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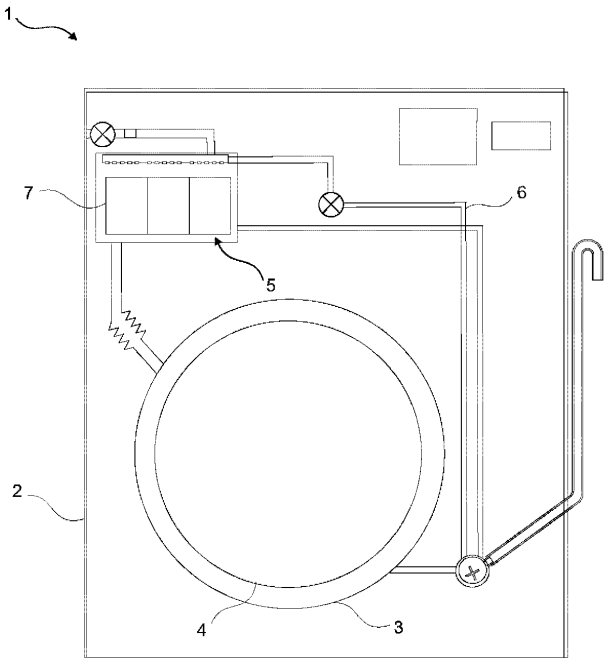
(54) A WASHING MACHINE COMPRISING A FILTER

(57) The present invention relates to a washing machine (1) comprising a body (2); a tub (3) which is disposed in the body (2); a drum (4) which is disposed in the tub (3) and wherein the washing process is performed; a housing (5) which is arranged on the body (2) and which is in fluid communication with the tub (3); a circulation line (6) which enables the water received from the tub (3) to be delivered to the housing (5); a dispenser (7) which is disposed into the housing (5); and a filter box (10) which is disposed on the dispenser (7) and which has a water inlet opening (8) connected to the circulation line (6) and at least one filter (9) which filters the fibers in the water.

Figure 1



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Description

[0001] The present invention relates to a washing machine comprising a filter for filtering the fibers in the washing water.

[0002] In washing machines, the laundry is loaded into a drum disposed in a washing tub supplied with detergent-water mixture and is washed in the drum which is rotated. During the washing process, fibers separated from the laundry subjected to both mechanical and chemical effects are discharged, together with the water discharged at the end of the washing process, to the waste water line whereto the washing machine is connected. In traditional washing machines, each washing process causes approximately 1 milligrams of fibers to be discharged to the waste water line. It is determined that more than half of microplastic accumulation in the nature is caused by waste waters originating from washing machines. Especially, taking into account the damage caused by synthetic fibers and particles in the nature, it is observed that waste waters originating from washing machines causes a critical environmental pollution. Therefore, the use of filters which filter the washing water is becoming widespread. The filters remove the microplastics or fibers in the washing water from the washing water. However, after a certain time, as the processes are repeated, the filters wear out and become unusable. The parts of the filters which contact the washing water the most wear out more quickly compared to other surfaces.

[0003] In the state of the art Korean Patent Application No. KR20070063996, a washing machine is disclosed, comprising a filter which is positioned under the detergent dispenser.

[0004] In the state of the art Chinese Patent Application No. CN201172752, a washing machine is disclosed, comprising a filter which is disposed into the detergent compartment.

[0005] The aim of the present invention is the realization of a washing machine wherein the economic life of the filter, which retains the fibers breaking off from the laundry during the laundry washing and/or drying process, is extended

[0006] The washing machine realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a body; a tub which is disposed in the body; a housing which is in fluid communication with the tub; a circulation line which transfers the water taken from the tub to the housing; a dispenser which is placed into the housing, and a filter box provided on the dispenser and having a water inlet opening connected to the circulation line and at least one filter for filtering the fibers in the water. The filter is a microfilter.

[0007] The washing machine of the present invention comprises a channel which is arranged in the filter box, which is connected to the water inlet and through which the water coming from the circulation line flows, and distribution openings which enable the water flowing through the channel to be delivered onto the filter. The distribution openings are arranged on the channel at certain intervals. The water is sent onto different points of the filter surface through each distribution opening. Thus, the water is delivered onto the filter in a homogeneous manner. Consequently, the risk of a part of the filter being subjected to more water and fibers than other parts so as to be worn down is eliminated. The economic life of the filter is extended.

[0008] In an embodiment of the present invention, the channel is in the form of a cylindrical tube. Thus, the water flows more easily in the channel.

[0009] In another embodiment of the present invention, the filter box comprises a fixing member which bears against the channel so as to prevent the channel from moving in the filter box or from dislodging. There can be more than one fixing member in the filter box. Thus, if one of the fixing members is damaged, the channel is kept fixed in the filter box by means of the other fixing members.

[0010] In another embodiment of the present invention, the washing machine comprises a headpiece which is attached onto the channel. The headpiece is attached onto the end of the channel which is connected to the water inlet opening and enables the channel to be fixed to the water inlet opening. The headpiece is snap-fittingly attached onto the skirt of the water inlet opening which extends into the filter box. In a preferred version of the embodiment, the headpiece is circular. The diameter of the headpiece is larger than the diameter of the water inlet opening. Thus, the fixing of the channel to the water inlet opening is facilitated.

[0011] In an embodiment of the present invention, the channel is attached to the water inlet opening in an inclined manner. The channel extends from the water inlet opening towards the base of the filter box. Thus, the flow rate of the water taken into the channel is increased. The water is enabled to be sent from the distribution openings onto the filter with more pressure.

[0012] By means of the present invention, a washing machine is realized, wherein the water sent onto the filter is homogeneously distributed into the filter. Thus, the risk of a part of the filter being more worn down than other parts is eliminated, increasing the economic life thereof.

[0013] The washing machine realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the schematic view of the washing machine related to an embodiment of the present invention.

Figure 2 - is the schematic view of the filter box related to an embodiment of the present invention.

Figure 3 - is the schematic view of the channel related to another embodiment of the present invention.

Figure 4 - is the schematic view of the channel related to another embodiment of the present invention.

[0014] The elements illustrated in the figures are numbered as follows:

1. Washing machine
2. Body
3. Tub
4. Drum
5. Housing
6. Circulation line
7. Dispenser
8. Water inlet opening
9. Filter
10. Filter box
11. Channel
12. Distribution opening
13. Fixing member
14. Headpiece

[0015] The washing machine (1) comprises a body (2); a tub (3) which is disposed in the body (2); a drum (4) which is disposed in the tub (3) and wherein the washing process is performed; a housing (5) which is arranged on the body (2) and which is in fluid communication with the tub (3); a circulation line (6) which enables the water received from the tub (3) to be delivered to the housing (5); a dispenser (7) which is disposed into the housing (5); and a filter box (10) which is disposed on the dispenser (7) and which has a water inlet opening (8) connected to the circulation line (6) and at least one filter (9) which filters the fibers in the water. In a preferred version of the embodiment, the filter (9) is a microfilter. Fibers may contain microplastics. By means of a filter (9) which is a microfilter, the microplastics in the fibers can be filtered. The fibers breaking off from the laundry treated in the washing machine (1) mix into the washing water. The washing water is sent from the circulation line (6) into the filter box (10) by means of the water inlet opening (8). In the filter box (10), the washing water is passed through the filter (9) such that the fibers therein are filtered.

[0016] The washing machine (1) of the present invention comprises a channel (11) which is arranged in the filter box (10), which is connected to the water inlet opening (8) at one end, which extends from the water inlet opening (8) almost along the filter box (10) and through which the water taken from the circulation line (6) by means of the water inlet opening (8) flows, and a plurality of distribution openings (12) which are arranged on the channel (11) and which enables the water flowing through the channel (11) to be delivered onto the filter (9). The water taken into the filter box (10) by means of the water inlet opening (8) first flows through the channel (11). By means of the distribution openings (12) on the channel (11), the water flowing through the channel 11) is sent onto the filter (9). By means of the distribution openings (12) arranged at different points on the channel (11), the water is enabled to be delivered onto the filter (9) homogeneously. Thus, the risk of a part of the filter (9) getting in contact with water more than the other parts so as to be worn down is eliminated. Consequently, the economic life of the filter (9) is extended.

[0017] In an embodiment of the present invention, the washing machine (1) comprises a cylindrical channel (11). Thus, the water is enabled to flow more easily through the channel (11). In a preferred version fo the present invention, the distribution openings (12) are located on the underside of the channel (11). Even if the pressure of the water taken through the water inlet opening (8) is low, the water can be more easily delivered to the distribution openings (12) thanks to the cylindrical structure of the channel (11). In a preferred version of the present invention, the channel (11) is in the form of a closed cylindrical tube. Thus, in case high-pressure water is taken into the channel (11) from the water inlet opening (8), the water is prevented from leaving the channel (11) at any other point other than the distribution openings (12).

[0018] In an embodiment of the present invention, the dishwasher (1) comprises at least one fixing member (13) which is disposed on the filter box (10) and which bears against the channel (11) so as to enable the channel (11) to be fixed into the filter box (10). The fixing member (13) is in the form of an extension which extends from the filter box (10) towards the channel (11) and which bears against the channel (11) so as to enable the channel (11) to be fixed into the filter box (10). Thus, the channel (11) is prevented from dislodging from the filter box (10) while the filter box (10) is being transported or because of forces which may generated due to the pressure of the flowing water.

[0019] In another embodiment of the present invention, the washing machine (1) comprises the distribution openings (12) which are arranged on the channel (11) at equal intervals. The distribution openings (12) are arranged along the channel (11) at equal intervals. Thus, the water is delivered onto the filter (9) in a homogeneous manner.

[0020] In another embodiment of the present invention, the washing machine (1) comprises a headpiece (14) which is disposed on the channel (11), which enables the channel (11) to be snap-fittingly attached to the water inlet opening (8) and which has a diameter larger than the diameter of the water inlet opening (8). The headpiece (14) is snap-fittingly attached onto the skirt of the water inlet opening (8) which extends into the filter box (10). Thus, the channel (11) is enabled to be fixed and centered in the filter box (10).

[0021] In another embodiment of the present invention, the washing machine (1) comprises the channel (11) which is placed so as to be inclined from the water inlet opening (8) towards the base of the filter box (10). Thus, the delivery of the water to the distribution openings (12) at the end of the channel (11) is facilitated by also using the effect of the gravity.

[0022] By means of the present invention, a washing machine (1) is realized, wherein the water is delivered homogeneously onto the surface of the filter (9) by means of a channel (11) which is connected to the water inlet

opening (8) and through which the water received from the circulation line (6) flows, and a plurality of the distribution openings (12) which are arranged on the channel (11) and which enable the water to be delivered onto the filter (9). Thus, the surface of the filter (9) is enabled to contact with almost the same amount of water, thereby extending the economic life of the filter (9).

Claims

1. A washing machine (1) **comprising** a body (2); a tub (3) which is disposed in the body (2); a drum (4) which is disposed in the tub (3) and wherein the washing process is performed; a housing (5) which is arranged on the body (2) and which is in fluid communication with the tub (3); a circulation line (6) which enables the water received from the tub (3) to be delivered to the housing (5); a dispenser (7) which is disposed into the housing (5); and a filter box (10) which is disposed on the dispenser (7) and which has a water inlet opening (8) connected to the circulation line (6) and at least one filter (9) which filters the fibers in the water, **characterized by**

   - a channel (11) which is arranged in the filter box (10), which is connected to the water inlet opening (8) at one end, which extends from the water inlet opening (8) almost along the filter box (10) and through which the water taken from the circulation line (6) by means of the water inlet opening (8) flows, and
   - a plurality of distribution openings (12) which are arranged on the channel (11) and which enables the water flowing through the channel (11) to be delivered onto the filter (9).

2. A washing machine (1) as in Claim 1, **characterized by** a cylindrical channel (11).

3. A washing machine (1) as in any one of the above claims, **characterized by** at least one fixing member (13) which is disposed on the filter box (10) and which bears against the channel (11) so as to enable the channel (11) to be fixed into the filter box (10).

4. A washing machine (1) as in any one of the above claims, **characterized by** the distribution openings (12) which are arranged on the channel (11) at equal intervals.

5. A washing machine (1) as in any one of the above claims, **characterized by** a headpiece (14) which is disposed on the channel (11), which enables the channel (11) to be snap-fittingly attached to the water inlet opening (8) and which has a diameter larger than the diameter of the water inlet opening (8).

6. A washing machine (1) as in any one of the above claims, **characterized by** the channel (11) which is placed so as to be inclined from the water inlet opening (8) towards the base of the filter box (10).

Figure 1

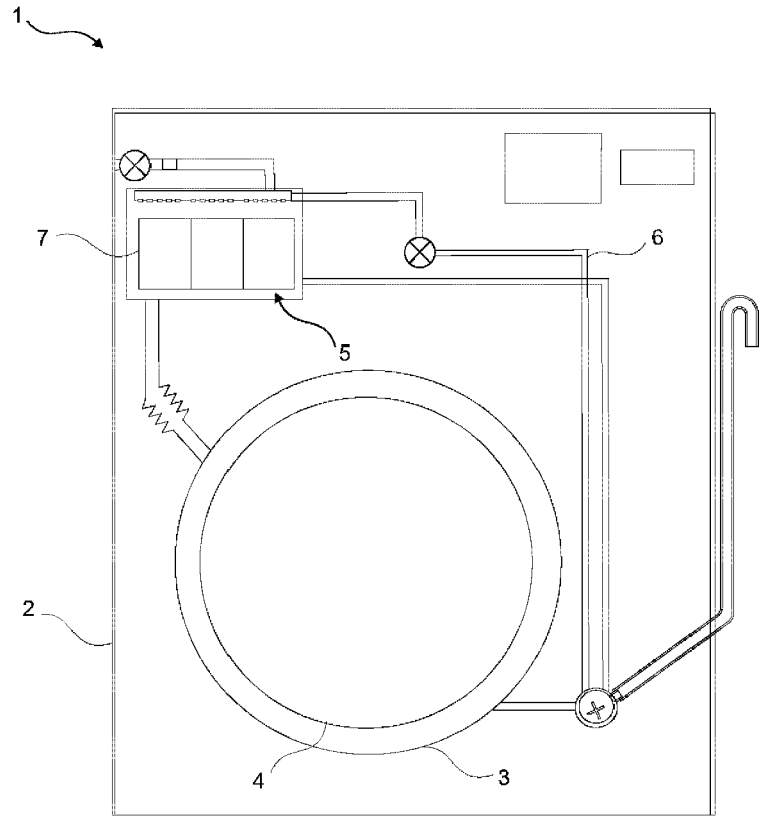


Figure 2

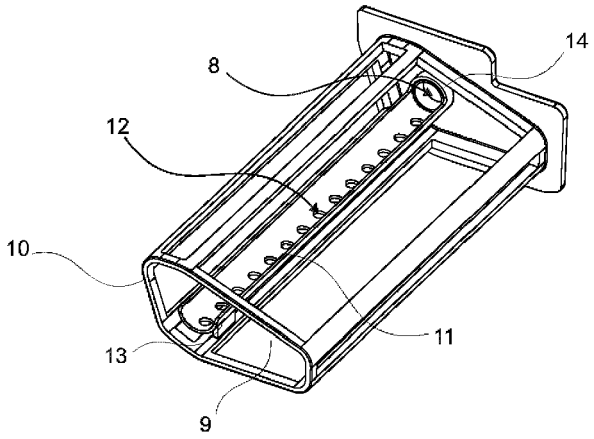


Figure 3

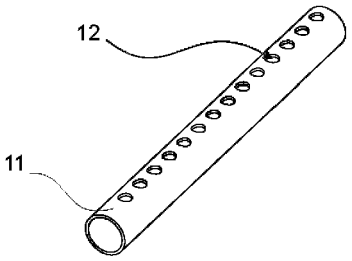
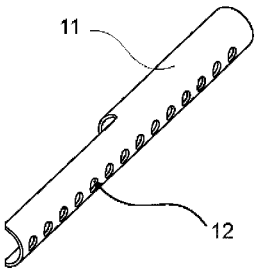


Figure 4



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EUROPEAN SEARCH REPORT

Application Number
EP 20 21 0298

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D06F
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	1 March 2021	Diaz y Diaz-Caneja

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