the control unit (15) tries to push or pull the magnet (20) in the body (19) according to the direction of the electric current applied. The magnet (20) moving inside the body (19) provides water to be delivered to the first chamber (13) or the second chamber (113) by opening one outlet channel (17, 117) and closing the other outlet channel (17, 117).

[0024] In another embodiment of the present invention, the washing machine (1) comprises more than one valve (18) connected to the periphery of the housing (7) and

rotating by following a semi-circular course (C) with a radius of (R) with the rotation of the drum (2) and a single magnetic coil (21) connected to the tub (3) rear wall, stationary together with the tub (3) and commonly used for all the valves (18) and a preferably "hall effect" type position sensor (22) placed near to the magnetic coil (21) at the tub (3) rear wall and detecting if the valves (18) are aligned with the magnetic coil (21) during the rotation (Figure 3, Figure 4).

[0025] In this embodiment, the valves (18) rotating together with the drum (2) and the rotating paths of which forms a circular course (C) passes by the stationary magnetic coil (21) in turn and the position sensor (22) detects if the valves (18) are aligned with the magnetic coil (21). When water is needed to be delivered to any chamber (13, 113) on any baffle (6), the control unit (15) applies electric current to the magnetic coil (21) when the valve (18) connected to the said baffle (6) is aligned with the magnetic coil (21) and the valve (18) is triggered and delivers water to the desired chamber (13, 113).

[0026] In an embodiment of the present invention, the position sensor (22) sends the information as to which valve (18) should be triggered to the control unit (15) by producing different voltage values for each valve (18), which provide to differentiate more than one valve (18) rotating the same course (C). Thus, the control unit (15), when the valve (18) corresponding to the baffle (6) which needs balancing is aligned with the magnetic coil (21), operates the valve (18) by applying current to the magnetic coil (21).

[0027] In another embodiment of the present invention, the washing machine (1) comprises more than one valve (18) which is connected to the periphery of the housing (7) at different distances from each other in the radial direction in reference to the horizontal axis (E) and thus which rotate by following different courses (C1, C2, C3, ...) at radii (R1, R2, R3, ...) different from each other and magnetic coils (21) in a number as many as the number of the valves (18), which are connected to the tub (3) rear wall at different distances perpendicular to the horizontal axis (E) such that each thereof is opposite to a single valve (18) (Figure 5, Figure 6).

[0028] In this embodiment, the control unit (15) applies current to the magnetic coil (21) corresponding to the valve (18) that is triggered. Each magnetic coil (21) affects only the valve (18) that it corresponds to in terms of the position thereof and not the other valves (18). Due to the different courses (C1, C2, C3, ...) that the valves (18) follow, the need to detect and differentiate different valves (18) passing by a magnetic coil (21) is eliminated, thus the control unit (15) does not need a position sensor (22) in order to apply current to the magnetic coil (21). The control unit (15) applies electric current for a certain period of time to the magnetic coil (21) corresponding to the baffle (6) the chambers (13, 113) of which will be supplied with water without waiting it to align with the valve (18) and the related valve (18) performs its function, during the rotation thereof, by being triggered at the moment it passes by the magnetic coil (21) forming a magnetic field beforehand.

[0029] In another embodiment of the present invention, the washing machine (1) comprises 3 baffles (6) placed around the rotational axis (E) at 120 degree-gaps, 6 chambers (13, 113) 4 gaskets (8) arranged in order between the housing (7) and the hub (5), 3 slots (9) disposed between the gaskets (8) and each of which is connected to a baffle (6) and 3 valves (18) connected to the said 3 slots (9) and guiding water received from the slots (9) to the chambers (13, 113). Each valve (18) provides each chamber (13 or 113) to be supplied from the same slot (9) by means of the two outlet channels (17), 3 slots (9) and 4 gaskets (8) are used for 6 chambers (13, 113) instead of 6 slots (9) and 7 gaskets (8) proposed in the state of the art and thus number of gaskets (8) and slots (9) is decreased.

[0030] In the washing machine (1) of the present invention, in case of an unbalanced load detected by the control unit (15), water in an amount that compensates the unbalanced load and decreases the effect to minimum is taken from the mains and delivered to the slots (9) between the gaskets (8) placed at the portion where the shaft (4) rotating the drum (2) is supported and transferred to the chambers (13,113) on the baffles (6) from the slots (9). By means of a valve (18) connected to each slot (9), two chambers (13, 113) at one baffle (6) are supplied by means of a single slot (9) and saving is provided by decreasing the number of costly gaskets (8) the production process of which is difficult. Moreover, by decreasing the space that the gasket (8)-slot (9) structure occupies in the drum (2), the laundry loading capacity of the drum (2) is increased.

[0031] It is to be understood that the present invention is not limited by the embodiments disclosed above and a person skilled in the art can easily introduce different embodiments. These should be considered within the scope of the protection postulated by the claims of the present invention.

Claims

1. A washing machine (1) comprising a drum (2) rotated by a motor around the horizontal axis, wherein the laundry is placed, a tub (3) wherein the drum (2) moves, a shaft (4) that transfers the movement received from the motor to the drum (2), a hub (5) disposed at the center of the rear wall of the tub (3), which is stationary together with the tub (3) and wherein the shaft (4) is supported, at least one baffle (6) disposed at the inner surface of the drum (2) and wherein water is transferred in case of an unbalanced load, a cylindrical housing (7) disposed at the center of the rear wall of the drum (2), surrounding the hub (5) concentrically such that there remains a gap therebetween and rotating together with the drum (2), more than one ring-shaped gasket (8) ar-

ranged one after the other and in parallel to each other in the gap between the housing (7) and the hub (5), more than one slot (9) disposed between the gaskets (8), at least one water inlet line (10) which provides water taken from the water mains to be delivered to the slot (9) for the balancing process of the unbalanced load, one end of which is connected to the water mains and the other end connected to the slot (9) and which is stationary together with the tub (3), at least one separator (12) placed at the inner region of the baffle (6) and separating the inner volume of the baffle (6) into two or more parts, at least two chambers (13, 113) disposed in the baffle (6), into which water is delivered according to the unbalanced load status and that the separator (12) separates from each other, at least two distribution lines (14, 114) which provide water to be delivered to the chambers (13, 113) from the slot (9), a control unit (15) which opens/closes water inlet valves (11) by determining the amount and position of the unbalanced load when unbalanced load is detected and which determines how much water should be delivered into which baffle (6) and chamber (13, 113), **characterized by** at least one valve (18) placed at the outlet of the slot (9), connected to the distribution lines (14, 114) and guides water taken from the slot (9) to the first chamber (13) or the second chamber (113) in the baffle (6) when unbalanced load is detected by the control unit (15) and thus provides the chambers (13, 113) in the baffle (6) to be supplied from the same slot (9).

2. A washing machine (1) as in Claim 1, **characterized in that** the valve is a multiple-way type valve (18) mounted to the periphery of the housing (7) and rotating together with the drum (2).

3. A washing machine (1) as in Claim 1 or 2, **characterized in that** the valve (18) has one inlet channel (16) and two outlet channels (17, 117), wherein said the inlet channel (16) is connected to the slot (9) said first outlet channel (17) to the first distribution line (14) and said second outlet channel (117) to the second distribution line (114).

4. A washing machine (1) as in any one of the above claims, **characterized by** the electromagnetic-type valve (18) comprising a body (19) on which the inlet channel (16) and the outlet channels (17, 117) are disposed and a magnet (20) which closes one outlet channel (17, 117) by moving in the body (19) and which allows water discharge from the other outlet channel (17, 117).

5. A washing machine (1) as in Claim 4, **characterized in that** at least one magnetic coil (21) which is mounted to the rear wall of the tub (3) so as to be opposite to the valve (18), which is stationary together with the tub (3), which is magnetized by the control unit (15) by applying electric current and which triggers the valve (18) rotating together with the drum (2) when the valve (18) is aligned by means of the magnetic field the magnetic coil (21) produces.

6. A washing machine (1) as in Claim 5, **characterized by** more than one valve (18) connected to the periphery of the housing (7) and rotating by following a semi-circular course (C) with a radius of (R) with the rotation of the drum (2) and a single magnetic coil (21) connected to the tub (3) rear wall, stationary together with the tub (3) and commonly used for all of the valves (18).

7. A washing machine (1) as in Claim 5 or 6, **characterized by** a position sensor (22) placed near the magnetic coil (21) at the tub (3) rear wall and detecting if the valves (18) are aligned with the magnetic coil (21) during the rotation.

8. A washing machine (1) as in Claim 7, **characterized by** the position sensor (22) sending to the control unit (15) the information as to which valve (18) should be triggered by producing different voltage values for each valve (18) rotating by following the same course (C).

9. A washing machine (1) as in Claim 7 or 8, **characterized in that** the position sensor (22) is a "hall effect" type position sensor (22).

10. A washing machine (1) as in Claim 5, **characterized by** more than one valve (18) which are connected to the periphery of the housing (7) at different distances from each other in the radial direction in reference to the horizontal axis (E) and thus which rotate by following different courses (C1, C2, C3, ...) in radii (R1, R2, R3, ...) different from each other and magnetic coils (21) in a number as many as the number of the valves (18), which are connected to the tub (3) rear wall such that each thereof is opposite to a single valve (18).

11. A washing machine (1) as in any one of the above claims, **characterized by** 3 baffles (6) placed around the rotational axis (E) at 120 degree-gaps, 6 chambers (13, 113), 4 gaskets (8) arranged in order between the housing (7) and the hub (5), 3 slots (9) disposed between the gaskets (8) and each of which is connected to a baffle (6) and 3 valves (18) connected to the said 3 slots (9) and guiding water received from the slots (9) to the chambers (13, 113).

Patentansprüche

1. Waschmaschine (1), umfassend eine Trommel (2),

die von einem Motor um die horizontale Achse gedreht wird und in die Wäsche gegeben wird, einen Waschbehälter (3), in dem sich die Trommel (2) bewegt, eine Welle (4), die die Bewegung vom Motor auf die Trommel (2) überträgt, eine Nabe (5), die in der Mitte der Rückwand des Waschbehälters (3) angeordnet ist und zusammen mit dem Waschbehälter (3) stationär ist und in der die Welle (4) getragen wird, wenigstens ein Prallblech (6), das an der Innenfläche der Trommel (2) angeordnet ist und in das im Falle einer Unwucht Wasser geleitet wird, ein zylindrisches Gehäuse (7) das in der Mitte der Rückwand der Trommel (2) angeordnet ist und die Nabe (5) konzentrisch umgibt, derart, dass ein Spalt dazwischen verbleibt, und sich zusammen mit der Trommel (2) dreht, mehrere ringförmige Dichtungen (8), die eine nach der anderen und parallel zueinander in dem Spalt zwischen dem Gehäuse (7) und der Nabe (5) angeordnet sind, mehrere Schlitze (9), die zwischen den Dichtungen angeordnet sind (8), wenigstens eine Wassereinlassleitung (10), die dafür sorgt, dass Wasser für den Auswuchtungsprozess der Unwucht vom Wasserversorgungsnetz an den Schlitz (9) geleitet wird, und deren eines Ende mit dem Wasserversorgungsnetz und deren anderes Ende mit dem Schlitz (9) verbunden ist und die zusammen mit dem Waschbehälter (3) stationär ist, wenigstens ein Trennelement (12), das im Innenbereich des Prallblechs (6) angeordnet ist und das Innenvolumen des Prallblechs (6) in zwei oder mehr Teile teilt, wenigstens zwei Kammern (13, 113), die im Prallblech (6) angeordnet sind und in denen entsprechend dem Unwuchtstatus Wasser geleitet wird und die das Trennelement (12) voneinander teilt, wenigstens zwei Verteilungsleitungen (14, 114), die dafür sorgen, dass Wasser von dem Schlitz (9) in die zwei Kammern (13, 113) geleitet wird, eine Steuereinheit (15), die Wassereinlassventile (11) öffnet/schließt, indem sie die Menge und Position der Unwucht bestimmt, wenn eine Unwucht erkannt wird, und bestimmt, wie viel Wasser in welches Prallblech (6) und welche Kammer (13, 113) geleitet werden soll,
gekennzeichnet durch

- wenigstens ein Ventil (18), das am Auslass des Schlitzes (9) angeordnet ist und mit den Verteilungsleitungen (14, 114) verbunden ist und Wasser vom Schlitz (9) an die erste Kammer (13) oder die zweite Kammer (113) im Prallblech (6) lenkt, wenn die Steuereinheit (15) eine Unwucht erkennt, und **dadurch** dafür sorgt, dass die Kammern (13, 113) im Prallblech (6) **durch** denselben Schlitz (9) versorgt werden.

2. Waschmaschine (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Ventil (18) ein Mehrwegeventil (18) ist, das am Umfang des Gehäuses (7) angebracht ist und sich zusammen mit der Trommel (2) dreht.

3. Waschmaschine (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Ventil (18) einen Einlasskanal (16) und zwei Auslasskanäle (17, 117) aufweist, wobei der Einlasskanal (16) mit dem Schlitz (9), der erste Auslasskanal (17) mit der ersten Verteilungsleitung (14) und der zweite Auslasskanal (117) mit der zweiten Verteilungsleitung (114) verbunden ist.

4. Waschmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das elektromagnetische Ventil (18) einen Körper (19), an dem der Einlasskanal (16) und die Auslasskanäle (17, 117) angeordnet sind, und einen Magnet (20) umfasst, der einen Auslasskanal (17, 117) schließt, indem er sich im Körper (19) bewegt, und das Ablassen von Wasser aus dem Auslasskanal (17, 117) zulässt.

5. Waschmaschine (1) nach Anspruch 4, **gekennzeichnet durch** wenigstens eine Magnetspule (21), die an der Rückwand des Waschbehälters (3) angebracht ist, derart, dass sie gegenüber dem Ventil (18) ist, zusammen mit dem Waschbehälter stationär ist (3) und **durch** die Steuereinheit (15) magnetisiert wird, indem elektrischer Strom angelegt wird, und das Ventil (18) ansteuert, das sich zusammen mit der Trommel (2) dreht, wenn das Ventil (18) durch das Magnetfeld ausgerichtet wird, das die Magnetspule (21) erzeugt.

6. Waschmaschine (1) nach Anspruch 5, **dadurch gekennzeichnet, dass** mehrere Ventile (18) mit dem Umfang des Gehäuses (7) verbunden sind und sich drehen, indem sie einem halbkreisförmigen Weg (C) mit einem Radius von (R) mit der Drehung der Trommel (2) folgen, und eine einzelne Magnetspule (21) mit der Rückwand des Waschbehälters (3) verbunden ist und zusammen mit dem Waschbehälter (3) stationär ist und für alle Ventile (18) gemeinsam benutzt wird.

7. Waschmaschine (1) nach Anspruch 5 oder 6, **gekennzeichnet durch** einen Positionssensor (22), der in der Nähe der Magnetspule (21) an der Rückwand des Waschbehälters (3) angeordnet ist und erkennt, ob die Ventile (18) während der Drehung an der Magnetspule (21) ausgerichtet sind.

8. Waschmaschine (1) nach Anspruch 7, **dadurch gekennzeichnet, dass** der Positionssensor (22) an die Steuereinheit (15) die Information dazu sendet, welches Ventil (18) angesteuert werden soll, indem er unterschiedliche Spannungswerte für jedes Ventil (18) erzeugt, das sich dreht, indem es demselben

Weg (C) folgt.

9. Waschmaschine (1) nach Anspruch 7 oder 8, **dadurch gekennzeichnet, dass** der Positionssensor (22) ein Hall-Positionssensor (22) ist.

10. Waschmaschine (1) nach Anspruch 5, **dadurch gekennzeichnet, dass** mehrere Ventile (18) in unterschiedlichen Abständen voneinander in radialer Richtung in Bezug auf die horizontale Achse (E) mit dem Gehäuse (7) verbunden sind und sich somit drehen, indem sie unterschiedlichen Wegen (C1, C2, C3, ...) in zueinander unterschiedlichen Radien (R1, R2, R3, ...) folgen, und Magnetspulen (21) in gleicher Anzahl wie die Ventile (18) vorliegen und derart mit der Rückwand des Waschbehälters (3) verbunden sind, dass jede davon gegenüber einem einzelnen Ventil (18) ist.

11. Waschmaschine (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** 3 Prallbleche (6), die mit Abständen von 120 Grad um die Rotationsachse (E) angeordnet sind, 6 Kammern (13, 113), 4 Dichtungen (8), die der Reihe nach zwischen dem Gehäuse (7) und der Nabe (5) angeordnet sind, 3 Schlitze (9), die zwischen den Dichtungen (8) angeordnet sind und jeweils mit einem Prallblech (6) verbunden sind, und 3 Ventile (18), die mit den 3 Schlitzen (9) verbunden sind und Wasser von den Schlitzen (9) an die Kammern (13, 113) lenken.

Revendications

1. Une machine à laver (1) comprenant un tambour (2) tourné par un moteur autour de l'axe horizontal, où le linge est placé, une cuve (3) dans laquelle le tambour (2) se déplace, un arbre (4) qui transmet le mouvement reçu du moteur au tambour (2), un moyeu (5) disposé au centre de la paroi arrière de la cuve (3), qui est immobile comme la cuve (3) et dans lequel l'arbre (4) est supporté, au moins un déflecteur (6) qui est disposé sur la surface intérieure du tambour (2) et dans lequel l'eau est transférée dans le cas d'une charge déséquilibrée, un logement cylindrique (7) qui est situé au centre de la paroi arrière du tambour (2), qui entoure le moyeu (5) de manière concentrique de telle sorte qu'un espace reste entre ceux-ci et qui tourne avec le tambour (2), plus d'un joint d'étanchéité (8) en forme d'anneau qui est placé l'un après l'autre et en parallèle l'un à l'autre dans l'espace entre le logement (7) et le moyeu (5), plus d'une fente (9) disposée entre les joints d'étanchéité (8), au moins une conduite d'entrée de l'eau (10) qui assure que l'eau reçue de l'alimentation en eau est délivrée à la fente (9) pour le processus d'équilibrage de la charge déséquilibrée, dont l'une extrémité est reliée à l'alimentation en eau et l'autre extrémité est reliée à la fente (9), et qui est immobile comme la cuve (3), au moins un séparateur (12) qui est placé à la partie intérieure du réflecteur (6) et qui sépare le volume intérieur du réflecteur (6) en deux ou plusieurs parties, au moins deux chambres (13, 113) qui sont situées dans le déflecteur (6) et dans laquelle l'eau est envoyée selon l'état de la charge déséquilibrée et qui sont séparées l'une de l'autre par le séparateur (12), au moins deux conduites de distribution (14, 114) qui permet la distribution de l'eau aux chambres (13, 113) de la fente (9), une unité de commande (15) qui ouvre/ferme des soupapes d'entrée de l'eau (11) en déterminant la quantité et la position de la charge déséquilibrée lorsque la charge déséquilibrée est détectée et qui détermine combien d'eau il faut délivrer dans lequel déflecteur (6) et laquelle chambre (13, 113),
caractérisée par

- au moins une soupape (18) qui est placée à la sortie de la fente (9), qui est reliée aux conduites de distribution (14, 114), qui guide l'eau reçue de la fente (9) à la première chambre (13) ou la deuxième chambre (113) dans le réflecteur (6) lorsque la charge déséquilibrée par l'unité de commande (15) et donc qui assure que les chambres (13, 113) dans le réflecteur (6) sont fournies par la même fente (9).

2. Une machine à laver (1) selon la Revendication 1, **caractérisée en ce que** la soupape (18) est une soupape de type à plusieurs voies (18) qui est montée sur la périphérie du logement (7) et qui tourne avec le tambour (2).

3. Une machine à laver (1) selon la Revendication 1 ou 2, **caractérisée en ce que** la soupape (18) présente un canal d'entrée (16) et deux canaux de sortie (17, 117), où ledit canal d'entrée (16) est relié à la fente (9), ledit premier canal de sortie (17) à la première conduite de distribution (14) et ledit deuxième canal de sortie (117) à la deuxième conduite de distribution (114).

4. Une machine à laver (1) selon l'une quelconque des revendications précédentes, **caractérisée par** la soupape de type électromagnétique (18) comprenant un corps (19) sur lequel le canal d'entrée (16) et les canaux de sortie (17, 117) sont disposés et un aimant (20) qui ferme un canal de sortie (17, 117) en se déplaçant dans le corps (19) et qui permet la décharge de l'eau à partir de l'autre canal de sortie (17, 117).

5. Une machine à laver (1) selon la Revendication 4, **caractérisée en ce que** au moins une bobine magnétique (21) qui est montée sur la paroi arrière de la cuve (3) de manière à être opposée à la soupape

(18), qui est immobile come la cuve (3), qui est magnétisé par l'unité de commande (15) en appliquant le courant électrique et qui déclenche la soupape (18) tournant avec le tambour (2) lorsque la soupape (18) est alignée au moyen du champ magnétique que la bobine magnétique (21) produit.

6. Une machine à laver (1) selon la Revendication 5, **caractérisée par** plus d'une soupape (18) qui est reliée à la périphérie du logement (7) et tourne en suivant un parcours semi-circulaire (C) avec un rayon de (R) avec la rotation du tambour (2) et une seule bobine magnétique (21) qui est reliée à la paroi arrière de la cuve (3), qui est immobile comme la cuve (3) et qui est utilisée généralement pour toutes les soupapes (18).

7. Une machine à laver (1) selon la Revendication 5 ou 6, **caractérisée par** un capteur de position (22) qui est placé à proximité de la bobine magnétique (21) sur la paroi arrière de la cuve (3) et qui détecte si les soupapes (18) sont alignées avec la bobine magnétique (21) pendant la rotation.

8. Une machine à laver (1) selon la Revendication 7, **caractérisée par** le capteur de position (22) qui envoie à l'unité de commande (15) l'information concernant quelle soupape (18) doit être déclenchée en produisant des valeurs de tension différentes pour chaque soupape (18) tournant en suivant le même parcours (C).

9. Une machine à laver (1) selon la Revendication 7 ou 8, **caractérisée en ce que** le capteur de position (22) est un capteur de position de type à effet Hall (22).

10. Une machine à laver (1) selon la Revendication 5, **caractérisée par** plus d'une soupape (18) qui est reliée sur la périphérie du logement (7) à des distances différentes entre celles-ci dans la direction radiale en référence à l'axe horizontal (E) et donc qui tourne en suivant des différentes parcours (C1, C2, C3, ...) avec des rayons (R1, R2, R3, ...) différents l'un de l'autre et des bobines magnétiques (21) dans un nombre autant que le nombre des soupapes (18), qui sont reliées à la paroi arrière de la cuve (3) de telle sorte que chacune de celles-ci est opposée à une seule soupape (18).

11. Une machine à laver (1) selon l'une quelconque des revendications précédentes, **caractérisée par** trois déflecteurs (6) qui sont placés autour de l'axe de rotation (E) à 120 degrés l'un de l'autre, six chambres (13, 113), quatre joints d'étanchéité (8) qui sont arrangés en ordre entre le logement (7) et le moyeu (5), trois fentes (9) qui sont disposées entre les joints d'étanchéité (8) et dont chacune est reliée à un déflecteur (6) et trois soupapes (18) qui sont reliées auxdites trois fentes (9) et qui guident l'eau reçue à partir des fentes (9) aux chambres (13, 113).

Figure 1

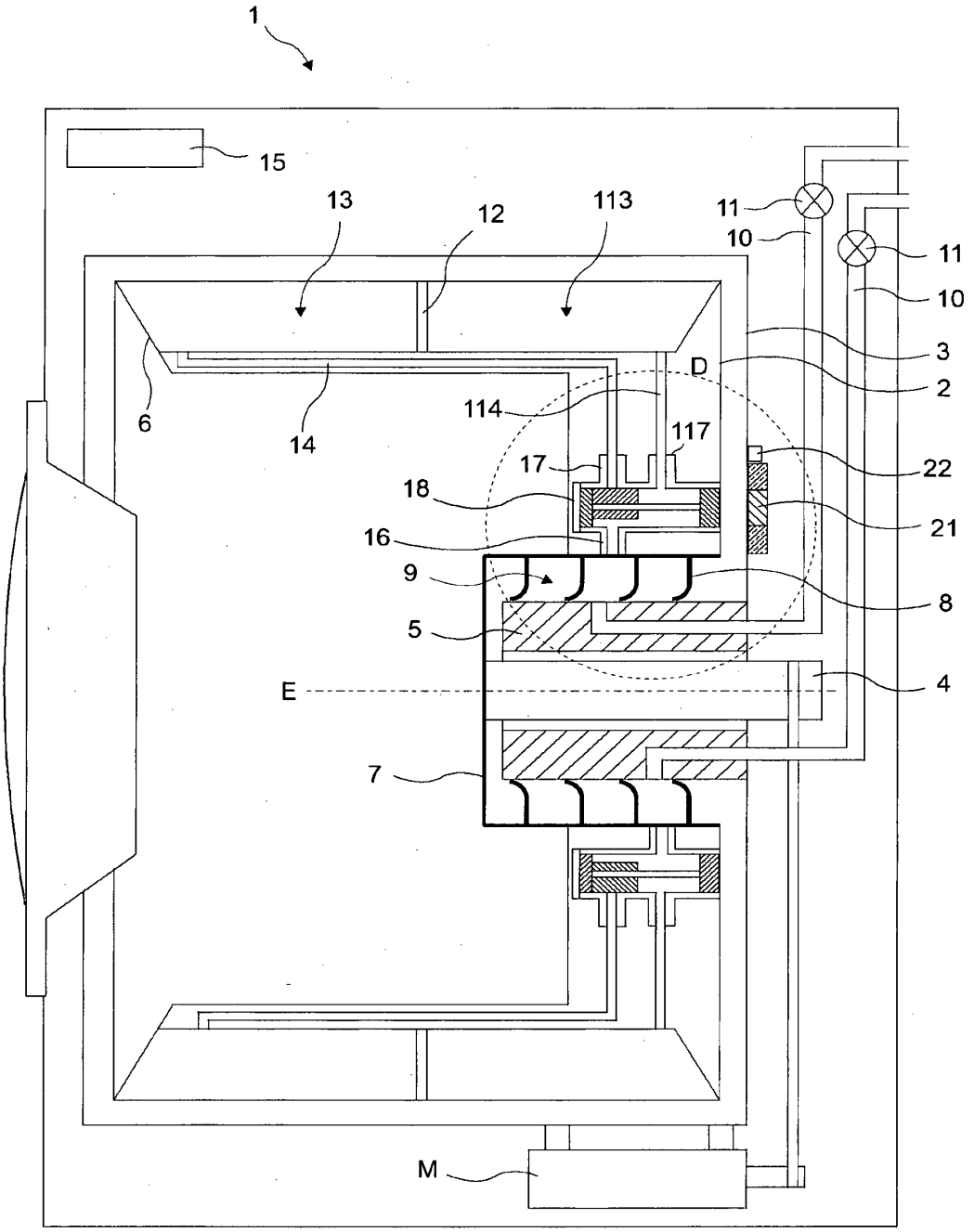


Figure 2

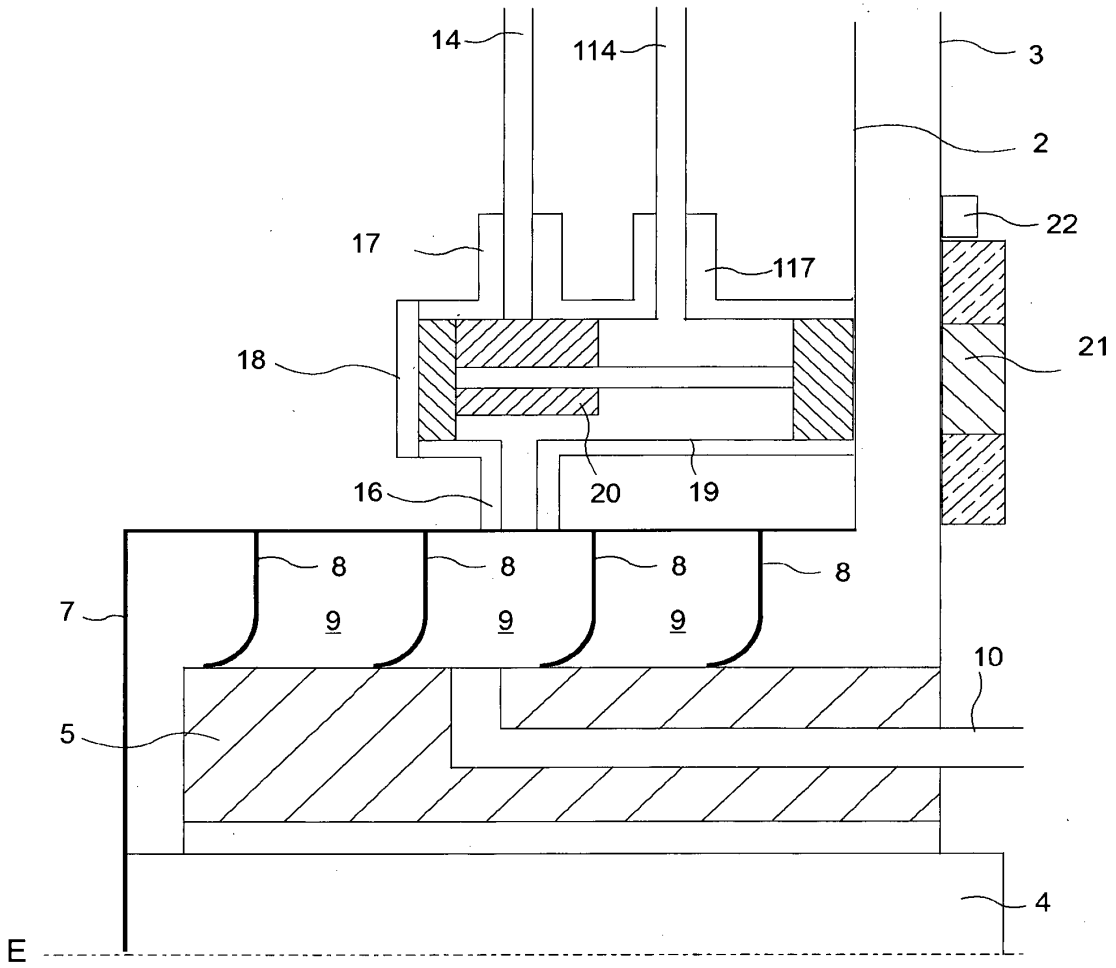


Figure 3

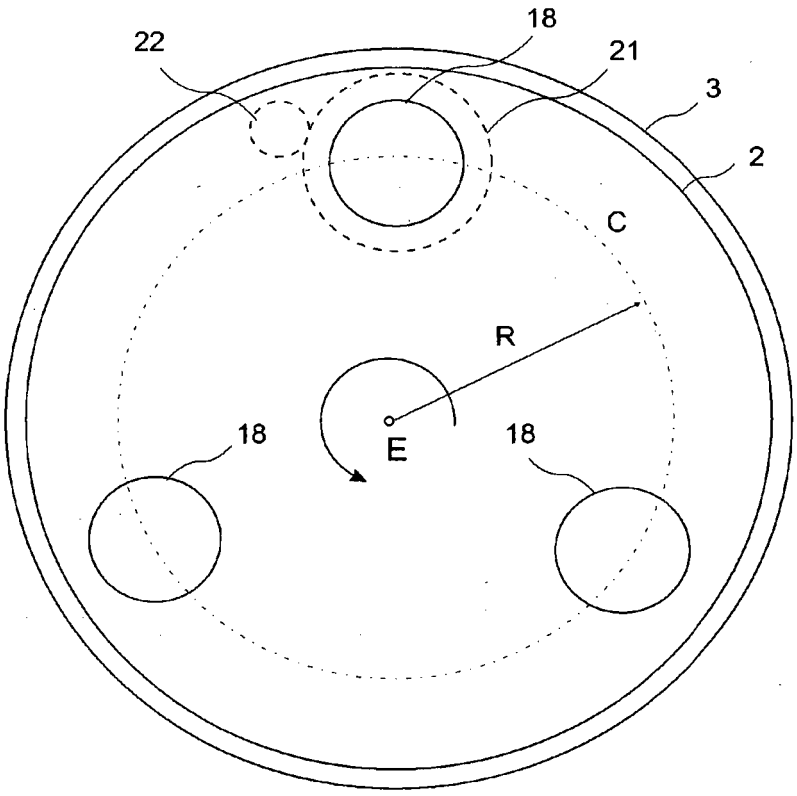


Figure 4

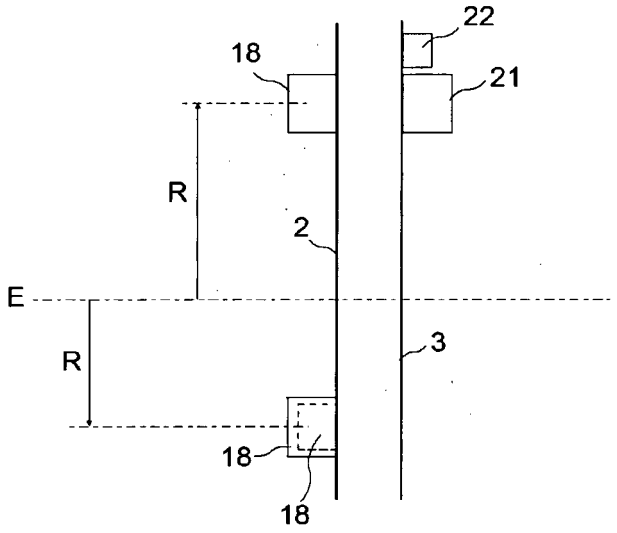


Figure 5

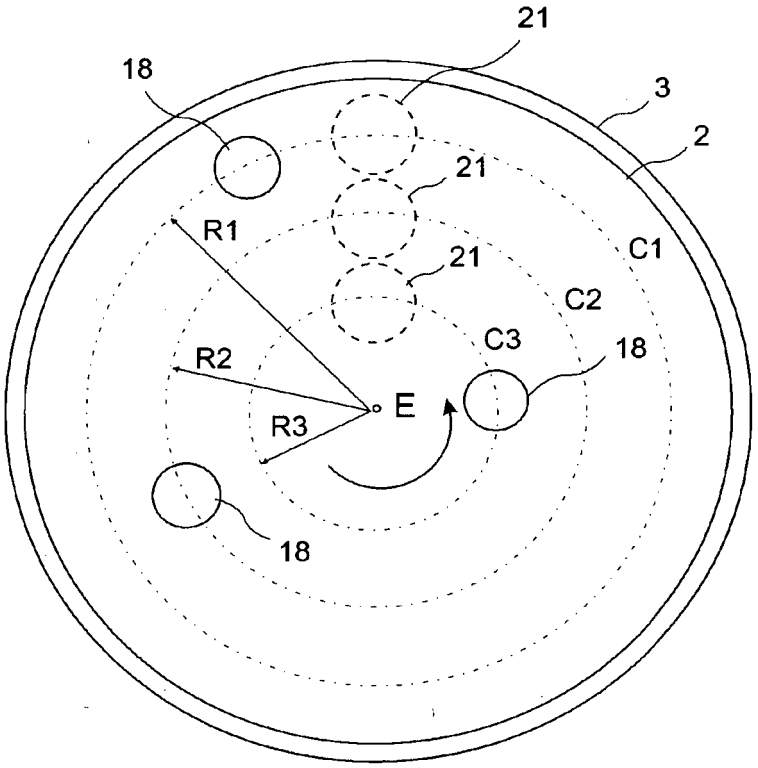
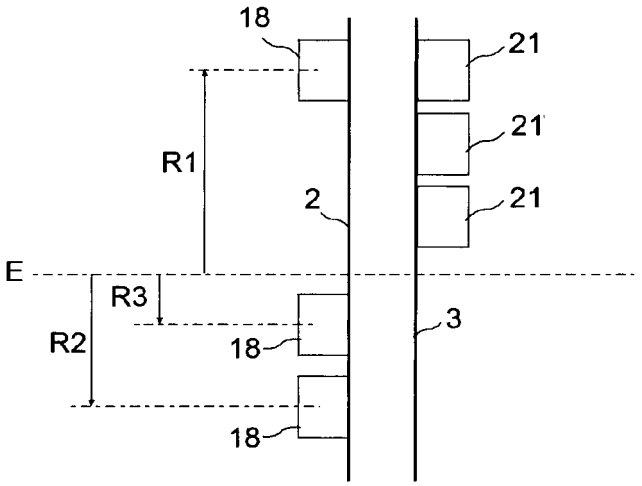


Figure 6



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