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(54) **Dishwasher**

(57) A dishwasher comprises a washing tub having a bottom wall provided with a sump and a horizontal circulation pump assembled to the sump and having an inlet coupled to a connecting port sucking the water within the sump (12). The connecting port is provided with a choke portion protruding into the sump and integral therewith.

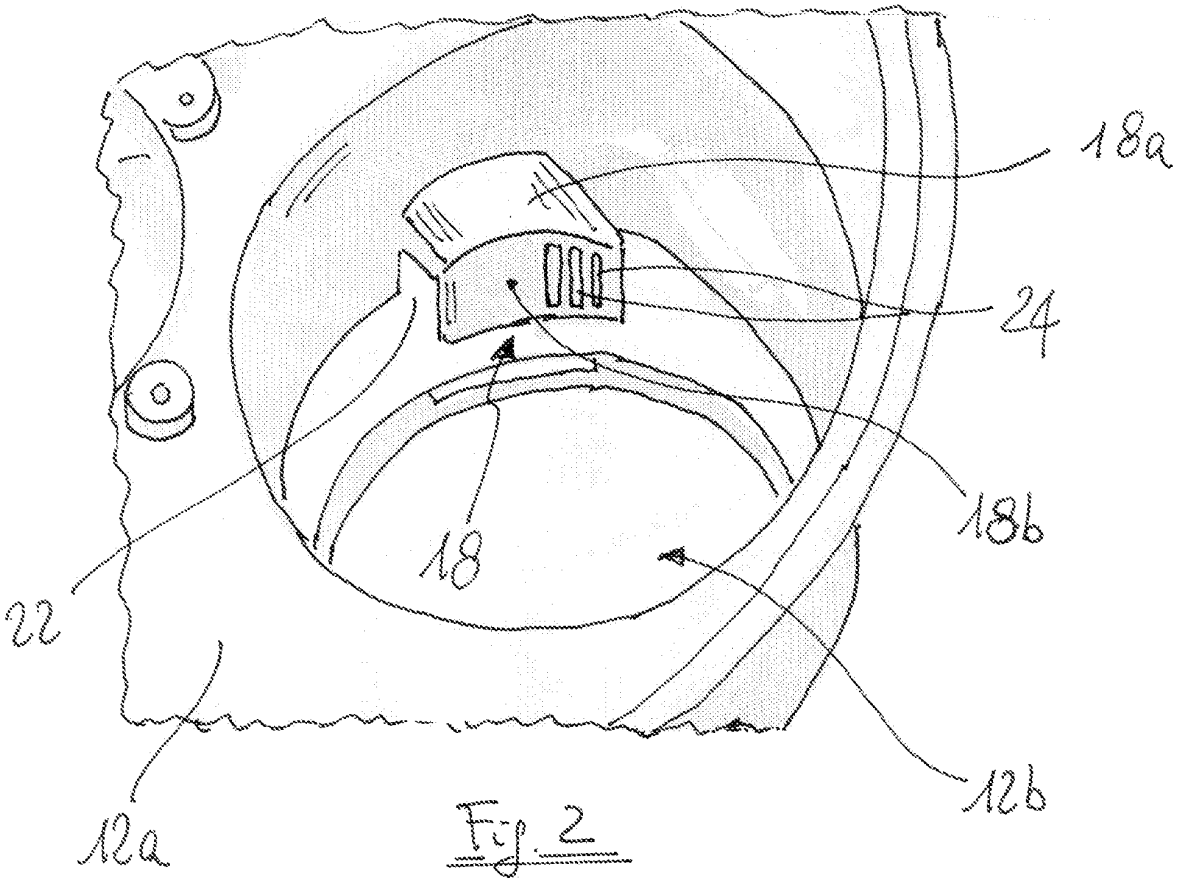

Fig. 2

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Description

[0001] The present invention relates to a dishwasher comprising a washing tub having a bottom wall provided with a sump and a horizontal circulation pump assembled to the sump and having an inlet coupled to a connecting port sucking water within the sump.

[0002] In modern dishwashers the sump comprises a flattened portion of reduced depth on which a substantially flat coarse filter screen is placed, and a deep pit-shaped portion in which a tubular fine filter (usually called "micro filter") is removably inserted.

[0003] Needed functions of the circulation pump suction inlet are in general water guiding towards the wash pump at the lowest pressure loss and restrictions, avoiding an overload of the micro filter by a direct water suction to the inlet hole and avoiding cavitation by using a roof, lowering the suction opening as much as possible (the higher the water column during pump operation, the lower the risk of drawing air bubbles).

[0004] In the current solutions a water guiding roof is created by an extra part installed on an upper edge of the pit-shaped portion of the sump, increasing assembly costs and creating quality issues. With the current solutions the existing gap between the top of the pit-shaped portion of the sump and guiding roof reduces the hydraulic benefits, creating sound issues by pump starving and cavitation.

[0005] It is an object of the present invention to provide a dishwasher of the type mentioned at the beginning of the description which does not present the above drawbacks and which is simple and economical to be produced. According to the invention, the above object is reached thanks to the features listed in the appended claims.

[0006] The use of a connecting port with a choke portion protruding into the sump presents the advantages of maintaining the same overall intake area while reducing cavitation and micro filter local clogging.

[0007] Moreover, if the choke portion is integral with the sump, the roof thereof is part of the slider of the injection moulding tool, which is needed to build the attachment for the wash pump.

[0008] This slider meets the core that is needed to mould the deep sump area, so both tooling parts create together the suction inlet.

[0009] Multiple shapes are possible to achieve the best protection at the lowest pressure losses to get the best pump stability at lowest water consumption. The applicant has discovered that with the solution according to the present invention it is possible to obtain a water saving of 0.2 litre per fill, so around 0.8 litre for the overall standard washing programme, without any loss in cleaning efficiency. The front wall of the choke portion, which is created by a moulding tool, can be closed or can have slots for the best flow through the micro filter.

[0010] Further advantages and features of a dishwasher according to the present invention will be clear from the following detailed description, provided as a non limiting example, with reference to the attached drawings in which:

- Figure 1 is a top view of the tub bottom plate of a dishwasher according to the invention, in which the coarse flat filter and the tubular fine filter have been removed for clarity purposes;
- Figure 2 is a perspective enlarged view of a detail of figure 1; and
- Figure 3 is a section taken along line III-III of figure 1.

[0011] With reference to the drawings, the bottom plate of a dishwasher tub is indicated with reference 10. In the tub bottom plate 10 a sump 12 is inserted. The sump 12 is made by polymeric material and it is inserted in a hole formed at the central part of the tub bottom plate 10 to be tightly fixed thereto. Of course the sump 12 may be integral with the tub bottom plate, particularly when this latter is made of polymeric material. Centrally to the sump 12 there is provided a fast coupling 13 to a low spray arm (not shown).

[0012] The sump 12 presents a swallow portion 12a adapted to be covered by a removable flat coarse filter screen 14, and a deep cylindrical portion 12b in which a removable tubular micro filter 16 with a handle 16a (figure 3) is inserted. The external diameter of the micro filter 16 is lower than the diameter of the deep portion 12b of the sump 12, so that an annular cylindrical portion is created between the micro filter 16 and the sump.

[0013] On a side wall of the deep portion 12a of the sump, near the bottom thereof, a connecting port 18 for a horizontal pump 20 is created. Such connecting port 18 present a choke portion protruding into the sump (and particularly in the annular space between the micro filter 16 and the deep cylindrical portion 12b of the sump 12) and having a protection roof 18a for pump suction inlet integrated with the sump and an integrated vertical wall 18b to avoid overloading of micro filter meshes by direct flow towards the pump 20. The roof 18a and the front wall 18b define together with the bottom of the sump a couple of side flow passages 22 through which water is sucked by the circulation pump 20. Slots 24 can be added to the front wall 18b in order to achieve the best compromise between micro filter soiling and flow resistance. In figure 2 only three slots 24 are shown, but it is clear that they can span the entire surface of the front wall 18b, in order to adjust the total area thereof, together with the area of the flow passages 22, to the requested flow rate of the wash pump 20.

[0014] With the system according to the invention, the protection roof 18a for pump suction inlet is integrated in sump, and no extra piece is needed.

Claims

1. Dishwasher comprising a washing tub having a bot-

tom wall (10) provided with a sump (12, 12a, 12b) and a horizontal circulation pump (20) assembled to the sump (12) and having an inlet coupled to a connecting port (18) sucking the water within the sump (12), **characterized in that** the connecting port (18) is provided with a choke portion (18a, 18b, 22) protruding into the sump (12b).

2. Dishwasher according to claim 1, wherein the choke portion (18a, 18b, 22) of the pump connecting port (18) is integral with the sump (12b).

3. Dishwasher according to claim 2, wherein the choke portion presents a roof-shaped part (18a) and a front wall (18b) defining two side apertures (22).

4. Dishwasher according to claim 3, wherein the front wall (18b) presents at least one aperture (24).

5. Dishwasher according to claim 4, wherein the front wall (18b) present a plurality of slots (24).

6. Method for producing by injection moulding a sump of a dishwasher, such sump (12) comprising a pit-shaped portion (12b), **characterized in that** it comprises using a male mould tool for forming said pit-shaped portion (12b) of the sump (12) and a movable slider for creating a connecting port (18) to a circulation pump and a choke portion (18a, 18b) thereof.

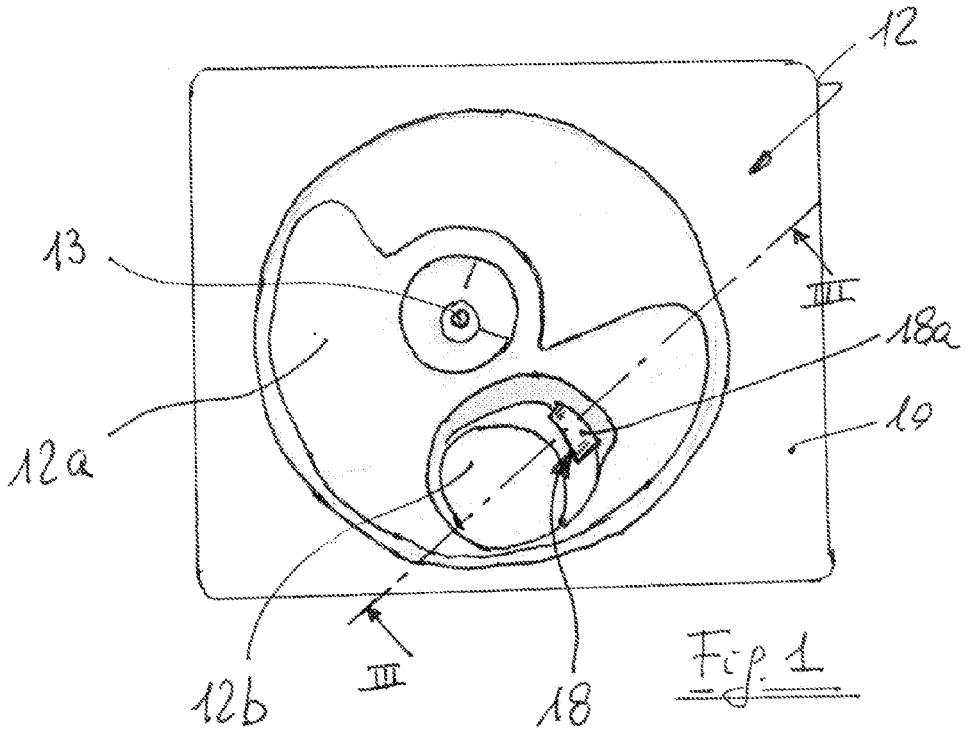

Fig. 1

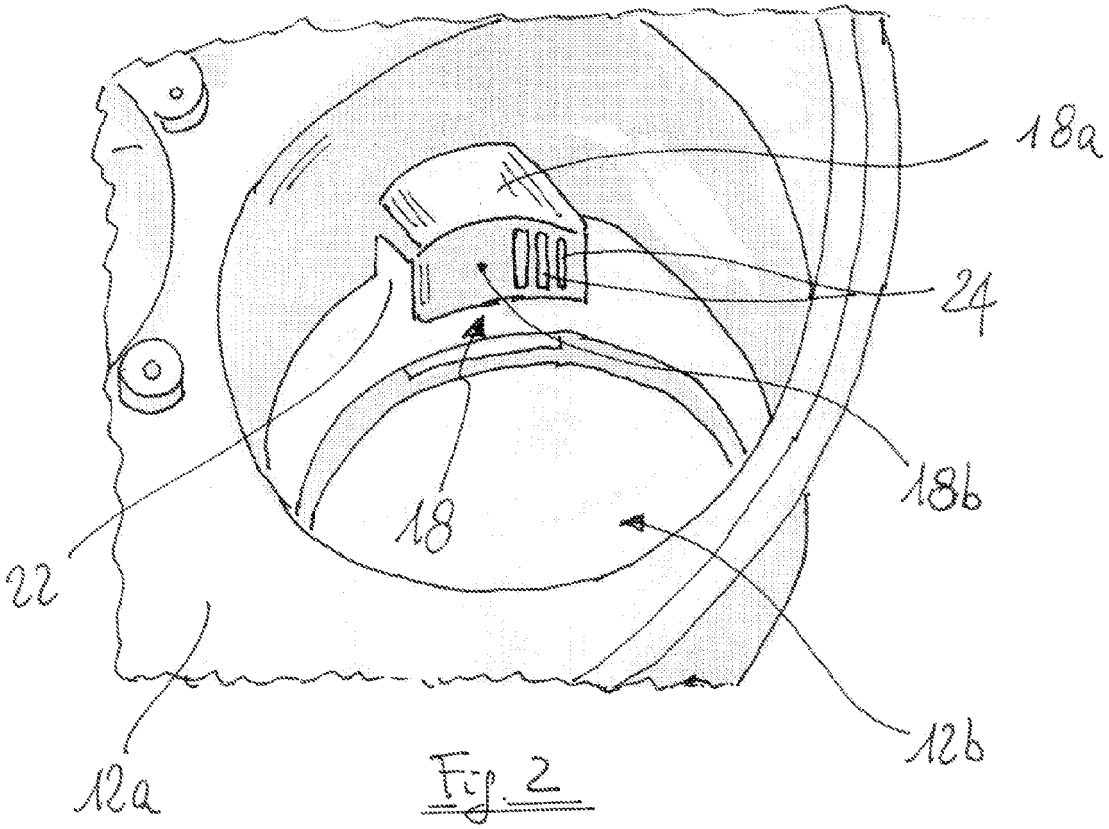

Fig. 2

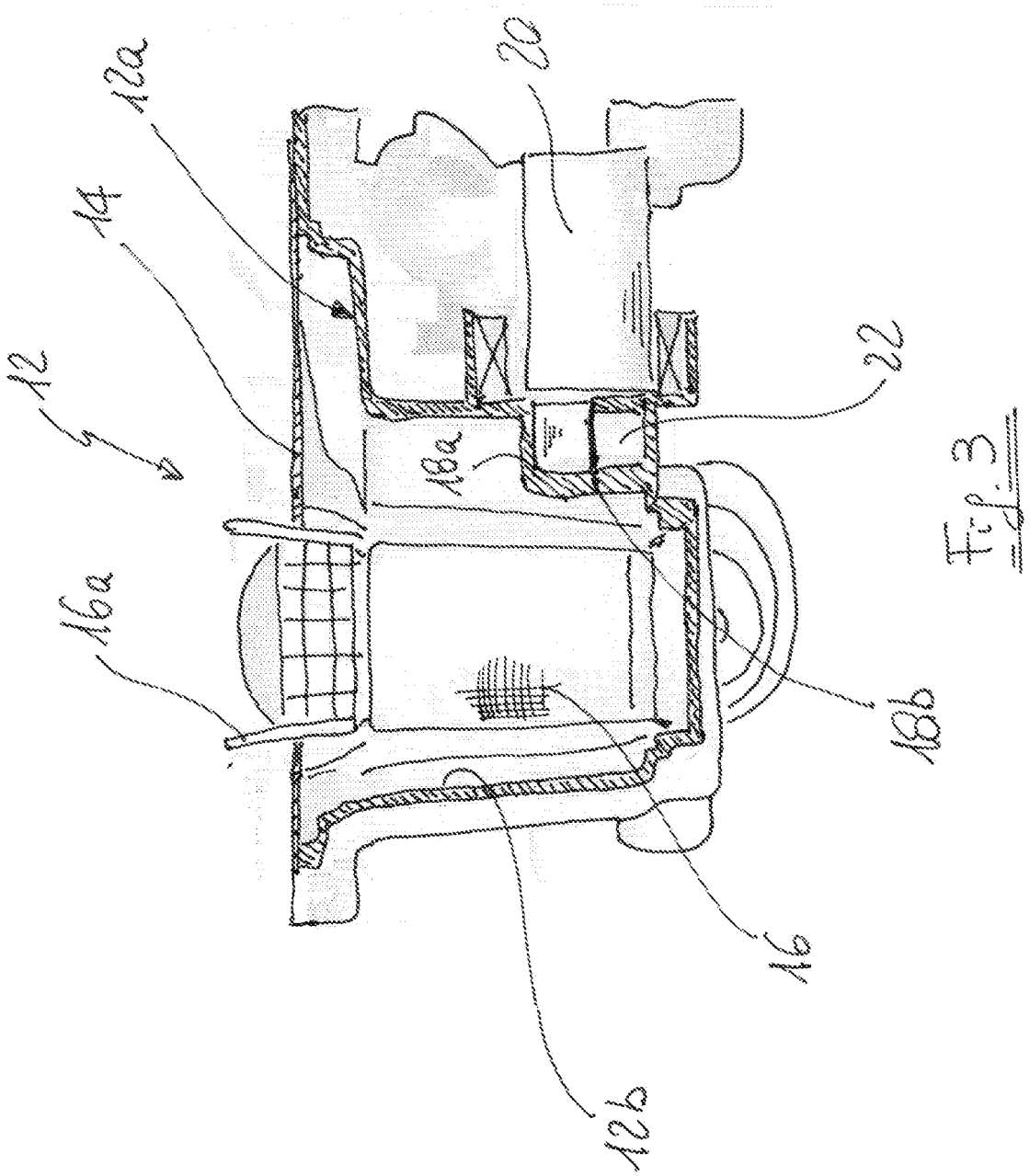

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 09 16 0720

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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	12 October 2009	Martin Gonzalez, G

CATEGORY OF CITED DOCUMENTS

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

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 16 0720

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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