



- (51) International Patent Classification:
A47J 41/02 (2006.01) A47J 37/07 (2006.01)
- (21) International Application Number:
PCT/EP2016/081894
- (22) International Filing Date:
20 December 2016 (20.12.2016)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
2015/5838 22 December 2015 (22.12.2015) BE
- (71) Applicant: ALLIBERT HOVAC [BE/BE]; Brugstraat 25,
8720 Oeselgem (BE).
- (72) Inventors: CABUS, Stijn; Moerbezielaan 27, 9032
Wondelgem (BE). OPLIEGER, Stefaan; Kasteelstraat 65,
1730 Asse (BE).
- (74) Agent: GEVERS PATENTS; Holidaystraat 5, 1831
Diegem (BE).
- (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, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN,
KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA,
MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG,
NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS,
RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY,
TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,

[Continued on next page]

- (54) Title: GLASS CONTAINER FOR AN INSULATING FLASK

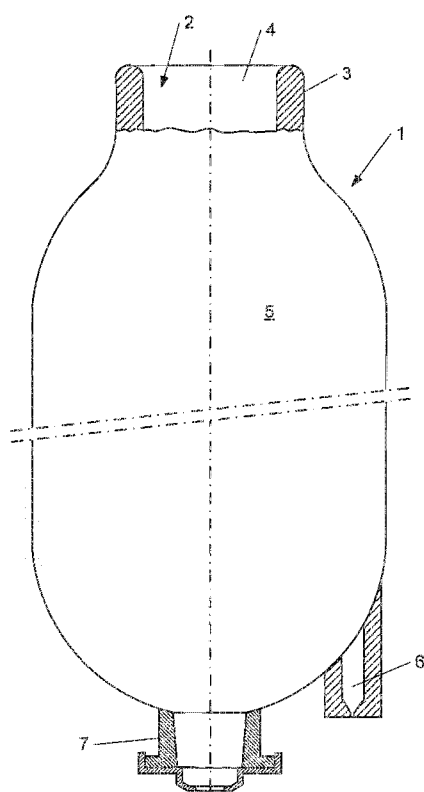


Fig. 1

(57) Abstract: A glass container (1) for an insulating flask, the glass container (1) having an internal wall (2) forming a confined space arranged to receive a liquid and an external wall (3) separated from said internal wall (2) by a space under vacuum, said internal wall (2) and said external wall (3) being connected to their respective ends where they form an open end (4) wherein the liquid can be poured, characterized in that said external wall (3) having an external surface is at least partially recovered with a heat shrunk film (5) on its external surface to prevent the break of the glass container (1) and in that the heat shrunk film (5) has a thickness comprised between 45 and 55 μm .



LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, **Published:**

SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, — *with international search report (Art. 21(3))*
GW, KM, ML, MR, NE, SN, TD, TG).

"GLASS CONTAINER FOR AN INSULATING FLASK"

The present invention relates to a glass container for an insulating flask, the glass container has an internal wall forming a confined space arranged to receive a liquid and an external wall separated from said internal wall by a space under vacuum. The internal wall and the
5 external wall being connected to their respective ends where they form an open end wherein the liquid can be poured.

Glass containers are generally used as inner flask for insulating flasks and are made of double walled vacuum glass.

10 The vacuum glass refill exists already from last century and has proven his functionality worldwide over this period. The original design has been developed a long time ago by James Dewar and was afterwards optimized and commercialized all around the world (https://en.wikipedia.org/wiki/James_Dewar). The purpose for consumers
15 is to keep their content, food or liquids, hot and cold for several hours.

The heat retention can be controlled by 3 parameters: reflection, conduction and convection. Reflection corresponds to heat loss by thermal reflection, conduction is a heat loss by contact and convection is linked to heat loss by molecules (gaseous state or liquid state).

20 These 3 aforementioned parameters will drastically influence the heat transfer between the glass container and the environment.

To decrease this phenomenon as much as possible, some solutions have already been developed in the state of the art.

For example, it is known to add silver coating between the
25 internal wall and the external wall to play favourably on the reflection parameters.

To decrease the conduction phenomenon, the container can be produced with the internal and external walls by being into contact at their respective ends.

To improve the convection process, it is also known to create a vacuum between the space which separate the internal and external walls of the glass container.

By implementing the above features, the double wall glass container will enable to maintain the contents with its initial temperature for many hours.

One of the most critical aspects linked to the use of glass containers is explained by the fragility of the raw material (glass) and also by the thermal shock. In fact, the thermal shock can occur when hot or cold liquid is poured in the glass container through the opened end. Liquid can be in contact with the glass container leading to the aforementioned thermal shock resulting to the break of the glass inside the insulating flask. This could happen easily when the difference in temperature around 95°C is reached on a very short period of time like, 1-2 second(s).

There is therefore a need to provide a glass container for an insulating flask, which glass container can support the thermal shock occurring when a hot/cold liquid is poured in the glass container by ensuring at the same time that the product is sufficiently safe during use.

It is already known that the glass container can be modified by adding borosilicate based compounds to the raw material in order to provide a final product which expands more than regular glass container. This product has thereby a high performing thermal insulation.

However, the use of such compounds makes the final product extremely fragile.

It is also known that glass container can be replaced by double walled stainless steel with vacuum in order to have a product having an appropriate thermal insulation and being more rigid than glass containers.

However, the use of stainless steel renders the final product really expensive.

There is therefore a need to overcome the aforementioned problem by providing a glass container which can be able to support thermal shock without leading to the break of the glass container.

It is an object of the present invention to provide a glass
5 container for insulating flask. The glass container being cheaper than stainless steel containers, having an appropriate thermal insulation ability and being sufficiently rigid.

To this end, the invention provides a glass container for insulating flask characterised in that said external wall having an external
10 surface is at least partially recovered with a heat shrunk film on its external surface to prevent the break of the glass container and in that the heat shrunk film (5) has a thickness comprised between 45 and 55 μm .

It has been surprisingly observed that the presence of the heat shrunk film on the external surface of the external wall enables
15 overcoming the problem linked to thermal shock when hot or cold liquid is poured in the opened end of the glass container. In fact, the heat shrunk film acts like a thermal shock absorber.

The fact that the film has heat shrinkable property enables the latter adopting the form of the external surface of the external wall
20 leading to a better protection all around the protected surface of the glass container.

An additional advantage of the glass container of the present invention is that the glass particles are held together enabling to hold the liquid by the heat shrunk film. By this phenomenon, it is possible to reduce
25 burn injuries during use of the glass container within an insulating flask.

The life cycle of the glass container is therefore longer than conventional glass container.

The price of the glass container provided according to the present invention is also cheaper in comparison with stainless steel
30 containers, what is particularly advantageous.

It has been observed that the selection of a heat shrinkable film is advantageous because it is easy to find food grade film what is crucial when providing such kind of products, being continuously in contact with liquids.

5 It has also been observed that a selection of thickness for the heat shrunk film enable to still improve the thermal insulation ability of the glass container. The life cycle of the final product having a heat shrunk film with a thickness comprised between 45 and 55 μm is longer in comparison with known glass container.

10 Preferably, the heat shrunk film is made of a thermoplastic material.

More preferably the heat shrunk film is selected from the group consisting of polyester, like polyethylene terephthalate (PET), polyethylene naphtalate (PEN).

15 Preferably, the heat shrunk film comprises a pigment.

Other embodiments of the glass container according to the present invention are mentioned in the annexed claims.

The invention also relates to a process of manufacturing the glass container according to the present invention, said process
20 comprising the steps of :

- providing a glass container having an internal wall forming a confined space arranged to receive a liquid and an external wall separated from said internal wall by a space under vacuum,
- 25 - creation of a vacuum in the space created between said internal and external walls, said external wall having an external surface,
- applying at least partially a heat shrinkable film on said external surface of said external wall, and
- 30 - introducing the glass container provided with the heat shrinkable film into an oven at a preselected temperature

in order to shrink the film all around said external wall of said glass container.

Other embodiments of the process according to the invention are mentioned in the annexed claims.

5 The present invention relates further to an insulating flask comprising the glass container according to the present invention.

Other embodiments of the insulating flask according to the invention are mentioned in the annexed claims.

Other characteristics and advantages of the invention will
10 appear more clearly in the light of the following description of a particular non-limiting embodiment of the invention, while referring to the figures.

Figure 1 is an illustration of a first embodiment of a glass container according to the present invention.

Figure 2 is a second embodiment of a glass container
15 according to the present invention.

In the drawings, a same reference sign has been allotted to a same or analogous element of the glass container according to the invention.

The process of manufacturing the glass container of the
20 present invention comprises mainly three steps. The first step consist in forming the glass container with a predefined shape. Secondly, the creation of vacuum is performed between the internal and external walls. Finally, the heat shrinkable film is applied on the external surface of the external wall.

25 The process of manufacturing the glass container involves the mixing of raw materials like silica sand, soda ash and/Borax.

Introducing an amount of the raw material into a furnace and heating it. The material can therefore by manipulated in order to form a specific form. This form can be obtained easily by the person skilled in the
30 art. During this step, a protuberance can be formed in order to close the opening after the vacuum process.

The space created between the external and internal walls can be cleaned with tin chloride and the latter will be removed. After having removed the tin chloride, silver nitrate is applied in the space created between the internal and external walls. The silver nitrate is then removed
5 with air and the coating formed on the internal wall is dried with hot air.

The glass container is then placed within a vacuum chamber wherein the vacuum in the space separating the internal and external walls can be operated.

Then a heat shrinkable film can be applied on the external
10 surface of the external wall of the glass container.

The glass container provided with the heat shrinkable film is then introduced into an oven at a preselected temperature. The preselected temperature can be comprised between 135°C and 165 °C.

The preselected temperature and the type of oven are well
15 known by the skilled person.

Fig. 1 shows a first embodiment of a glass container according to the present invention.

As illustrated, the glass container 1 has an internal wall 2 forming a confined space arranged to receive a liquid and an external wall
20 3 separated from said internal wall 2 by a space under vacuum. The internal wall 2 and the external wall 3 are connected to their respective ends where they form an open end 4 wherein the liquid can be poured.

The external wall 3 has external surface which is at least partially recovered with a heat shrunk film 5 on its external surface to
25 prevent the break of the glass container 1 in case of thermal shock.

The illustrated glass container comprises also a protuberance 6 which enable to create the vacuum in the space created between the external and internal walls 2,3.

The glass container includes also a support means 7
30 enabling the introduction of it inside an insulating flaks. In that way, the

glass contained can be easily maintained according to a vertical axis. This support means is not essential in the present invention.

This an example of a glass container with a particular shape forming the structure of the glass container.

5 However, several kinds of shape can be used and thereby recovered by the heat shrinkable film as disclosed in the present invention.

In a preferred embodiment, the external surface of the external wall 3 is totally recovered with a heat shrunk film 5 to prevent the break of the glass container 1 in case of thermal shock.

10 The heat shrunk film has a thickness of 50 μm and is made of PET.

Advantageously, the heat shrunk film 5 has a thickness comprised between 45 and 55 μm .

15 According to a particularly preferred embodiment, the heat shrunk film 5 is selected in the group consisting of polyester, like polyethylene terephthalate (PET), polyethylene naphtalate (PEN).

Advantageously, the heat shrunk film is made of thermoplastic materials, like PET or PEN.

Furthermore, the heat shrunk film 5 can comprise a pigment.

20 The glass container can have a dimension of 241.30 mm x 322.00 mm.

The glass container illustrated in figure 1 can be part of an insulating flask in order to contain a liquid which can be hot or cold.

25 Figure 2 illustrates a glass container according to a second embodiment. This glass container has a different shape in comparison with the one illustrated in figure 1.

As explained above, the glass container 1 of the present invention can have different kinds of shape without adversely affecting the ability of the glass container 1 in terms of thermal shock.

The glass container 1 illustrated in figure 2 comprises all the elements described for the glass container illustrated in figure 1 except that it does not comprise a support means 7.

Advantageously, the heat shrunk film 5 has a thickness
5 comprised between 45 and 55 μm .

According to a particularly preferred embodiment, the heat shrunk film 5 is selected in the group consisting of polyester, like polyethylene terephthalate (PET), polyethylene naphthalate (PEN).

It is preferable to use a thermoplastic material to form the
10 heat shrunk film of the present invention.

Furthermore, the heat shrunk film 5 can comprise a pigment.

The glass container illustrated in figure 1 can be part of an insulating flask in order to contain a liquid which can be hot or cold.

15 **Comparative example 1-**

Use is made of a coating in order to recover the external and internal wall of a glass container. The coating is applied by dipping technique well known by the skilled person.

20 However, this process is complex and expensive. It is therefore not applicable in industrial scale.

Moreover, the coating is made with harmful chemical products not considered as being food grade. For this reason, this technique is not advantageous and gave negative results.

25

Comparative example 2-

A glass container has an internal wall and an external wall which is covered with a heat shrunk film having a thickness equal to 70
30 μm . Such thickness is too thick and thereby less flexible. So, the film does not adapt to the curve of the glass container properly.

Such a glass container does not prevent the break of the glass container, when it is used in an insulating flask which is configured to deliver warm or cold liquid for the user.

5 **Comparative Example 3-**

A glass container has an internal wall and an external wall which is covered with a heat shrunk film having a thickness equal to 30 μm . Such thickness is too thin and thereby so flexible that the film breaks easily.

10 Such a glass container does not prevent the break of the glass container, when it is used in an insulating flask which is configured to deliver warm or cold liquid for the user.

15 Although the preferred embodiments of the invention have been disclosed for illustrative purpose, those skilled in the art will appreciate that various modifications, additions or substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

CLAIMS

1. A glass container (1) for an insulating flask, the glass container (1) having an internal wall (2) forming a confined space arranged to receive a liquid and an external wall (3) separated from said internal wall (2) by a space under vacuum, said internal wall (2) and said external wall (3) being connected to their respective ends where they form an open end (4) wherein the liquid can be poured, characterized in that said external wall (3) having an external surface is at least partially recovered with a heat shrunk film (5) on its external surface to prevent the break of the glass container (1) and in that the heat shrunk film (5) has a thickness comprised between 45 and 55 μm .

2. Glass container (1) according to claim 1, wherein the heat shrunk film (5) is made of a thermoplastic material.

3. Glass container (1) according to any one of the preceding claims, wherein the heat shrunk film is selected in the group consisting of polyester, like polyethylene terephthalate (PET), polyethylene naphthalate (PEN).

4. Glass container (1) according to any one of the preceding claims, wherein the heat shrunk film (5) comprises a pigment.

5. Process of manufacturing the glass container (1) according to any one of the preceding claims, comprising the steps of :

- providing a glass container (1) having an internal wall (2) forming a confined space arranged to receive a liquid and an external wall (3) separated from said internal wall (2) by a space under vacuum,
- creation of a vacuum in the space created between said internal (2) and external walls (3), said external wall (3) having an external surface,
- applying at least partially a heat shrinkable film (5) on said external surface (3) of said external wall, and

- introducing the glass container (1) provided with the heat shrinkable film (5) into an oven at a preselected temperature in order to shrink the film (5) all around said external wall (3) of said glass container (1).

5 6. Insulating flask comprising the glass container (1) according to any one of claims 1 to 4.

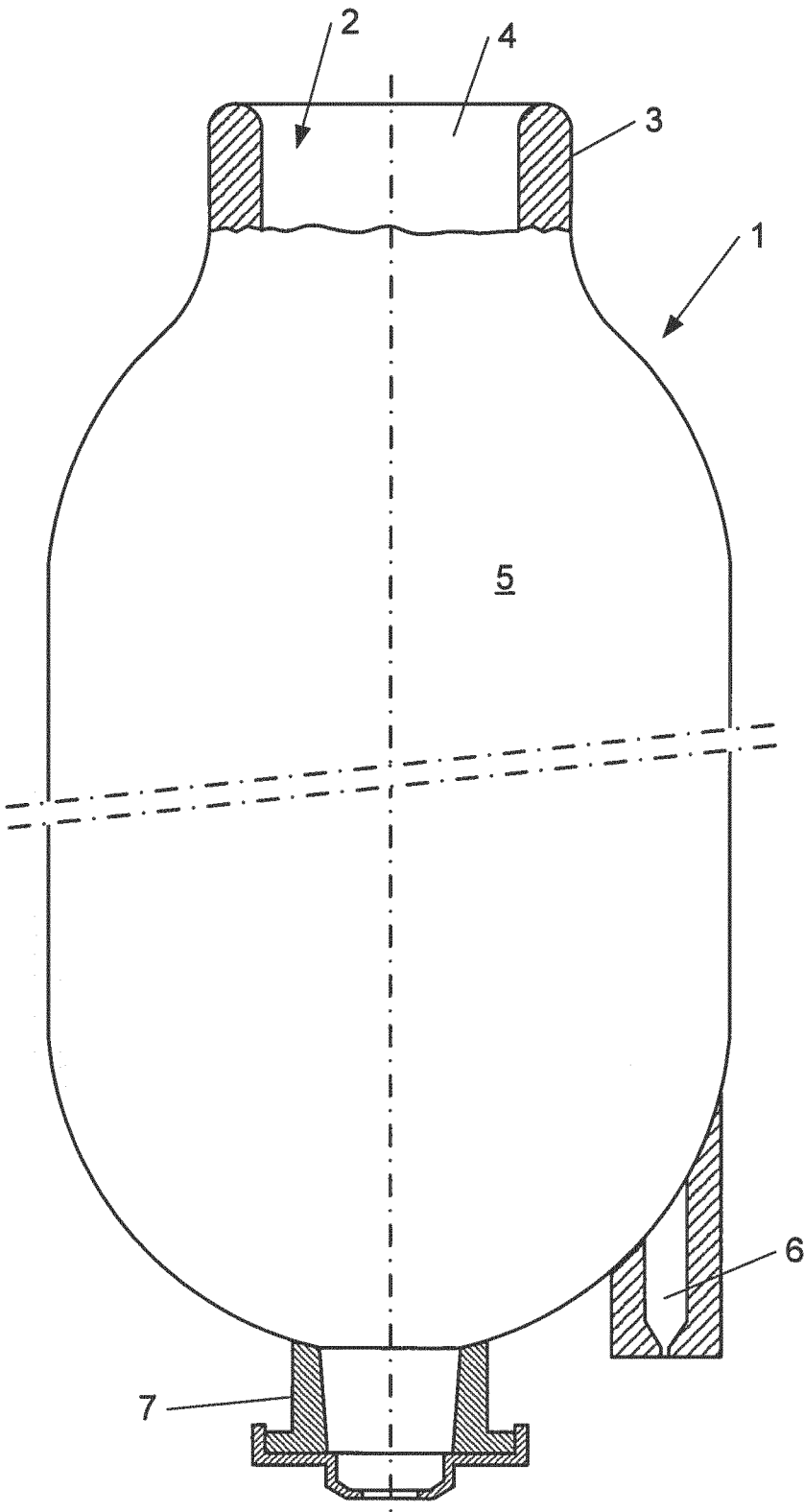
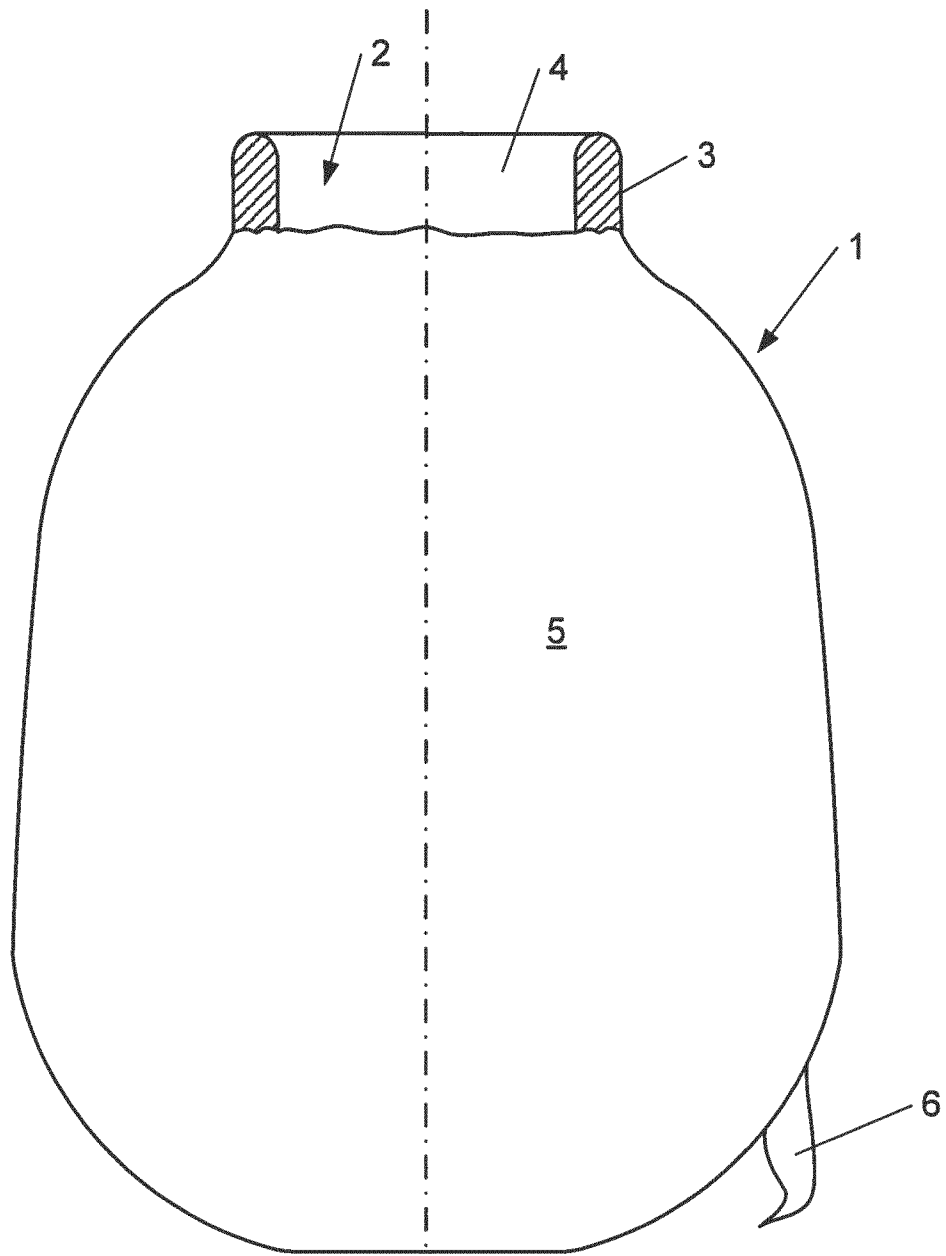


Fig. 1

***Fig. 2***

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/081894A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J41/02 A47J37/07
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)
A47J B65D F17C B23K

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 2 434 440 A (THERMOS KK [JP]) 25 July 2007 (2007-07-25) page 8; figure 1 ----- -/--	1-6



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 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)

"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

31 January 2017

Date of mailing of the international search report

13/02/2017

Name and mailing address of the ISA/

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

Authorized officer

Behammer, Frank

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2016/081894

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3 355 045 A (DAVID DOUGLAS) 28 November 1967 (1967-11-28) "...The parts are then allowed to cool causing the lip on the jacket to shrink into scaling engagement with the groove in the linear member..." "...As the parts cool the lip portion 32 will shrink causing it to produce a tight seal at the neck groove 18 of the glass liner' The result is a waterproof seal permitting the entire assembly to be placed in a dishwasher for example without any danger of getting water or other liquid trapped between the glass liner and the plastic jacket. Furthermore, by quickly sealing the vent hole 30 after insertion of the liner in the jacket the cooling of the heated air inside the jacket will create a slight vacuum therein which further aids in producing a tight seal at the neck groove 18..." -----	1-6
Y	EP 2 932 875 A1 (EMSA GMBH [DE]) 21 October 2015 (2015-10-21) paragraph [0031] -----	1-6
Y	EP 0 597 773 A1 (NIPPON OXYGEN CO LTD [JP]) 18 May 1994 (1994-05-18) figure 1 -----	1-6
Y	GB 2 088 040 A (ZOJIRUSHI VACUUM BOTTLE CO) 3 June 1982 (1982-06-03) the whole document -----	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/081894

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2434440	A	25-07-2007	CA 2585570 A1 28-09-2006
			DE 112005003087 T5 18-10-2007
			GB 2434440 A 25-07-2007
			US 2007295684 A1 27-12-2007
			WO 2006100770 A1 28-09-2006

US 3355045	A	28-11-1967	NONE

EP 2932875	A1	21-10-2015	CN 104970712 A 14-10-2015
			DE 102014105283 A1 15-10-2015
			EP 2932875 A1 21-10-2015

EP 0597773	A1	18-05-1994	CN 1117834 A 06-03-1996
			DE 69318107 D1 28-05-1998
			DE 69318107 T2 22-10-1998
			DE 69332035 D1 18-07-2002
			DE 69332035 T2 30-01-2003
			EP 0597773 A1 18-05-1994
			EP 0755646 A2 29-01-1997
			HK 1009926 A1 06-12-2002
			SG 47681 A1 17-04-1998

GB 2088040	A	03-06-1982	DE 3145916 A1 12-08-1982
			GB 2088040 A 03-06-1982
			JP S5790017 U 03-06-1982
			JP S5812680 Y2 11-03-1983
			KR 880004240 Y1 30-11-1988
			US 4427123 A 24-01-1984
