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(54) **Discharge unit for washing machine**

(57) A discharge unit for washing machine provided with a washing tank is described. The unit comprises a filter container (1) connected with the tank and in which a filter (2) for the filtering of the washing water coming from the tank is housed. The filter container (1) is fixedly mounted to a discharge pump container (100) provided with an impeller (9) for the conveying of the filtered washing water towards a discharge duct (7). Between

the filter (2) and the impeller (9) a wall (4) is arranged that is provided with an opening (5) with which a non-return valve is associated (10, 20) which maintains said opening (5) open by means of action of the same washing water during a normal operation of discharge of the washing water and which maintains said opening (5) closed by the action of the back-flow water from the discharge pipe (7) at the end of the discharge operation.

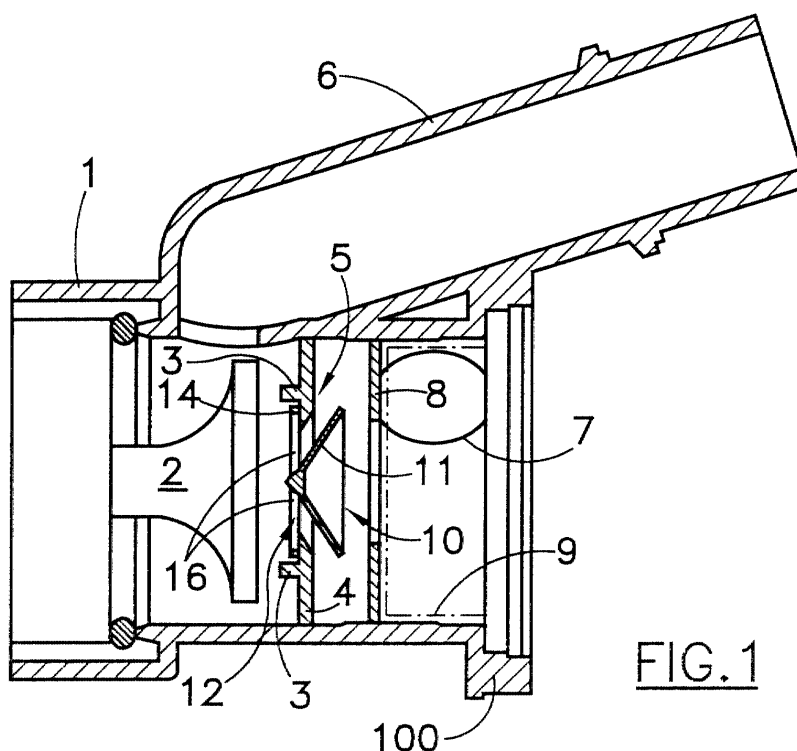


FIG. 1

Description

[0001] The present invention refers to a discharge unit for a washing machine, in particular for a laundry washing-machine or dishwasher.

[0002] Traditional washing-machines or dishwashers are commonly provided with a unit for the discharge of the washing water; such unit comprises a tubular duct in flow connection with the tank of the washing-machine or dishwasher, a filter for the filtering of the washing water coming from the tank and a discharge pump provided with a delivery pipe in order to discharge the filtered washing water outside. After the discharge operation a certain amount of washing water contained in the discharge pipe falls back inside the tank containing the filter and tends to outflow through the mouth of the filter during the operation of cleaning or substitution of the same thus forcing the user to recuperate it with fortune means.

[0003] In order to obviate the aforesaid disadvantage a valve is generally used that is capable to open up during the discharge of the washing water to the outside and to close up when such operation of discharge ends thus preventing the back-flow water from the pipe to invade the tank containing the filter. Such valve, called non-return valve, is traditionally positioned inside the container of the discharge pump in proximity of the discharge pipe.

[0004] The position of the non-return valve turns out to be somewhat disadvantageous because it makes the substitution in case of malfunction of the same difficult.

[0005] In view of the state of the art herein described, scope of the present invention is to present a discharge unit for washing machine in which the non-return valve is positioned in a position that is more easily reachable for the intervention on it or its substitution.

[0006] According to the present invention, such scope is attained by means of an discharge unit for washing machine provided with a washing tank, said unit comprising a filter container connected with said tank and in which a filter for the filtering of the washing water coming from said tank is housed, said filter container being fixedly mounted to a discharge pump container provided with an impeller for the conveying of the filtered washing water towards a discharge duct, characterized in that between said filter and said impeller a wall is arranged that is provided with an opening with which a non-return valve is associated, said non-return valve maintaining said opening opened by means of action of the same washing water during a normal operation of discharge of the washing water and maintaining said opening closed by means of action of the back flow water from said discharge pipe at the end of the discharge operation.

[0007] The characteristics and the advantages of the present invention will become evident from the following detailed description of an embodiment thereof, that is illustrated as a non limiting example in the enclosed drawings, in which:

Figure 1 is a section view of a discharge unit of a washing machine according to an embodiment of the present invention with the non-return valve in open position;

Figure 2 is a section view of the unit in Figure 1 with the non-return valve in closed position;

Figure 3 is a section view that shows a variation of the unit in Figure 1 with non-return valve in open position;

Figure 4 is a section view of the unit in Figure 3 with non-return valve in open position.

[0008] With reference to Figures 1 and 2 a unit for the discharge of the washing water according to the present invention is shown.

[0009] Such unit comprises a container 1 for a mushroom shaped filter 2 facing a vertical wall 4 mounted inside the container 1 and provided with a central hole 5. Said container 1 is coupled on top, in the part of container antecedent the wall 4, to a tubular duct 6 that is in flow connection with a washing tank not visible in figures. The same container 1 is fixedly mounted to a container 100 of an impeller 9 of a discharge pump that is laterally provided with an opening 7 for the connection with a discharge pipe not visible in the figures. In the container 100 another centrally pierced vertical wall 8 and arranged between the vertical wall 4 and the opening 7 is also provided.

[0010] In proximity of the hole 5 of the vertical wall 4 a non-return valve 10 generally made of rubber is arranged which comprises a cone 11 connected at its apex to a round plate 12 similar to a wheel with round rim 14 and openings 16 delimited by appropriate spokes. The valve 10 is free to move only horizontally and it is positioned so that the plate 12 gets in abutment with the edge of the hole 5 of the wall 4 in its surface facing the filter 2 and the cone 11 is arranged with its base facing the wall 8.

[0011] During the discharge operation of the washing water contained in the tank, the same washing water flows through the duct 6 inside the container 1 and it is filtered by the filter 2. The flow of the washing water thrusts the plate 12 of the valve 10 in abutment with the wall 4, as visible in Figure 1; in that way the washing water passes through the openings 16 and the passage area delimited by the edge of the hole 5 of the wall 4 and by the side surface of the cone 11 of the valve 10 and after having passed through the hole of the wall 9 is lead toward the opening 7 of the discharge pipe.

[0012] Once the discharge operation is completed, the back-flow water from the discharge pipe thrusts the cone 11 of the valve 10 toward the wall 4; in such a way the valve 10 is moved towards the left, the plate 12 is not any more in abutment with the wall 4 while the side surface of the cone 11 gets in abutment with the edge of the hole 5 of the wall 4 thus closing the passage for the back-flow water from the discharge pipe, as visible in Figure 2.

[0013] The conical shape of the part 11 of the non-return valve 10 allows the closing of the hole 5 of the wall 4 with any position of the valve 10 at the moment of the water back flow from the discharge pipe; the shape of the plate 12 allows to leave the passage of the washing water free when the same must be sucked by the impeller 9 of the discharge pump.

[0014] The vertical wall 4 is provided with projections 3 that allow a simple removal from the container 1 by means of action of holding with pincers after the extraction of the filter 2.

[0015] The mushroom filter 2 is located at a preestablished distance from the wall 4, for instance comprised between 3÷4mm.

[0016] As an alternative the filter 2 can be made of a ring structure or an appropriately pierced tubular structure.

[0017] A variation of the embodiment above described provides for the use of a different type of non-return valve 20 shown in Figures 3 and 4. Such valve 20, made of rubber, is positioned in the part of container 1 comprised between the walls 4 and 8 and it comprises a half sphere shaped plate 21 attached to an upper appendix 30 of the wall 4 of the container 1 as a pendulum by means of a rubber border 22. The plate 21 has the hollow part facing the wall 8 while its spherical surface faces towards the wall 4 so as to be able to close the hole 5.

[0018] During the operation of discharge of the washing water, the same water after having been filtered by the filter 2 outflows from the hole 5 thus moving the plate 21 towards the right and it is conveyed towards the discharge pipe, as visible in Figure 3.

[0019] After completion of the discharge operation, the back-flow water from the discharge pipe thrusts the plate 21 of the valve 20 towards the wall 4; in such a way the plate 21 goes in abutment with the edge of the hole 5 of the wall 4 thus closing the passage for the back-flow water from the discharge pipe, as visible in Figure 4.

Claims

1. Discharge unit for washing machine provided with a washing tank, said unit comprising a filter container (1) connected with said tank and in which a filter (2) for the filtering of the washing water coming from said tank is housed, said filter container (1) being fixedly mounted to a discharge pump container (100) provided with an impeller (9) for the conveying of the filtered washing water towards a discharge duct (7), **characterized in that** between said filter (2) and said impeller (9) a wall (4) is located that is provided with an opening (5) with which a non-return valve (10, 20) is associated, said non-return valve (10, 20) maintaining said opening (5) open by means of action of the same washing water during a normal operation of discharge of the washing wa-

ter and maintaining said opening (5) closed by the action of the back-flow water from said discharge pipe (7) at the end of the discharge operation.

2. Unit according to claim 1, **characterized in that** said non-return valve (10) comprises a cone (11) having the base facing the impeller (9) of the discharge pump and fixedly mounted at its apex to a pierced plate (12) facing the filter (2), being said plate (12) in abutment with the edge of said opening (5) of the wall (4) during the discharge operation of the washing water and being instead the side surface of said cone (11) in abutment with the edge of said opening (5) of the wall (4) at the end of the discharge operation.

3. Unit according to claim 1, **characterized in that** said non-return valve (20) comprises a half sphere shape sphere shape plate (21) whose spherical surface is facing the wall (4) and whose hollow part is facing the impeller (9) of the discharge pump, said plate (21) being attached as a pendulum in proximity of the upper part of said wall (4) so that it maintains opened said opening (5) of the wall open during the discharge operation of the washing water and being the spherical surface of said plate (21) in abutment with the edge of said opening (5) of the wall (4) once the operation of discharge has been completed.

4. Unit according to claim 1, **characterized in that** said non-return valve (10, 20) is made of rubber.

5. Unit according to claim 1, **characterized in that** said washing machine is a laundry washing-machine.

6. Unit according to claim 1, **characterized in that** said washing machine is a dishwasher.

7. Unit according to claim 1, **characterized in that** said wall (4) is easy removable from said filter container (1).

