(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 April 2010 (01.04.2010)

PCT

(10) International Publication Number
WO 2010/034663 A1

(51) **International Patent Classification**:
B65D 1/16 (2006.01) ***B65D 85/804*** (2006.01)

(21) **International Application Number**:
PCT/EP2009/062050

(22) **International Filing Date**:
17 September 2009 (17.09.2009)

(25) **Filing Language**: English

(26) **Publication Language**: English

(30) **Priority Data**:
08164893.3 23 September 2008 (23.09.2008) EP

(71) **Applicant** *(for all designated States except US)*: **NESTEC S.A.** [CH/CH]; Avenue Nestlé 55, CH-1800 Vevey (CH).

(72) **Inventors; and**
(75) **Inventors/Applicants** *(for US only)*: **OZANNE, Matthieu** [FR/CH]; Au Jordil, CH-1846 Chessel (CH). **GERBER, Gilles** [FR/CH]; Chemin des Pâles 2, CH-1095 Lutry (CH).

(74) **Agent**: **DUCREUX, Marie**; Avenue Nestlé 55, CH-1800 Vevey (CH).

(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) **Title**: PROCESS FOR PRODUCING BICOLOURED ALUMINIUM CONTAINERS

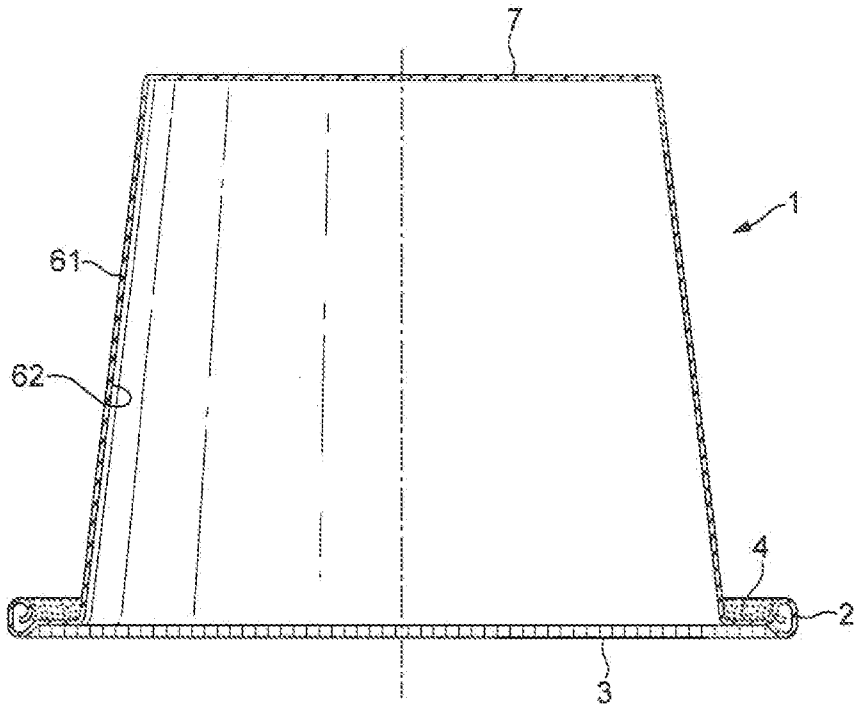


FIG. 1

(57) **Abstract**: The invention concerns an aluminium container (1) issued from the process of deep drawing an aluminium foil (6) to form a container body (7), cutting the edges of the container body, curling said edges on the exterior side of the container body in order to form a curled edge (2) and closing the container body by a foil/lid/membrane (3) wherein the colour of the curled edge is different from the natural colour of the aluminium foil.

WO 2010/034663 A1

Published:

— *with international search report (Art. 21(3))*

PROCESS FOR PRODUCING BICOLOURED ALUMINIUM CONTAINERS

The present invention relates to aluminium containers and in particular to beverage aluminium capsules.

Containers made of aluminium foils are very current and have been known for a long time. These containers are very often used in the field of food industry for storing and dispensing food ingredients.

Such aluminium containers are particularly used in the field of production of beverages : they can present the form of a capsule containing beverage ingredients designed for insertion in a beverage production device in which a liquid enters the capsule in order to interact with ingredients in the capsule and to drain a beverage from the capsule. The capsules can contain different types of beverage ingredients in order to produce different types of beverages. Usually the exterior side of the capsules present different colours according to the nature of the beverage ingredients stored in the capsule.

These aluminium containers or capsules are commonly produced by implementing the following steps :

- cutting an aluminium foil to fit the dimensions of the container,
- deep drawing the precut aluminium foil to preform a body and simultaneously rolling the edges which usually present a torn and sharp aspect,
- filling the container body with the ingredients to be stored inside, and
- closing the stamped container by a cover.

To get containers or capsules of different outside colours, a face of the starting aluminium foil is coloured so that when it is deep drawn, the exterior face of the container appears with the colour.

In the nowadays systems implementing a beverage production machine associated with a range of specific capsules, an increase number of different capsules containing different beverage-type ingredients is implemented so as to propose to customers a large panel of different beverages and to continuously provide the customers with new beverages. It can lead to the production of aluminium containers with a high number of different colours to differentiate each new beverage from the others and it can be difficult for the customers to memorise the colour corresponding to each beverage.

A solution could be to provide beverage information on the cover closing the capsule body,

yet such a solution would imply the production of specific covers for each existing beverage and consequently a more complicated and expansive production of the capsules. Besides, this solution would not enable a rapid and direct knowledge of the beverage inside the capsule without manipulating, orienting the capsule and reading the information written on the cover. A problem is that, when a high number of beverage capsules exists, it should be possible for the customer to select the right beverage and capsule by a simple glance. The fact or writing information on the cover is not satisfying since the capsules are often stored with the cover oriented downside or randomly placed in a box.

Another solution could be to associate a second colour to the first one on the exterior face of the body of the capsule for example by deep drawing an aluminium foil painted on one of his face with two colours e.g. in the form of an alternation of lines of two different colours. Yet due to the deformation of the aluminium surface during the deep drawing, the resulting aspect of the capsule could not be perfectly controlled and may present an irregular aspect from one capsule to another. Besides, some trials showed that it was not easy for customers to rapidly differentiate containers of different colours combinations when containers had been randomly mixed.

It is neither a solution to imagine colouring the outside of the capsule once it has been deep drawn on account of production steps optimization and production costs, the number of produced beverage capsules being huge. Actually today some plants can produce up to millions capsules per day and it impossible to apply a coloured treatment on a part of the capsule.

The present invention aims at solving the problem of providing aluminium foil made containers, in particular beverage capsules, presenting an outside aspect enabling the differentiation of containers according to their contents, especially according to content variations, and that can be produced in a huge amount without complicating the known production process and increasing its cost.

Another problem is to solve the problem of increasing the number of different colours for aluminium foil made containers without complicating the known production process.

According to a first aspect, the invention concerns a process for producing an aluminium container, said process comprising the steps of :

- cutting an aluminium foil to produce a piece of aluminium fitting the dimensions of the container,
- deep drawing the piece of aluminium foil to form a container body and rolling the edges of the container body on the exterior side of the deep drawn container in order to form a curled edge,

wherein each of the faces of the starting aluminium foil presents a colour treatment of different colour than the other face.

The process usually comprises a subsequent step of filling the container body and a step of closing the container body by a lid.

Concerning the starting aluminium foil, colour treatments of the faces of said foil are usually realised by application of a paint composition comprising at least a pigment and a lacquer. This application is usually made by roller coatings on each side of the foil.

According to the invention, the paint compositions for each face of the starting aluminium foil differ by the nature of the pigment so that the faces finally present different colours. Usually, the paint composition that is applied on the face of the starting aluminium foil intended to form the interior face of the aluminium container comprises also a welding lacquer, usually a heat seal lacquer. This lacquer enables the welding of the lid on the edges of the opening of the container body, preferably on the flange-like rim of the container. Welding is usually realised by heating. Such welding lacquers are well known products usually implemented for the production of aluminium containers.

In the case where the aluminium container is produced as a container for storing an edible product, it is preferable that at least one of the colour treatments is realised with a food agreed paint composition. Effectively since the starting aluminium foil is treated on its both faces by a colour treatment, one of the faces is in contact with the edible product stored in the container and said face must be designed for a safe food contact. Then for this use the aluminium foil must be deep drawn so that the inside of the container body presents the colour treatment that is realised with food agreed lacquers and pigments.

According to a second aspect, the invention concerns an aluminium container issued from the process of deep drawing the aluminium foil to form a container body and rolling the edges of the container body on the exterior face of the container body in order to form a curled edge wherein the colour of the curled edge is different from the natural colour of the aluminium foil.

The container of the present invention is prepared starting from an aluminium foil which is first cut to provide a piece of aluminium fitting the dimensions of the final container to be obtained. This step results in the production of sharp and torn edges around the container body. This piece of aluminium foil is deep drawn according to known deep drawing process in either one or several deep drawing steps ; during the at least one deep drawing step, the edges of the aluminium foil piece are rolled to provide a nice and secure aspect to the edge of the container body. The rolling operation is realised by rolling the edges on themselves in direction of the exterior face of the container body. Then it is the same aluminium foil face that is inside the body container that becomes apparent at the exterior of the curled edge. According to the invention,

the colour of the curled edge is different from the natural colour of the aluminium foil, and preferably the colour of the exterior side of the container body is different from the natural colour of the aluminium foil too. "Natural colour of aluminium" means the colour of aluminium which is not altered by any colour treatment. Then view from the exterior the aluminium container of the present invention can present two parts of different colours, each being different from the natural colour of the aluminium foil : one part is the exterior face of the container body presenting one coloured face of the starting aluminium foil and the other part is the curled edge presenting the colour of the other face of the starting aluminium foil from which the container is made.

Finally the opening of the container of the present invention can be closed by a lid or cover like a foil or a membrane. Usually the lid is attached to a flange-like rim between the container body and the curled edge, this flange can be produced during deep drawing step.

The aluminium container of the present invention preferably contains an edible product. According to the preferred embodiment of the present invention, the aluminium container is a capsule containing at least one beverage ingredient designed for insertion in a beverage production device in which a liquid enters the capsule in order to interact with the ingredient in the capsule and to drain a beverage from the capsule.

The present invention presents the advantage of enabling the production of capsules with a high number of different colour combinations of the container body exterior face and the curled edge without complicating the known production process of aluminium containers. Then the fact of producing coloured capsules does not decrease the capsule production rate, which is the most important advantage of the present invention.

The way the capsules are coloured on the container body exterior face and the curled edge enables a rapid selection of the desired container by a simple glance even if a high number of different coloured containers are present. This property is helpful for the consumer in face of the final container filled with product and laying other its lid. It is also helpful for the container producer during the step of storage of unfilled containers since the containers can be piled up while the colours of the edge of the containers staying apparent. Moreover it has also be surprisingly noticed that the fact of having only a thin touch of colour on the curled edge of the capsule is sufficient for the customer to identify the capsule he is searching for, which was not prima facie obvious.

The way the containers are coloured is particularly adapted for the presentation of the containers by range or variety according to the products stored inside. In particular for the use of the containers as beverage capsules, it is possible to create different ranges based on different

basic beverages like tea, coffee and chocolate by applying the same colour on the container body exterior face and to differentiate inside each range different beverage specialities by applying different colours on the curled edges, for example in the tea range to differentiate green, black, red, herbal tea, in the coffee range to differentiate several origins, etc …

Brief description of the drawings

The characteristics and advantages of the invention will be better understood in relation to the figures which follow :

- Figure 1 is a cross section view of an aluminium container,
- Figure 2 is a perspective view of an aluminium container,
- Figure 3 is a schematic diagram of the different steps of production of the container according to the present invention.

Detailed description of the drawings

Figures 1 and 2 illustrate the type of aluminium containers to which the present invention refers. The aluminium container 1 is made of an aluminium foil that has been stamped in order to form a container body 7. The extremity of the container body presents a flange-like rim 4 and a curled edge 2. The opening of the container is closed by a lid 3 welded on the flange-like rim 4. The product stored in the container 1 has not been represented. According to the invention, the aluminium foil from which the container is made presents two faces 61, 62 presenting different colour treatments. Due to this difference of treatment, the container presents a curled edge 2 of different colour from the container body 7 and the flange-like rim 4, said colour being represented in a stipple fashion in Figures 1 and 2.

Figure 3 illustrates a process for producing the containers of the present invention. In steps a) and b), a piece of aluminium foil 6 is preformed by deep drawing means 8. The starting piece of aluminium foil 6 presents two faces 61, 62 with different colour treatments. For the use of the container in food applications, it is preferable that the face 62 is treated with food agreed pigment and lacquer. In step c), the walls of the container body 7 created by deep drawing are folded to create flange-like rims. In step d), the edges of the container are rolled. Yet the steps b), c) and d) can be simultaneously realised during the deep drawing step. In step e) the container is filled with the product 5 to be stored inside and said product is eventually tamped down. Finally in step f) the container is closed by welding a lid on the flange-like rim 4.

CLAIMS

1. Process for producing an aluminium container (1) comprising the steps of :
- cutting an aluminium foil to produce a piece of aluminium (6) fitting the dimensions of the container,
- deep drawing the piece of aluminium foil (6) to form a container body (7) and rolling the edges of the container body on the exterior side of the deep drawn container in order to form a curled edge (2),
wherein each of the faces of the starting aluminium foil presents a colour treatment of different colour than the other face.

2. Process according to Claim 1 wherein at least one of the colour treatments is realised with a food agreed paint composition.

3. Process according to Claim 2 wherein the aluminium foil is deep drawn so that the inside of the container body (7) presents the colour treatment that is realised with a food agreed pigment and lacquer.

4. Process according to any of the precedent clains wherein it comprises a step of filling the container body (7) and a step of closing the container body by a lid (3).

5. Aluminium container (1) issued from the process of deep drawing the aluminium foil (6) to form a container body (7) and rolling the edges of the container body on the exterior face of the container body in order to form a curled edge (2) wherein the colour of the curled edge is different from the natural colour of the aluminium foil.

6. Aluminium container according to Claim 5 wherein the colour of the exterior side of the container body is different from the natural colour of the aluminium foil.

7. Aluminium container according to Claim 5 or 6 wherein a lid is attached to a flange-like rim (4) between the container body (7) and the curled edge (2).

8. Aluminium container according to any of claims 5 to 7 wherein it contains an edible product (5).

9. Aluminium container according to any of claims 5 to 8 wherein the capsule contains at least a beverage ingredient designed for insertion in a beverage production device in which a liquid enters the capsule in order to interact with the ingredient in the capsule and to drain a beverage from the capsule

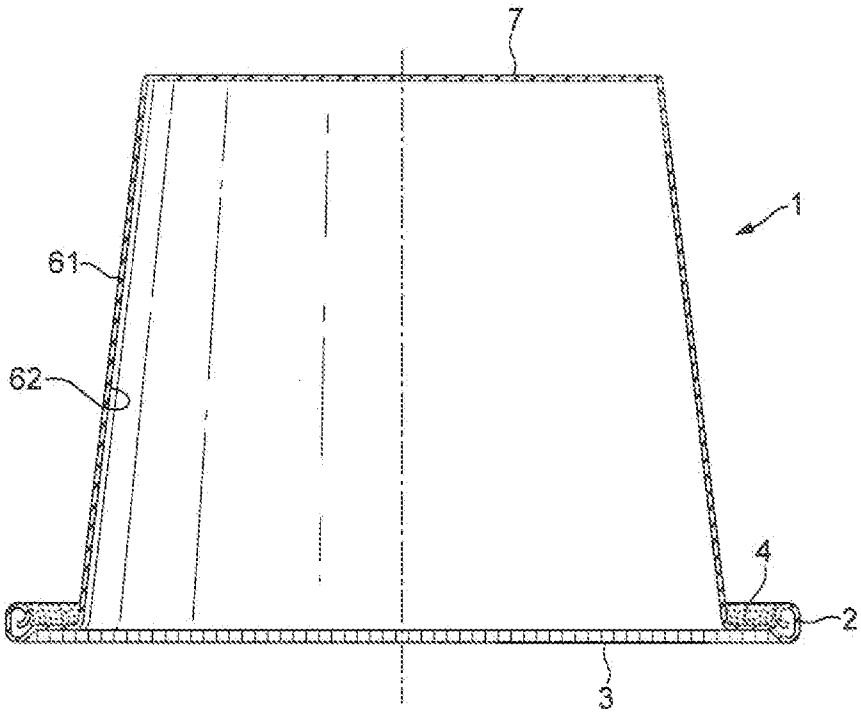


FIG. 1

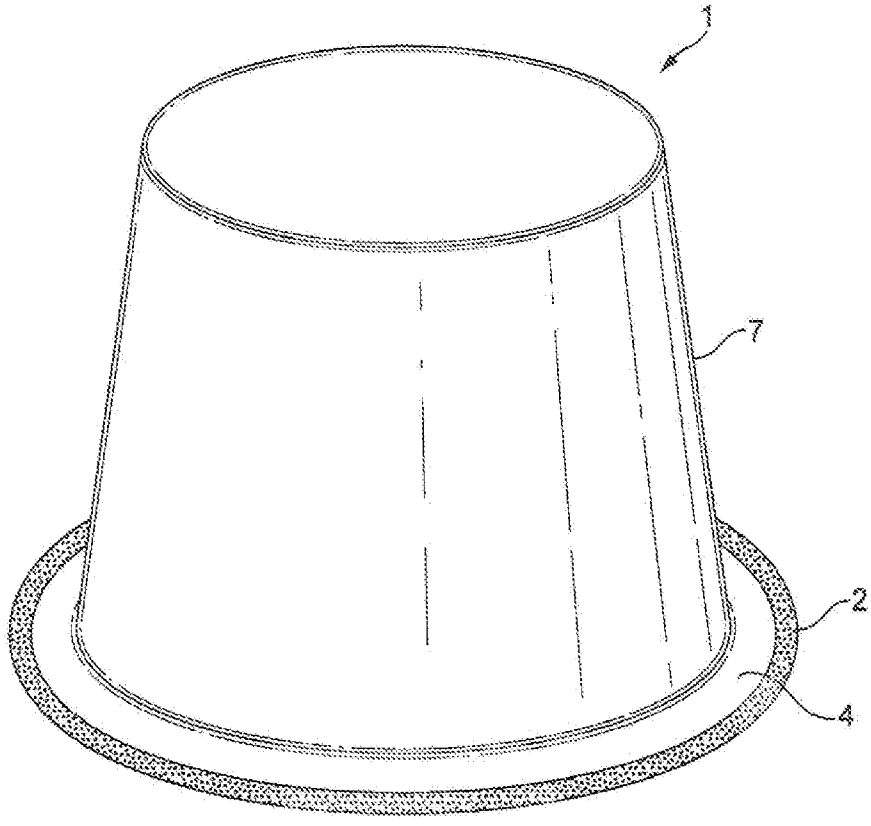


FIG. 2

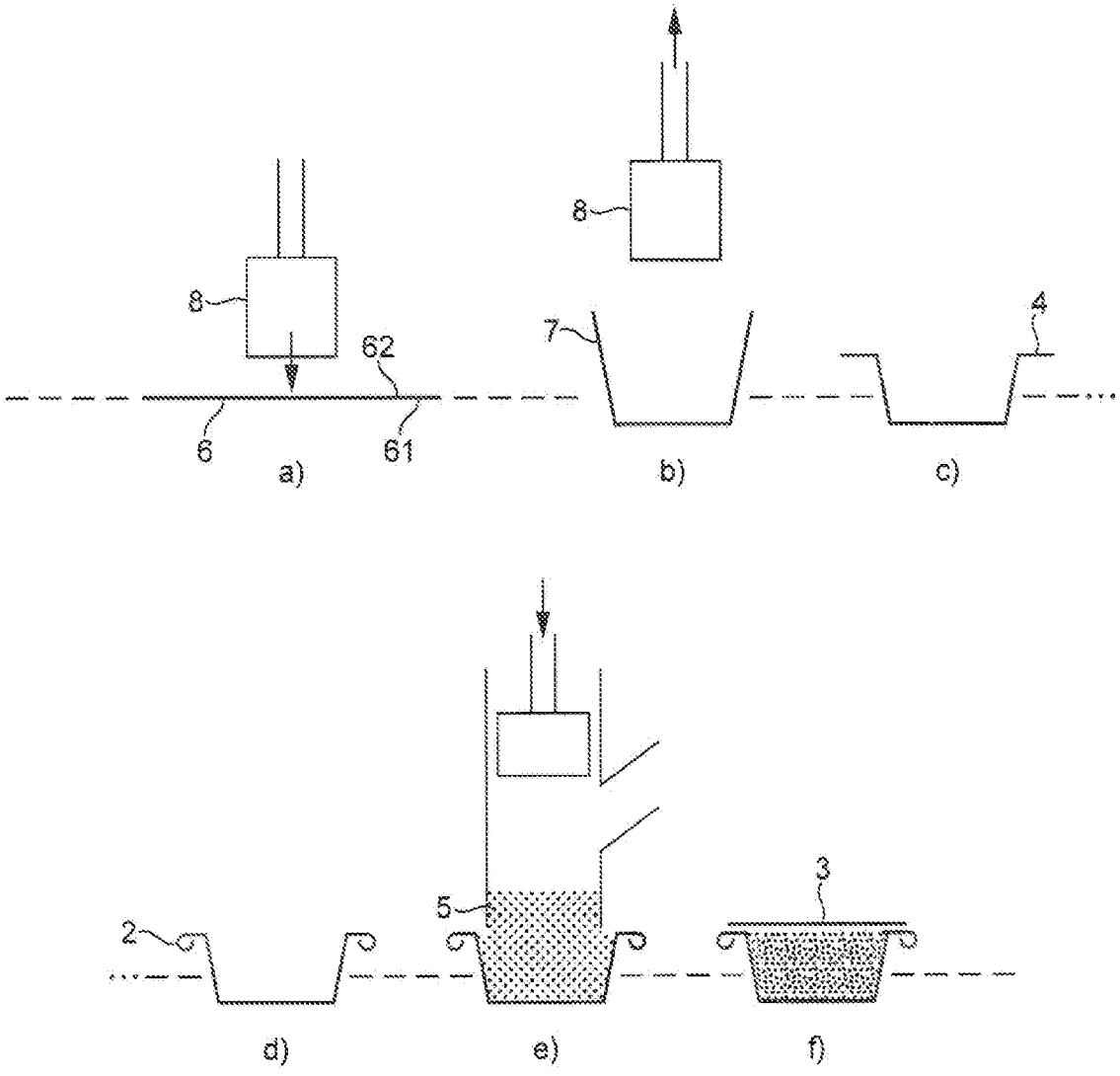


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/062050

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D1/16 B65D85/804

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)
B65D

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 468 079 A (NESTLE SA [CH]) 29 January 1992 (1992-01-29) column 1, line 1 - line 10 column 2, line 50 - line 52 column 4, line 13 - column 5, line 54; figures 1,2	1-9
A	EP 1 849 715 A (NESTEC SA [CH]) 31 October 2007 (2007-10-31) paragraphs [0001], [0002], [0030], [0040], [0044], [0048], [0049], [0053]	1-9
Y	DE 20 2005 021160 U1 (CAFFITA SYSTEM S P A [IT]) 5 April 2007 (2007-04-05) paragraphs [0001], [0002], [0022], [0029]	1-9

-/--

[X] Further documents are listed in the continuation of Box C.

[X] 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.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 December 2009	22/12/2009

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Fax: (+31–70) 340–3016	Lämmel, Gunnar

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/062050

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2004/083071 A (SEGAFREDO ZANETTI COFFEE SYSTE [IT]; ZANETTI MATTEO [IT]) 30 September 2004 (2004-09-30) page 1, line 4 - line 12 page 2, line 6 - line 10; claim 8; figure 2	1-9
A	EP 0 292 462 A (KOUPERMAN BIDONS BOITES METALL [BE]) 23 November 1988 (1988-11-23) column 3, line 16 - line 30 column 4, line 43 - line 53; figure 1	1-9

IPR2024-00257
Nespresso USA, Inc. Ex. 1025
Page 13 of 14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2009/062050

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0468079 A	29-01-1992	AT 142974 T	15-10-1996
		AU 655184 B2	08-12-1994
		BR 9102993 A	18-02-1992
		CA 2046558 A1	28-01-1992
		DE 69028628 D1	24-10-1996
		DE 69028628 T2	30-01-1997
		DK 0468079 T3	03-03-1997
		ES 2091780 T3	16-11-1996
		FI 913270 A	28-01-1992
		GR 3021816 T3	28-02-1997
		JP 2784282 B2	06-08-1998
		JP 4236920 A	25-08-1992
		MX 9100373 A1	28-02-1992
		NO 912910 A	28-01-1992
		NZ 238935 A	27-06-1994
		PT 98458 A	30-09-1993
		ZA 9105420 A	29-04-1992
EP 1849715 A	31-10-2007	AR 063194 A1	14-01-2009
		AT 435170 T	15-07-2009
		AU 2007242800 A1	01-11-2007
		CA 2649443 A1	01-11-2007
		CN 101432207 A	13-05-2009
		WO 2007122206 A1	01-11-2007
		ES 2326909 T3	21-10-2009
		JP 2009534143 T	24-09-2009
		US 2009223373 A1	10-09-2009
DE 202005021160 U1	05-04-2007	NONE	
WO 2004083071 A	30-09-2004	AR 056901 A1	07-11-2007
EP 0292462 A	23-11-1988	DE 3871439 D1	02-07-1992
		DK 207188 A	17-10-1988
		JP 63281960 A	18-11-1988
		NO 881646 A	17-10-1988

IPR2024-00257
Nespresso USA, Inc. Ex. 1025