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(71) Applicant: **MINIPACK-TORRE S.p.A.**
I-24044 Dalmine (Bergamo) (IT)

(72) Inventor: **Torre, Fabio**
I-24044 Dalmine (BG) (IT)

(74) Representative: **Garavelli, Paolo**
A.BRE.MAR. S.R.L.
Via Servais 27
10146 Torino (IT)

(54) **PORTABLE CONTAINER FOR FOODSTUFF WITH REFRIGERATION AND PARTIAL VACUUM FUNCTIONALITIES**

(57) A portable container (1) for foodstuff with refrigeration and partial vacuum functionalities is described, comprising: a removable cover (3), preferably made of PMMA; a base (5), preferably made of ABS, adapted to be operatively coupled with the cover (3) for the airtight closure of the container (1); a device (6) for creating vacuum inside the container (1) placed therein; a device (7) for cooling the base (5) placed inside the container (1); sensor means (11), placed inside the container (1) for detecting its internal pressure and restoring vacuum and means (14) for managing and controlling the device (6) for creating vacuum and the cooling device (7).

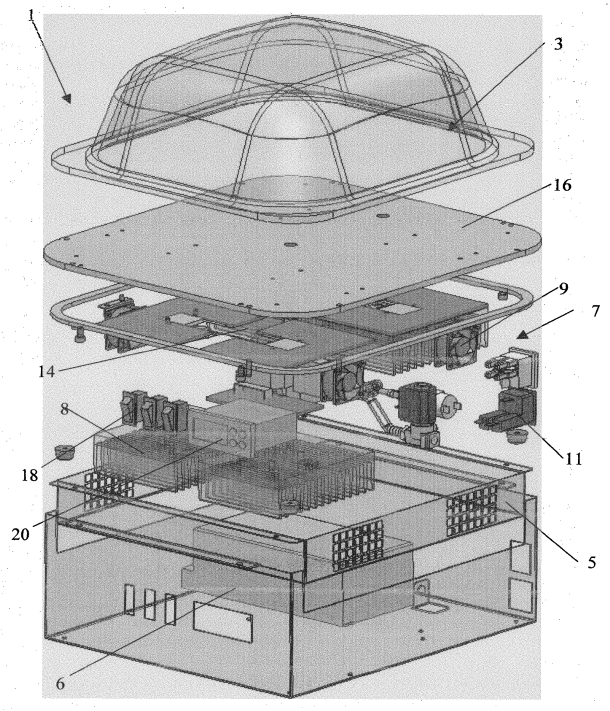


FIG. 1

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Description

[0001] The present invention refers to a portable container for foodstuff with refrigeration and partial vacuum functionalities.

[0002] In order to preserve foodstuff, plastic bags are currently known, which contains foodstuff, inside which vacuum is created for extending its storage time.

[0003] In case of transport of such bags, should foodstuff also require a refrigeration, it is necessary to provide for suitable refrigerating containers in which they have to be placed: this implies at least two operations (making vacuum and refrigeration), which increase cost and complexity of this type of operations.

[0004] Object of the present invention is solving the above prior art problems, by providing a container, which in practice is an actual household appliance, which allows extending the storage time of foodstuff through the two refrigeration and partial vacuum technologies which it is able to simultaneously perform inside it.

[0005] This obviously strongly reduces preparation times and costs of foodstuff and makes it easier to use them for more time, wholly removing the prior art storage bags.

[0006] The above and other objects and advantages of the invention, as will appear from the following description, are obtained with a portable container as claimed in claim 1. Preferred embodiments and non-trivial variations of the present invention are the subject matter of the dependent claims.

[0007] It is intended that all enclosed claims are an integral part of the present description.

[0008] The present invention will be better described by some preferred embodiments thereof, provided as a non-limiting example, with reference to the enclosed drawings, in which the single Figure 1 is an exploded perspective view of a possible preferred embodiment of the portable container according to the present invention.

[0009] With reference to Figure 1, a preferred embodiment of the portable container of the present invention is shown and described. It will be immediately obvious that numerous variations and modifications (for example related to shape, sizes, arrangements and part with equivalent functionality) could be made to what is described, without departing from the scope of the invention as appears from the enclosed claims.

[0010] As shown, the portable container 1 for foodstuff with refrigeration and partial vacuum functionalities of the present invention substantially comprises:

- a removable cover 3, preferably made of PMMA;
- a base 5, preferably made of ABS, adapted to be operatively coupled with the cover 3 for the airtight closure of the container 1;
- at least one device 6 for creating vacuum inside the container 1 and placed inside it;
- at least one device 7 for cooling the base 5, placed inside the container 1;
- sensor means 11, placed inside the container 1, for detecting the internal pressure and restoring vacuum; and
- means 14 for managing and controlling the device 6 for creating vacuum and the cooling device 7.

[0011] In particular, the device 6 for creating vacuum can be composed of at least one pump with relative solenoid valves (not shown).

[0012] Still in particular, the device 7 for cooling the base 5 can be composed of at least one Peltier cell 8 with related dissipating devices, probes and venting elements 9.

[0013] The container 1 of the invention can further comprise, inside it, at least one plate 16, preferably made of aluminium, under which, in contact, the single Peltier cells 7 are applied.

[0014] Moreover, the container 1 can comprise at least one handle (not shown) for facilitating its transport and handling.

[0015] In particular, the managing and controlling means 14 can be composed of an electronic card (for example of the type currently known as "Arduino") and of a control card for setting the managing parameters of the container 1, such as vacuum percentage, temperature, opening and air re-entering.

[0016] The container 1 of the invention has been devices taking into account the production needs, and putting them in relationship with the operating efficiency.

[0017] The machine interior has therefore been divided into four identical sectors, each one completed with a Peltier cell 7, a dissipating device and the related fan for increasing the dissipation efficiency.

[0018] At the centre of the base 5, a sort of groove has been obtained, about 100 mm wide, for housing the remaining components, together with the vacuum pump, with the aluminium plate 16, preferably 5 mm thick, which covers the base of the container 1.

[0019] With this arrangement, the main specifications of the inventive container 1 are as follows:

- creating vacuum with a residual pressure of 200 mBar;
- refrigerating foodstuff at a temperature from about 5 °C to 8 °C;
- having small sizes (preferably 400 x 300 x 400 mm);
- showing an hygienic and easy-to-clean surface for foodstuff to be stored;
- being scarcely noisy, possibly less than 60 dB; and
- having a base with reduced height (possibly less than 50 mm) for electronics.

[0020] The container/household appliance therefore appears as a wide tray with cover, whose base contains the electronic components 14 and the control panel 20 for a user, while its transparent dome allows creating the vacuum environment, leaving the foodstuff in plain sight.

[0021] The operation of the portable container accord-

ing to the present invention will now be described.

[0022] After having closed the cover 3 of the container 1, by pressing a start-up pushbutton 18, the pump 6 starts removing air present inside the container, in order to reach a residual pressure of about 200 mBar. After having reached such value (detected by the pressure sensor), the pump 6 stops and refrigeration starts.

[0023] The cells 8 start cooling the plate 16 and this latter one, due to conduction, lowers the temperature inside the container 1. After having reached the desired temperature (about 5 °C), detected through a suitable sensor (not shown), the container 1 enters in a wait or stand-by state.

[0024] Should temperature and/or pressure fall below the desired values, the cells 8 and/or the pump 6 will be re-activated.

[0025] In order to lift the cover 3 after the container 1 has been actuated, it will be necessary to allow air to enter inside and thereby removing vacuum: in order to do this, another dedicated pushbutton 18 will be provided.

[0026] In case of overheating, given the use of the Peltier cells 8, an emergency thermostat (not shown) will remove the supply to all components, to thereby prevent possible risks for users or for the container 1 itself.

[0027] The advantages offered by the inventive container thereby are:

- slowing down the proliferation of aerobic micro-organisms;
- reduced oxidations;
- keeping freshness and protection from external bad odours;
- preventing the contamination of odours and tastes between foodstuff inside it, due to lack of air, which would be a vehicle for odours; and
- the combination of vacuum and refrigeration allows a longer storage time for foodstuff, two or three times greater than storage in a common refrigerator.

Claims

1. Portable container (1) for foodstuff with refrigeration and partial vacuum functionalities, comprising:

- a removable cover (3), preferably made of PMMA;
- a base (5), preferably made of ABS, adapted to be operatively coupled with the cover (3) for the airtight closure of the container (1) ;
- at least one device (6) for creating vacuum inside the container (1) placed inside it;
- at least one device (7) for cooling the base (5) placed inside the container (1);
- sensor means (11), placed inside the container (1) for detecting the internal pressure and restoring vacuum; and
- means (14) for managing and controlling the device (6) for creating vacuum and the cooling device (7);

characterized in that said device (7) for cooling the base (5) is composed of at least one Peltier cell (8) with related dissipating devices, probes and venting elements (9), and **in that** it further comprises, inside it, at least one plate (16), preferably made of aluminium, under which, in contact, the single Peltier cells (8) are directly applied, the container (1) interior being divided into four identical sectors, each one completed with a Peltier cell (7), a dissipating device and the related fan, at the centre of the base (5) a groove being obtained, adapted to house the remaining components of the container (1), together with the device (6) for creating vacuum, with the plate (16) which covers the base of the container (1).

2. Portable container (1) according to claim 1, **characterized in that** said device (6) for creating vacuum is composed of at least one pump with relative solenoid valves.

3. Portable container (1) according to any one of the previous claims, **characterized in that** it further comprises at least one handle for facilitating its transport and handling.

4. Portable container (1) according to any one of the previous claims, **characterized in that** the managing and controlling means (14) are composed of an electronic card and of a control card for setting the managing parameters of the container (1), such as vacuum percentage, temperature, opening and air re-entering.

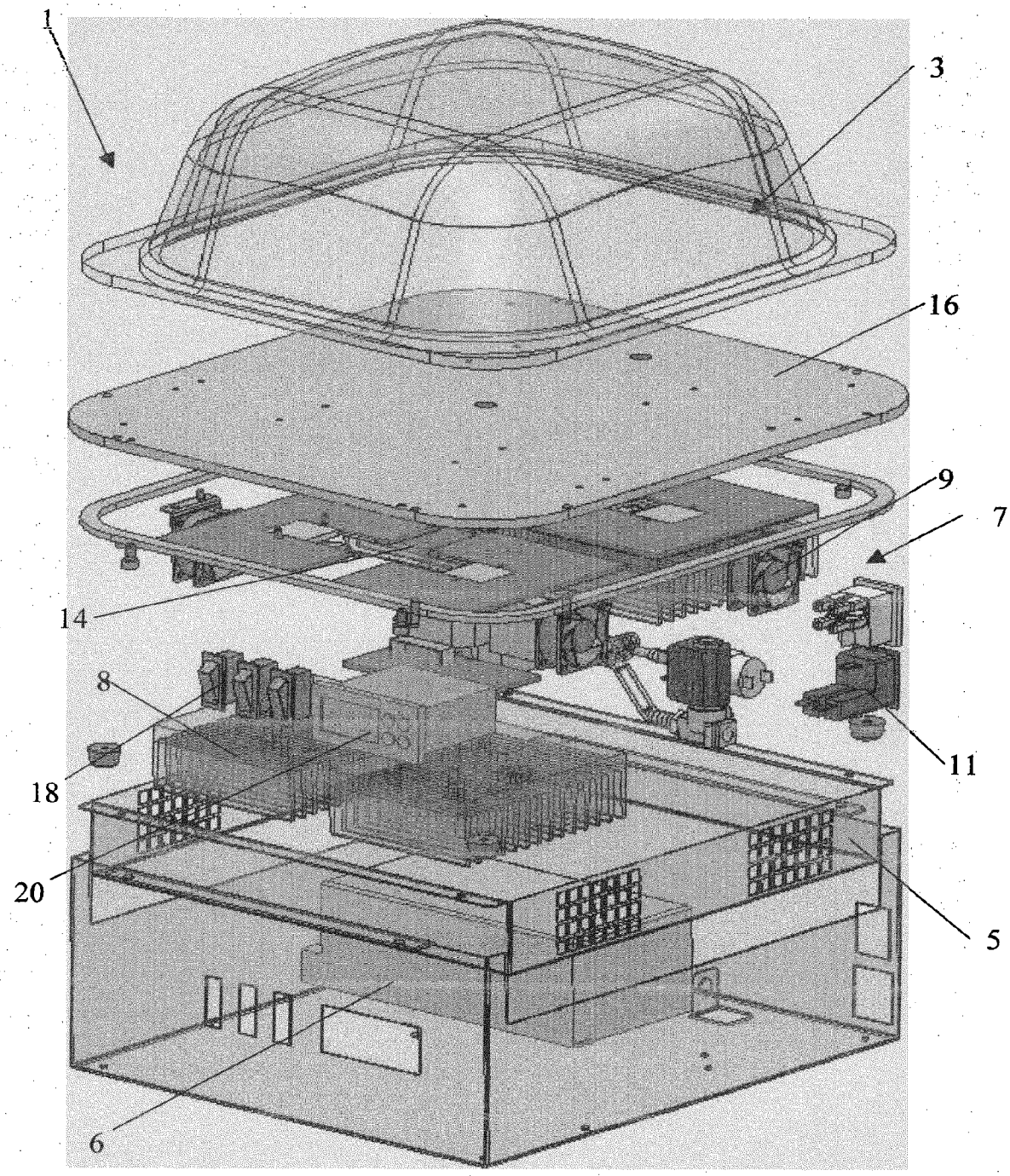


FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 15 00 0981

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 5 946 919 A (MCKINNEY EDWARD C [US] ET AL) 7 September 1999 (1999-09-07) * column 2, lines 7-34 * * column 5, lines 1-5; figures * -----	1-4	INV. F25D31/00
Y	US 6 308 519 B1 (BIELINSKI GEORGE [US]) 30 October 2001 (2001-10-30) * column 6, lines 31-32; figures * * column 6, line 59 - column 7, line 32 * -----	1,2,4	
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A	US 2007/227617 A1 (TSAI MEI-HUA [TW]) 4 October 2007 (2007-10-04) * the whole document * -----	1-4	

TECHNICAL FIELDS SEARCHED (IPC)

F25D
F25B
B65D
A47J

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	1 October 2015	Vigilante, Marco

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 00 0981

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01-10-2015

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82