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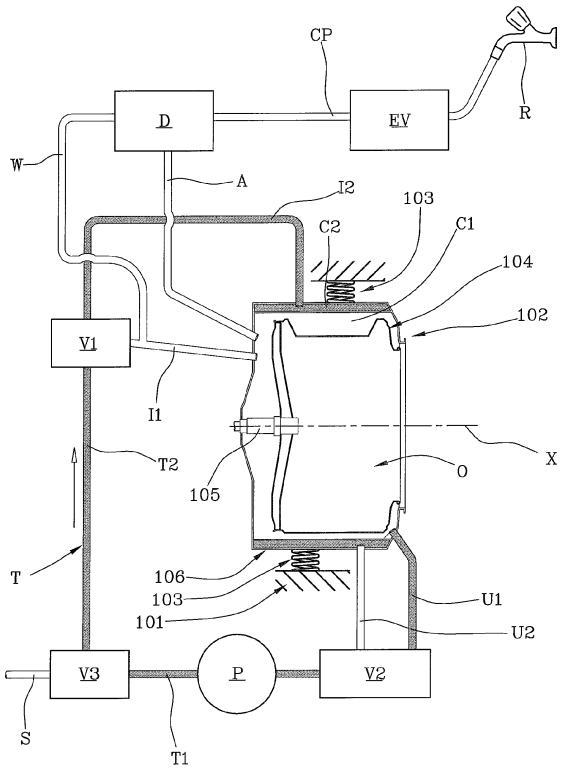
(54) **Washing machine with water storage tank**

(57) A washing machine with water accumulation tank comprises a containment body (102) having a washing compartment (C1) inside of which there is a rotary drum (104) for receiving the laundry to be washed. The containment body (102) has a side wall (106) defining a ring-shaped hollow space (C2), which constitutes a water accumulation 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).

FIG 2



EP 2 607 540 A1

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).

FIG 1

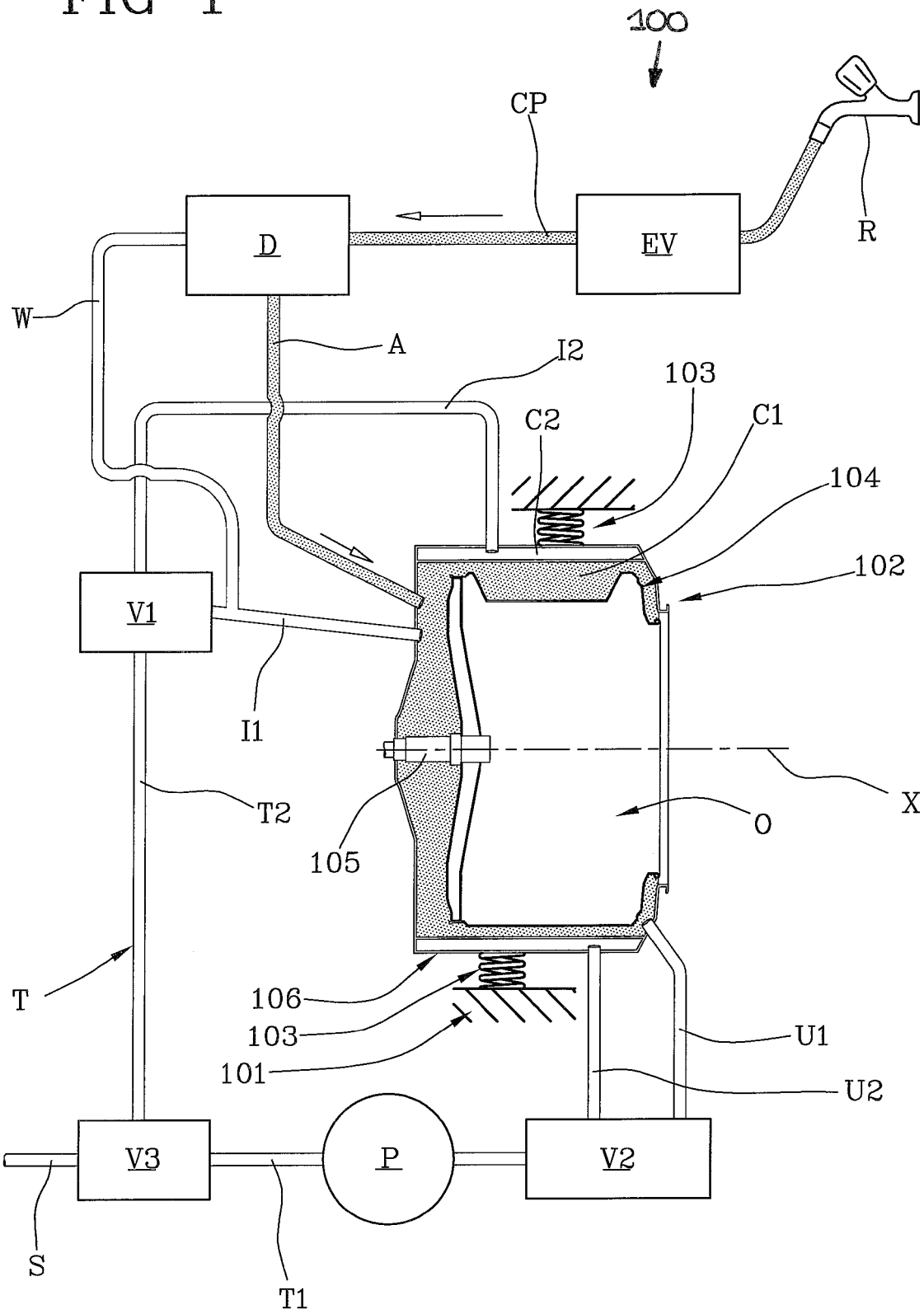

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FIG 2

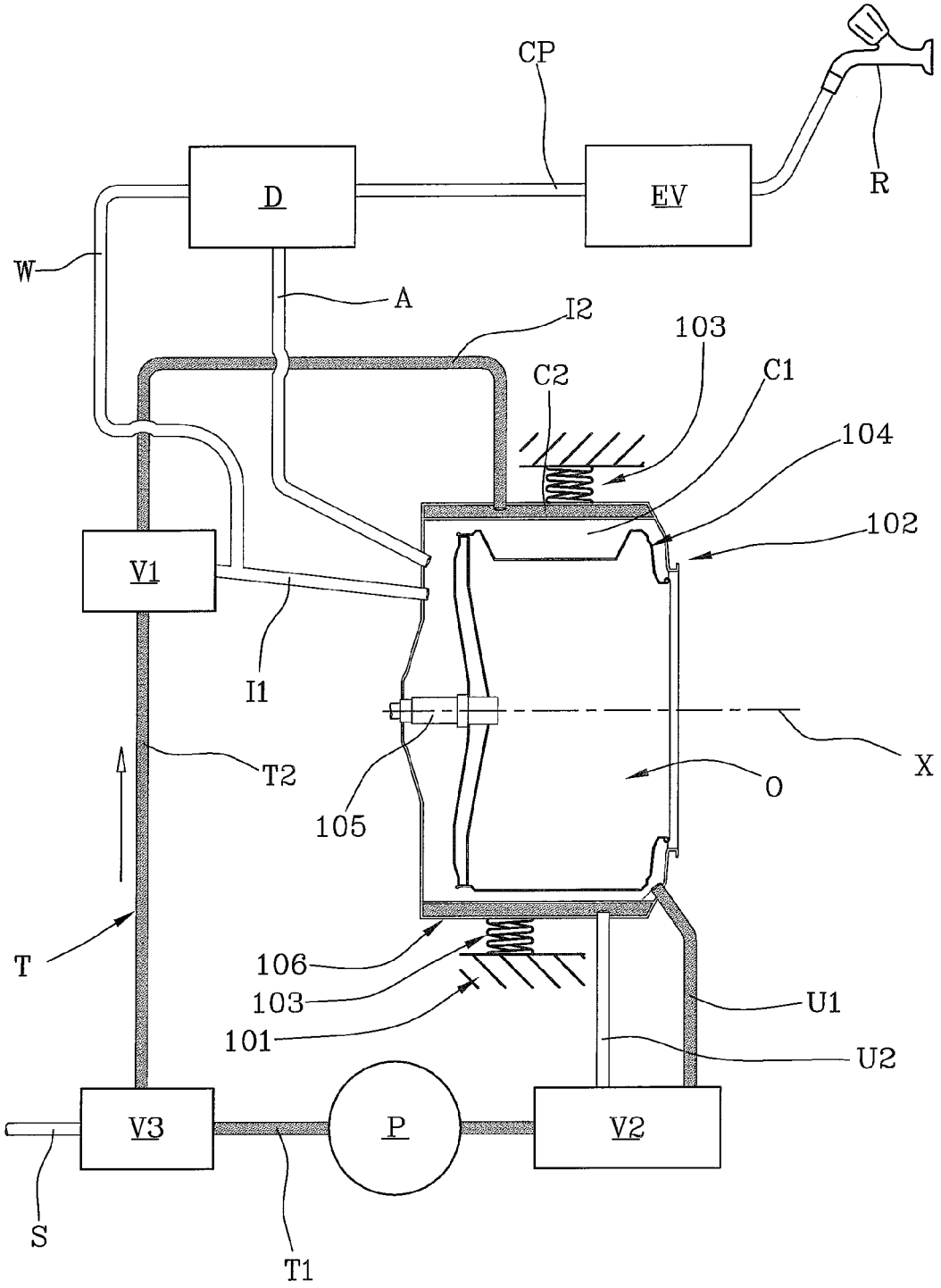
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FIG 3

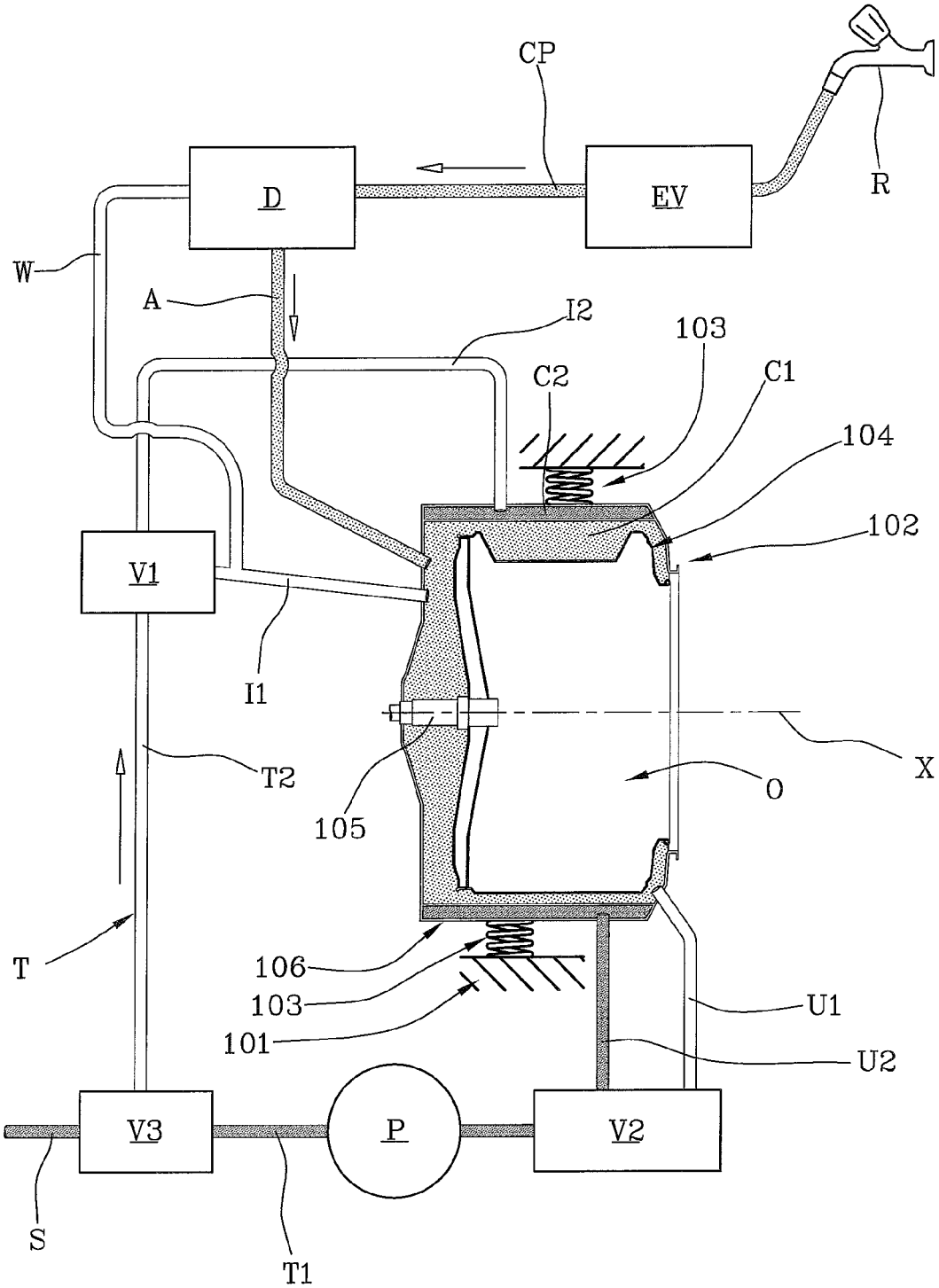
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FIG 4

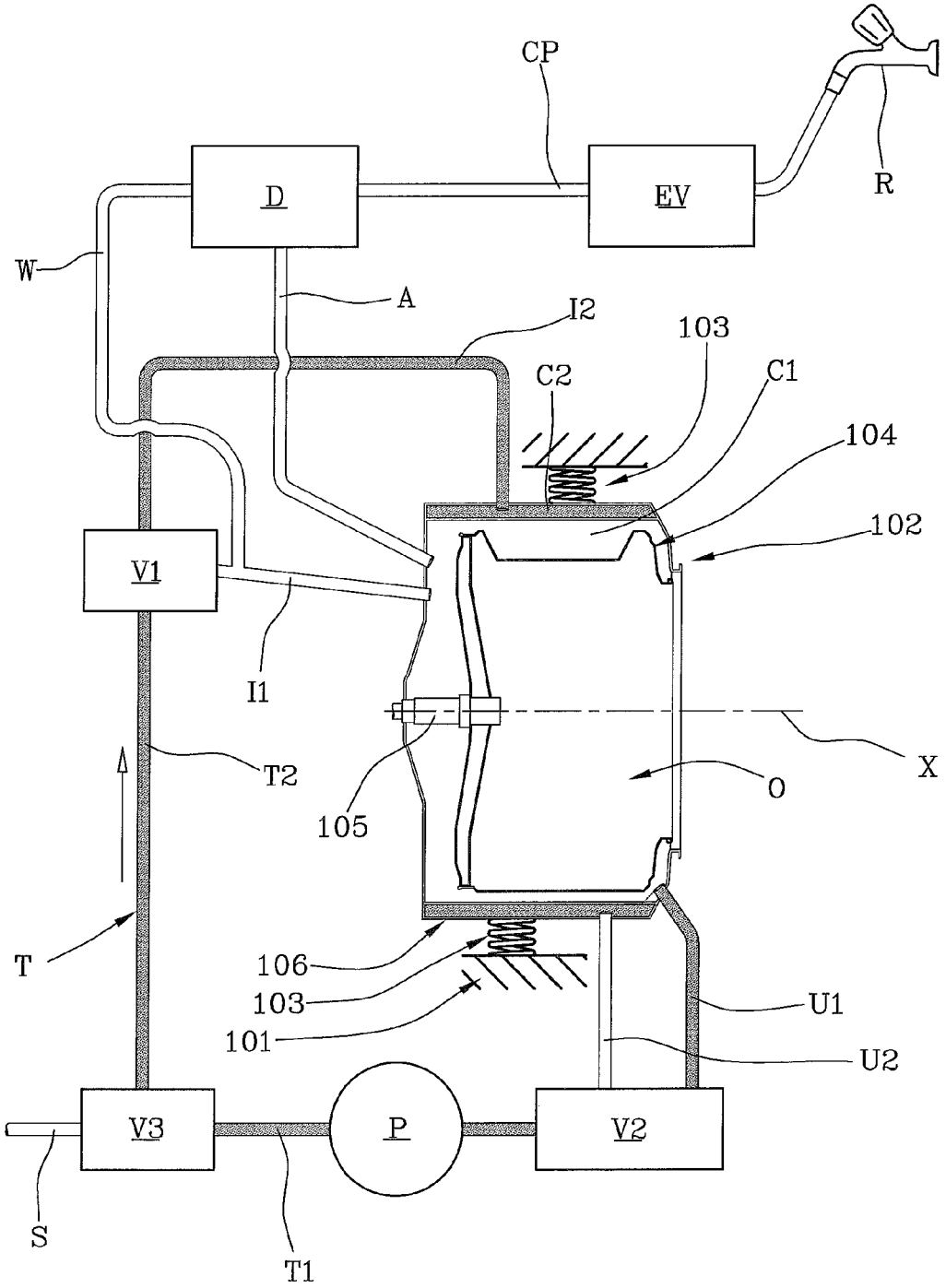
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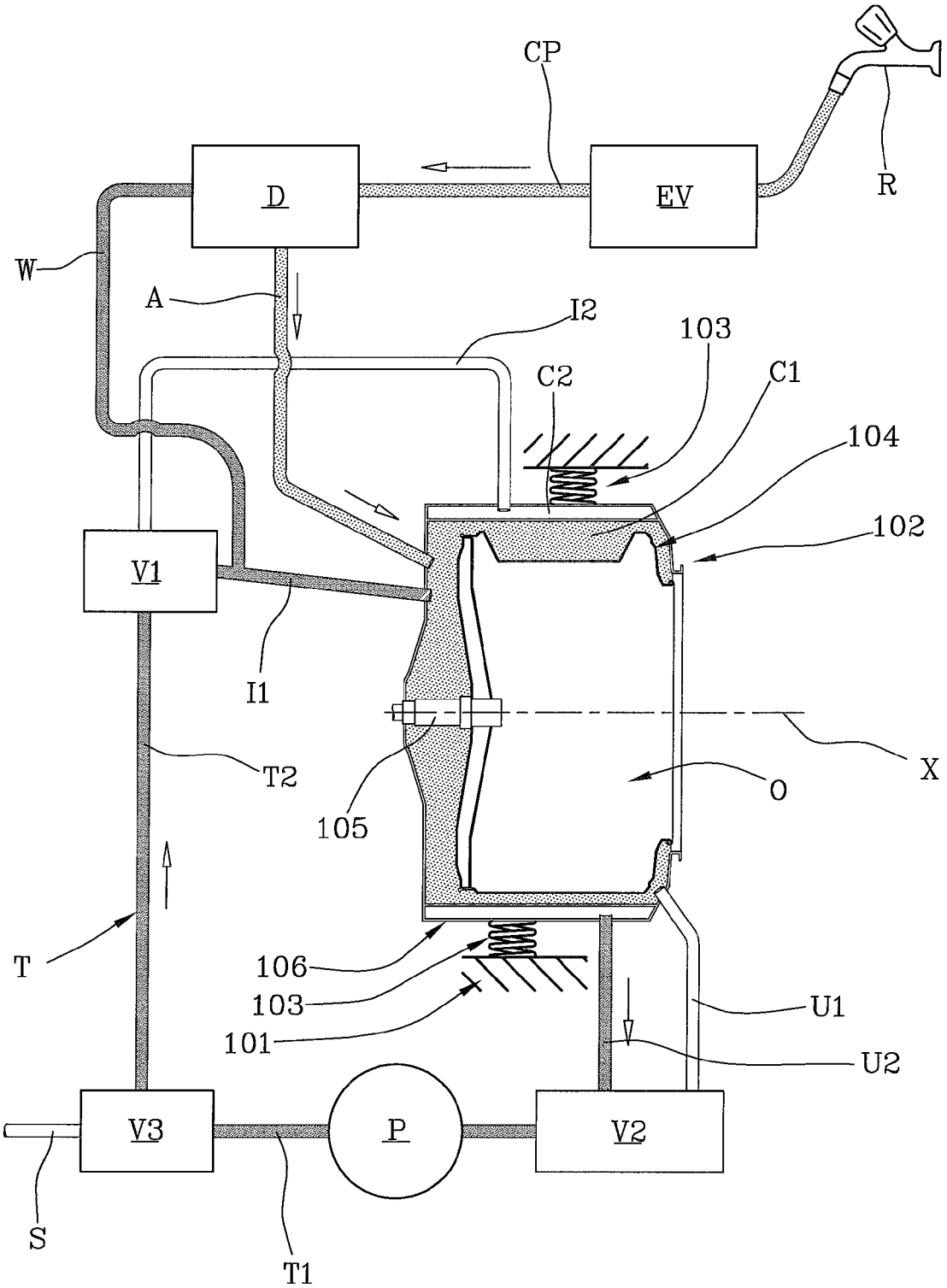
FIG 5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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 6053

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 326 502 A1 (MARTINEZ GEORGES) 2 August 1989 (1989-08-02) * the whole document *	1-12	INV. D06F37/26
A	EP 0 551 067 A1 (ZANUSSI ELETTRODOMESTICI [IT]) 14 July 1993 (1993-07-14) * column 3 - column 4; claim 1; figure 1 *	1-12	
A	WO 2006/008601 A1 (ITW IND COMPONENTS SRL [IT]; BASSI ALBERTO [IT]) 26 January 2006 (2006-01-26) * the whole document *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)
D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 April 2013	Stroppa, Giovanni

CATEGORY OF CITED DOCUMENTS

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons
.....
& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 19 6053

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26-04-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0326502 A1	02-08-1989	DE 68903958 D1	04-02-1993
		DE 68903958 T2	29-04-1993
		EP 0326502 A1	02-08-1989
		FR 2626588 A1	04-08-1989
		JP H01308595 A	13-12-1989
EP 0551067 A1	14-07-1993	EP 0551067 A1	14-07-1993
		IT 1259200 B	11-03-1996
		JP H05253385 A	05-10-1993
WO 2006008601 A1	26-01-2006	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 326502 A1 **[0005] [0059]**