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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) Device for releasing washing and / or rinsing liquid into the rotating drum of a laundry washing machine

(57) Device for releasing washing and/cr rinsing water into the rotating drum of a laundry washing machine with recirculation carried out via jets operating radially through the perforated circumferential wall (2) of the drum (3), comprising at least one nozzle (14) positioned radially on the tank (1) of the laundry washing machine, in a region away from the base of the tank, the output of said nozzle being turned towards the drum (3) , a plurality of fins (4) fixed to the internal circumferential wall of the drum, said fins (4) protruding radially towards the axis of rotation (X-X) of the drum (3) and extending longitudinally along said wall in the direction substantially parallel to said axis of rotation, said fins (4) each being provided with a respective internal cavity (9,9a) having predetermined circumferential width and a plurality of holes (10,11,12) which place the cavity (9,9a) in communication with the interior (3a) of the drum.

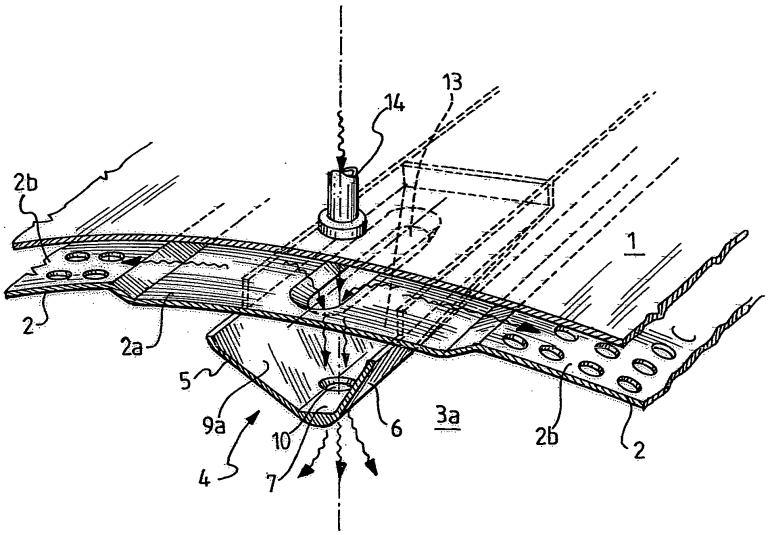

Fig.1

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Description

[0001] The present invention relates to a device for releasing washing and/or rinsing liquid into the rotating drum of a laundry washing machine with recirculation carried out via jets operating radially through the perforated circumferential wall of the drum, comprising at least one nozzle positioned radially on the tank of the laundry washing machine in a region away from the base of the tank, the supply of said nozzle being turned towards the drum, a plurality of fins fixed to the internal circumferential wall of the drum, said fins protruding radially towards the axis of rotation of the drum and extending longitudinally along said wall in the direction substantially parallel to said axis of rotation, said fins each being provided with a respective internal cavity having a predetermined circumferential width and a plurality of holes which place the cavity in communication with the interior of the drum.

[0002] Devices of the aforementioned type are known in the art and are widely used although they do have the drawback of being relatively less effective at distributing liquid inside the drum where the laundry to be washed is placed and at which the liquid must be directed both during the washing stage and the rinsing stage.

[0003] In fact, according to the known devices of the aforementioned type, instead of passing through the perforated circumferential wall of the drum and entering thereinto, a significant portion of liquid infiltrates the gap which exists between the circumferential wall of the tank and that of the rotating drum and flows directly into the region at the base of the tank without passing through the laundry present in the drum.

[0004] The devices for releasing liquids of the known art therefore require that an amount of liquid be used which allows for the operating condition mentioned above and which is therefore larger than that which may be strictly necessary to wash or rinse the laundry.

[0005] Moreover, this larger amount of liquid results in an undesired increase in the dynamic level of liquid in the tank during recirculation, creating resistance to the path of the drum containing laundry during its rotation and/or oscillation with relative absorption of energy by the motor driving the drum.

[0006] If the amount of liquid is greater than that strictly necessary for washing a specific amount of laundry, this results in higher energy consumption for heating and circulation and thus lower overall energy efficiency of the machine in general.

[0007] The object of the present invention is to try to reduce the energy consumption of a laundry washing machine functioning with a reduced amount of liquids circulating therein during both the washing and rinsing stages.

[0008] The object is achieved with the device according to claim 1 below.

[0009] The invention will now be described in greater detail with reference to a preferred embodiment illustrated in the appended drawings which are solely indicative and non-limiting, and in which:

- Fig. 1 is a perspective view, partly in section, of the tank and the drum of a laundry washing machine equipped with a device according to the invention;
- Fig. 2 is a partial schematic radial section of the tank and the drum with the device according to the invention;
- Fig. 3 is a cross-section perpendicular to the axis of rotation of the drum taken along line III-III of Fig. 2;
- Fig. 4 is a plan view, partly in section, of the device according to the invention with the opening in the wall of the drum for releasing the liquid.

[0010] With reference to the figures above, reference numeral 1 identifies the tank of a conventional laundry washing machine of the type in which washing or rinsing liquid is supplied during the phases in which the recirculation pump is active via jets operating radially through the perforated circumferential wall 2 of the drum 3.

[0011] In a conventional manner, said drum is set in rotation about an axis indicated by X-X via an electric motor, not shown in the drawings. The drum 3 is provided with a plurality of fins 4 fixed to the perforated wall 2 and turned radially towards the axis X-X. Each fin 4 has a substantially triangular cross-section formed by side walls 5 and 6 which join at an apex region 7, opposite a side 8 formed by a portion of the wall 2 of the drum, thus forming an internal cavity 9.

[0012] Each fin 4 extends longitudinally into the drum 3 in the direction substantially parallel to the axis X-X for a longitudinal distance shorter than the axial dimensions of the drum 3.

[0013] A plurality of holes 10 positioned along the apex region 7 places the cavity 9 in communication with the interior 3a of the drum 3.

[0014] Another plurality of holes 11 and 12 is provided respectively in the lateral walls 5 and 6 in the vicinity of their connection to the circumferential wall 2 of the drum 3.

[0015] The plurality of holes 11 and 12 also places the interior 9 of each fin 4 in hydraulic communication with the interior 3a of the drum 3 in such a way that during rotation of the drum the washing or rinsing liquid may enter into and exit from the cavity 9 of the fins.

[0016] In accordance with the invention, the device comprises an opening 13 formed in the side 8 of each fin 4 so as to be radially aligned with at least one of the holes 10 formed at the apex region 7.

[0017] Each opening 13 is formed in the region of the circumferential wall 2 of the drum which, during rotation thereof about the axis X-X, radially faces the liquid feed nozzle 14, positioned on the tank 1 in an elevated position away from the base region.

[0018] The nozzle 14 is supplied in a conventional manner by the recirculation pump, not shown, of the machine.

[0019] The cavity 9 of each fin 4 is provided in particular with a dividing panel 15 which separates a chamber 9a which is arranged directly below the opening 13 and is

also in fluid communication with the interior 3a of the drum via at least one of the holes 10, 11 and 12.

[0020] The openings 13 relative to the fins 4 are in the form of longitudinal slots and are advantageously formed, in the wall 2 of the drum, in regions 2a which are radially lowered with respect to the neighbouring circumferential regions identified with the reference numeral 2b which, in practice, are radially drawn towards the outside of the drum 3.

[0021] During rotation of the drum 3, when an opening 13 is arranged below the nozzle 14 of the jet feed, it receives liquid and conveys it into portion 9a of the cavity of the respective fin 4.

[0022] The liquid reaches the laundry placed inside the drum from said cavity through the holes 10, 11 and 12.

[0023] During this operation, a substantial portion of the liquid released from the nozzle 14 is advantageously collected from the radially lowered region 2a of the wall of the drum which serves as a funnel towards the opening 13.

[0024] Moreover, the radially drawn regions 2b of the wall of the drum 3 reduce the annular gap between the tank 1 and the wall 2 of the drum with the advantage of limiting the amount of liquid which, instead of entering the drum 3, tends to pass directly outside said drum and collects in the base of the tank.

[0025] Therefore, in accordance with the device according to the invention, based on the amount of laundry to be washed inside the drum, the amount of water necessary is reduced since the portions thereof which are inactive are reduced, which portions, collecting in the base of the tank, would produce an undesired resistance to the movement of the drum.

[0026] The end result is a significant overall energy saving for the machine.

Claims

1. Device for releasing washing and/or rinsing liquid into the rotating drum of a laundry washing machine with recirculation carried out via jets operating radially through the perforated circumferential wall (2) of the drum (3), comprising at least one nozzle (14) positioned radially on the tank (1) of the laundry washing machine, in a region remote from the base of the tank, the output of said nozzle being turned towards the drum (3), a plurality of fins (4) fixed to the internal circumferential wall of the drum, said fins (4) radially protruding towards the axis of rotation (X-X) of the drum (3) and extending longitudinally along said wall in the direction substantially parallel to said axis of rotation, said fins (4) each being provided with a respective internal cavity (9, 9a) having a predetermined circumferential width and a plurality of holes (10, 11, 12) which place the cavity (9, 9a) in communication with the interior (3a) of the drum, **characterised in that** it includes an opening (13) formed in the circumferential wall (2) of the drum (3) at each region in which, inside the drum, a respective fin (4) is fixed, said opening (13) being in fluid communication with the cavity (9a) of the fin.

2. Device according to claim 1, **characterised in that** each opening (13) formed in the circumferential wall (2) of the drum extends longitudinally parallel to the axial extension of the associated internal fin (4) to the drum and, in the circumferential direction, extends for a distance which does not exceed the circumferential width of the cavity (9, 9a) of the fin measured in the vicinity of its connection to the wall (2) of the drum.

3. Device according to claims 1 and 2, **characterised in that** the central portion of said opening (13) is radially aligned with at least one (10) of the holes which place the cavity (9a) of the fin (4) in communication with the interior (3a) of the drum.

4. Device according to claims 1 to 3, **characterised in that** said opening (13) in the wall (2) of the drum is formed in the region of the circumferential wall of the drum which, during rotation thereof, radially faces the liquid feed nozzle (14) positioned on the tank (1).

5. Device according to claims 1 to 4, **characterised in that** each of said openings (13) formed in the circumferential wall (2) of the drum are located in wall regions (2a) which are radially lowered with respect to the other surrounding regions (2b).

6. Device according to claims 1 to 5, **characterised in that** the cavity (9) of each fin (4) of the drum (3) comprises a dividing panel (15) which delimits a region (9a) of the cavity facing said opening (13), said region (9a) remaining separate from the other part of the cavity (9).

Amended claims in accordance with Rule 137(2) EPC.

1. Device for releasing washing and/or rinsing liquid into the rotating drum of a laundry washing machine with recirculation carried out via jets operating radially through the perforated circumferential wall (2) of the drum (3), comprising at least one nozzle (14) positioned radially on the tank (1) of the laundry washing machine, in a region remote from the base of the tank, the output of said nozzle being turned towards the drum (3), a plurality of fins (4) fixed to the internal circumferential wall of the drum, said fins (4) radially protruding towards the axis of rotation (X-X) of the drum (3) and extending longitudinally along said wall in the direction substantially parallel to said axis of rotation, said fins (4) each being provided with

a respective internal cavity (9, 9a) having a predetermined circumferential width and a plurality of holes (10, 11, 12) which place the cavity (9, 9a) in communication with the interior (3a) of the drum, an opening (13) formed in the circumferential wall (2) of the drum (3) at each region in which, inside the drum, a respective fin (4) is fixed, said opening (13) being in fluid communication with the cavity (9a) of the fin.
characterised in that each of said openings (13) formed in the circumferential wall (2) of the drum are located in wall regions (2a) which are radially lowered with respect to the other surrounding regions (2b).

2. Device according to claim 1, **characterised in that** each opening (13) formed in the circumferential wall (2) of the drum extends longitudinally parallel to the axial extension of the associated internal fin (4) to the drum and, in the circumferential direction, extends for a distance which does not exceed the circumferential width of the cavity (9, 9a) of the fin measured in the vicinity of its connection to the wall (2) of the drum.

3. Device according to claims 1 and 2, **characterised in that** the central portion of said opening (13) is radially aligned with at least one (10) of the holes which place the cavity (9a) of the fin (4) in communication with the interior (3a) of the drum.

4. Device according to claims 1 to 3, **characterised in that** said opening (13) in the wall (2) of the drum is formed in the region of the circumferential wall of the drum which, during rotation thereof, radially faces the liquid feed nozzle (14) positioned on the tank (1).

5. Device according to claims 1 to 4, **characterised in that** the cavity (9) of each fin (4) of the drum (3) comprises a dividing panel (15) which delimits a region (9a) of the cavity facing said opening (13), said region (9a) remaining separate from the other part of the cavity (9).

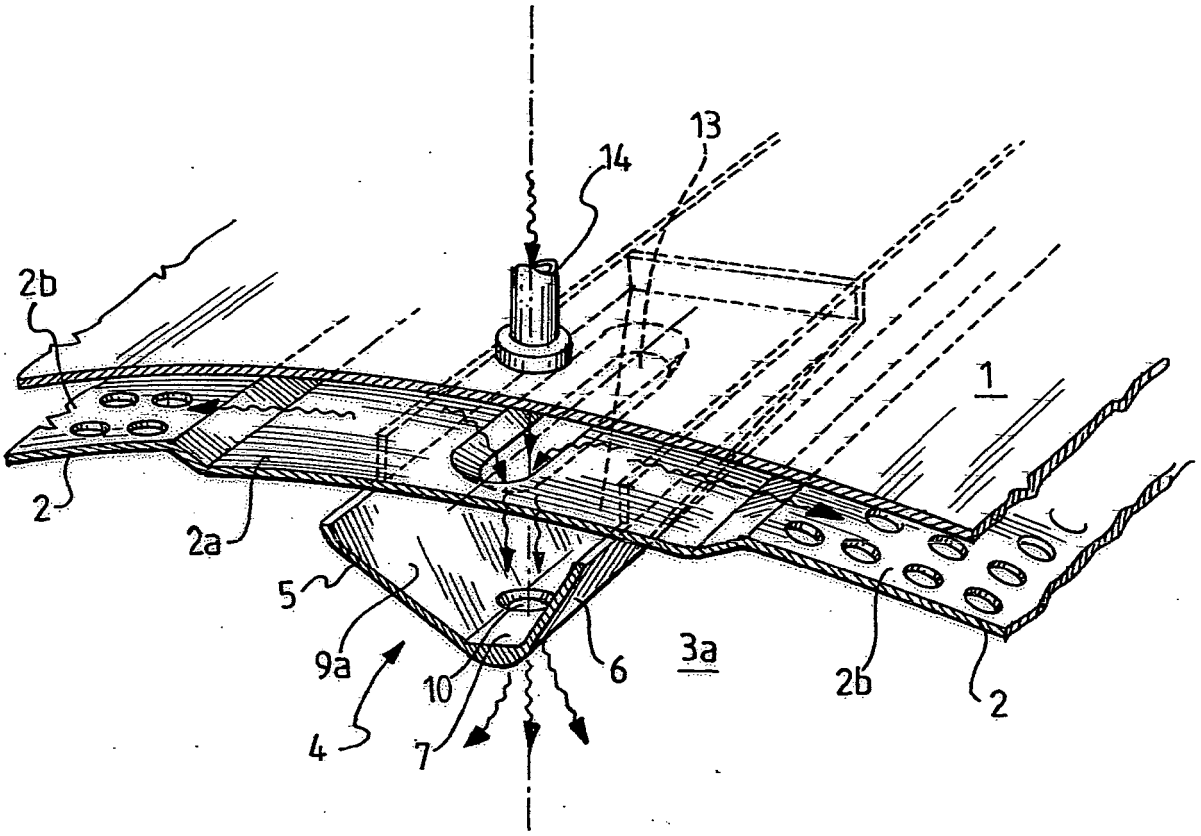

Fig.1

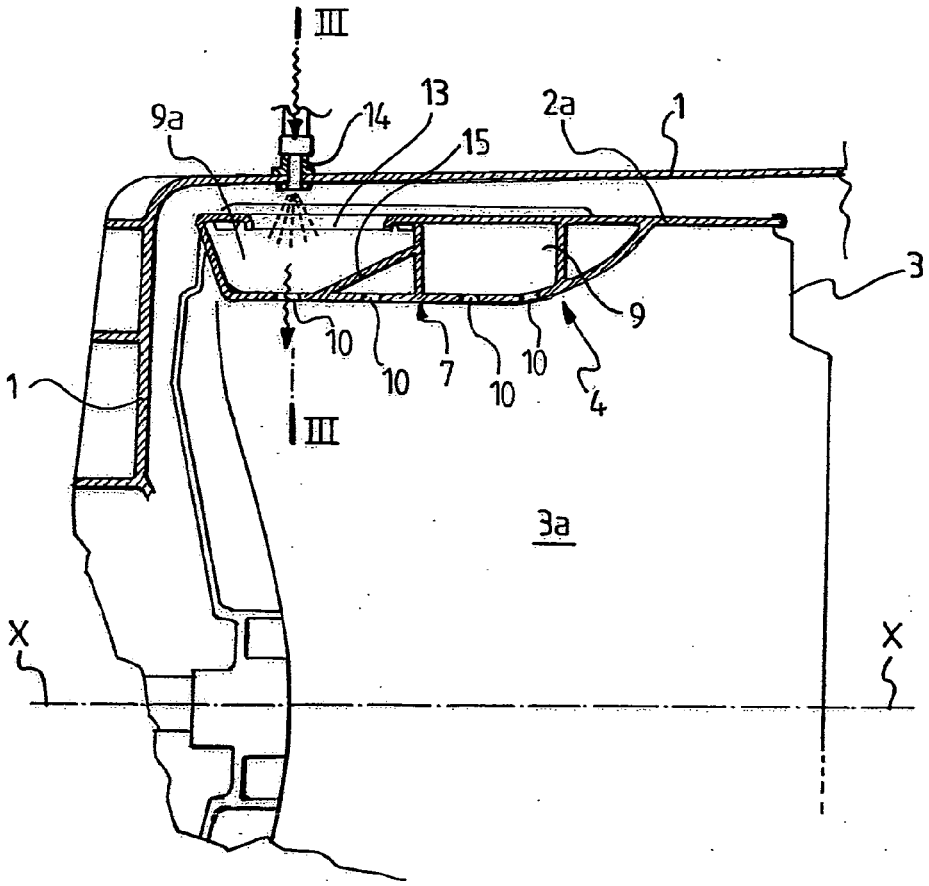
III
9a
14
13
15
2a
1
3
9
10
10
7
10
10
4
III
1
3a
X
X

Fig.2

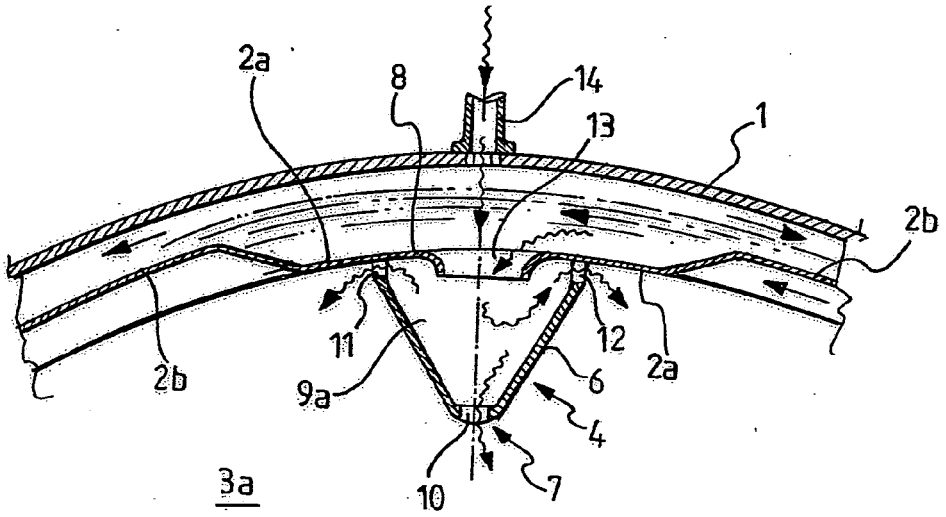
2a
8
14
13
1
2b
11
12
2a
2b
9a
6
4
3a
10
7

Fig.3

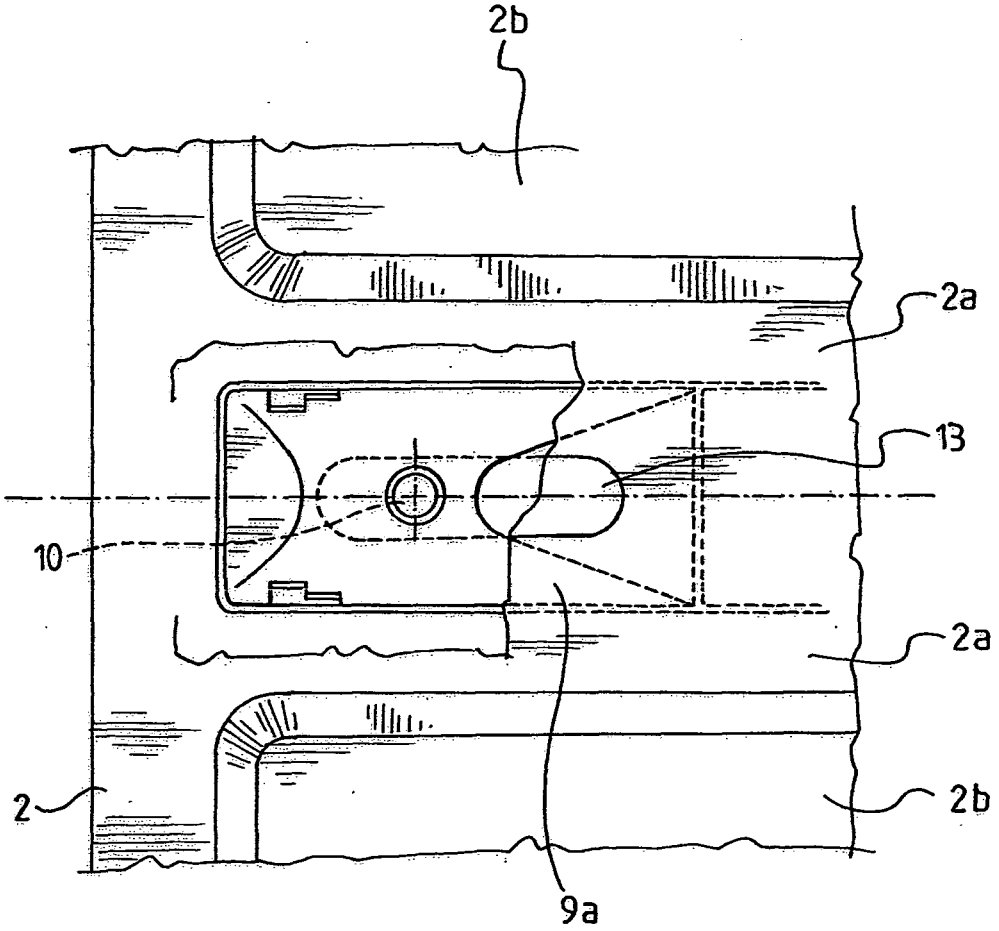

Fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5444

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Place of search	Date of completion of the search	Examiner
Munich	18 November 2008	Dupuis, Jean-Luc

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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1 EPO FORM 1503 03.82 (P04C01)

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