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(54) **Washing machine with water storage tank**

Waschmaschine mit Wasserspeichertank

Machine à laver avec réservoir de stockage d'eau

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Description

[0001] The present invention relates to a washing machine (more commonly referred to as a washer) equipped with a water accumulation tank.

[0002] As is known, washers of a traditional type are household appliances comprising a washing compartment, inside of which there is a drum for containing the laundry to be washed, which is rotatable about a horizontal or vertical axis, a system for delivering water, which is connectable to the water system and flows into the washing compartment, a unit for heating the water by means of a resistor and an conduit for draining the water from the washing compartment after the wash is completed.

[0003] The washing compartment is connected to counterweights (usually made of concrete), the function of which is to stabilise the washing machine, reducing the vibrations transmitted from the oscillating unit to remaining parts of the frame of the washing machine.

[0004] For the purpose of recycling the water (and the heat associated with it) from one wash cycle to the next, some existing washing machines further comprise a water accumulation tank, which is connected to the drum to receive therefrom the laundry rinse water. Once it has been suitably filtered, this rinse water is then stored in the tank to be utilised later in the next wash cycle.

[0005] Document EP326502A1 discloses a washing machine provided with counterweight means comprising one or more reservoirs which can be filled with water to suppress excessive vibrations, said reservoirs being positioned along the perimeter of the drum.

[0006] Disadvantageously, washers of the traditional type (equipped with counterweights made of concrete) are very heavy to transport owing to the increase in mass (several dozen kg) due to the presence of the counterweights.

[0007] Moreover, such counterweights require specific disposal procedures that are complex and costly.

[0008] With reference to stability during the spin draining cycle, it should be considered that proper damping action regarding the vibrations transmitted by the oscillating unit to remaining parts of the washing machine requires that the counterweights be adequately distributed and in the case of counterweights made of concrete, this is never fully achievable. This inevitably presents complications for design and production.

[0009] Moreover, the counterweights absorb the heat transmitted to the water in the heating unit, and this negatively affects the thermal efficiency of the washer and thus increases consumption.

[0010] In addition, in washers with accumulation tank, the need to predispose a specific housing space for the accumulation tank presents several critical points for the design, while the presence of this tank complicates the design of the washer structurally and increases assembly time.

[0011] The technical task of the present invention is therefore that of making available a washing machine with water accumulation tank that overcomes the above-described drawbacks of the prior art.

[0012] The aim of the present invention is to make available a washing machine with water accumulation tank having a reduced mass, but that in the meantime achieves an excellent action of damping the vibrations (particularly the vibrations transmitted from the oscillating unit to the frame) and permits maximum stability of the washing machine particularly during the spin draining cycles.

[0013] It is also an aim of the present invention to make available a washing machine with water accumulation tank that reduces the critical structural points of design and that requires reduced assembly time.

[0014] A further aim of the present invention is to make available a washing machine with water accumulation tank that has high thermal efficiency and therefore low consumption levels.

[0015] It is also an aim of the present invention to make available a washing machine with water accumulation tank that is highly practical in terms of disposal at the end of its useful life.

[0016] The defined technical task and the specified aims are substantially achieved by a washing machine with water accumulation tank having the characteristics expressed in one or more of the appended claims.

[0017] Further characteristics and advantages of the present invention will become more apparent from the indicative, and thus non-limiting, description of a preferred, though not exclusive, embodiment of a washing machine with water accumulation tank as illustrated in the accompanying drawings, wherein:

- Figure 1 is a schematic view, such as to show the plumbing connections, of a washing machine according to the present invention and in a first stage of operation;
- Figures 2-5 represent the schematic view of Figure 1 in different stages of operation.

[0018] With reference to the attached figures, 100 denotes a washing machine according to the present invention in its entirety and in a schematic manner.

[0019] The machine 100 comprises, in accordance with a widely known structure, an external support frame 101 of a generally box-like shape. Conveniently, the machine 100 may comprise a containment body 102, or tub. This containment body 102 is usually supported by the suspension system 103 connected to the frame 101. This suspension system 103 may comprise vibration-damping means, for example shock absorbers and/or helical springs.

[0020] The containment body 102 internally defines a washing compartment C1 adapted to be filled with a mixture of water and detergent during stages of operation of the machine 100.

[0021] In addition, the containment body 102 is of a

substantially cylindrical shape, and in particular it has a side wall 106 of a cylindrical shape that has an access opening at the front that is closed with a porthole "O". Inside the containment body 102, a rotary drum 104 is rotatably mounted, and set in rotation by means of a shaft 105 about a horizontal or substantially horizontal axis of rotation "X". The axis of rotation can in any case have any spatial orientation, for example vertical or generically inclined with respect to the horizontal.

[0022] The drum 104 is accessible at the front from the opening provided with a porthole "O" for insertion of laundry or clothing to be washed and, as is known, it has a peripheral wall that is perforated so as to permit the mixture of water and detergent present in the washing compartment C1 to reach the laundry present in the drum 104. More generally, the space inside the rotary drum 104 is in fluid communication with the space external to the drum 104 and inside the containment body 102. Advantageously, at least one wall of the containment body 102, delimiting the washing compartment C1, forms an inner hollow space C2 defining an accumulation tank for water or for a mixture of water and detergent. Preferably, the hollow space C2 is realised inside the side wall 106 and extends about the axis of rotation "X" of the drum 104.

[0023] Preferably, the hollow space C2 extends about the axis of rotation "X" of the drum 104 through an angle greater than 180°.

[0024] Still more preferably, the hollow space C2 is ring-shaped and completely surrounds the axis of rotation "X" of the drum 104. In other words, the hollow space C2 preferably extends along an extension of a complete angle about the axis "X".

[0025] The accumulation tank defined by the hollow space C2 is connectable to the washing compartment C1 for receiving and accumulating at least a portion of the water contained in the washing compartment C1 during an operating cycle of the washing machine 100.

[0026] In order to permit this connection, the machine 1 further comprises water hook-up means, which are active at least between the washing compartment C1 and the hollow space C2 so as to carry out a transfer of fluid at least from the washing compartment C1 to the hollow space C2. Preferably, the water hook-up means are adapted to carry out a transfer of fluid in both directions between the washing compartment C1 and the hollow space C2. In this manner, it is possible to fill the hollow space C2 with the liquid present in the washing compartment C1, and also to drain the liquid stored in the hollow space C2 into the washing compartment C1, with recycling of the liquid.

[0027] In more detail, and in accordance with Figures 1-5, the water hook-up means comprise, for each of the washing compartment C1 and hollow space C2 mentioned hereinabove, a respective inlet conduit I1, I2 (arranged at an upper portion of the washing compartment C1 or hollow space C2) and a respective outlet conduit U1, U2 (arranged at a lower portion of the washing compartment C1 or hollow space C2).

[0028] The inlet conduits I1, I2 serve for filling the washing compartment C1 and the hollow space C2, whereas the outlet conduits U1, U2 serve for emptying them.

[0029] The hook-up means further comprise a first distributor V1, which is active on the inlet conduits I1, I2 and connected thereto for controlling the opening or closing thereof, and a second distributor V2, which is active on the outlet conduits U1, U2 for controlling the opening or closing thereof. The water hook-up means further comprise a connection conduit "T", which is interposed between the two distributors V1, V2 so as to put the two distributors in fluid communication, and a third distributor V3 mounted on the connection conduit "T".

[0030] The third distributor V3 is connectable to a drain conduit "S" and designed to selectively connect the second distributor V2 with the first distributor V1 or with a drain conduit "S".

[0031] The connection conduit "T" is thus divided into a first length T1 comprised between the second and the third distributor V2, V3, and a second length T2 comprised between the first and the third distributor V1, V3.

[0032] On the connection conduit "T", and preferably on the cited first length T1, there is arranged a hydraulic pump "P" designed to bring about the circulation of the liquid in the inlet, outlet and connection conduits.

[0033] The delivery direction of the pump "P" is from the second distributor V2 towards the first distributor V1, therefore from the outlet conduits U1, U2 towards the inlet conduits I1, I2.

[0034] The machine 100 further comprises a feeding circuit that is connectable to a water system so as to deliver water to the washing compartment C1. The feeding circuit comprises a main conduit CP that is connectable to the water system, for example by means of a tap "R" external to (not comprised in) the washing machine and, mounted on the main conduit CP, a solenoid valve EV for opening/closing the main conduit CP, a drawer "D" for mixing the water with a detergent, and a supply conduit "A" extending between the drawer and the washing compartment.

[0035] Preferably, there is also provided an auxiliary conduit "W" designed to intercept at least a portion of the fluid circulating between the second distributor V2 and the inlet conduit I1 of the washing compartment C1 and to convey it towards the mixing drawer "D".

[0036] Preferably, the auxiliary conduit "W" defines a branch of the inlet conduit I1 of the washing compartment C1, as illustrated in the attached figures. The fluid flow rates circulating in the inlet conduit I1 and in the auxiliary conduit W are regulated by suitably dimensioning the respective sections.

[0037] Alternatively, according to an unillustrated embodiment, the auxiliary conduit "W" directly connects the first distributor V1 with the mixing drawer "D".

[0038] Preferably, the distributors V1, V2, V3 are of the three-way or four-way type. These valves operate so as to realise a plurality of operating configurations corresponding to different operating cycles of the machine

100. By way of example, the second distributor V2 can take on a first configuration in which it opens the outlet conduit U1 of the washing compartment C1, keeping the outlet conduit U2 of the hollow space C2 closed (figure 2), a configuration in which it opens the outlet conduit U2 of the hollow space C2, keeping the outlet conduit U1 of the washing compartment C1 closed (figure 3), and, preferably, also a third configuration in which it keeps both outlet conduits U1, U2 closed (figure 1). The other two distributors V1, V3 operate in an identical manner.

[0039] The distributors V1 and/or V2 and/or V3 can constitute distinct elements inside the water hook-up means or they can be incorporated in one or more valve assemblies. In addition, it is clear to the person skilled in the art that the distributors and/or the valve assemblies can be substituted at least in part with pumps.

[0040] The hollow space C2 can involve any wall of the containment body 2. In particular it can involve at least a portion of the rear or front wall. The incorporation of the hollow space C2 in the rear wall proves to be particularly advantageous when the latter is realised with a box-like structure (for the purpose of increasing the rigidity thereof).

[0041] In the attached figures the inlet conduit I1 and the supply conduit A lead to the rear of the drum 104. Advantageously, the conduit I1 and/or the conduit A could lead at the front part of the drum 104, directing the jet directly inside the drum 104 with the aim of aiding in the saturation of the laundry.

[0042] Conveniently, the containment body 2 is made of plastic material and comprises two reciprocally welded half-shells. Each half-shell is obtained by moulding. The moulding of the half-shell thus determines the formation of a portion of the hollow space C2.

[0043] It is also an object of the present invention to provide a method of operation of the machine 100 described hereinabove.

[0044] In a first operating cycle, for example in order to carry out a first wash upon purchase of the machine, the method comprises the following steps:

- supplying the washing compartment C1 with a mixture of water and detergent (figure 1; this step is achieved by means of the opening of the solenoid valve EV and the passage of water from the water system into the drawer "D", in which some detergent has been placed);
- performing a cycle for washing the laundry contained in the drum 104;
- transferring at least a portion of the wash water previously contained in the washing compartment C1 into the hollow space C2 (figure 2; in this configuration the solenoid valve EV is closed, the first distributor V1 is open on the inlet conduit I2 of the hollow space C2 and closed on the other inlet conduit I1, the second distributor V2 is open on the outlet conduit U1 of the washing compartment C1 and closed on the other outlet conduit U2 and the third distributor V3 is open on the second length T2 of the connection conduit "T" and closed on the drain conduit "S", and the pump "P" is activated);
- performing a spin draining step while the hollow space C2 is filled, at least partly and preferably completely, with the cited wash water coming from the washing compartment C1.

[0045] In the subsequent rinsing cycle, the method further comprises the following steps:

- supplying the washing compartment C1 with water (figure 3, with the opening of the solenoid valve EV and closing of the outlet conduit U1);
- performing a cycle of rinsing the laundry contained in the drum 104;
- draining the wash water previously contained in the hollow space C2, preferably at the same time when water is being supplied to the washing compartment C1 or when the rinsing cycle is being carried out (figure 3; draining takes place by means of the opening of the second distributor V2 on the outlet conduit U2 of the hollow space, and the opening of the third distributor V3 on the drain conduit "S" with the closing of the connection conduit "T" on the second length T2 and activation of the pump P);
- transferring at least a portion of the rinse water previously contained in the washing compartment C1 into the hollow space C2 (figure 4; the configuration of the distributors is the same as that appearing in figure 2).

[0046] In the event that more rinsing cycles are provided, the method provides for transferring into the hollow space C2 at least a portion of the rinse water utilised in the washing compartment C1 in the penultimate rinse or in a preceding rinsing cycle. In fact, the purpose is to avoid the transfer of the water present in the washing compartment C1 in the last rinsing cycle into the hollow space C2 (given that this water usually has fabric softener additives).

[0047] If the rinsing cycle is carried out more than once, the operations for supplying water to the washing compartment C1 and for rinsing are carried out with each cycle. The draining of the rinse water from the washing compartment C1 takes place with each cycle with the exception of one in which there is a transfer into the hollow space C2.

[0048] In an additional operating cycle, for example in order to carry out an additional wash with the machine already started, the method comprises the following steps:

- transferring a first portion of the wash or rinse water (depending on the step carried out previously) contained in the hollow space C2 into the washing compartment C1 and, at the same time as this step, transferring a second portion of the wash or rinse water

contained in the hollow space C2 to the drawer "D" for mixing with detergent and subsequently to the washing compartment C1 (figure 5; in this configuration, the solenoid valve EV is closed, the first distributor V1 is open on the inlet conduit I1 of the washing compartment C1 and closed on the other inlet conduit I2, the second distributor V2 is open on the outlet conduit U2 of the hollow space C2 and closed on the other outlet conduit U1, and the third distributor V3 is open on the second length T2 of the connection conduit "T" and closed on the drain conduit "S", and the pump "P" is activated).

[0049] In the configuration of Figure 5, it can be noted that the auxiliary conduit "W" transfers to the mixing drawer "D" a portion of the wash/rinse water coming from the hollow space C2 and directed to the washing compartment C1. In any case, all of the water previously contained in the hollow space C2 can be utilised to carry out the washing of the laundry previously loaded in the drum 104.

[0050] In addition, in this step, the amount of wash water present in the washing compartment C1 is constantly measured, for example by means of a specific level transducer (not illustrated) applied in the washing compartment C1, and additional water can be drawn from the water supply by means of activation of the solenoid valve EV (run based on a filling signal supplied by the cited transducer) in the event that the wash cycle to be carried out requires more water than the water available from the hollow space C2, as shown in Figure 5. If instead the hollow space C2 contains excess water with respect to the amount needed for the wash cycle, the excess water can be drained according to the logic illustrated in Figure 3.

[0051] Moreover, preferably there is provided a level sensor (not illustrated) applied to the hollow space so as to monitor the water level therein and thus to monitor the filling thereof.

[0052] It is evident that the procedure described above can be repeated so as to obtain a sequence of wash and rinse cycles with temporary storage of the rinse (or wash) water inside the accumulation tank defined by the hollow space C2.

[0053] The present invention achieves the intended aims, overcoming the above-mentioned drawbacks of the prior art.

[0054] The peculiar structure of the machine, which implements the accumulation tank directly in the containment body of the rotary drum, makes it possible to bring about an optimal action consisting of the reduction of vibrations (and thus of noise) during the spin draining step, by providing for the filling of the tank prior to that step, rendering, in any case, the machine easily transportable owing to the reduction in weight made possible by the draining of the water from the accumulation tank.

[0055] Furthermore, this characteristic optimises the spaces inside the support frame of the washing machine, overcoming the necessity of having to provide special spaces for housing a separate accumulation tank and thus eliminating the critical structure-related issues existing in traditional machines. Moreover, the realisation of the latter inside the wall of the containment body of the rotary drum reduces assembly time for the machine.

[0056] It should also be pointed out that the recycling of the wash water, by means of storage in the accumulation tank, achieves recycling of both thermal energy (the water can be reutilised while it is still hot) and water resources (less waste of water).

[0057] Moreover, the realisation of the accumulation tank by means of a hollow space around the drum, makes it possible to improve the thermal efficiency of the machine: in fact, the result of leaving the hollow space empty when the water is being heated, is that the air contained therein brings about a stage of thermal insulation that obstructs heat loss, unlike the existing solutions in which the concrete counterweights, in addition to not providing thermal insulation, act as heat absorbers to the detriment of the overall thermal efficiency of the machine.

[0058] The elimination of the concrete counterweights also allows for simplification of the process of disposal of the machine at the end of its useful life.

[0059] With particular consideration to the prior art represented by EP326502A1, the present invention clearly reaches the goal of providing a laundry washing machine with an enhanced storage tank that can be manufactured with reduced assembly times.

Claims

1. A washing machine with water storage tank, comprising:

   - a containment body (102) delimiting a laundry washing compartment (C1);
   - a water storage tank, which is connectable to the washing compartment (C1) for receiving and accumulating at least a portion of the water contained in the washing compartment (C1) during an operating cycle of the washing machine (100); and
   - water hook-up means (I1, I2, T, U1, U2, V1, V2, V3), which are at least active between the washing compartment (C1) and a hollow space (C2), for at least transferring fluid from the washing compartment (C1) to the hollow space (C2);

   characterised in that at least one wall (106) of the containment body (102) which delimits said washing compartment (C1) forms an inner hollow space (C2) defining said storage tank.

2. A machine according to claim 1, comprising a rotary drum (104) suitable for receiving the laundry to be washed; the hollow space (C2) extending about the

axis of rotation (X) of the drum (104) through an angle greater than 180°.

3. A machine according to claim 2, wherein the hollow space (C2) is ring-shaped and completely surrounds the axis of rotation (X) of the drum (104).

4. A machine according to any one of the preceding claims, wherein said water hook-up means (I1, I2, T, U1, U2, V1, V2, V3) are adapted to transfer the fluid in both directions between the washing compartment (C1) and the hollow space (C2).

5. A machine according to any one of the preceding claims, wherein said water hook-up means (I1, I2, T, U 1, U2, V1, V2, V3) comprise, for each of said washing compartment (C1) and hollow space (C2), a respective inlet conduit (I1, I2) and a respective outlet conduit (U1, U2), and also comprise a first distributor (V1), which is active on said inlet conduits (I1, I2) for controlling the opening and closing of said inlet conduits (I1, I2), and a second distributor (V2), which is active on said outlet conduits (U1, U2) for controlling the opening and the closing of said outlet conduits (U1, U2).

6. A machine according to claim 5, wherein said water hook-up means (I1, I2, T, U1, U2, V1, V2, V3) also comprise a connection conduit (T) interposed between said first and second distributor (V1, V2), and a third distributor (V3) mounted on said connection conduit (T) and designed to selectively connect said second distributor (V2) with said first distributor (V1) or with a drain conduit (S).

7. A machine according to claim 6, also comprising a hydraulic pump (P) mounted on said connection conduit (T) and preferably interposed between said second and third distributor (V2, V3).

8. A machine according to any one of the preceding claims, also comprising a feeding circuit (EV, D, CP, A), which is connectable to a water system for delivering water to said washing compartment (C1), said feeding circuit (EV, D CP, 1) comprising a main conduit (CP), which is connectable to the water system and, mounted on said main conduit (CP), a solenoid valve (EV) for opening/closing the main conduit (CP), a drawer (D) for mixing the water with a detergent and a supply conduit (A) extending between the drawer (D) and the washing compartment (C1).

9. A machine according to claim 8, when dependent on claim 5, also comprising an auxiliary conduit (W) designed to intercept at least a portion of the fluid circulating between the first distributor (V1) and the inlet conduit (I1) of the washing compartment (C1), and to convey it towards the mixing drawer (D), said auxiliary conduit (W) preferably defining a branch of said inlet conduit (I1) of the washing compartment (C1).

10. An operating method for the washing machine according to claim 1, comprising the following steps:

- supplying the washing compartment (C1) with a mixture of water and detergent;
- performing a cycle for washing the laundry contained in the washing compartment (C1);
- transferring at least a portion of the wash water previously contained in the washing compartment (C1), to said hollow space (C2);
- performing a spin draining step while said hollow space (C2) is filled, at least partly and preferably completely, with said wash water.

11. A method according to claim 10, wherein a rinse cycle is performed after the spin draining step, said rinse cycle comprising the following steps:

- supplying the washing compartment (C1) with water;
- performing a cycle of rinsing the laundry contained in the washing compartment (C1);
- draining the wash water previously contained in the hollow space (C2), preferably at the same time as supplying the washing compartment (C1) with water;
- transferring at least a portion of the rinse water previously contained in the washing compartment (C1), to said hollow space (C2).

12. A method according to claim 10 or 11, comprising a further wash cycle comprising the following steps:

- transferring a first portion of the wash or rinse water contained in the hollow space (C2) to said washing compartment (C1);
- transferring a second portion of the wash or rinse water contained in the hollow space (C2) to a drawer (D) for mixing with detergent;
- transferring said second portion of the wash or rinse water from the mixing drawer (D) to the washing compartment (C1).

Patentansprüche

1. Waschmaschine mit Wasserspeichertank, umfassend:

- einen eine Wäschewaschabteilung (C1) begrenzenden Aufnahmekörper (102);
- einen Wasserspeichertank, welcher mit der Waschabteilung (C1) zum Aufnehmen und Sammeln von mindestens einem Teil des in der Waschabteilung (C1) während eines Betriebs-

zyklus der Waschmaschine (100) enthaltenen Wassers verbindbar ist; und
- Wasseranschlussmittel (11, 12, T, U1, U2, V1, V2, V3), welche mindestens zwischen der Waschabteilung (C1) und einen Hohlraum (C2) mindestens für eine Übertragung von Fluid aus der Waschabteilung (C1) zu dem Hohlraum (C2) tätig sind;

dadurch gekennzeichnet, dass mindestens eine Wand (106) des Aufnahmekörpers (102), welche die Waschabteilung (C1) begrenzt, einen inneren Hohlraum (C2) bildet, welcher den Speichertank definiert.

2. Maschine nach Anspruch 1, umfassend eine zur Aufnahme der zu waschenden Wäsche geeignete Drehtrommel (104); wobei der Hohlraum (C2) sich um die Drehachse (X) der Trommel (104) über einen Winkel von mehr als 180° erstreckt.

3. Maschine nach Anspruch 2, wobei der Hohlraum (C2) ringförmig ist und vollständig die Drehachse (X) der Trommel (104) umgibt.

4. Maschine nach einem der vorhergehenden Ansprüche, wobei die Wasseranschlussmittel (11, 12, T, U1, U2, V1, V2, V3) dafür eingerichtet sind, das Fluid in beide Richtungen zwischen der Waschabteilung (C1) und dem Hohlraum (C2) zu übertragen.

5. Maschine nach einem der vorhergehenden Ansprüche, wobei die Wasseranschlussmittel (11, 12, T, U1, U2, V1, V2, V3) für sowohl die Waschabteilung (C1) als auch den Hohlraum (C2) eine jeweilige Einlassleitung (11, 12) und eine jeweilige Auslassleitung (U1, U2) umfassen und ferner einen ersten Verteiler (V1), welcher an den Einlassleitungen (11, 12) zum Regeln/Steuern des Öffnens und Schließens der Einlassleitungen (11, 12) tätig ist, und einen zweiten Verteiler (V2) umfassen, welcher an den Auslassleitungen (U1, U2) zum Regeln/Steuern des Öffnens und des Schließens der Auslassleitungen (U1, U2) tätig ist.

6. Maschine nach Anspruch 5, wobei die Wasseranschlussmittel (11, 12, T, U1, U2, V1, V2, V3) ferner eine zwischen dem ersten und zweiten Verteiler (V1, V2) eingefügte Verbindungsleitung (T) und einen dritten Verteiler (V3) umfassen, welcher an der Verbindungsleitung (T) montiert ist und zum selektiven Verbinden des zweiten Verteilers (V2) mit dem ersten Verteiler (V1) oder mit einer Ablassleitung (S) ausgelegt ist.

7. Maschine nach Anspruch 6, welche ferner eine Hydraulikpumpe (P) umfasst, die an der Verbindungsleitung (T) montiert ist und vorzugsweise zwischen dem zweiten und dritten Verteiler (V2, V3) eingefügt ist.

8. Maschine nach einem der vorhergehenden Ansprüche, welche ferner einen Speisekreislauf (EV, D, CP, A) umfasst, welcher mit einem Wassersystem zum Liefern von Wasser an die Waschabteilung (C1) verbindbar ist, wobei der Speisekreislauf (EV, D, CP, 1) eine Hauptleitung (CP), welche mit dem Wassersystem verbindbar ist, und ein auf der Hauptleitung (CP) montiertes Magnetventil (EV) zum Öffnen/Schließen der Hauptleitung (CP), einen Einschub (D) zum Mischen des Wassers mit einem Reinigungsmittel und eine sich zwischen dem Einschub (D) und der Waschabteilung (C1) erstreckende Versorgungsleitung (A) umfasst.

9. Maschine nach Anspruch 8, wenn abhängig von Anspruch 5, ferner eine Hilfsleitung (W) umfassend, welche dafür ausgelegt ist, wenigstens einen Teil des zwischen dem ersten Verteiler (V1) und der Einlassleitung (11) der Waschabteilung (C1) zirkulierenden Fluids aufzufangen und ihn in Richtung des Mischeinschubs (D) zu befördern, wobei die Hilfsleitung (W) bevorzugt einen Zweig der Einlassleitung (11) der Waschabteilung (C1) definiert.

10. Betriebsverfahren für die Waschmaschine nach Anspruch 1, umfassend die folgenden Schritte:

- Versorgen der Waschabteilung (C1) mit einem Gemisch aus Wasser und Reinigungsmittel;
- Durchführen eines Zyklus zum Waschen der in der Waschabteilung (C1) enthaltenen Wäsche;
- Übertragen mindestens eines Teils des zuvor in der Waschabteilung (C1) enthaltenen Waschwassers zu dem Hohlraum (C2);
- Durchführen eines Schleuderschritts während der Hohlraum (C2) mindestens teilweise, vorzugsweise vollständig, mit dem Waschwasser gefüllt ist.

11. Verfahren nach Anspruch 10, wobei ein Spülzyklus nach dem Schleuderschritt durchgeführt wird, wobei der Spülzyklus die folgenden Schritte umfasst:

- Versorgen der Waschabteilung (C1) mit Wasser;
- Durchführen eines Zyklus eines Spülens der in der Waschabteilung (C1) enthaltenen Wäsche;
- Ablassen des zuvor in dem Hohlraum (C2) enthaltenen Waschwassers, vorzugsweise zur gleichen Zeit wie ein Versorgen der Waschabteilung (C1) mit Wasser;
- Übertragen zumindest eines Teils des zuvor in der Waschabteilung (C1) enthaltenen Spülwassers zu dem Hohlraum (C2).

12. Verfahren nach Anspruch 10 oder 11, umfassend einen weiteren Waschzyklus, welcher die folgenden Schritte umfasst:

- Übertragen eines ersten Teils des in dem Hohlraum (C2) enthaltenen Wasch- oder Spülwassers zu der Waschabteilung (C1);
- Übertragen eines zweiten Teils des in dem Hohlraum (C2) enthaltenen Wasch- oder Spülwassers zu einem Einschub (D) zum Mischen mit einem Reinigungsmittel;
- Übertragen des zweiten Teils des Wasch- oder Spülwassers aus dem Mischeinschub (D) zu der Waschabteilung (C1).

Revendications

1. Machine à laver à réservoir de stockage d'eau, comportant :

- un corps de confinement (102) délimitant un compartiment de lavage du linge (C1) ;
- un réservoir de stockage d'eau, lequel peut être raccordé au compartiment de lavage (C1) pour recevoir et accumuler au moins une partie de l'eau contenue dans le compartiment de lavage (C1) pendant un cycle de fonctionnement de la machine à laver (100) ; et
- des moyens de branchement d'eau (I1, I2, T, U1, U2, V1, V2, V3) qui sont au moins actifs entre le compartiment de lavage (C1) et un espace creux (C2), permettant au moins un transfert de fluide du compartiment de lavage (C1) jusqu'à l'espace creux (C2) ;

caractérisée en ce qu'au moins une paroi (106) du corps de confinement (102), laquelle délimite ledit compartiment de lavage (C1), forme un espace creux intérieur (C2) définissant ledit réservoir de stockage.

2. Machine selon la revendication 1, comportant un tambour rotatif (104) approprié pour recevoir le linge à laver ; l'espace creux (C2) s'étendant autour de l'axe de rotation (X) du tambour (104) sur un angle supérieur à 180°.

3. Machine selon la revendication 2, dans laquelle l'espace creux (C2) est annulaire et entoure complètement l'axe de rotation (X) du tambour (104).

4. Machine selon l'une quelconque des revendications précédentes, dans laquelle lesdits moyens de branchement d'eau (I1, I2, T, U1, U2, V1, V2, V3) sont conçus pour transférer le fluide dans les deux sens entre le compartiment de lavage (C1) et l'espace creux (C2).

5. Machine selon l'une quelconque des revendications précédentes, dans laquelle lesdits moyens de branchement d'eau (I1, I2, T, U1, U2, V1, V2, V3) comprennent, pour chacun dudit compartiment de lavage (C1) et dudit espace creux (C2), un conduit d'admission respectif (I1, I2) et un conduit de sortie respectif (U1, U2), et comprennent également un premier distributeur (V1), actif sur lesdits conduits d'admission (I1, I2) pour commander l'ouverture et la fermeture desdits conduits d'admission (I1, I2), et un deuxième distributeur (V2), actif sur lesdits conduits de sortie (U1, U2) pour commander l'ouverture et la fermeture desdits conduits de sortie (U1, U2).

6. Machine selon la revendication 5, dans laquelle lesdits moyens de branchement d'eau (I1, I2, T, U1, U2, V1, V2, V3) comprennent également un conduit de raccordement (T) interposé entre ledit premier et ledit deuxième distributeur (V1, V2), et un troisième distributeur (V3) monté sur ledit conduit de raccordement (T) et conçu pour raccorder sélectivement ledit second distributeur (V2) au dit premier distributeur (V1) ou à un conduit de vidange (S).

7. Machine selon la revendication 6, comprenant également une pompe hydraulique (P) montée sur ledit conduit de raccordement (T) et interposée, de préférence, entre ledit deuxième et ledit troisième distributeur (V2, V3).

8. Machine selon l'une quelconque des revendications précédentes, comprenant également un circuit d'alimentation (EV, D, CP, A), lequel peut être raccordé à un système d'eau pour délivrer de l'eau au dit compartiment de lavage (C1), ledit circuit d'alimentation (EV, D CP, A) comportant un conduit principal (CP), lequel peut être raccordé au système d'eau et, montée sur ledit conduit principal (CP), une électrovanne (EV) pour ouvrir/fermer le conduit principal (CP), un tiroir (D) permettant de mélanger l'eau à un détergent, et un conduit d'alimentation (A) s'étendant entre le tiroir (D) et le compartiment de lavage (C1).

9. Machine selon la revendication 8, lorsque dépendante de la revendication 5, comprenant également un conduit auxiliaire (W) conçu pour intercepter au moins une partie du fluide circulant entre le premier distributeur (V1) et le conduit d'admission (I1) du compartiment de lavage (C1) et pour la transporter vers le tiroir de mélange (D), ledit conduit auxiliaire (W) définissant, de préférence, une ramification dudit conduit d'admission (I1) du compartiment de lavage (C1).

10. Procédé de fonctionnement d'une machine à laver selon la revendication 1, comportant les étapes suivantes :

- fournir au compartiment de lavage (C1) un mélange d'eau et de détergent ;
- exécuter un cycle pour laver le linge contenu dans le compartiment de lavage (C1) ;
- transférer au moins une partie de l'eau de lavage contenue antérieurement dans le compartiment de lavage (C1) vers ledit espace creux (C2) ;
- exécuter une étape de vidange essorage alors que ledit espace creux (C2) est rempli, au moins partiellement et, de préférence, entièrement, avec ladite eau de lavage.

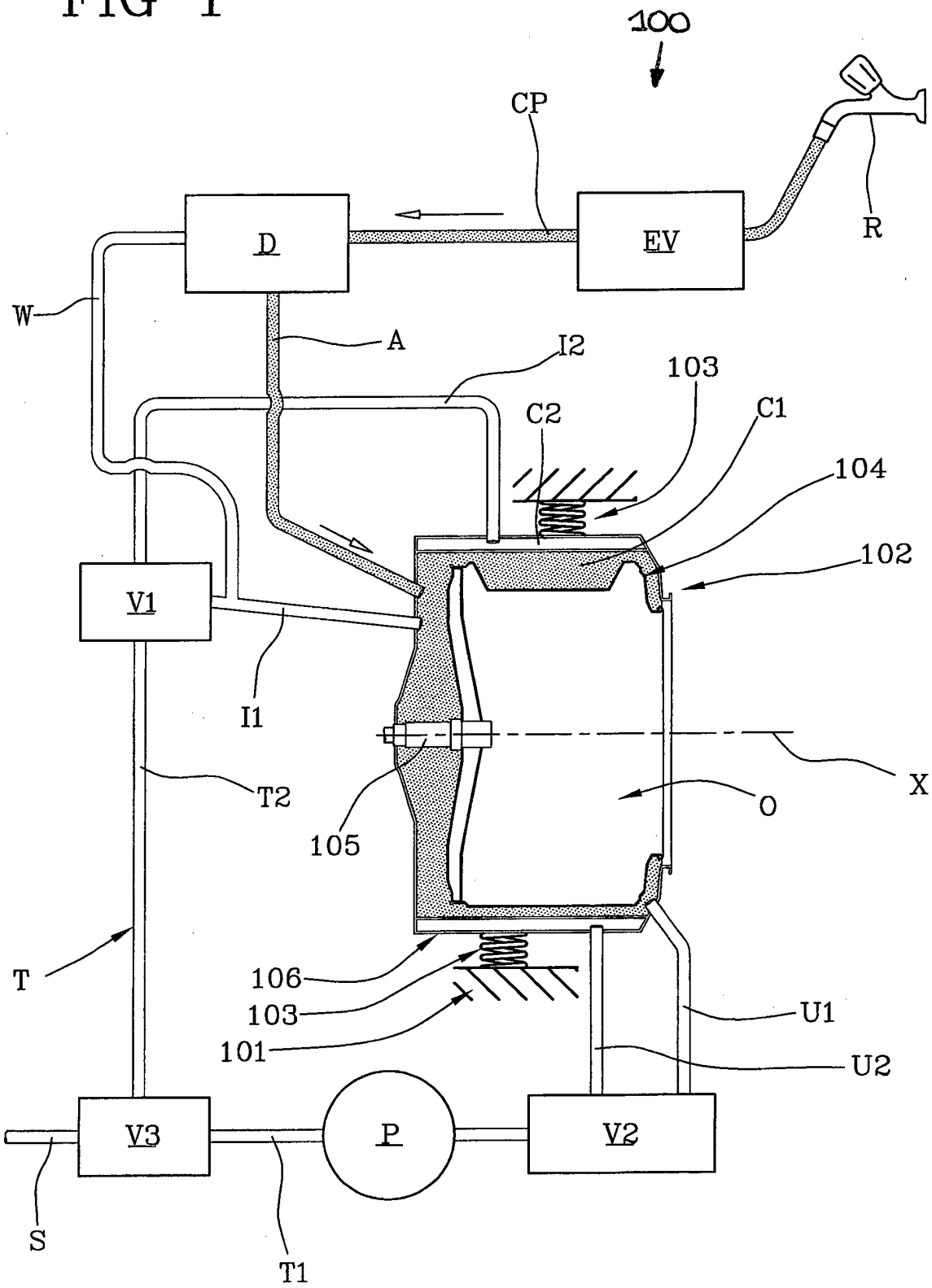
11. Procédé selon la revendication 10, dans lequel un cycle de rinçage est exécuté après l'étape de vidange essorage, ledit cycle de rinçage comprenant les étapes suivantes :

- alimenter en eau le compartiment de lavage (C1) ;
- exécuter un cycle de rinçage du linge contenu dans le compartiment de lavage (C1) ;
- vidanger l'eau de lavage contenue antérieurement dans l'espace creux (C2), de préférence en même temps qu'alimenter en eau le compartiment de lavage (C1) ;
- transférer au moins une partie de l'eau de rinçage contenue précédemment dans le compartiment de lavage (C1) vers ledit espace creux (C2).

12. Procédé selon la revendication 10 ou 11, comprenant un cycle de lavage supplémentaire comportant les étapes suivantes :

- transférer une première partie de l'eau de lavage ou de rinçage contenue dans l'espace creux (C2) vers ledit compartiment de lavage (C1) ;
- transférer une seconde partie de l'eau de lavage ou de rinçage contenue dans l'espace creux (C2) vers un tiroir (D) pour la mélanger avec un détergent ;
- transférer ladite seconde partie de l'eau de lavage ou de rinçage du tiroir de mélange (D) vers le compartiment de lavage (C1).

FIG 1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A
I2
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C2
C1
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102
V1
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T
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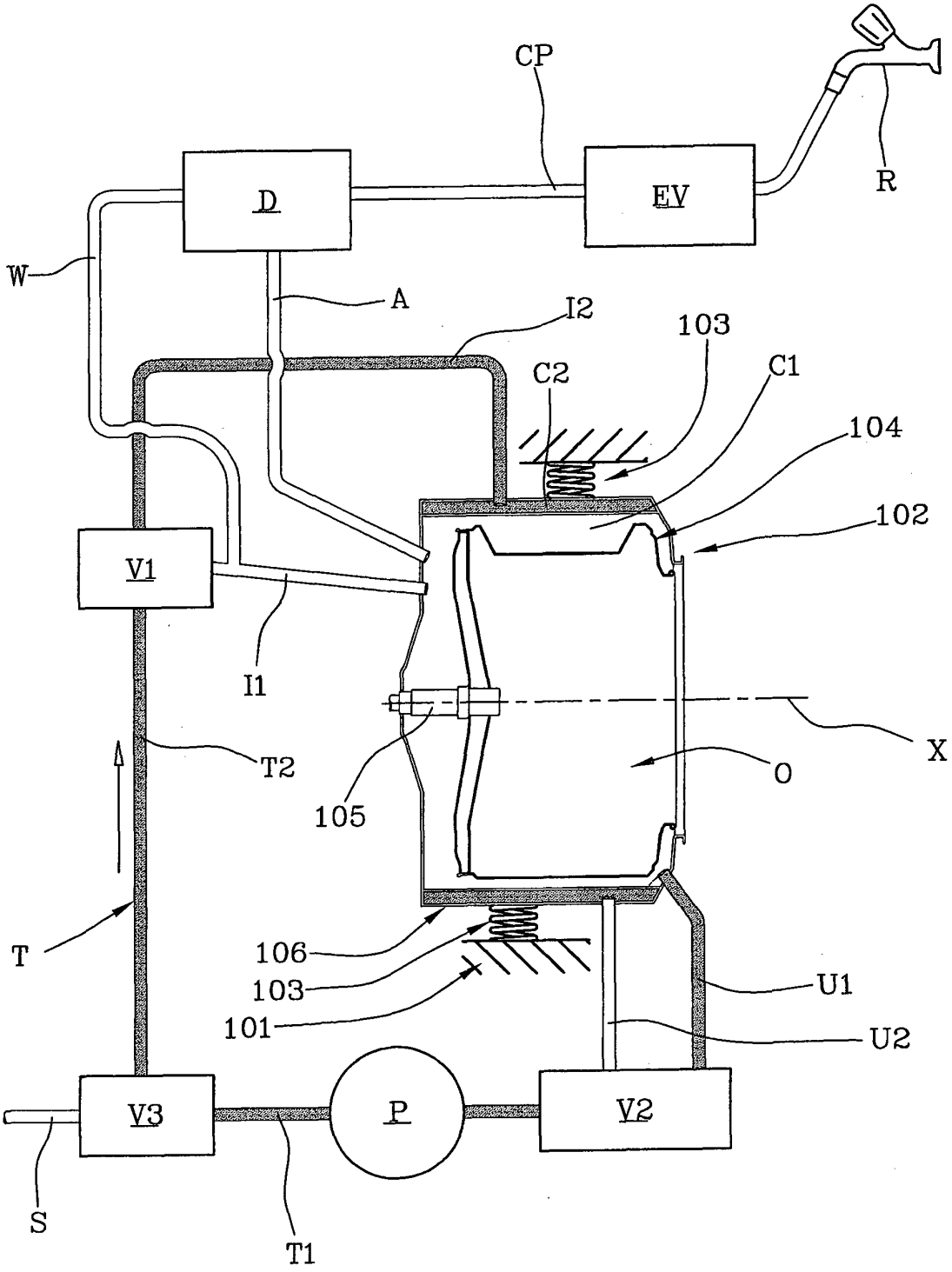
103
101
U1
U2
V3
P
V2
S
T1

FIG 2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106
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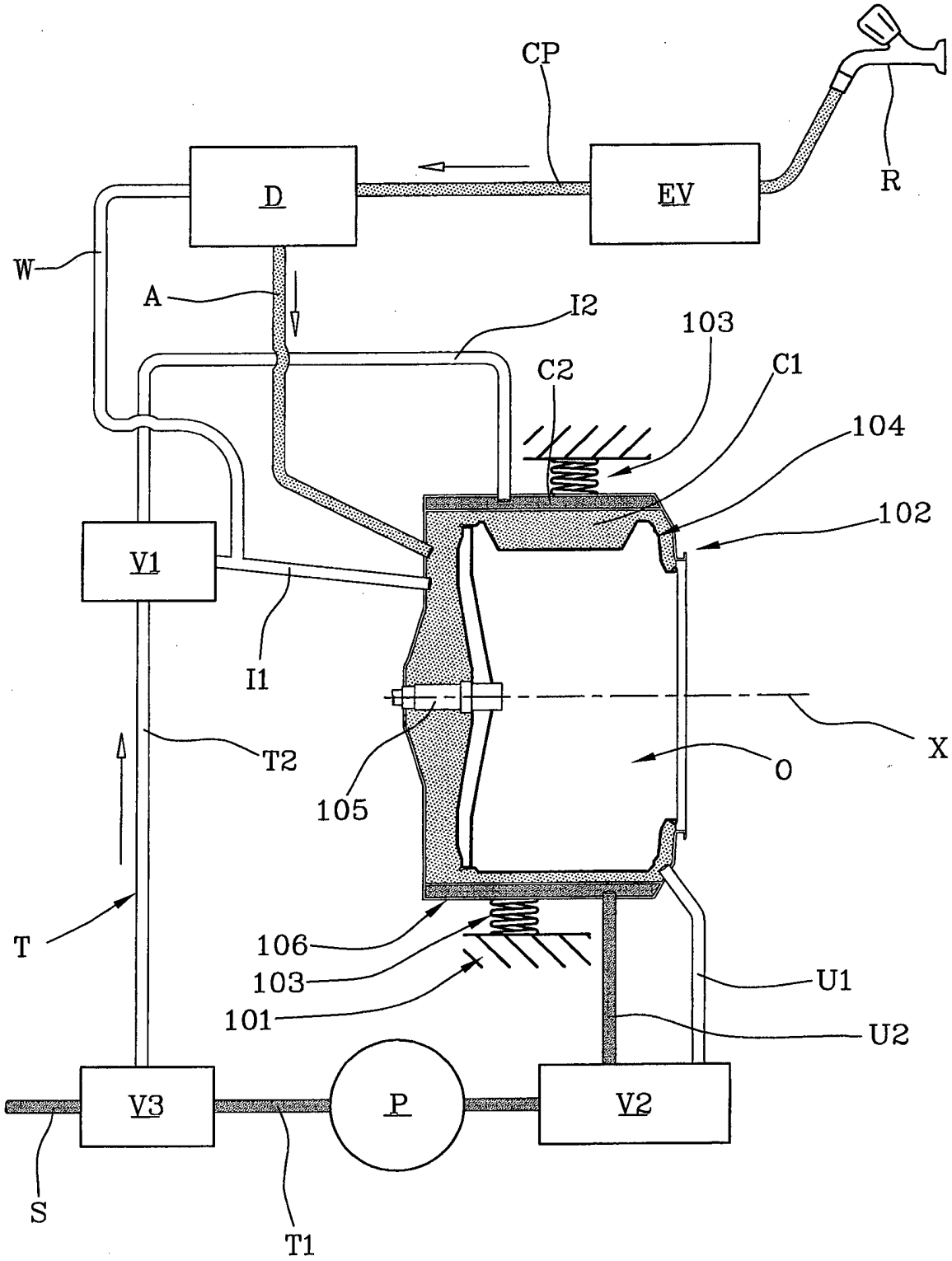
101
U1
U2
V3
P
V2
S
T1

FIG 3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C1
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103
101
U1
U2
V3
P
V2
S
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FIG 4

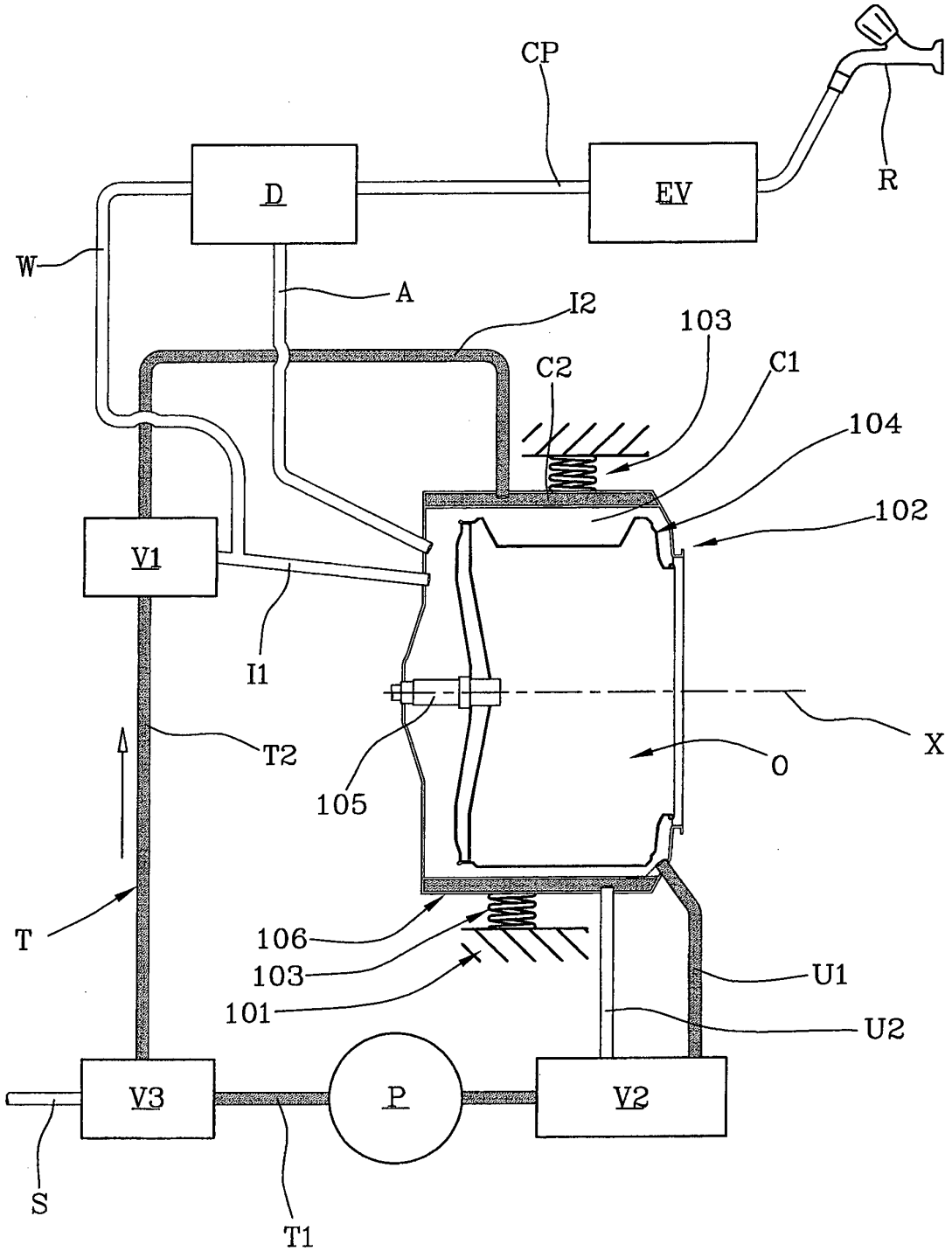
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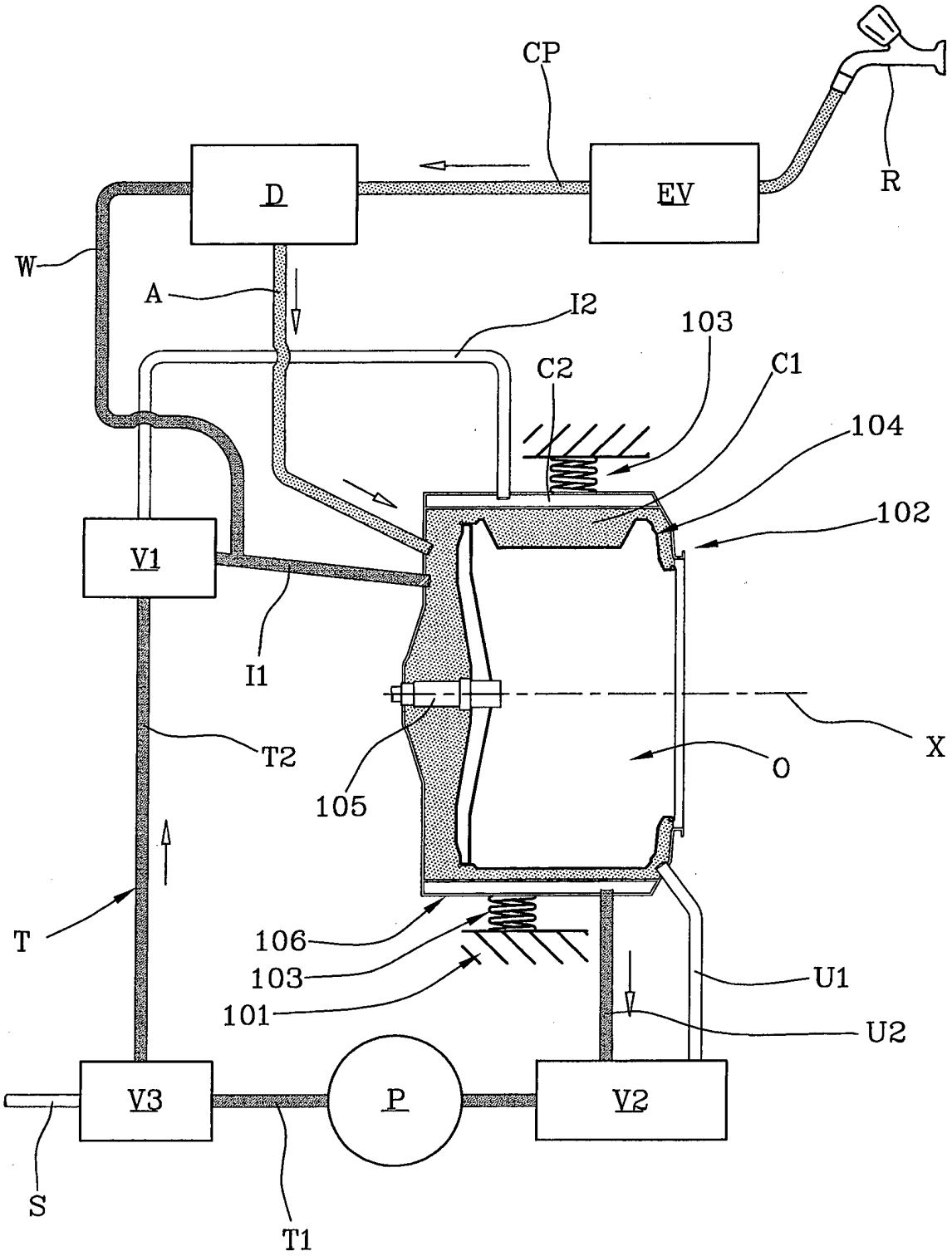
FIG 5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REFERENCES CITED IN THE DESCRIPTION

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