

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
3 August 2006 (03.08.2006)

PCT

(10) International Publication Number
WO 2006/079580 A1

(51) International Patent Classification:
A47J 31/40 (2006.01)

(21) International Application Number:

PCT/EP2006/050123

(22) International Filing Date: 10 January 2006 (10.01.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

PN 2005 A 000006 27 January 2005 (27.01.2005) IT

(71) Applicant (for all designated States except US): **N & W GLOBAL VENDING S.P.A.** [IT/IT]; Via Roma 24, I-24030 Valbrembo (Bergamo) (IT).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CARRARA, Osvaldo** [IT/IT]; Via S. Carlo 9b, I-24020 Casnigo (Bergamo) (IT). **PERSONENI, Silvano** [IT/IT]; Via S. Omobono 44, I-24030 Mazzoleni (Bergamo) (IT).

(74) Agent: **GIUGNI, Valter**; Propria S.r.l., Via Mazzini 13, I-33170 Pordenone (IT).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

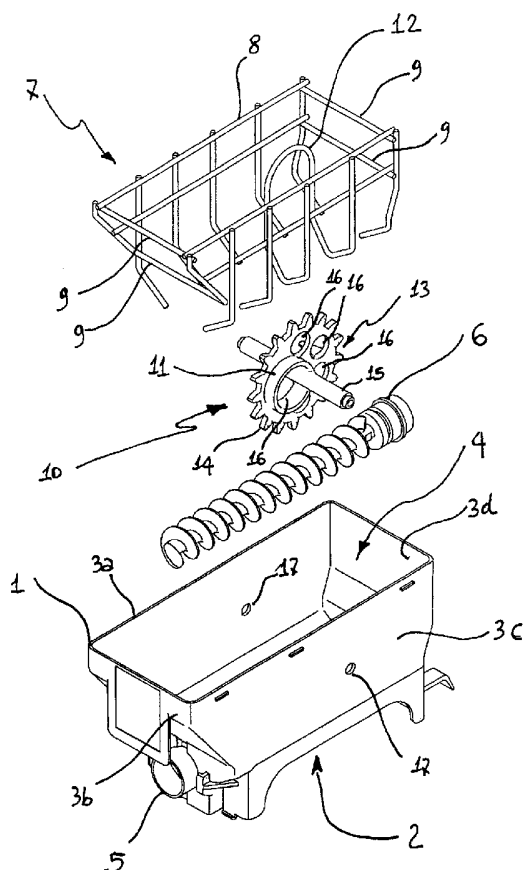
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: FOOD PRODUCT DISPENSER



(57) Abstract: The invention relates to a food product dispenser, in particular such dispenser intended for dealing out metered amounts of powder products in general, ground coffee, tea leaves, products in granular form or in the form of thick liquids in a beverage or food-item vending machine. The inventive dispenser comprises a box-shaped container (1) for storing a food product, comprising at least a substantially planar wall portion (3a, 3b, 3c, 3d) and a dispensing outlet (5); the dispenser further comprises scraper means (7) for removing product from said wall (3a, 3b, 3c, 3d) and actuating means (10) for driving said scraper means (7). The inventive dispenser is characterized in that said scraper means (7) are operated by said actuating means (10) to displace in a direction parallel to at least a substantially planar wall portion (3a, 3b, 3c, 3d) with a reciprocating translatory motion.

WO 2006/079580 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

5

10

FOOD PRODUCT DISPENSER

DESCRIPTION

The present invention refers to a food product dispenser, in particular
15 a dispenser adapted to deal out powders, granules or thick liquids in an automatic vending machine for food products.

Prior-art food product dispensers, such as dispensers of powder products in general, ground coffee, tea leaves, products in granular form
20 or in the form of thick liquids, are generally known to comprise a container for storing a product, a screw feeder or similar arrangement to dispense such product, which is adapted to take a metered amount of product from the container and convey it towards a dispensing mouth or outlet, and a stirrer adapted to stir the product inside the container in
25 view of preventing it from agglomerating into lumps or clots that might cause the product to be dispensed in an inappropriate amount in view of the intended use thereof. The stirrer, which is generally constituted by arms extending into the storage room defined by said container, usually operates by performing a rotary motion that is brought about either by
30 the same dispensing screw being driven to rotate about its own longitudinal rolling axis by an electric motor or, possibly, even manually by an operator. According to other solutions that have been devised to such purpose – and, for the matter, constructively more complicated to

embody – the stirrer is driven independently of the dispensing screw.

Prior-art dispensers that are solely provided with the stirrer have the disadvantage deriving from the fact that, in the areas of the product storage room that are not reached by the stirring action and, above all, in the region that lies closer to the walls of the storage container, a certain amount of product may be left stagnating without being ever dispensed, actually. The presence inside the storage container of product that fails to be dispensed and, therefore, remains there for extended periods of time may cause the food product stored therein to deteriorate, or anyway to undergo some decay, each time the container is replenished.

To at least partially do away with this problem, dispensers of powder products have been proposed, in which the stirrer comprises a scraping member adapted to remove the product from the walls of the storage container. An example of such stirrer is disclosed in US patent publication No. 5,113,917. Anyway, since the stirrer is driven to rotate inside the storage container and the scraper is an integral part of the same stirrer, in view of enabling the scraper to adhere against, i.e. be in contact with the walls of the container the need arises for the latter to be given the shape of a solid of revolution, such as for instance a cylinder or a truncated cone. Now, these shapes have the disadvantage of being rather cumbersome, i.e. requiring a lot of space, and this is certainly a drawback when the need arises for a certain number of dispensers of the above-described kind to be accommodated and installed within a single and same casing of a food-product vending machine. The narrow, restricted and irregularly shaped spaces that are generally available within the outer casings of vending machines, along with the need for various such containers for different products such as coffee, sugar, powder milk, chocolate, tea, and the like, in view of enabling a user to select among a satisfactorily wide choice of beverages, practically force vending machine manufacturers to do without the use of dispensers that make use of storage containers in the shape of a solid of revolution and

are provided with a rotary scraper to remove product from the container walls. Providing vending machines with correspondingly larger outer casings is again not a satisfactory solution to such problem, since the outer dimensions of casings and cabinets in general are subject to
5 restrictions, such as the ones imposed by the dimensions of a door of the room in which the vending machine has to be installed.

In view of overcoming the above-described drawbacks, vending machine manufacturers have therefore proposed the use of product
10 dispensers making use of a rotary device for stirring and mixing the product stored in a container, along with a dedicated arrangement for removing product accumulating along or sticking to the walls of the same container. Such arrangements are substantially comprised of springs that are first loaded by the motion of the dispensing screw and then instantly
15 released so that the abrupt extension thereof causes them to hit the wall of the container, thereby inducing a vibration that causes product heaping up on or sticking to said wall to separate therefrom. If, on the one hand, arrangements of this kind allow containers of any desirable shape to be used, actually, thereby solving the afore-noted space problems
20 inside the outer casing of vending machines, on the other hand they still have a drawback in that they give rise to a noise that might annoy the users of the vending machine, thereby making the latter scarcely appealing to the public. An additional drawback connected with arrangements of the above-noted kind lies in the fact that, after a certain
25 number of operating cycles, the springs so repeatedly impinging against the walls of the container are likely to cause the same container to crack or break down, thereby enabling product to leak out. Furthermore, the springs – generally of the wound kind – prove rather awkward to clean. In the case that the container is in a shape differing from the one of a solid
30 of revolution, the same drawback as already mentioned hereinbefore will also come up again owing to areas of the storage volume of the container not being reached by the action of the stirrer, so that the same problems as cited above, and deriving from product being enabled to heap up and

stagnate in these areas, will arise also in this case.

It is therefore an object of the present invention to provide a dispenser of food products that does away with the drawbacks and disadvantages of prior-art dispensers.

Within this general object, it is a purpose of the present invention to provide a dispenser of food products that enables a metered amount of product to be repeatedly dealt out in a reliable manner, even after a relatively high number of operating hours of the dispenser, regardless of the latter being installed to operate in particularly moist environments that tend to cause soluble powders to clot.

It is a further purpose of the present invention to provide a dispenser of food products that is capable of operating in a noiseless manner and enables product storage containers in a box-like shape, even of a reduced height, to be used.

Yet another purpose of the present invention is to provide a dispenser of food products that is effective in preventing clots or lumps of product to be dispensed from forming inside the storage container and, at the same time, preventing the same product from heaping up on and sticking to the walls of the container.

A further purpose of the present invention is to provide a dispenser of food products that is capable of being accommodated, along with other dispensers of the same kind, inside any pre-existing vending machine.

Another purpose of the present invention is to provide a dispenser of food products that is not cumbersome, i.e. takes up just a reduced space, and is constructively simple to implement.

According to the present invention, these aims, along with further ones

that will become apparent from the following disclosure, are reached in a dispenser of food products incorporating the features and characteristics as recited in claim 1 appended hereto.

5 Further features and advantages of the present invention will be readily understood from the description that is given below by way of non-limiting example with reference to the accompanying drawings, in which:

- Figure 1 is a perspective exploded view of the food product dispenser
10 according to the present invention;

- Figure 2 is a perspective view of the food product dispenser shown in Figure 1, as viewed in the assembled state thereof;

15 - Figure 3 is a perspective view of the assembled food product dispenser shown in Figure 2, from which the container has however been removed.

With reference to the above-listed Figures, the food product dispenser,
20 as intended in particular for dispensing powders, granules or thick liquids, comprises a container 1 having a substantially box-like shape formed of two pairs of mutually facing planar walls 3a, 3c and 3b, 3d and a bottom region 2 in a hopper-like conformation created through the use of curved or inclined walls. The container walls 3a, 3b, 3c, 3d and the
25 hopper 2 define a containment or storage volume 4 for storing a food product, in particular such food product in a powder form or in the form of granules or a thick liquid, therein. The container 1 is also provided with a removable cover (not shown in the Figures).

30 At the afore-mentioned bottom region 2 in a hopper-like conformation, there is provided a dispensing mouth or outlet 5, from which the product stored in the container 1 is dealt out. A feeder screw 6, or the like, is arranged inside the container 1, close to said dispensing outlet 5. The

screw 6 is driven rotatably by motor means of a kind that is largely known as such in the art (not shown in the Figures). Owing to the rotation of this screw 6, a portion of product in the container 1 is taken therefrom and conveyed towards the dispensing outlet 5.

5

The dispenser further comprises a scraper member 7 arranged within the container 1 so as to be able to extend close to surfaces of the planar walls 3a, 3b, 3c, 3d facing the inner containment volume 4 of the container 1. The scraper 7 comprises a net-like, reticular structure 8 that
10 substantially replicates the shape of said inner containment volume 4 of the container 1, so as to perform as a remover of soluble product that may deposit or clog onto said planar walls 3a, 3b, 3c, 3d.

It can be readily appreciated that, in this case, the scraper 7 is
15 particularly convenient to remove and, as a result, quite easy to clean.

The scraper 7 is driven by actuating means 10, so that it can perform a reciprocating translatable motion. By the effect of such motion, the scraper 7 is therefore capable of displacing in a direction parallel to the planar
20 walls 3a, 3c of the container 1, thereby removing the product heaping up on said walls owing to the reticular structure 8 being so caused to slide, i.e. scrape against the surface of said walls. The product that heaps up on the walls 3b and 3d, which are arranged transversally relative to the moving direction of the scraper 7, is in turn removed therefrom by the
25 action of first stirring means 9 that are in turn arranged transversally relative to the displacing direction of the scraper 7. The stirring means 9, further to causing the product to thoroughly mix up as the scraper 7 moves back and forth, cause the layer of product settled onto the planar walls 3b and 3d to crumble down when the scraper approaches these
30 walls. The number of stirring means 9 provided may be varied in accordance with the actual shape of the inner containment volume 4 of and the kind of product stored in the container 1.

To drive the scraper 7 in the above-indicated manner, the actuating means 10 comprise cam means 11, the axis of rotation of which is arranged transversally relative to the direction of translatory motion of the scraper 7. These cam means 11 are arranged so as to engage a curved rod 12 provided on said scraper 7. The rod 12 is bent so as to form a reverse U, i.e. a U arranged so that the concavity thereof faces downwards. This rod 12 accommodates the cam 11 between the parallel arms or flanks thereof.

For the construction of the cam means 11 to be further simplified, these means can be comprised of a simple eccentric. The interaction of the rotary motion of the cam means 11 with the curved rod 12 generates the reciprocating translatory motion of the scraper 7.

Those skilled in the art will readily appreciate that the cam means 11, or any similar means that may be used, can also generate a more complex motion, for example by adding oscillations thereto, in view of more effectively brushing up the walls of the dispenser.

The cam means 11 are associated to second stirring means 13, which are comprised of a cogwheel 14 and a shaft 15 that is rotatably associated to the container 1 through holes 17 provided in two mutually facing walls 3a, 3c. The cogwheel 14 is provided with through-holes 16 that are effective in bringing about a stirring effect in the soluble product within the containment volume 4 of the container 1 when the actuating means 10 are operated. In an advantageous manner, the cam means 11, the stirring means 13 and the shaft 15 are provided as an integral, unitary-piece construction and, jointly, form said actuating means 10. In turn, these actuating means 10 are mechanically linked to and constantly engaged with the feeding screw 6, so that, whenever product is required to be dispensed, a mixing effect is induced to a certain extent in the same product so as to facilitate its outflow from the containment volume 4 in the correct metered amount.

The dispensing screw 6 is arranged so that the axis of rotation thereof extends in the direction of translatory motion of the scraper 7.

One or more dispensers of the above-described kind may be accommodated within a beverage vending machine, for instance upstream of a brewing unit of a type largely known as such in the art, so that the products stored in the containers can be used without any waste in preparing the beverages that are from time to time selected by the users of the vending machine according to their own tastes.

10

Fully apparent from the above description is therefore the ability of the dispenser according to the present invention to effectively reach the aims and advantages cited afore, through the provision of a dispenser of food products that enables said products to be repeatedly dealt out in metered amounts in a fully reliable manner, while preventing the same products from clotting or agglomerating, as well as from heaping up on and sticking to the walls of the related container. Fully apparent is also the ability of the dispenser according to the present invention to enable containers having a substantially box-shaped, particularly "flat" (i.e. much wider than high) body to be used instead of the traditional containers in the form of a solid of revolution. This solution involves lower space requirements, i.e. is much less cumbersome, so that it enables one or more such dispensers to be accommodated within the casing of possibly existing vending machines.

25

In addition, the food product dispenser according to the present invention is advantageously simple to manufacture and particularly quiet in operation.

It shall be appreciated that the materials used, as well as the shape and the sizing of the various parts, may each time be selected so as to more appropriately meet the particular requirements or suit the particular application.

It shall further be appreciated that the various parts forming the object of the present invention shall certainly not be solely embodied in the manner that has been described and illustrated hereinbefore, but can rather be implemented in many other embodiments – although not
5 specifically illustrated here – without departing from the scope of the present invention.

5

CLAIMS

10 **1.** Food product dispenser, in particular such dispenser intended for dealing out metered amounts of powder products in general, ground coffee, tea leaves, products in granular form or in the form of thick liquids in a beverage or food-item vending machine, comprising:

 - a box-shaped container (1) for storing a food product, comprising at
15 least a substantially planar wall portion (3a, 3b, 3c, 3d) and a dispensing outlet (5);

 - scraper means (7) provided within said container (1) and extending in close proximity of the surface of said wall portion (3a, 3b, 3c, 3d) for removing said product from said wall;

20 - actuating means (10) for driving said scraper means (7),

characterized in that said scraper means (7) are operated by said actuating means (10) to displace in a direction parallel to at least a substantially planar wall portion (3a, 3b, 3c, 3d) with a reciprocating translatable motion.

25

2. Food product dispenser according to claim 1, wherein said scraper means (7) comprise a reticular structure (8) that substantially replicates the shape of the inner containment volume (4) of said container.

30 **3.** Food product dispenser according to claim 2, wherein said scraper means (7) comprise one or more first stirring means (9) that extend in a direction running transversally to the direction of said reciprocating translatable motion.

4. Food product dispenser according to any of the preceding claims, wherein said actuating means (10) comprise cam means (11) arranged to rotate about an axis extending transversally to the direction of the reciprocating translatory motion of said scraper means (7).

5. Food product dispenser according to claim 4, wherein said cam means (11) are arranged to engage a curved rod (12) provided on said scraper means (7).

10

6. Food product dispenser according to claim 4 or 5, wherein said cam means (11) are associated to second stirring means (13) comprising a cogwheel (14) and a shaft (15) rotatably associated to the container (1).

7. Food product dispenser according to any of the preceding claims, comprising a dispensing screw (6) driven by motor means to take a portion of said food product from the container (1) and conveying said portion towards said dispensing outlet (5), said screw (6) being mechanically linked to said actuating means (10) to operate said scraper means (7).

15
20

8. Food product dispenser according to claim 7, wherein said screw (6) extends in the direction of the reciprocating translatory motion of said scraper means (7).

25

9. Beverage vending machine comprising a food product dispenser according to claims 1 to 8.

30

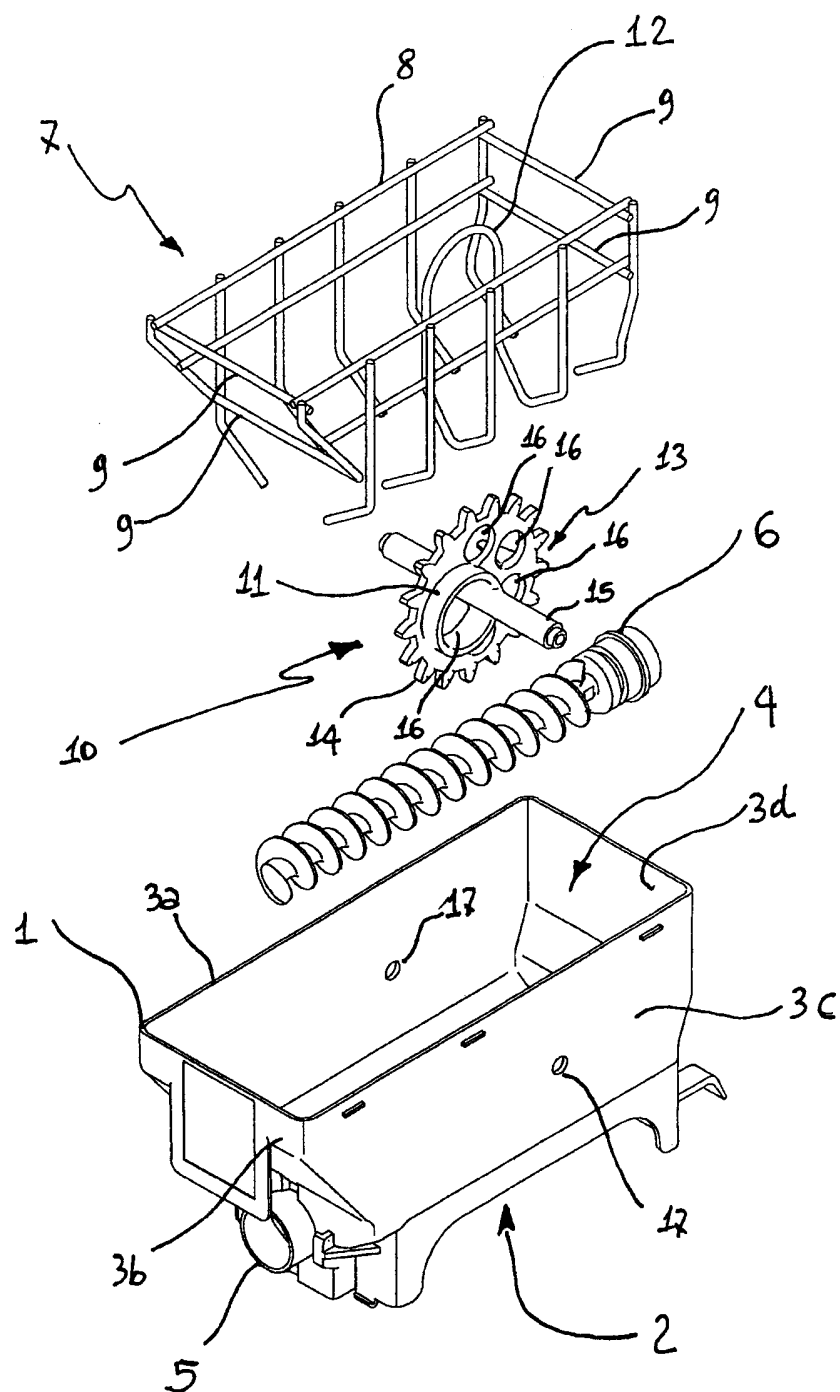
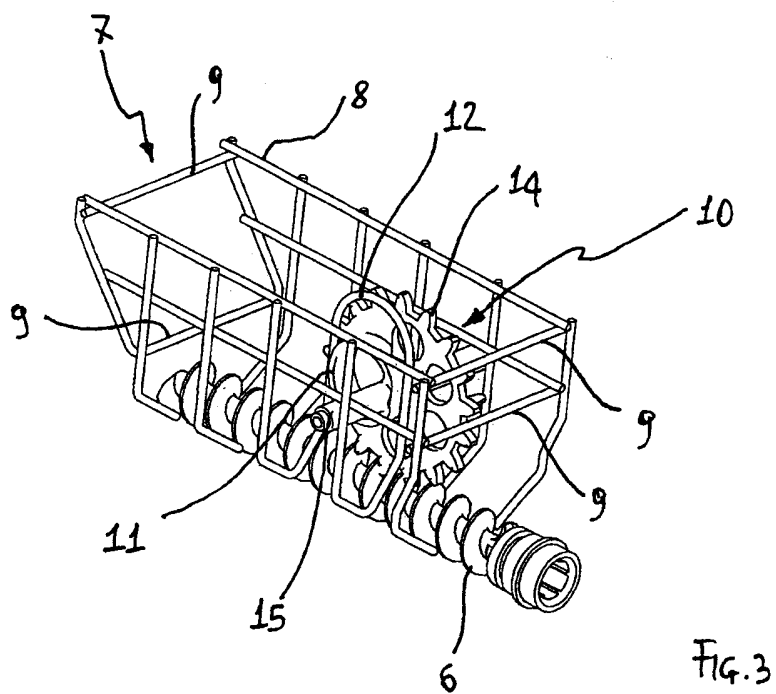
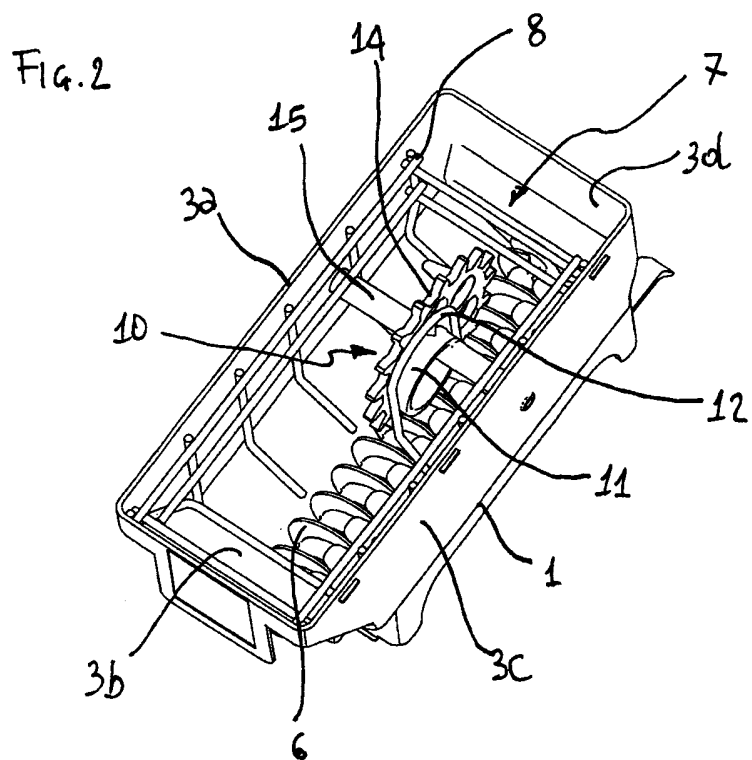


FIG. 1



INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2006/050123

A. CLASSIFICATION OF SUBJECT MATTER

INV. A47J31/40

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)

A47J

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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 461 405 A (ADAMSON ET AL) 24 July 1984 (1984-07-24) column 2, line 37 - column 5, line 45; figures	1,7-9
X	US 2003/024945 A1 (DASILVA BRIAN) 6 February 2003 (2003-02-06) paragraphs [0028] - [0037] paragraph [0039]; figures	1
A	US 3 400 861 A (PEARL DONALD C) 10 September 1968 (1968-09-10) column 2, line 57 - column 5, line 47; figures	1-9
	----- -/--	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document 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)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *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.
- *G* document member of the same patent family

Date of the actual completion of the international search

10 May 2006

Date of mailing of the international search report

17/05/2006

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

De Terlizzi, M

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2006/050123

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 287 993 A (FORD ET AL) 22 February 1994 (1994-02-22) column 4, line 4 - column 6, line 68; figures -----	1-9
A	EP 1 159 906 A (WESTOMATIC CATERING SYSTEMS LIMITED) 5 December 2001 (2001-12-05) paragraphs [0013] - [0018] -----	1,7-9
A	GB 1 241 784 A (ROWENTA-WERKE GESELLSCHAFT MIT BESCHRANKTER HAFTUNG) 4 August 1971 (1971-08-04) page 1, line 80 - page 3, line 50; figures -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2006/050123

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4461405	A	24-07-1984	NONE	
US 2003024945	A1	06-02-2003	NONE	
US 3400861	A	10-09-1968	DE 1556536 A1 GB 1147117 A JP 51040339 B	29-01-1970 02-04-1969 02-11-1976
US 5287993	A	22-02-1994	NONE	
EP 1159906	A	05-12-2001	AT 254874 T DE 60101287 D1	15-12-2003 08-01-2004
GB 1241784	A	04-08-1971	BE 746453 A1 CH 506985 A DE 7001460 U ES 376158 A1 FR 2032451 A5	31-07-1970 15-05-1971 09-07-1970 01-03-1972 27-11-1970