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- with amended claims and statement (Art. 19(1))

(54) Title: PRODUCT DISPENSING SYSTEM BY INERTIAL CENTRIFUGAL FORCE FOR HOUSEHOLD APPLIANCES

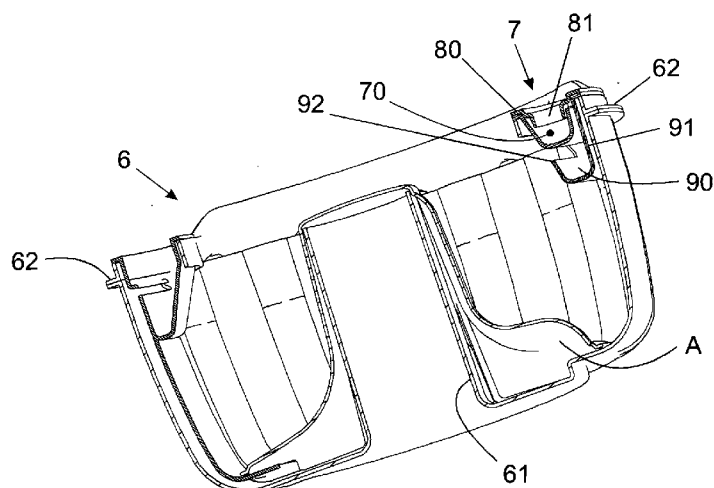


FIG. 3

(57) Abstract: The present invention refers to a product dispensing system for household appliances, more specifically to its use in vertical axis washing machine for storing, diluting and dispensing softener. The present invention relates to a dispensing system that operates with no need to use electrical electronic system, which is therefore only actuated by physical forces already acting during the conventional process to operate washing machines. Said system (7) comprises at least one product storage reservoir (70) cooperating with a washing basket (6); at least one cover (80) cooperating with at least one reservoir (70) and at least one reservoir (90) cooperating downwardly with said at least one reservoir (70) and with said washing basket.



“PRODUCT DISPENSING SYSTEM BY INERTIAL CENTRIFUGAL FORCE FOR HOUSEHOLD APPLIANCES”

Field of the Invention

The present invention refers to a product dispensing system for household appliances, intended more specifically for use in vertical axis washing machines to store, dilute and dispense softener. The present invention aims at a dispensing system operating with no need for electrical electronic systems, and, therefore, it is only driven by physical forces already acting on conventional functioning of washing machines.

Background of the Invention

It is widely known that washing of any kind of clothes basically and usually requires the use of water, detergent and softener to make the clothes softer and easier to iron, in addition to scenting the clothes. Logically, depending on the fabric type being processed, other washing products are used, but the present disclosure will only taken into account these two products, which are the commonest products used either in hand-washing or in automatic washing machines.

More specifically, the use of washing machines also requires the use of such products either in hand form during the washing cycle or when filling the compartments themselves which manually or automatically release such products at determined moments during washing process.

Among the equipments provided with such compartments – which among them are those mainly intended to be used in vertical axis top cover washing machines– there can be mentioned those disclosed in BRPI0204383-1 and BRPI1101037-1, which operate with the aid of electrical electronic devices to release products at specific moments of the cycle.

With regard to dispensers disclosed in BRPI1101332-0 and BRMU9101963-0, they do not make use of electronic systems – that is, a user manually fills the compartments before the cycle begins and, at certain times and also in a total manual way, the user must actuate them to allow for the products to be released. In a comparison, known manual dispensers have manufacture and operational costs significantly lower than the automated ones

but they need user's attention and follow-up during the washing cycle because otherwise the cycles will only use water for the process of a washing load.

An already widely known solution to minimize this drawback is to provide, as illustrated in the attached Fig. 1, a compartment C disposed on the top of the central agitator A of the apparatus, which can be filled prior to the beginning of a washing process to release a product by means of inertial centrifugal force only when rotation of agitator A reaches a certain amount of rpm, i.e. a moment at which the product stored therein starts going up through walls P of compartment C until it reaches the edge thereof and it is then delivered within agitator A body, from which same is dispensed in the washing area. It should be clarified that equipments using such system normally execute the first rinsing step without centrifugation such that a product is dispensed only during the second rinsing when simultaneous centrifugation occurs.

However, it is also observed that in the system cited above dispensing of the product is made in one single step and with no pre-dilution of the product in water, which may result in that the delivery of the product is not eventually homogeneously effected and as a result some portions of the washing load will not appropriately contact the product so that they will not benefit from its action. Furthermore, residues of the product are observed inside the compartment after the cycle is complete, thus suggesting that same had not been entirely used.

Therefore, it is noted that the present state of the art lacks solutions for dispensing devices and systems for washing products which will not increase the costs of household appliances by using electrical electronic components but which may appropriately function for dispensing products without requiring manual interference during the washing process.

Objects of the Invention

Thus, one object of the present invention is to provide a product dispensing system by inertial centrifugal force for household appliances, which operates automatically without requiring the use of electric electronic components of any nature, specific for this purpose.

Further an object of the present invention is to provide a product dispensing system by inertial centrifugal force which can be incorporated into a

household appliance with no need to increase the manufacture costs thereof in order to allow the population of lower purchasing power to purchase it.

Another object of the present invention is to provide a product dispensing system comprising a step of previously diluting the product in water before
5 same is brought into contact with a washing load.

Furthermore, an object of the invention is provide a dispensing system to deliver products to the washing load during the rinsing step thereof to ensure maximum presence of the product on the parts after completing the cycle – thereby increasing its efficiency also concerning the scent of said parts.

10 Summary of the Invention

The above mentioned objects are accomplished by means of a product dispensing system by inertial centrifugal force for household appliances, more specifically for washing machines comprising a housing containing a fixed tank having a movable basket provided with a balancing device, where a moving
15 tower cooperates with said movable basket and with a washing compartment.

In a preferred embodiment of the invention, said system comprises:

- at least one product storage reservoir cooperating with a washing compartment;

- at least one cover cooperating with said at least one reservoir;

- at least a reservoir cooperating downwardly with said at least one
20 reservoir and with said washing compartment.

In a further preferred embodiment of the invention, said at least one reservoir comprises an upper perimetral platform cooperating with the edge of said washing compartment, and a rip cooperating with said at least one
25 reservoir.

Said at least one cover comprises at least one orifice cooperating with said at least one reservoir, wherein said cover cooperates with the upper perimetral platform of the reservoir.

Preferably, said at least one reservoir comprises a rear wall cooperating
30 with the upper perimetral platform of the reservoir, and at least one rip in fluid communication between the inner area of the washing compartment and the reservoir.

Additionally, in the preferred embodiment illustrated in the appended figures, the product dispensing system cooperates with the washing compartment by at least one of the following forms: solidary joining, engagement, interference, fixing with pressure elements or coupling with any
5 fixation elements.

In an alternative embodiment of the invention, said at least one product storage reservoir cooperates with the movable basket, or with the movable basket balancing device.

Furthermore, the product dispensing system of the present invention
10 comprises at least one step of previously diluting a washing product in water within the reservoir before dispensation in the inner area of the washing compartment.

In short, said dispensing system of the present invention is characterized in that it comprises means to dilute and dispense products stored inside the
15 reservoir of the product dispensing system to the interior of the washing compartment by means of rotary movement of the washing compartment.

Brief Description of the Drawings

The present invention will be more fully described below with reference to the drawings, wherein:

20 Fig. 1 shows a sectioned elevation view of the state-of-the-art dispensing device, which is disposed inside an agitator of the equipment;

Fig. 2 shows a perspective view of a washing compartment for washing machine comprising a preferred embodiment of the product dispensing system by inertial centrifugal force for household appliances, in accordance with the
25 object of the present invention;

Fig. 3 shows a cross-sectional perspective view of the object illustrated in Fig. 2;

Fig. 4 shows a vertical cut view of the washing compartment illustrated in Fig. 2;

30 Fig. 5 shows an enlarged detail in perspective view of the product dispensing system in accordance with a preferred embodiment of the present invention, as shown in Fig. 4

Fig. 6 shows an enlarged detail in elevation of the portion shown in Fig. 4, which further contains arrows indicating a fluid flow during the operation of a household appliance comprising the system in accordance with the object of the present invention;

Fig. 7 shows in longitudinal cut view a household appliance comprising the product dispensing system by inertial centrifugal force for household appliances of the present invention.

Detailed Description of the Invention

The object of the present invention will be described in further details and explained on the basis of the accompanied figures which should be construed as merely exemplificative and not limitative, given that adaptations and modifications can be made without departing from the claimed scope of protection.

The present invention refers to a product dispensing system by inertial centrifugal force for household appliances, mainly used for storing and dispensing fabric softener to a washing load without using any electrical electronic installation type.

To this effect, said system 7 is intended to be used in washing machines 1 such as, for example, the one illustrated in the attached Fig. 7, defined by a substantially parallelepipedal housing 2 having a vertical shaft and an access cover 21 disposed on its upper surface. Said housing 2 comprises, in its interior, a fixed tank 3 cooperating with a main basket 10 provided with a balancing device 11, wherein a moving tower 4 cooperates with the main basket 10 and with the rotor shaft 5 of the appliance.

In an example of the embodiment illustrated in said Fig. 7 and in the remaining appended figures, the washing load to be processed will be inserted in a further washing compartment 6, which in this case is a preferably removable basket (see Figs. 2 to 4) defined by a substantially cylindrical body provided with a cylindrical central wall 62 configuring a span to couple with the moving tower 4, wherein the washing compartment 6 comprises, on its upper edge, a small perimetral platform 62, which, besides helping to hold the compartment 6 on a hydraulic ring 11 of the movable basket 10, also

cooperates with the product dispensing system 7 illustrated in better details in Figs. 4 and 5. It should be pointed out that the mounting of said compartment 6 to washing machine 1 in question is completed by coupling a concentric agitator A to basket 6 and, consequently, to rotor 5 of the appliance.

5 In this aspect, it should be pointed out that the product dispensing system 7 can be solidary with the body of said compartment 6 or coupled therewith by a fitting/fixing system with the aid of any elements without departing from the presently claimed scope of protection.

10 In a more detailed preferred embodiment of the invention illustrated in Figs. 5 and 6, said product dispensing system 7 essentially comprises a reservoir provided with an upper perimetral platform and posterior rip 72, wherein the lower edge of said upper perimetral platform 71 rests on a perimetral platform 62 of washing compartment 6.

15 A cover 80 provided with orifice 81 is disposed on the upper perimetral platform 71 of the reservoir 70, wherein through this orifice 81 the reservoir 70 can be filled with a washing product.

20 The dispensing system, in accordance with the present invention, also comprises a second reservoir 90 disposed under the reservoir 70, wherein said reservoir 90 comprises a rear wall 91 cooperating with the upper perimetral platform 71 of said reservoir 70, and a rip 92 disposed on the front wall, which allows for fluid communication between the inner area of the washing compartment 6 and reservoir 90.

25 Furthermore, Figs. 4 and 6 illustrate an NA level at which water remains after said compartment 6 is completely filled to start the washing cycle. Therefore, it is noted that when the equipment is actuated and filled with water, the reservoir 90 remains in fluid communication with the washing area; nevertheless, due to a more elevated disposition of the posterior rip 72 of said reservoir 70, at no time of the processing water reaches the interior of said reservoir 70.

30 To use the present system, prior to turning on the equipment, a user must fill the reservoir 70 with the amount of product - which shall necessarily be a liquid, preferably a softener - suitable for the amount of a washing load to be

processed. It should be noted that filling is effected through orifice 81 of cover 80.

After actuating the washing cycle, filling of the tank 3 and/or of the washing compartment 6 begins until water reaches NA level shown in Figs. 4 and 6. It should be emphasized that after filling the machine, said reservoir 70 that stores the product remains without water but the reservoir 90 is filled with water by virtue of the existence of rip 92.

After starting the cycle, rotor 5 begins moving – more specifically an alternate rotary movement – to allow for rotation of the tower 4 of the washing compartment 6 and agitator A, at a determined amount of rotations per minute (rpm). Thus, as the amount of rpm increases the centrifugal inertial force of the assembly increases such that when this force reaches certain intensity, during centrifugation step, the product stored inside the reservoir 70 starts to protrude against its rear wall 73, thereby moving upwardly (according to indicative arrows in Fig. 6) such that when reaching the lower edge of rip 72, the product is thrown against the rear wall 91 of said reservoir 90, remaining between said rear wall 91 and the cover 80 until rotation speed decreases and reaches a minimum intensity (which may vary depending on the equipment) at which the product will start to go down through the rear wall 91 until it reaches the base of said reservoir 90.

It is important to point out that at this moment there will be no more water inside the washing compartment 6 but only a residual volume in reservoir 90, which will allow for the previous dilution of the product, which will only be effectively transported to the inside of the washing compartment 6 after a new filling with water occurs and upon fluid communication provided by said rip 92.

In this aspect, it should be clarified that after centrifugation step, the entire product stored in said compartment 70 will have been transferred to reservoir 90, thus promoting the total use of the product.

It is then noted that the system of the present invention permits that only the movement of the motor rotor 5 which allows for the equipment to function is sufficient enable the product dispensing system 7 to function by merely and

simply making use of physical laws to transfer a washing product from the compartment 70 to the compartment 90 and then to the washing area.

Additionally it should be noted that in an alternative embodiment of the present invention, the product dispensing system 7 may optionally be used in
5 the own movable basket 10, without by doing departing from the presently claimed scope of protection.

Therefore, it can be assured that the object of the present invention practically, efficiently and economically solves the state-of-the-art problems once the use of additional physical and/or electrical electronic component to
10 dispense the washing products during the equipment operation is not required, thus resulting in a system that can be incorporated in any type of equipments without increasing costs and therefore it can be used in low cost equipments which can also be purchased by the population of low purchasing power.

Attention should be drawn to the fact that in the preferred embodiment
15 described above, the system of the invention removable is used in removable baskets 6; nevertheless, it is important to mention that other types of baskets can be used irrespective of their dimensions, capacities or geometrical shapes, without by doing so departing from the presently claimed scope of protection.

Furthermore, it should also be emphasized that the description above
20 only intends to describe in an exemplificative form some of the preferred embodiments of the present invention. Therefore, those skilled in the art will understand that many construction modifications, variations and combinations of elements having substantially the same function to achieve the same results will be within the scope of protection as limited by the appended claims.

CLAIMS

1. Product dispensing system by inertial centrifugal force for household appliances, more specifically for washing machines (1) comprising a housing (2) containing a fixed tank (3) cooperating with a movable basket (10) provided with
5 a balancing device (11), wherein a moving tower (4) cooperates with said movable basket (10), within which a washing compartment (6) is disposed, the system (7) being **CHARACTERIZED** in that it comprises:

- at least one product storage reservoir (70) cooperating with the washing compartment (6);

10 - at least one cover (80) cooperating with the at least one reservoir (70);

- at least one reservoir (90) cooperating downwardly with said at least one reservoir (70) and with the washing compartment (6).

2. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one reservoir (70) comprises an upper perimetral platform (71)
15 cooperating with the edge of the washing compartment (6), and a rip (72) cooperating with said at least one reservoir (90).

3. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one cover (80) comprises at least one orifice (81) cooperating with said at least one reservoir (70), wherein said cover (80) cooperates with the upper
20 perimetral platform (71) of said reservoir (70).

4. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one reservoir (90) comprises a rear wall (91) cooperating with the upper perimetral platform (71) of the reservoir (70), and at least one rip (92) in fluid communication between the inner area of the washing compartment (6) and the
25 reservoir (90).

5. System, in accordance with claim 1, **CHARACTERIZED** in that the product dispensing system (7) cooperates with the washing basket (6) by at least one of the following forms: solidary joining, engagement, interference, fixing with pressure elements or coupling with any fixation elements.

30 6. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one product storage reservoir (70) cooperates with the movable basket (10).

7. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one product storage reservoir (70) cooperates with said balancing device (11) of the movable basket (10).

5 8. System, in accordance with any of claims 1 to 5, **CHARACTERIZED** in that it comprises at least one previous dilution of the washing product in water inside the reservoir (70) prior to dispensing it in the inner area of the washing compartment (6).

10 9. System, in accordance with claims 1 and 6, **CHARACTERIZED** in that it comprises diluting and dispensing products from the interior of the reservoir (70) to the inner area of the washing compartment (6) during centrifugation and rinsing steps.

15 10. System, in accordance with claim 1, **CHARACTERIZED** in that it comprises means to dilute and dispense products stored inside the reservoir (70) from the product dispensing system (7) to the interior of the washing compartment (6) only by means of rotary movement of the washing compartment (6).

AMENDED CLAIMS
RECEIVED BY THE INTERNATIONAL BUREAU ON 02 DECEMBER 2014
(02.12.2014)

1. Product dispensing system by inertial centrifugal force for household appliances, more specifically for washing machines (1) comprising a housing (2) containing a fixed tank (3) cooperating with a movable basket (10) provided with a balancing device (11), wherein a moving tower (4) cooperates with said movable basket (10), within which a washing compartment (6) is disposed, the system (7) being **CHARACTERIZED** in that it comprises:
- at least one product storage reservoir (70) cooperating with the washing compartment (6);
 - at least one cover (80) cooperating with the at least one reservoir (70);
 - at least one reservoir (90) cooperating downwardly with said at least one reservoir (70) and with the washing compartment (6);
- wherein at least one reservoir (90) comprises a rear wall (91) cooperating with the upper perimetral platform (71) of the reservoir (70), and at least one rip (92) in fluid communication between the inner area of the washing compartment (6) and the reservoir (90), and;
- wherein at least one previous dilution of the washing product in water inside the reservoir (90) prior to the dispensing it in the inner area of the washing compartment (6).
2. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one reservoir (70) comprises an upper perimetral platform (71) cooperating with the edge of the washing compartment (6), and a rip (72) cooperating with said at least one reservoir (90).
3. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one cover (80) comprises at least one orifice (81) cooperating with said at least one reservoir (70), wherein said cover (80) cooperates with the upper perimetral platform (71) of said reservoir (70).
4. System, in accordance with claim 1, **CHARACTERIZED** in that the product dispensing system (7) cooperates with the washing basket (6) by at least one of the following forms: solidary joining, engagement, interference, fixing with pressure elements or coupling with any fixation elements.

5. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one product storage reservoir (70) cooperates with the movable basket (10).

5 6. System, in accordance with claim 1, **CHARACTERIZED** in that said at least one product storage reservoir (70) cooperates with said balancing device (11) of the movable basket (10).

7. System, in accordance with claim 1, **CHARACTERIZED** in that it
10 comprises diluting and dispensing washing products from the interior of the reservoir (70) to the inner area of the washing compartment (6) during centrifugation and rinsing steps.

8. System, in accordance with claim 1, **CHARACTERIZED** in that it
15 comprises means to dilute and dispense products stored inside the reservoir (90) from the product dispensing system (7) to the interior of the washing compartment (6) only by means of rotary movement of the washing compartment (6).

Application N°. PCT/BR2014/000232**Comments regarding the Written Opinion of the International Searching Authority and basis for amendments in accord with Art 19 PCT**

Referring to the International Search Report and Written Opinion mailed on October 02, 2014 the Applicant, based on PCT Rule 46, presents informal comments regarding documents cited by the Examiner, and amendments to patent application No. PCT/BR2014/000232 filed on June 18, 2014.

The Applicant presents herein a new set of claims and their respective basis of amendments to fulfill Examiner requirements, as required by Art 19 PCT.

Claims differences between those as filed and those as amended

Claim 1 – amended in order to incorporate features of original claims 4 and 8;

Claims 4 and 8 – their content were incorporated in claim 1;

Claim 7 – amended;

Claim 10 – amended;

Claims 5, 6, 7, 9 and 10 - renumbered.

Basis for amendments

Amendment to the Claim 1:

i) lines 12 to 15, wherein features from former claim 4 were incorporated in the claim 1 in order provide a better definition for the scope of protection of the present application.

ii) the reference number “(70)” was incorrectly typed in the former claim 8 (inserted in claim 1), wherein reference number “(90)” must replace it, as in the amendment.

iii) lines 16 to 18, wherein features from former claim 8 were incorporated in the claim 1 in order provide a better definition for the scope of protection of the present application.

Amendment to the Claim 7:

i) line 2, the term “washing” was inserted in order to overcome a clarity issue.

Amendment to the Claim 8:

i) line 2, the reference number “(70)” was incorrectly typed in the claim 8 (former claim 10), wherein reference number “(90)” must replace it, as in the amendment.

Comments regarding to the formal issues

The term “*product dispensing system*” characterizes literal translation to the English of the original application. It is highlighted that, how the “dispensing” occurs and what

kind of "product" is dispensed are aspects clearly defined in the description; therefore, the applicant asserts that such term must remain unmodified.

The term "cooperate" relates to the act of join for a common purpose or benefit; in accordance with the set of claims, the components, which "cooperate" are united or have, at least, one physical connection. The applicant asserts that such term must remain unmodified.

The term "*one previous dilution*" refers to the known action of make thinner by the addition of water. In the original description filed, page 3, lines 3 to 5, it is clearly defined the "*previous dilution*" as follows: "*...a product dispensing system comprising a step of previously diluting the product in water before same is brought into contact with a washing load*". In this sense, the applicant asserts that such term must remain unmodified.

The terms "*engagement*", "*interference*" characterizes literal translation to the English of the original application; therefore, the applicant asserts that such term must remain unmodified.

Comments regarding to the prior art

Regarding to the prior art document D1 (US 4,186,573) mentioned in the referred Written Opinion the applicant provides the following comments:

Document D1 presents a first compartment and a second compartment, wherein said second compartment is provided exclusively and merely for the passage of the washing product toward the washing compartment.

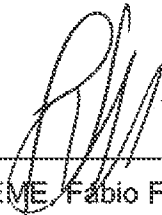
Different from the present application, wherein a reservoir (90), which cooperates with the upper perimetral platform (71) of another reservoir (70), wherein said reservoir (90) allows a previous dilution in water of the washing product.

It is highlighted that, in the present application, only when the washing machine is activated and supplied with water; the reservoir (90) gets fluid communication with the washing compartment, thereby, providing diluted washing products to the washing compartment (page 6, lines 23 to 29 of the original application).

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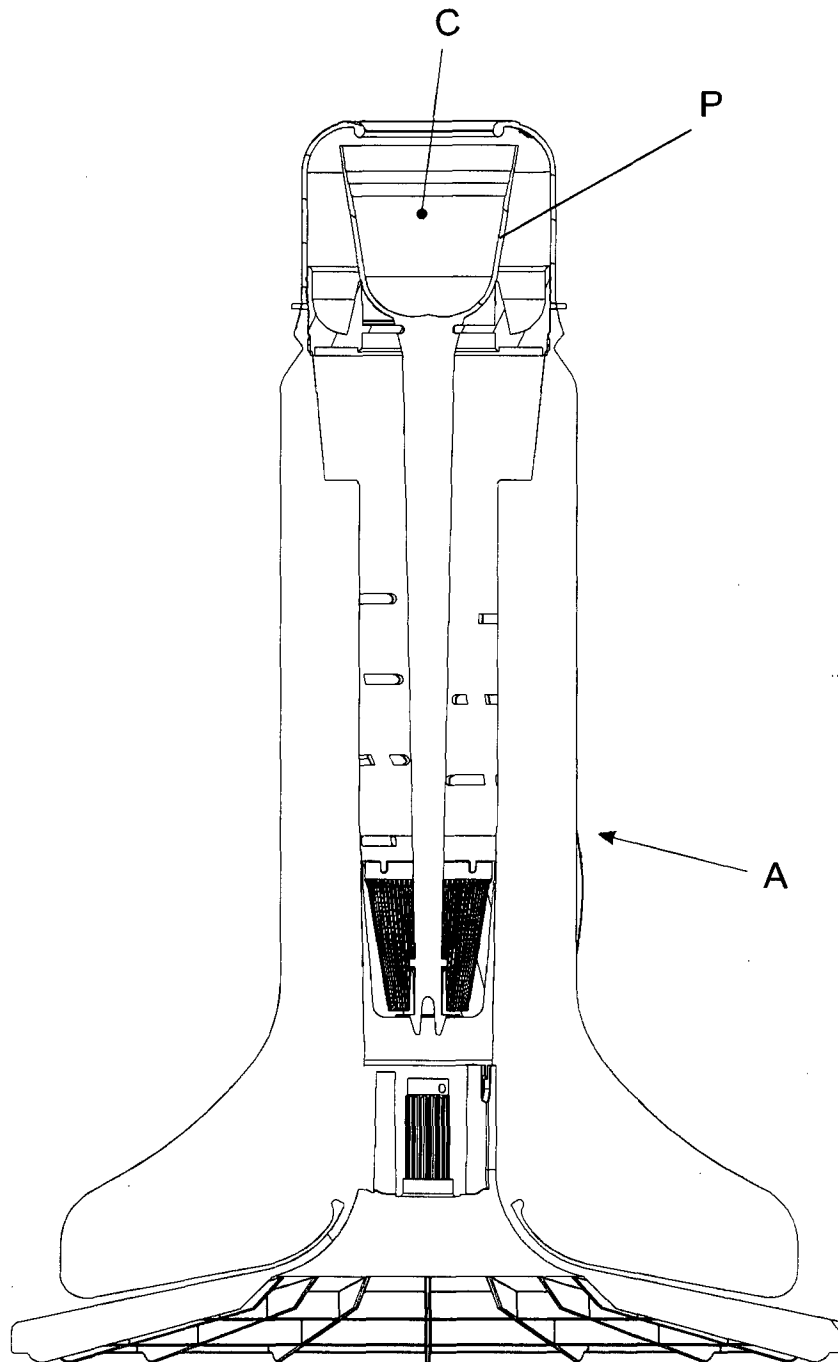
SCG/mmd



LEME Fábio Ferraz de Arruda

Daniel Advogados

1 / 5



(PRIOR ART)

FIG. 1

2 / 5

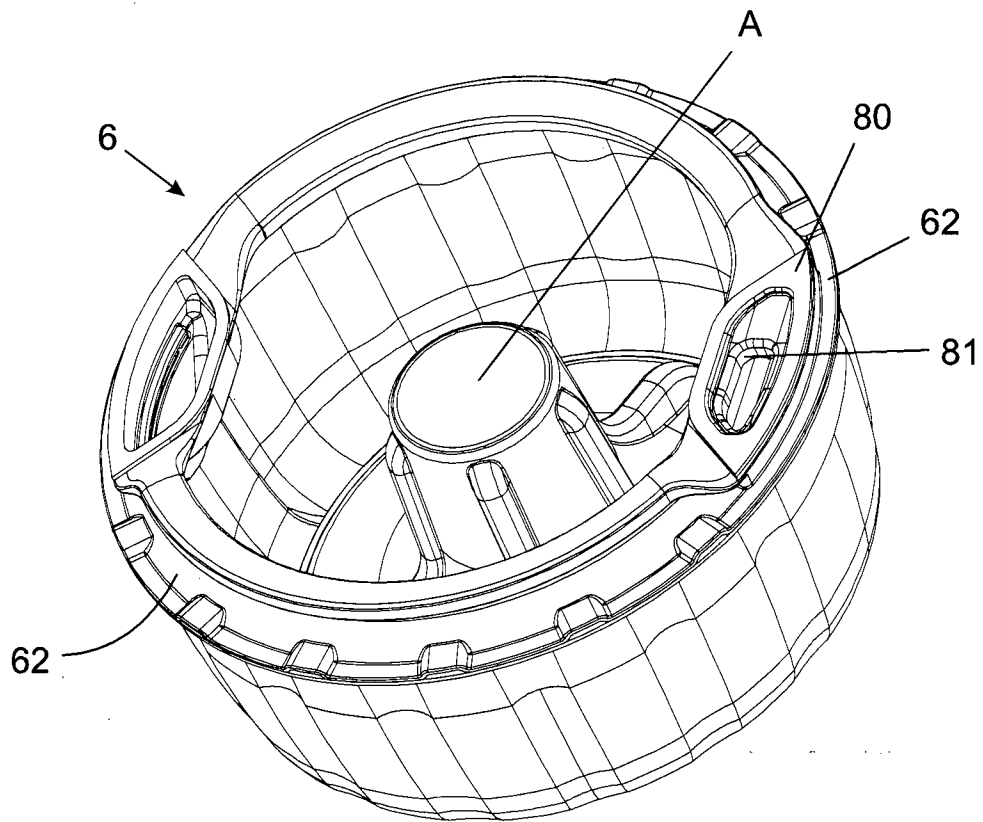


FIG. 2

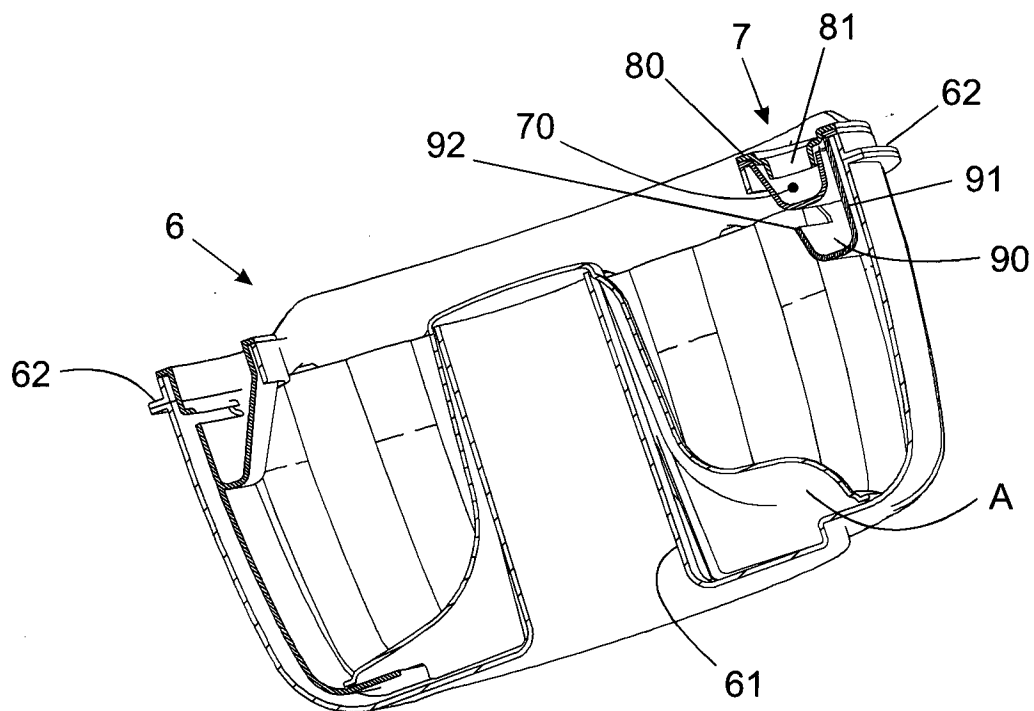


FIG. 3

3 / 5

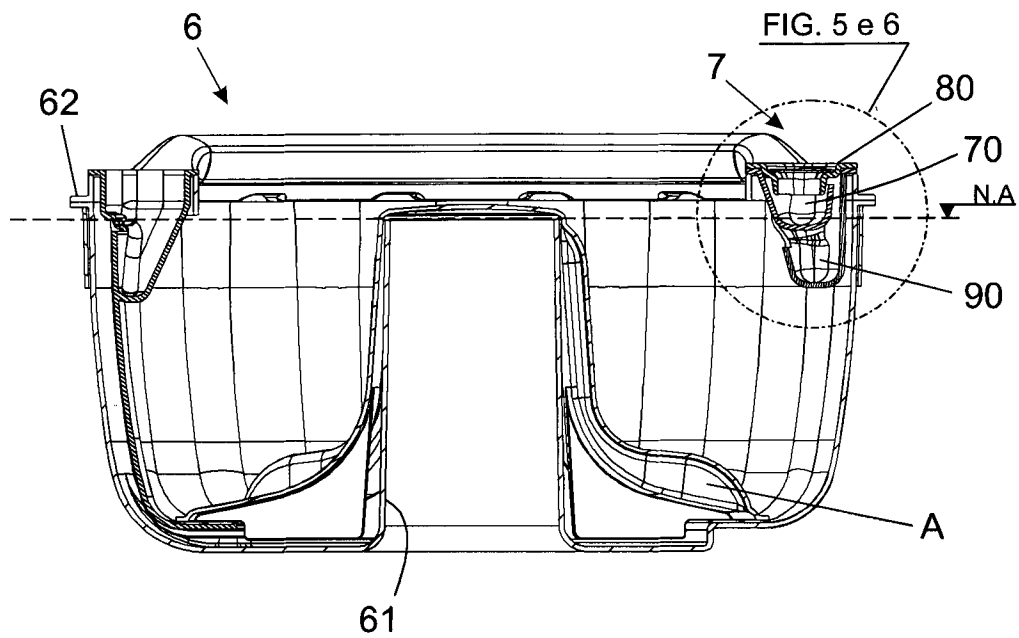


FIG. 4

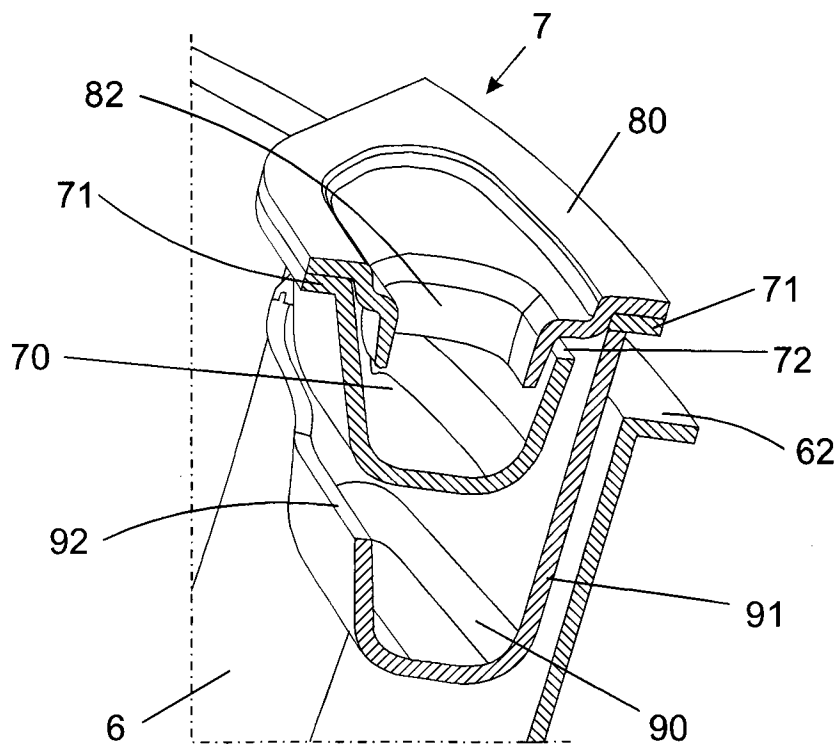


FIG. 5

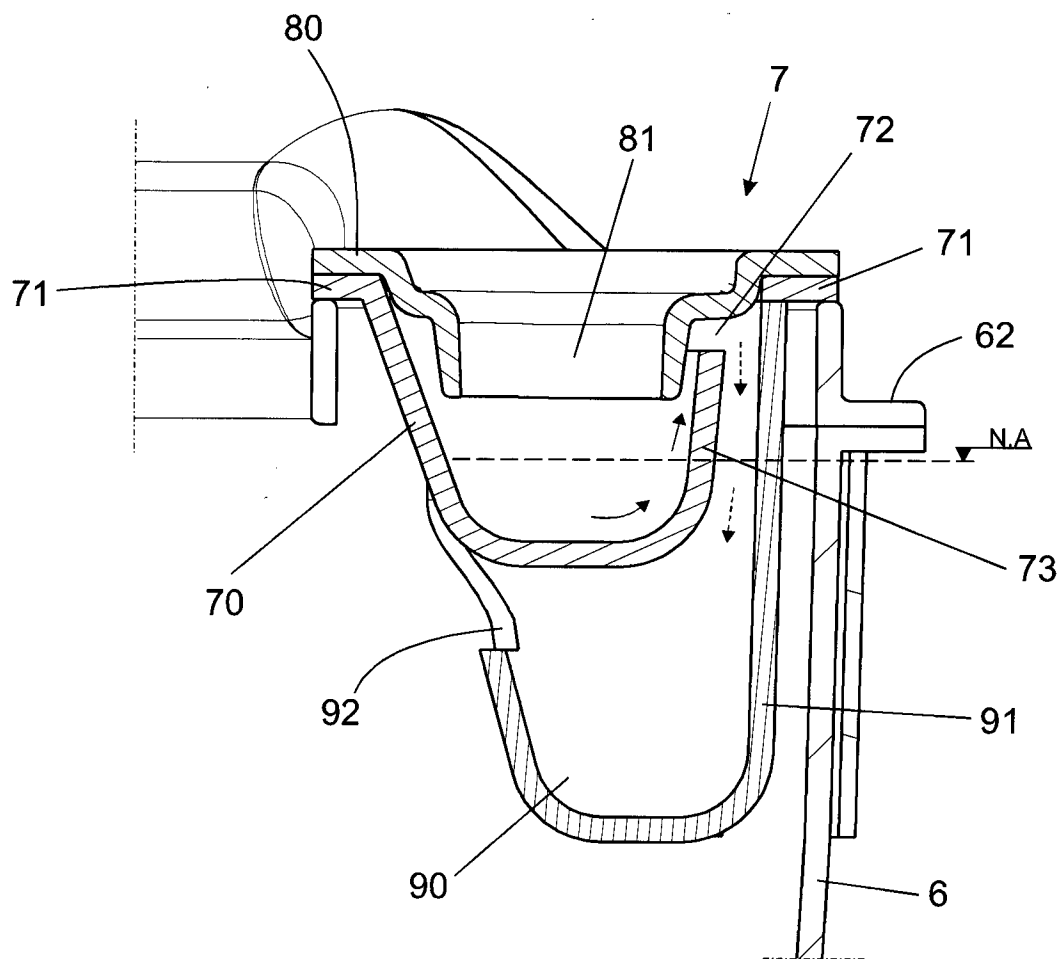


FIG. 6

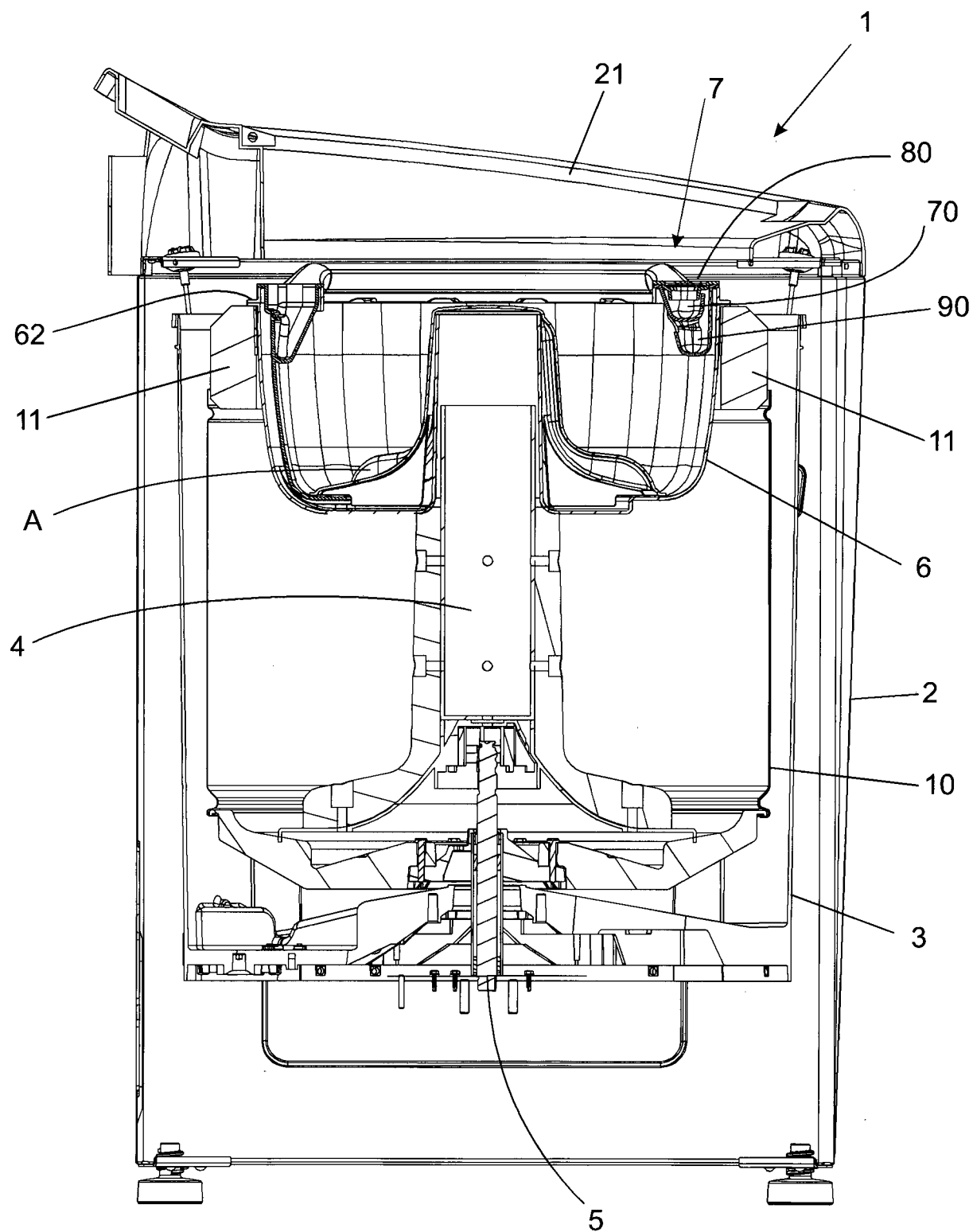


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/BR2014/000232

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F39/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 186 573 A (BRENNER ROBERT A [US] ET AL) 5 February 1980 (1980-02-05) column 4, lines 13-35; figures 1, 4 -----	1-10
A	US 6 543 259 B1 (SHERRATT PAUL ROBERTSON [GB] ET AL) 8 April 2003 (2003-04-08) claim 1; figure 1 -----	1-10
A	WO 03/069042 A1 (PROCTER & GAMBLE [US]) 21 August 2003 (2003-08-21) abstract; figure 3 -----	1-10



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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