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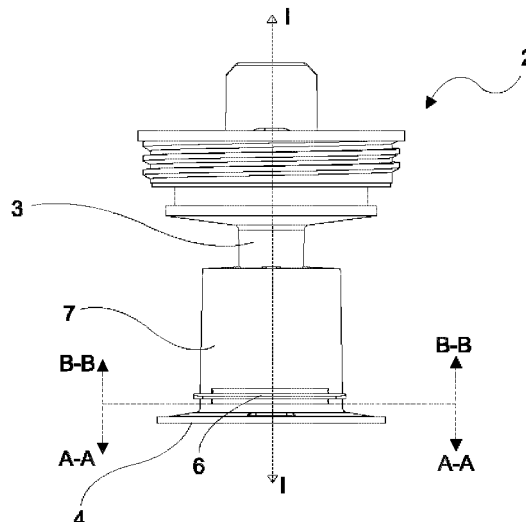
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(54) **A FILTER ASSEMBLY HAVING IMPROVED FILTERING MECHANISM**

(57) The present invention relates to a filter assembly (1), comprising; a filter (2) having a rod (3) extending along an axis (I) with a plate (4) disposed at one end thereof; the plate (4) comprising an opening (5) for facilitating the passage of fluid; a wing (6) disposed on the filter (2); wherein the difference of the distance between

a nearest and a furthest point of the opening (5) and that of the wing (6) from the axis (I) is a first length (x) and a second length (y) respectively; wherein the second length (y) is greater than the first length (x) and wherein the projection of the wing (6) along the axis (I) is configured to surround that of the opening (5).

Figure 2



Description

[0001] The present invention relates to a filter assembly, in particular to a filter assembly having improved filtering mechanism.

[0002] In washing machines, as a result of throwing some parts other than the laundry into the drum, these parts can leave the drum and reach the tub and pump. Some of these parts may cause the impeller to be blocked when they reach the impeller section. The blockage of the pump impeller causes the washing machine to fail to complete the program and the washing machine to malfunction. The filter assembly, drum and bellows designs should be designed in such a way as to prevent these samples from reaching the propeller as much as possible. The bellows and drum should prevent the passage of articles into the tub. The pump filter, on the other hand, must be able to hold articles that may cause the impeller to block. The filter assembly must be able to hold samples that may cause the impeller to block.

[0003] A prior art publication in the technical field of the present invention may be referred to as CN203729116U among others, the document disclosing a washing machine having a device for draining and filtering water used during washing steps of the washing machine.

[0004] A prior art publication in the technical field of the present invention may be referred to as DE202009014134U1 among others, the document disclosing a washing machine and relates to a filter insert for a pump, in particular a liquid pump for pumping dirty water out of a washing machine or a dishwasher.

[0005] A prior art publication in the technical field of the present invention may be referred to as US7243512B2 among others, the document relates to a washing machine and more particularly, to a filter assembly of a washing machine having a simple structure to separate dirt or particles involved in washing water using a centrifugal force.

[0006] An objective of the present invention is to provide a filter assembly having improved filtering mechanism.

[0007] Another objective of the present invention is to provide a filter assembly having a filter mechanism that is able to block articles, especially elongated articles to reach the impeller, thereby improving the life time of the impeller and that of the washing machine.

[0008] The method realized to achieve the aim of the present invention and disclosed in the first claim and the dependent claims comprises a filter assembly. The filter assembly comprises a casing wherein the casing houses a filter having a rod extending along the axis (I). A plate is disposed at one end of the rod. The plate comprises an opening used for facilitating the passage of the fluid through the plate. The filter comprises a wing disposed on the filter. The difference between a nearest point and furthest point of the opening from the axis (I) is equal to a first length (x). The difference between a nearest point

and furthest point of the wing from the axis (I) is equal to a second length (y). The second length (y) is greater than the first length (x). Additionally, the projection of the wing along the axis (I) is configured to completely overlap and cover the opening. The wing and the opening each comprises a pair of end lines wherein the said end lines point toward the axis (I). The angles subtended by an arc from the end lines of the wing and the opening with the axis (I) are α and β respectively. The angles are related with the disequilibrium of $\alpha > \beta + 5$ degrees. By means of this, elongated articles are prevented from passing through the opening.

[0009] In an embodiment of the invention, the filter assembly comprises a cylindrical wall that originates from the plate and extends along the axis (I) and towards the end of the filter assembly opposite to the end whereon the plate is located. The cylindrical wall is concentric with the rod. The cylindrical is also used to accommodate the wing.

[0010] In an embodiment of the invention, a channel for facilitating the flow of fluid through the filter assembly is provided in between the rod and the cylindrical wall. The channel is provided in the form of a hole and on the plate. The channel allows larger amount of fluid to pass through the filter assembly.

[0011] In an embodiment of the invention, the rod is connected to the cylindrical wall by means of at least a support rib. The support ribs provide structural support, meanwhile filtering out the particles such as lint, pieces of clothing, yarn, fiber.

[0012] In an embodiment of the invention, the support rib extends spirally around the rib and along the axis (I). The helps create a vortex which helps increase the suction of fluid along the filter assembly.

[0013] In an embodiment of the invention, the wing comprises an upper and a lower surface wherein the said surfaces are inclined along the axis (I). This means that the thickness of the wing along the axis (I) increases towards the rod and therefore towards the axis (I).

[0014] In an embodiment of the invention, the filter assembly is configured to be used in a washing machine.

[0015] Another advantageous effect provided by means of this invention is that the foreign articles and especially elongated articles are prevented to reach the impeller which may damage the impeller. As a result, life time of the filter assembly is improved.

[0016] The drawings are not meant to delimit the scope of protection as identified in the claims nor should they be referred to alone in an effort to interpret the scope identified in the claims without recourse to the technical disclosure in the description of the present invention.

Figure 1 - is a side view of the filter assembly

Figure 2 - is a side view of the filter

Figure 3 - is a cross sectional view along dashed A-A lines in Figure - 2

Figure 4 - is a cross sectional view along dashed B-B lines in Figure - 2

Figure 5 - is a side view of the filter

Figure 6 - is an enlarged view of dashed C-C lines in Figure - 5

[0017] The following numerals are assigned to different parts demonstrated in the drawings and referred to in the present detailed description of the invention:

1. Filter assembly
2. Filter
3. Rod
4. Plate
5. Opening
6. Wing
7. Cylindrical wall
8. Channel
9. Support rib

I : Axis

x : First length

y : Second length

α : the angle subtended by an arc from the ends of the wing (6), the vertex being the axis (I).

β : the angle subtended by an arc from the ends of the opening (5), the vertex being the axis (I).

[0018] The present invention relates to a filter assembly (1), comprising; a filter (2) having a rod (3) extending along an axis (I) with a plate (4) disposed at one end thereof, the plate (4) comprising an opening (5) for facilitating the passage of fluid; a wing (6) disposed on the filter (2); wherein the difference of the distance between a nearest and a furthest points of the opening (5) and that of the wing (6) from the axis (I) is a first length (x) and a second length (y) respectively; wherein the second length (y) is greater than the first length (x) and wherein the projection of the wing (6) along the axis (I) is configured to surround that of the opening (5).

[0019] In the preferred embodiment of the invention, the wing (6) and the opening (5) comprises a pair of end lines perpendicularly extending away from the axis (I) and that the angles subtended by an arc from the ends of the wing (6), and that of the opening (5) are α and μ respectively, the vertex being the axis (I), and that the relation between the angles is; $\alpha > \beta + 5$ degrees. The filter assembly (1) comprises a casing housing the operational parts of the filter assembly (1). The filter assembly (1) comprises a hole via which the filter (2) is inserted inside the casing. The filter comprises a rod (3) extending linearly and defining the axis (I). The filter (2) further comprises the plate (4) disposed at one end thereof wherein and a grip portion disposed onto the other end. The opening (5) is provided on the plate (4). The filter (1) upon being placed inside the filter assembly (1) divides the inner volume of the casing into two chambers. The plate (4) is shaped so as to divide the casing into said chamber. The opening (5) provides the liquid entering one of the said chambers to pass to the adjacent one of the said

chambers. The filter (1) further comprises the wing (6). The difference of the distance between the nearest point of the wing (6) to the axis and that of the furthest point of the wing (6) to the axis is the first distance (x). Meaning that the depth of the wing (6) with respect to the axis (I) is the first distance (x). The difference of the distance between the nearest point of the opening (5) to the axis and that of the furthest point of the opening (5) to the axis is the second distance (y). Meaning that the depth of the opening (5) with respect to the axis (I) is the second distance (y). In other words, the wing (6) is longer than the opening (5) and completely covers the opening (5) along the axis (I). The wing (6) and the opening (5) comprises the pair of end lines, the said lines forming a linear line pointing towards the axis (I). The angle between the end lines of the opening (5) and the axis (I) is equal to β . The angle between the end lines of the wing (6) and the axis (I) is equal to α . The said angles are related with the disequilibrium of $\alpha > \beta + 5$. Meaning that the wing (6) scans an angle of 5 degrees larger than that of the opening (5) with respect to the axis (I). In a further preferred embodiment, $\alpha > \beta + 20$. Additionally, due to the large area covered by the wing (6) along the projection of the axis (I), the wing (6) completely covers the opening (5) along the axis (I). By means of this, elongated articles entering the filter assembly (1) is prevented to proceed into to the adjacent chamber defined by the plate (4). This chamber houses an impeller that is used for creating vacuum, forcing the liquid to pass through the filter assembly (1). The advantageous effect provided by preventing the elongated articles to reach the impeller is that the malfunction of the impeller by the elongated articles getting caught in between the blades is prevented.

[0020] In an embodiment of the invention, the filter assembly (1) comprises a cylindrical wall (7) provided on the plate (4) and concentric with the rod (3) onto which the wing (6) is provided. The cylindrical wall (7) originates from the plate (4) and extends towards the opposing end of the filter along and concentric with the rod (3) and therefore with the axis (I). The cylindrical wall (7) does not contact the grip portion and there is a gap between them. The wing is provided in the form of a protrusion on the cylindrical wall (7) and extends away from the axis (I). The cylindrical wall (7) along with the gap formed in between the grip portion, blocks the movement of large articles inside the filter assembly (1).

[0021] In an embodiment of the invention, the filter assembly (1) comprises a channel (8) provided on the plate (4) in between the rod (3) and the cylindrical wall (7). The channel (8) allows to water pass through the filter (2) in greater amounts.

[0022] In an embodiment of the invention, the filter assembly (1) comprises a support rib (9) connecting the cylindrical wall (7) to the rod (3). The ribs (9) extend between the rod (3) and the cylindrical wall (7) and fixes the cylindrical wall (7) onto the rod (3). The ribs (9) provides filtering effect for the water passing through, preventing pieces of clothing, such as lint, yarn, and fibers

to reach the impeller which in time may damage the impeller. Additionally, the support ribs (9) provides structural support for the cylindrical wall (7).

[0023] In an embodiment of the invention, the support rib (9) extends spirally around the rod (3). The ribs (9) extend spirally around the rod (3) which helps create a vortex along with the vacuum effect of the impeller, increasing water filtering and extraction efficiency of the filter assembly (1).

[0024] In an embodiment of the invention, the wing (6) comprises an upper and a lower surface wherein the said surfaces are inclined along the axis (I). The inclination provides a stronger wing (6).

[0025] In an embodiment of the invention, the filter assembly (1) is used in a washing machine.

[0026] In an embodiment of the invention, the plate (4) is circular.

[0027] In an embodiment of the invention, the filter assembly (1) comprises a seal in between the filter (2) and the filter assembly (1), preventing water leakages.

[0028] An advantageous effect provided by means of the invention is that the articles, having an elongated form are prevented to bypass the filter (1) and reach the impeller.

3. A filter assembly (1) according to claim 2, **characterized by** a channel (8) provided on the plate (4) in between the rod (3) and the cylindrical wall (7).

5 4. A filter assembly (1) according to claims 2 to 3, **characterized by** a support rib (9) connecting the cylindrical wall (7) to the rod (3).

10 5. A filter assembly (1) according to claim 4, **characterized in that** the support rib (9) extends spirally around the rod (3).

15 6. A filter assembly (1) according to any preceding claim, **characterized in that** the wing (6) comprises an upper and a lower surface wherein the said surfaces are inclined along the axis (I).

20 7. A washing machine comprising a filter assembly (1) according to any preceding claim.

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Claims

1. A filter assembly (1), comprising;

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a filter (2) having a rod (3) extending along an axis (I) with a plate (4) disposed at one end thereof,

the plate (4) comprising an opening (5) for facilitating the passage of fluid;

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a wing (6) disposed on the filter (2); wherein the difference of the distance between a nearest and a furthest point of the opening (5) and that of the wing (6) from the axis (I) is a first length (x) and a second length (y) respectively; wherein the second length (y) is greater than the first length (x) and wherein the projection of the wing (6) along the axis (I) is configured to surround that of the opening (5);

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characterized in that

the wing (6) and the opening (5) comprises a pair of end lines perpendicularly extending away from the axis (I) and that the angles subtended by an arc from the ends of the wing (6) and that of the opening (5) are α and μ , respectively, the vertex being the axis (I), and that the relation between the angles is; $\alpha > \beta + 5$ degrees.

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2. A filter assembly (1) according to claim 1, **characterized by** a cylindrical wall (7) provided on the plate (4) and concentric with the rod (3) onto which the wing (6) is provided.

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Figure 1

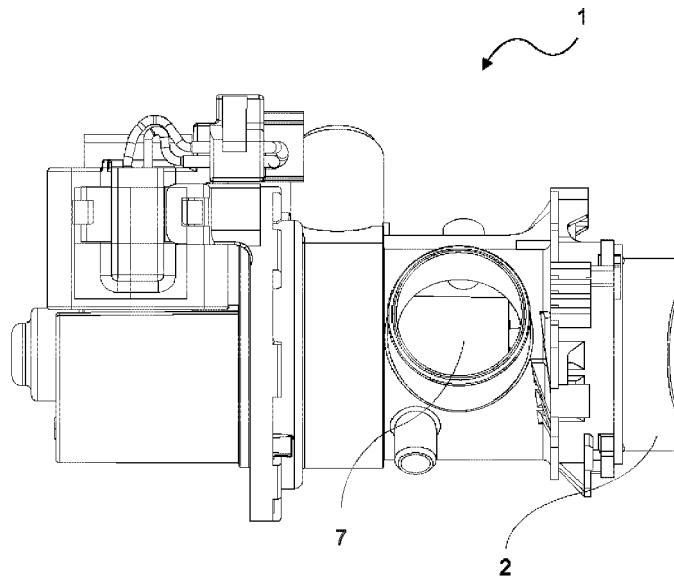


Figure 2

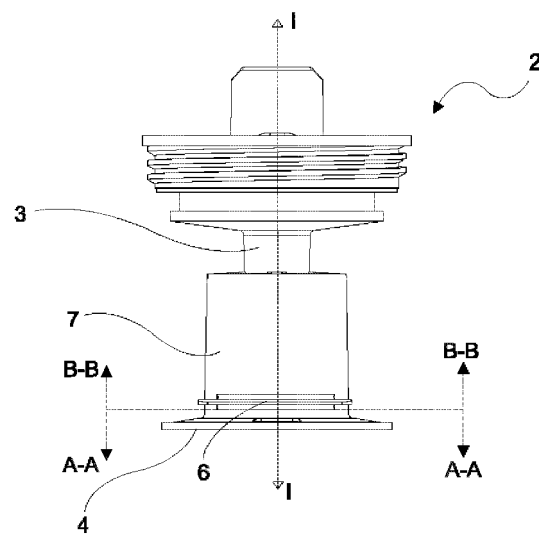


Figure 3

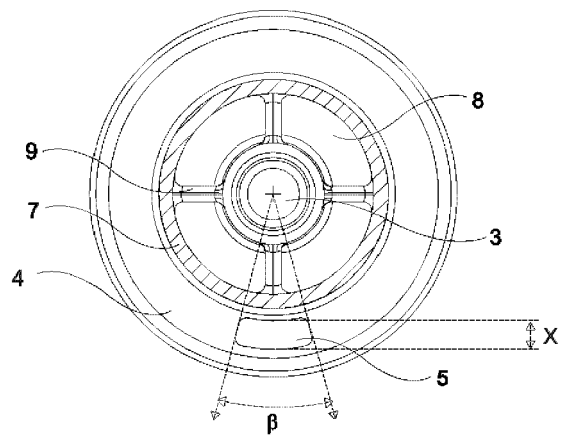


Figure 4

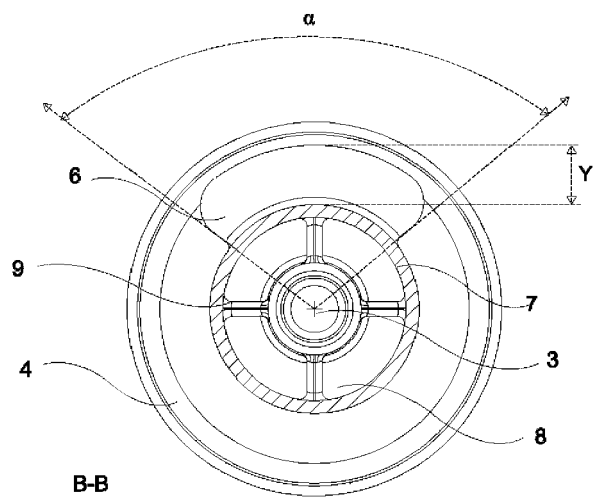


Figure 5

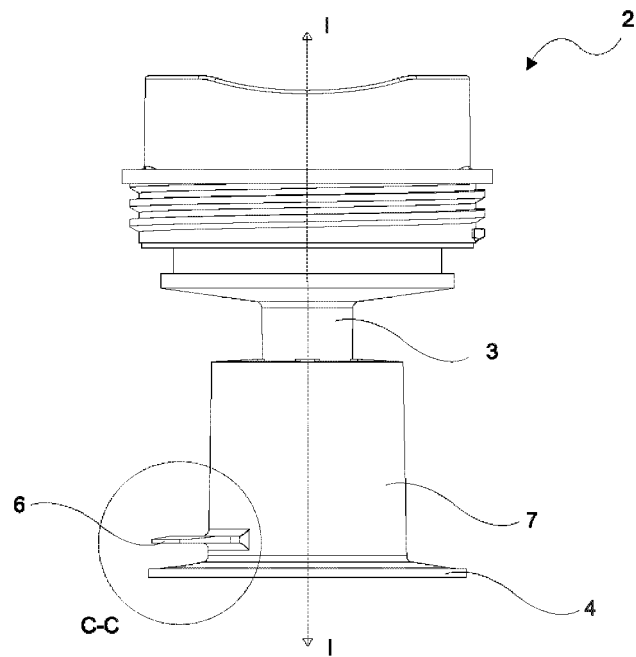
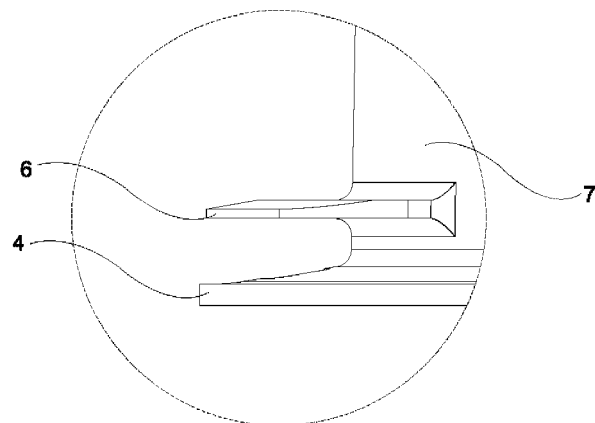


Figure 6





EUROPEAN SEARCH REPORT

Application Number

EP 21 19 9943

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 February 2022	Examiner Diaz y Diaz-Caneja
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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