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(72) Inventors:

- **Carli, Carlo**
21041 Albizzate, Varese (IT)
- **Rossetti, Andrea**
20030 Senago, Milano (IT)

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(74) Representative: **Petruzzelli, Antonio**
European Patent Attorney
C.so Italia, No. 43
20122 Milano (IT)

(71) Applicant: **T & P S.p.A.**
21049 Tradate (Varese) (IT)

(54) **Compartment for proportioning regeneration liquid in a dishwasher, equipped with a flow rate meter**

(57) A compartment (1) for proportioning regeneration liquid in a dishwasher, equipped with a flow meter

(3), wherein the flow meter (3) is snap-fastened outside of the compartment (1).

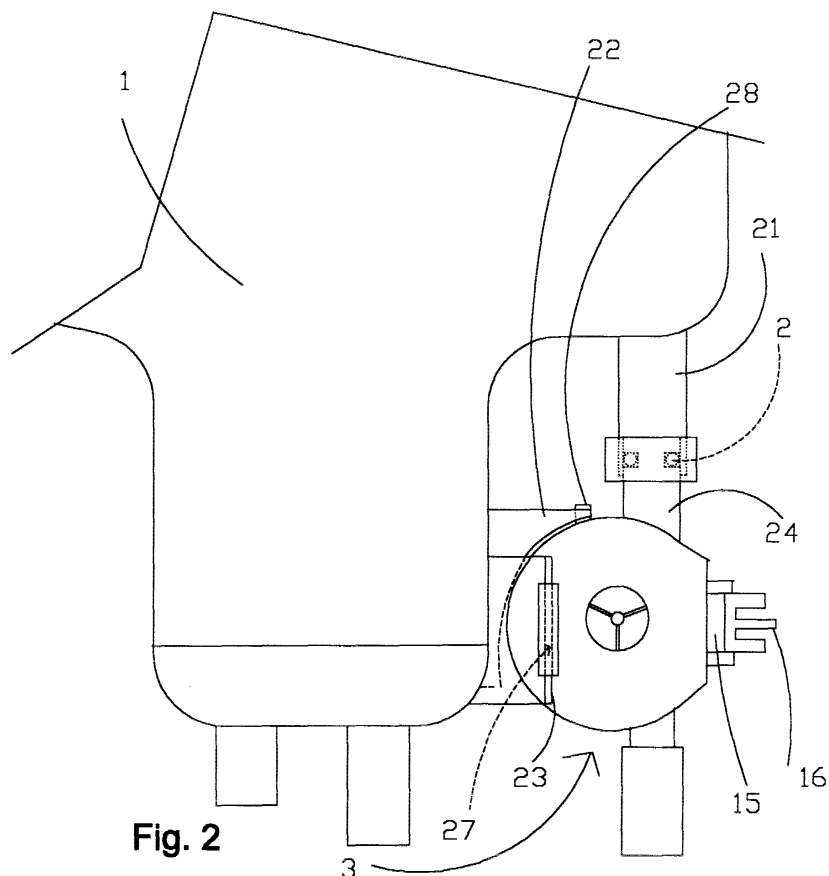


Fig. 2

Description

[0001] The present invention relates to a compartment for the proportioning of the regeneration liquid in a dishwasher, equipped with a flow rate meter.

[0002] The flow rate meter measures the flow of water flowing into the compartment in such a way that predefined quantities of water are fed to the dishwasher according to the preset washing program.

[0003] From the Italian patent N° 1.291.760 a receptacle for feeding water for a washing machine or dishwasher is known wherein a flow rate meter is integrated in the form of a wheel.

[0004] Integration of the flow rate meter of the regeneration compartment entails various disadvantages, including the fact that a possible fault in the meter would also make the entire regeneration compartment unusable, which compartment would have to be replaced together with the meter.

[0005] The configuration of the walls of the compartment wherein the flow rate meter is integrated must also be suitable for containing the wheel in such a way that it can rotate freely without risks of jamming. In order to form the cavity for housing the wheel, defining the casing of the wheel, an additional insert part is used, to be inserted tightly between the walls of the compartment.

[0006] Manufacture of the housing for the wheel integrated with the compartment and the method of production of the compartment itself are therefore laborious, complex and somewhat expensive.

[0007] The object of the present invention is thus that of providing a compartment for proportioning the regeneration liquid in a dishwasher, equipped with a flow rate meter which eliminates the disadvantages suffered by a traditional device.

[0008] More particularly, the object of the present invention is that of providing a compartment for the proportioning of the regeneration liquid in a dishwasher, equipped with a flow rate meter, wherein the flow meter is accessible for simple inspection, maintenance or replacement.

[0009] Another object of the present invention is that of providing a compartment for proportioning the regeneration liquid in a dishwasher, equipped with a flow rate meter which can be attached simply and rapidly to the compartment without complicating the manufacture of the compartment itself.

[0010] Yet another object of the present invention is that of providing a compartment for proportioning the regeneration liquid in a dishwasher, equipped with a flow rate meter which creates a perfect and safe seal in relation to the body of the compartment.

[0011] These objects are achieved by the present invention by providing a compartment for proportioning the regeneration liquid in a dishwasher, equipped with a flow meter, characterised in that the flow meter is snap-fastened outside of the compartment.

[0012] The placing of the flow meter outside of the

body of the compartment and the possibility of removing the flow meter, considerably facilitate inspection and maintenance work on the device.

[0013] The snap-engaging provides the possibility of adjusting insertion also for other types of meter, and not necessarily wheel meters.

[0014] Sealing of the device is achieved through an O-ring or toroidal ring or one of another shape attached between the pipette for entrance of the water into the regeneration compartment and the delivery mouth of the wheel.

[0015] The seal ring is simple, safe, reliable, practical to apply, economical and can be easily inspected from the outside in order to assess its structural intactness.

[0016] These and other advantages will be made clearer on reading a preferred embodiment of the present invention, referred to the accompanying drawings, in which:

Figure 1 represents a front view of the compartment in accordance with the preferred embodiment of the invention;

Figure 2 shows an enlarged front view of the assembly between the compartment and flow meter in accordance with the preferred embodiment of the invention;

Figure 3 represents the flow meter blown up into its component parts.

[0017] Figures 1-4 illustrate the assembly of the present preferred embodiment of the invention, comprising a compartment 1 for proportioning the regeneration liquid, that is to say the liquid intended for regenerating the ion exchange resins after decalcification of the washing water, a wheel flow rate meter 3 outside of the regeneration compartment 1, and a seal member 2 of the O-ring or toroidal gasket type or the like for engaging between the inlet mouth 21 of the regeneration compartment 1 and the delivery mouth 24 of the wheel flow meter 3.

[0018] The compartment 1 is composed of two half-shells in polypropylene, welded one to the other by means of a hot blade, and has the inlet mouth 21 on the lower end wall of the regeneration compartment 1 in a position upstream of the safety device against the return of contaminated water to the water supply system, also known as "air break", provided in a point not shown in the regeneration compartment 1.

[0019] This positioning of the wheel meter 3 upstream of the air break is advantageous due to the fact that it allows accurate measurement of all the water entering the regeneration compartment 1, both of the water which goes beyond the air break towards the decalcifier (not shown) of the dishwasher, and of the minimal quantity of water which, via the air break, is conveyed directly towards the washing tub without passing through the de-

calcifier.

[0020] The wheel flow meter 3, in a known manner, comprises a containing body formed by two half-shells 11 and 12 welded one to the other or attached for rotation with a seal gasket and a "bayonet" coupling between the two half-shells 11 and 12.

[0021] The rotor or wheel 13, true and proper, is placed inside the containing body and which rotor or wheel in turn is composed of a plastic part, with the blades for submitting to and measuring the passing flow, and of a magnet 14, snap-fastened to the centre of the wheel.

[0022] Functioning of the wheel flow meter, also known, is as follows: after its own rotation, the magnet 14 reverses the polarity twice per complete turn, producing two cycles of opening/closure of a normal reed contact contained in a printed circuit 15 and placed outside of the half-shell 12 of the wheel 13. The signal given by the number of cycles of opening/closure of the reed contact is processed electronically in a wholly known manner in order to be correlated with the flow rate measured. 16 in Figure 3 finally denotes the plastic female connector required for electrical wiring of a male connector with wires.

[0023] The flow meter 3 is clamped to the regeneration compartment 1 by special means which can be coupled reciprocally, formed on the body of the compartment 1 near the inlet mouth 21 of the compartment 1 and on the half-shell 11 of the body for containing the flow meter 3.

[0024] The reciprocal coupling means comprise a male element defined by guide ribbing 23, formed on the body of the compartment 1, and a female element defined by a groove 27 sliding on the ribbing 23, formed on the half-shell 11 of the body for containing the flow meter 3.

[0025] The reciprocal coupling means also comprise a retainer 22 formed on the body of the compartment 1 and a striker member 28 which can be snap-hooked by the retainer 22 formed on the half-shell 11 of the body for containing the flow meter 3.

[0026] Clamping between the regeneration compartment 1 and the flow meter 3 takes place as follows.

[0027] Initially the housing 27 of the body for containing the meter 3 is made to slide axially on the guide ribbing 23 until it rests against the retainer 22. In this way rotation of the flow meter 3 in relation to the regeneration compartment 1 is blocked.

[0028] Subsequently, by a light axial pressure, the retainer 22 is snap-inserted in the corresponding striker member 28 in such a way as to block also axial translation of the flow meter 3 in relation to the regeneration compartment 1. The retainer 22 can be actuated manually or by means of a special tool so as to disengage from the corresponding striker member 28 in such a way as to allow release and subsequent separation of the flow meter 3 from the regeneration compartment 1.

[0029] The present preferred embodiment should be

read purely by way of a non-limiting example and various changes can be made without departing from the concept disclosed in the present invention.

[0030] In particular the regeneration compartment designed in this way is suitable, in a versatile manner, for the use of any system of metering the flow, also operatively different from that illustrated above.

[0031] Moreover the snap-fastening can also be different from that illustrated, providing male parts and female parts for coupling either on the flow meter or on the body of the regeneration compartment.

Claims

1. A compartment (1) for proportioning the regeneration liquid in a dishwasher, equipped with a flow meter (3), characterised in that the flow meter (3) is snap-fastened outside of the compartment (1).
2. A compartment according to the previous claim, wherein a safety device against the return of contaminated water towards the system or "air break" is present, characterised in that the regeneration compartment (1) has an inlet mouth (21) upstream of the air break and the flow meter (3) has a delivery mouth (24) which engages in said inlet mouth (21) of the regeneration compartment (1), and in that means are provided for watertight engaging between said inlet mouth (21) of the compartment (1) and said delivery mouth (24) of the flow meter (3).
3. A compartment (1) according to the previous claim, characterised in that said means for watertight engaging are in the form of an O-ring (2) or toroidal seal ring or the like.
4. A compartment according to any one of the previous claims, characterised in that clamping between the compartment (1) and the flow meter (3) is provided by means which can be reciprocally coupled on the body of the compartment (1) near said inlet mouth (21) of the compartment (1) and on the body (11, 12) for containing the flow meter (3).
5. A compartment (1) according to the previous claim, characterised in that said means which can be reciprocally coupled comprise a male element defined by guide ribbing (23) formed on the body of the compartment (1), and a female element defined by a groove (27) sliding on said ribbing (23) formed on the body (11) for containing the flow meter (3), said means being coupled so as to lock rotation of the flow meter (3) in relation to the regeneration compartment (1).
6. A compartment (1) according to the previous claim, characterised in that said means which can be re-

ciprocally coupled also comprise a retainer (22) formed on the body of the compartment (1) and a striker member (28) which can be snap-hooked by said retainer (22) formed on the body (11) for containing said flow meter (3), said means being coupled to block axial translation of the flow meter (3) in relation to the regeneration compartment (1).

7. A compartment according to the previous claim, characterised in that said retainer (22) can be actuated manually or with a tool so as to be disengaged from the corresponding striker member (28) in such a way as to allow release and subsequent separation of the flow meter (3) from the regeneration compartment (1).
8. A compartment according to any one of the previous claims, characterised in that said flow meter (3) is in the form of a wheel or rotor.

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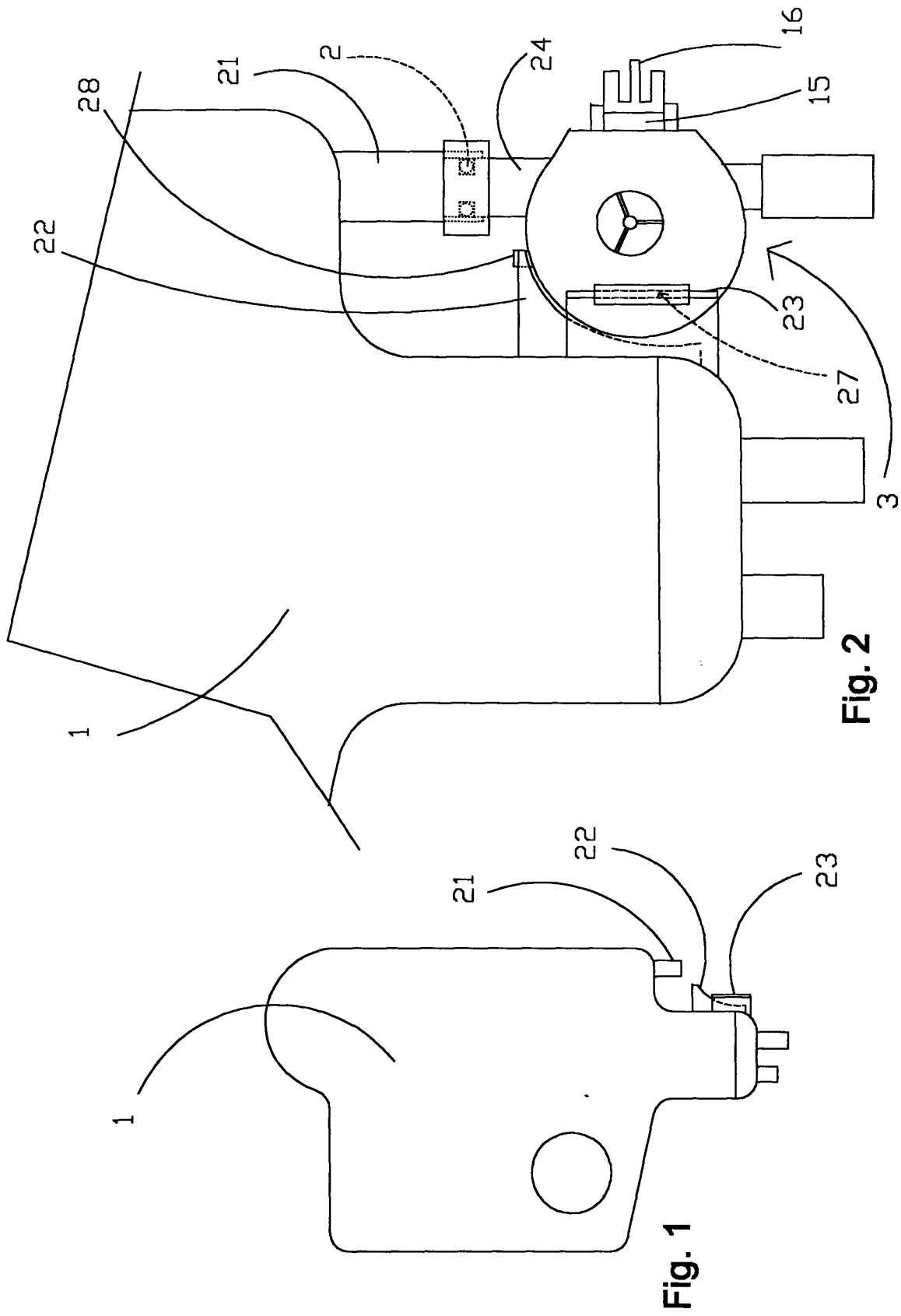
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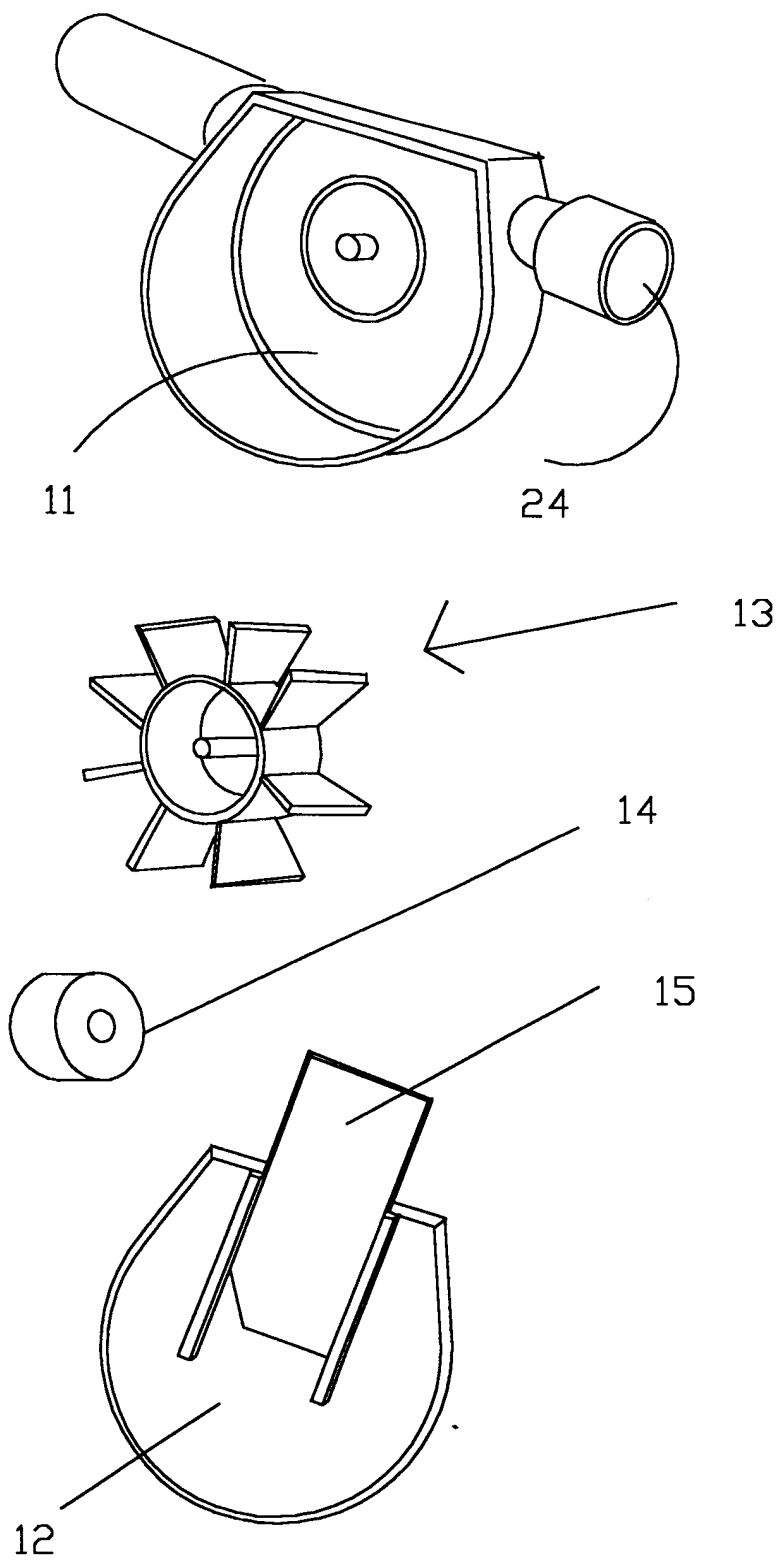


Fig. 3



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 5277

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CI.7)
A	DE 44 46 731 A (MIELE & CIE) 27 June 1996 (1996-06-27) * the whole document *	1	A47L15/42
A	DE 16 28 532 A (BOSCH HAUSGERAETE GMBH) 25 November 1971 (1971-11-25) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.CI.7)
			A47L
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16 May 2001	Examiner Norman, P
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 12 5277

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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16-05-2001

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