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(54) STORAGE CONTAINER

LAGERBEHÄLTER

RÉCIPIENT DE STOCKAGE

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Description

[0001] The present invention relates to a storage container for storing food and beverages in aircrafts, to be placed inside a trolley.

[0002] In most cases, trolleys, i.e. wheeled carts (hereafter Trolley), manufactured from aluminium, are used for storing and dispensing food and beverages in aircrafts. The Trolleys are dimensioned according to international standards and their size is generally known.

[0003] Cooling the food and beverage portions inside the Trolley usually takes place with pellets or blocks of solid carbon dioxide. Solid carbon dioxide is very efficient as a cooling agent, but also unequal and an environmental burden.

[0004] Solid carbon dioxide, i.e. "dry ice", produces 530 L of carbon dioxide per kg. Carbon dioxide is one of the most considerable waste materials of mankind. The green house effect is largely accelerated by explicitly carbon dioxide.

[0005] It is an aim of the present invention to eliminate the problems related to cooling of food products, such as food and beverages, such as the unequal cooling, and minimize exploitation of solid carbon dioxide as a cooling agent.

[0006] The invention relates to a container to be placed inside a Trolley for storing food and beverages in an aircraft.

[0007] More specifically, the container according to the invention is defined in claim 1.

[0008] The use of the container according to the invention, on the other hand, is characterized by what is stated in claims 14 and 15.

[0009] By means of the invention, means for the refrigerated storage of food and beverage products are obtained, which allow the temperature of the storage area to remain stable without burdening the environment. Since the cooling means according to the invention are refreezable, they also do not cause any considerable amount of waste.

[0010] In the following, a more detailed description of the invention is provided with reference to the enclosed drawings, which are intended to clarify, but not to limit, the invention.

Figure 1 is a schematic drawing of the container according to the invention and the components that are comprised in it.

Figure 2 represents dimensions of the frame component of the container.

Figure 3 represents the detailed drawings of the components of the container.

Figure 4 represents the preferable positions for connecting the frame components, the lid component and the shelves of the container to each other.

[0011] The container according to the embodiments of the invention preferably comprises the following structural

al pieces (as in the Figures):

1, 2	frame component
3	tongue-and-groove joint
4	lid component
5	cavity
6	hinge and counterpart
7	grooves of the inner walls
8	shelf
9	cooling bag
10, 11, 12, 13	temperature measurement system
14	means for monitoring the temperature
15	means for data transfer

[0012] Thus, the container according to the invention is formed from at least two separate, well heat-insulating frame components 1, 2 that can be connected to each other, which comprise means for carrying out a tight connection, and a lid component 4, using which the container can be sealed. Preferably, the frame components 1, 2 are provided with groove and shoulder arrangements for implementing the tongue-and-groove joint.

[0013] According to a preferred embodiment of the invention, the inner space of the container can be divided with hole disc shelves 8 into at least two compartments, of which at least one can be applied for the storage of food and beverage products and at least one can be applied for the storage of the cooling product.

[0014] A temperature measurement system 10, 11, 12, 13 for monitoring the temperature has been joined to the lid component 4 by embedding or attaching. Preferably, the lid component 4 comprises means for monitoring the temperature 14 and for attaching the means for data transfer 15 to the lid component 4. In order to attach the lid component 4 to the frame, a hinge component 6a has been attached to one of the components of the frame 2, preferably to the lower part of the component 2, and a counterpart 6b corresponding to the hinge component 6a has been attached to the lid component 4, respectively. A small cavity 5 has preferably been carved into the upper part of the lid component 4 to facilitate the opening.

[0015] According to a preferred embodiment of the invention, the hinge 6 is manufactured from plastic and is readily demounted both from the frame and the lid component for the time of cleaning. The lid component (the door) 4 is installed with the help of the hinges 6 to be opened either upwards or downwards depending on the application.

[0016] Since the frame components 1, 2 have been joined together by a tongue-and-groove joint 3, they can also be readily attached to each other and also readily opened, for example for cleaning or maintenance. Similarly, they can be readily attached to each other. The container is machine washable.

[0017] The mentioned cooling product preferably comprises at least one cryogel cooling bag 9, which most suitably contains refreezable gel.

[0018] According to a preferred embodiment of the in-

vention, the halves of the frame 1, 2 of the container are manufactured from EPP expandable polypropylene by industrial compression.

[0019] Grooves 7a, b, c are carved into the inner walls of the frame components 1, 2 of the container, preferably on three sites, for installing the spacers 8, such as shelves 8. The shelves are preferably manufactured from metal, more preferably from aluminium. Most preferably they are perforated to enhance equalization of the temperature.

[0020] Depending on the need for cooling, 1 or 2 cooling gel bags 9 are placed on top of each other in the container, preferably on the shelf 8 installed into either the groove 7a or 7b. Since the gel bags 9 expand by 5 - 20% during freezing, preferably about 10%, compared to their required volume at room temperature, the grooves 7a, b, by help of which the shelf 8 for the gel bags can be installed on the desired site in the container, are dimensioned so that the gel bag(s) 9 fit tightly between the shelf 8 and the upper part of the frame. Therefore, the delivery of cold air only occurs downwards through the preferably perforated shelves and, thus, the cooling time is prolonged. If one gel bag 9 is sufficient to provide the necessary cooling time and capacity, the shelf 8 is installed into the groove 7a, and if a longer cooling time and/or greater cooling capacity is needed, two gel bags are placed on top of each other, whereby the shelf 8 is installed into the groove 7b to gain the free space required by the gel bag 9.

[0021] The lowest groove 7c is reserved for the product shelf 8, onto which, for example, food or beverage products that need cooling are placed during the use of the container. Thus, inside the container, products can be distributed equally both on the shelf 8 installed in the groove 7c and on the bottom of the container without them being smashed up against each other.

[0022] According to a preferred embodiment of the present invention, a gel bag 9 having an efficient and long lasting cooling capacity is used for cooling the food and beverage products. More preferably, the gel bag 9 is custom-built and has a temperature of -3 °C after a temperature adjustment, such as freezing. The gel bag 9 is formed of a food-approved casing containing three small gel bags.

[0023] In order to monitor the serving acceptability of the products to be frozen, the temperature inside the container is measured and controlled. This takes place with a measurement device 10 that may be either permanently or temporarily attached or embedded into the lid component 4 of the container. The measurement device 10 is preferably located in the middle of the lid component 4. According to the invention, the component 4 contains a small hole 11 with a diameter of 5 - 7 mm for the measurement device 10 and, further, a mortise 12 on the inside of the component 4, where the temperature sensor 13 of the measurement device 10 is placed. The temperature sensor 13 measures the inner temperature of the container either at a desired time interval or continuously.

[0024] According to a preferred embodiment of the invention, the sensor 13 is installed permanently in the lid component 4. According to this embodiment, the entire lid component 4 is preferably demounted from the frame for cleaning and, when necessary, maintenance.

[0025] According to a particularly preferred embodiment of the invention, the means for monitoring the temperature 14, which are attached outside the lid component 4 for the time of the measurement, indicate the sufficiency of the temperature inside the container by blinking lights of different colours, such as green or red light. The parameters of the measurement device 10 may be set at desired intervals and/or points of time. For example, it may be defined that the inner space must remain below +8 °C during the entire storage, such as the flight and/or the return flight, whereby the products inside the container are still hygienic and servable.

[0026] According to another particularly preferred embodiment, means for data transfer 15, preferably a USB cable 15, are attached to the hole 11 for the measurement device, through which means, by connecting to a computer, statistical data of the prevailing temperature inside the container and the temperature fluctuation is obtained. Both the coloured light measurement and the measurement carried out with the means for data transfer 15 may be carried out without opening the lid component 4, whereby the temperature inside the container remains unchanged.

[0027] Instead of a USB cable 15, also other ways of transferring data, for example wireless technique, may naturally be used.

[0028] According to that which is mentioned above, according to a particularly preferred embodiment, the invention relates to a cold storage container, designated as Inflight Cooler, which comprises two component halves 1 and 2 manufactured from EPP expandable polypropylene, which are attached to each other by tongue-and-groove joints, as well as a hatch 4 that serves as a lid, and hole disc shelves 8 out of aluminium for placement of the cryogel bags 9 and for distributing the space.

[0029] According to said embodiment, the invention relates specifically to a measurement system sensor, which is embedded or attached to the hatch 4 of the Inflight Cooler, for monitoring the temperature 10, 11, 12, 13, a measurement device 14 to be separately attached for the temperature measurement to the hatch 4 for the time of the measurement, and a USB cable 15 provided for data transfer, as well as custom-built and washable cryogel cooling bags of -3 °C.

[0030] The size of the container is suited for serving carts (Trolleys) dimensioned according to the KSSU measurement standards and used by most airlines as well as for KSSU storage boards, which are on the market. The dimensions of the container have been planned for, for example, serving carts of aircrafts so that 1 - 2 containers fit tightly into a serving cart (Trolley) depending on the application. No excess space is left between the inner wall of the cart and the outer wall of the container

according to the invention, whereby the container endures well even heavy agitation and possible turbulence. Alternatively, it is possible to place the container tightly inside a KSSU storage board in the kitchen space of an aircraft. One container according to the invention fits into this storage board. Tight storage prolongs the in-service life of the container, since it cannot move inside the cart or the board. Thus, also the maximization of the storage space is implemented.

[0031] The amount of oxygen between the outer walls of the container and the inner walls of the cart is minimal. This enhances, among others, the fire safety. While the doors of the cart are closed, the aluminium/steel walls of the Trolley protect the storage container of the invention from being battered.

[0032] The container is intended, among others, for prolonging the time frame of freight and serving of food and beverages to be served cold. The temperature for serving such foodstuff is required to be below +8 °C at the time of serving.

[0033] The cooling properties of the container are based on the tight structure and the insulating material. Exclusively in the case of the lid component 4, it is possible for air to pass into the container when opening it, in contrast to Trolleys, which are not tight. Projections preferably present on the edge of the lid component 4 attach it tightly to the frame of the Trolley and to the door during the freight.

[0034] In the invention, the interaction of the gel bags used for cooling and the perforated shelves causes the cooling and the distribution of cold air inside the container to be even, controlled and prolonged.

Claims

1. A storage container for storing food and beverages in aircrafts, to be placed inside a Trolley, said storage container being formed of

- at least two separate, well heat-insulating frame components (1, 2) that can be connected to each other, which comprise means for implementing a tight connection, and
- a lid component (4), using which the container can be sealed and which comprises

- a temperature measurement system (10, 11, 12, 13) for measuring the temperature that has been joined to the lid component (4) by embedding or attaching, wherein
- the temperature measurement system (10, 11, 12, 13) comprises

- a measurement device (10) attached or embedded into the lid component (4),
- a hole (11) with a diameter of 5 - 7

- mm for the measurement device (10),
- a mortise (12) carved inside the lid component (4), and
- a temperature sensor (13), which has been placed into the mortise (12).

2. The container according to claim 1, **characterized in that** the frame components (1, 2) are provided with groove and shoulder arrangements for implementing a tongue-and-groove joint.

3. The container according to claim 1 or 2, **characterized in that** its inner space can be provided with spacers (8), such as shelves (8), using which the inner space can be divided into at least two segments, of which at least one can be applied for storing food and beverage products and at least one can be applied for storing a cooling product.

4. The container according to claim 3, **characterized in that** the shelves (8), which preferably are perforated, can be installed into grooves (7a, b, c) carved, preferably at three sites, into the inner walls of the frame components (1, 2).

5. The container according to claim 3 or 4, **characterized in that** the shelves (8) are manufactured from metal, preferably from aluminium.

6. The container according to claim 3, **characterized in that** the storage container can be provided with a cooling product that comprises at least one cryogel cooling bag (9), preferably 1 or 2 bags (9).

7. The container according to claim 6, **characterized in that** the temperature of the gel of the cryogel cooling bag (9) is adjustable, preferably to a temperature of -3 °C, whereby, when the bag (9) is frozen, the gel expands by 5 - 20%, preferably 10%, compared to its required volume at room temperature.

8. The container according to any preceding claim, **characterized in that** the lid component (4) comprises means for monitoring the temperature (14) and for attaching means for data transfer (15) into the lid component (4).

9. The container according to claim 8, **characterized in that** the means for data transfer (15), preferably a USB cable (15), has been attached to the hole (11) for the measurement device.

10. The container according to any preceding claim, **characterized in that** at least one hinge component (6a) has been attached to one of the components (2) of the frame, and at least one counterpart (6b) corresponding to the hinge component (6a) has been attached to the lid component (4), respectively, to

attach the lid component (4) to the frame.

11. The container according to claim 10, **characterized in that** the hinges (6) are manufactured from plastic.

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12. The container according to any preceding claim, **characterized in that** a small cavity (5) has been carved into the lid component (4) to facilitate the opening.

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13. The container according to any preceding claim, **characterized in that** the frame components (1, 2) are manufactured from EPP expandable polypropylene by industrial compression.

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14. Use of the storage container according to any of claims 1 - 13 for cooling foodstuff to a desired temperature or for storing them at the desired temperature.

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15. Use of the storage container according to any of claims 1 - 13 in a serving cart or storage board dimensioned according to KSSU measurement standards for cooling their contents to a desired temperature or for storing them at the desired temperature.

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16. The use according to claim 14 or 15, wherein the desired temperature is below 8 °C.

17. The use according to claim 16, wherein 1 or 2 containers according to any of claims 1 - 13 are placed inside a Trolley, or wherein 1 container according to any of claims 1 - 13 is placed inside a storage board.

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Patentansprüche

1. Lagerbehälter zum Lagern von Lebensmitteln und Getränken in Luftfahrzeugen, der innerhalb eines Servierwagens zu platzieren ist, wobei der Lagerbehälter gebildet ist aus

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- mindestens zwei separaten Schacht-wärmeisolierenden Gestellbauteilen (1, 2), die miteinander verbunden werden können, die Mittel zum Umsetzen einer dichten Verbindung umfassen, und

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- ein Deckelbauteil (4), durch dessen Verwenden der Behälter abgedichtet werden kann, und das

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◦ein Temperaturmesssystem (10, 11, 12, 13) zum Messen der Temperatur umfasst, das an dem Deckelbauteil (4) durch Einbetten oder Anbringen verbunden wurde, wobei

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◦das Temperaturmesssystem (10, 11, 12, 13)

*eine Messvorrichtung (10) umfasst, die an dem Deckelbauteil (4) angebracht oder darin eingebettet ist,

*eine Bohrung (11) mit einem Durchmesser von 5 - 7 mm für die Messvorrichtung (10),

*ein Stemmloch (12), das innerhalb des Deckelbauteils (4) gekerbt ist, und

*einen Temperatursensor (13), der in dem Stemmloch (12) platziert wurde.

2. Behälter nach Anspruch 1, **dadurch gekennzeichnet, dass** die Gestellbauteile (1, 2) mit Nut- und Schultereinrichtungen zum Umsetzen einer Nut- und Federverbindung versehen sind.

3. Behälter nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** sein Innenraum mit Abstandhaltern (8), wie Regalen (8), versehen werden kann, durch deren Verwenden der Innenraum in mindestens zwei Segmente geteilt werden kann, von welchen mindestens eines zum Lagern von Lebensmittel- und Getränkeprodukten angewandt werden kann, und mindestens eines zum Lagern eines Kühlprodukts angewandt werden kann.

4. Behälter nach Anspruch 3, **dadurch gekennzeichnet, dass** die Regale (8), die vorzugsweise gelocht sind, in Nuten (7a, b, c) installiert werden können, die vorzugsweise an drei Stellen in die Innenwände der Gestellbauteile (1, 2) gekerbt sind.

5. Behälter nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** die Regale (8) aus Metall, vorzugsweise aus Aluminium, hergestellt sind.

6. Behälter nach Anspruch 3, **dadurch gekennzeichnet, dass** der Lagerbehälter mit einem Kühlprodukt versehen werden kann, das mindestens einen Kryogelkühlbeutel (9), vorzugsweise 1 oder 2 Beutel (9), umfasst.

7. Behälter nach Anspruch 6, **dadurch gekennzeichnet, dass** die Temperatur des Kryogelkühlbeutels (9) einstellbar ist, vorzugsweise auf eine Temperatur von -3 °C, wodurch, wenn der Beutel (9) eingefroren wird, sich das Gel um 5 - 20 %, vorzugsweise um 10 % im Vergleich zu seinem erforderlichen Volumen bei Raumtemperatur ausdehnt.

8. Behälter nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das Deckelbauteil (4) ein Mittel zum Überwachen der Temperatur (14) und zum Anbringen von Mitteln für Datentransfer (15), in das Deckelbauteil (4) umfasst.

9. Behälter nach Anspruch 8, **dadurch gekennzeichnet, dass** das Mittel für Datentransfer (15), vorzugs-

weise ein USB-Kabel (15), an der Bohrung (11) für die Messvorrichtung angebracht wurde.

10. Behälter nach einem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** mindestens ein Scharnierbauteil (6a) an einem der Bauteile (2) des Gestells angebracht wurde, und jeweils mindestens ein Gegenstück (6b), das dem Scharnierbauteil (6a) entspricht, an dem Deckelbauteil (4) angebracht wurde, um das Deckelbauteil (4) an dem Gestell zu befestigen. 5
11. Behälter nach Anspruch 10, **dadurch gekennzeichnet, dass** die Scharniere (6) aus Kunststoff hergestellt sind. 10
12. Behälter nach einem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** ein kleiner Hohlraum (5) in den Deckelbauteil (4) gekerbt wurde, um das Öffnen zu erleichtern. 15
13. Behälter nach einem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** die Gestellbauteile (1, 2) aus EPP, expandierbarem Polypropylen, durch industrielle Kompression hergestellt werden. 20
14. Verwendung eines Lagerbehälters nach einem der Ansprüche 1 - 13 zum Kühlen von Lebensmitteln auf eine erwünschte Temperatur oder zu ihrem Lagern an der gewünschten Temperatur. 25
15. Verwendung des Lagerbehälters nach einem der Ansprüche 1 - 13 in einem Servierwagen oder Lagerregal, die gemäß KSSU-Maßnormen bemessen sind, zum Kühlen ihres Inhalts auf eine gewünschte Temperatur oder zu deren Lagern an der gewünschten Temperatur. 30
16. Verwendung nach Anspruch 14 oder 15, wobei die gewünschte Temperatur unter 8 °C liegt. 35
17. Verwendung nach Anspruch 16, wobei 1 oder 2 Behälter nach einem der Ansprüche 1 - 13 innerhalb eines Servierwagens platziert sind, oder wobei ein Behälter nach einem der Ansprüche 1 - 13 innerhalb eines Lagerregals platziert ist. 40

Revendications

1. Récipient de stockage pour stocker des aliments et des boissons dans des aéronefs, à placer à l'intérieur d'un chariot, ledit récipient de stockage étant constitué de ce qui suit : 45
- au moins deux composants distincts de cadre de bonne isolation thermique (1, 2) qui peuvent être raccordés l'un à l'autre, comprenant des 50

moyens pour mettre en œuvre un raccordement hermétique, et

- un composant de couvercle (4), au moyen duquel le récipient peut être scellé et qui comprend

- un système de mesure de température (10, 11, 12, 13) pour mesurer la température, qui a été joint au composant de couvercle (4) par encastrement ou attachement, dans lequel
- le système de mesure de température (10, 11, 12, 13) comprend

- un dispositif de mesure (10) attaché ou encastré dans le composant de couvercle (4),
- un trou (11) d'un diamètre de 5 à 7 mm pour le dispositif de mesure (10),
- une mortaise (12) taillée à l'intérieur du composant de couvercle (4), et
- un capteur de température (13), qui a été placé dans la mortaise (12).

2. Récipient selon la revendication 1, **caractérisé en ce que** les composants de cadre (1, 2) sont pourvus d'agencements de rainures et d'épaulements pour mettre en œuvre une jointure à rainure et languette.
3. Récipient selon la revendication 1 ou 2, **caractérisé en ce que** son espace intérieur peut être pourvu d'entretoises (8), comme des étagères (8), dont l'utilisation permet de diviser l'espace intérieur en au moins deux segments, parmi lesquels au moins un segment peut être appliqué pour stocker des aliments et des boissons et au moins un segment peut être appliqué pour stocker un produit de refroidissement.
4. Récipient selon la revendication 3, **caractérisé en ce que** les étagères (8), qui sont de préférence perforées, peuvent être installées dans des rainures (7a, b, c) taillées, de préférence à trois sites, dans les parois intérieures des composants de cadre (1, 2).
5. Récipient selon la revendication 3 ou 4, **caractérisé en ce que** les étagères (8) sont fabriquées en métal, de préférence en aluminium.
6. Récipient selon la revendication 3, **caractérisé en ce que** le récipient de stockage peut être pourvu d'un produit de refroidissement comprenant au moins un sac de refroidissement à cryogel (9), de préférence 1 ou 2 sacs (9).
7. Récipient selon la revendication 6, **caractérisé en ce que** la température du gel du sac de refroidissement à cryogel (9) est ajustable, de préférence à une

température de - 3°C, de telle manière que, lorsque le sac (9) est congelé, le gel s'étende de 5 à 20 %, de préférence de 10 %, par rapport à son volume requis à température ambiante.

8. Récipient selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le composant de couvercle (4) comprend des moyens pour surveiller la température (14) et pour attacher des moyens de transfert de données (15) dans le composant de couvercle (4). 5 10
9. Récipient selon la revendication 8, **caractérisé en ce que** les moyens de transfert de données (15), de préférence un câble USB (15), ont été attachés au trou (11) pour le dispositif de mesure. 15
10. Récipient selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'au moins** un composant de charnière (6a) a été attaché à l'un des composants (2) du cadre, et au moins une contrepartie (6b) correspondant au composant de charnière (6a) a été attachée au composant de couvercle (4) respectivement pour attacher le composant de couvercle (4) au cadre. 20 25
11. Récipient selon la revendication 10, **caractérisé en ce que** les charnières (6) sont fabriquées en plastique. 30
12. Récipient selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'une** petite cavité (5) a été taillée dans le composant de couvercle (4) pour faciliter l'ouverture. 35
13. Récipient selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les composants de cadre (1, 2) sont fabriqués en polypropylène expansible, EPP, par compression industrielle. 40
14. Utilisation du récipient de stockage selon l'une quelconque des revendications 1 à 13 pour le refroidissement de denrées alimentaires à une température souhaitée ou pour le stockage de celles-ci à la température souhaitée. 45
15. Utilisation du récipient de stockage selon l'une quelconque des revendications 1 à 13 dans un chariot de service ou un plateau de stockage dimensionné selon les normes de mesure KSSU pour le refroidissement de leur contenu à une température souhaitée ou pour le stockage de celui-ci à la température souhaitée. 50 55
16. Utilisation selon la revendication 14 ou 15, dans laquelle la température souhaitée est inférieure à 8°C.

17. Utilisation selon la revendication 16, dans laquelle 1 ou 2 récipients selon l'une quelconque des revendications 1 à 13 sont placés dans un chariot, ou dans laquelle 1 récipient selon l'une quelconque des revendications 1 à 13 est placé à l'intérieur d'un plateau de stockage.

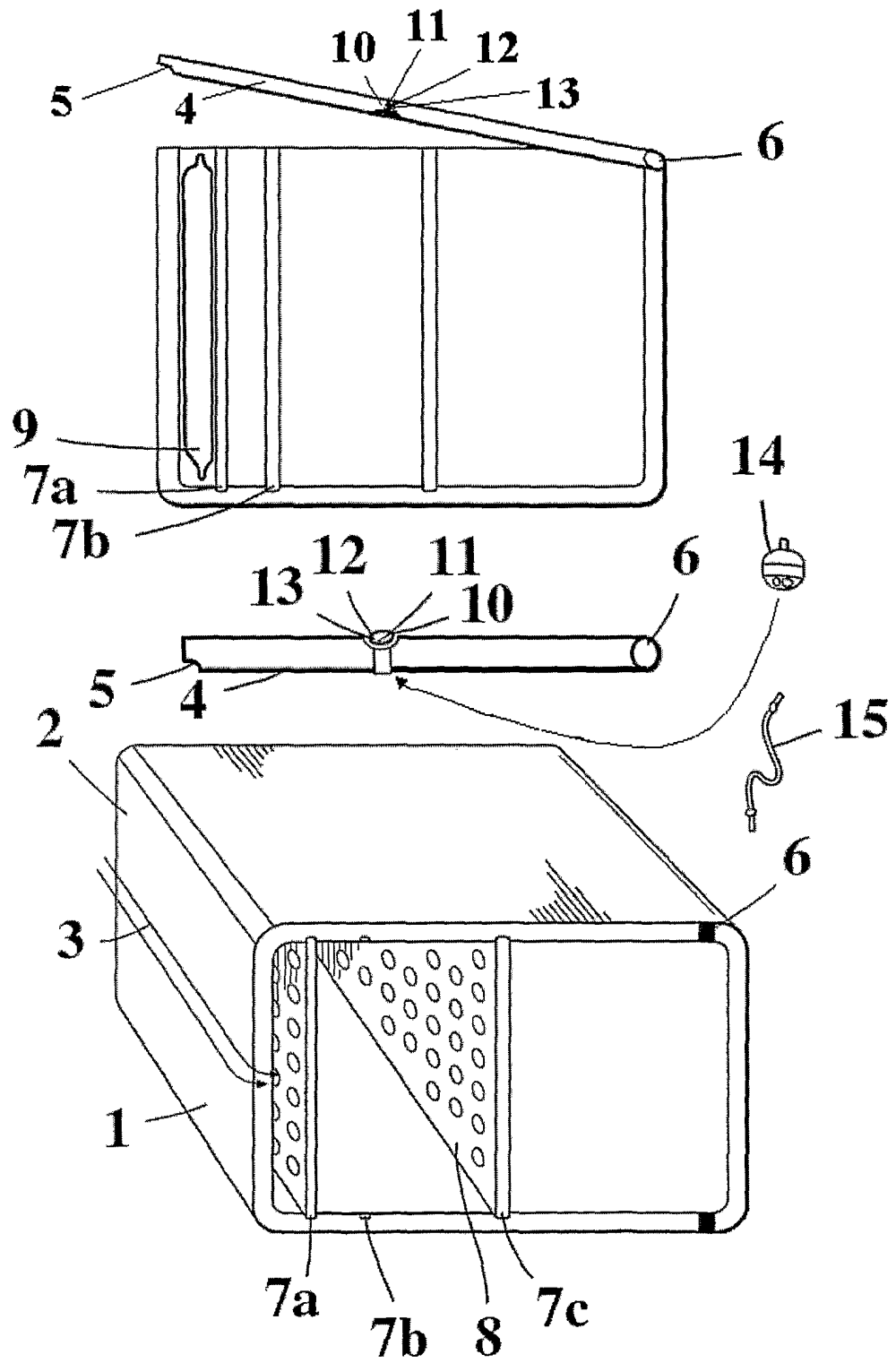


Fig.1

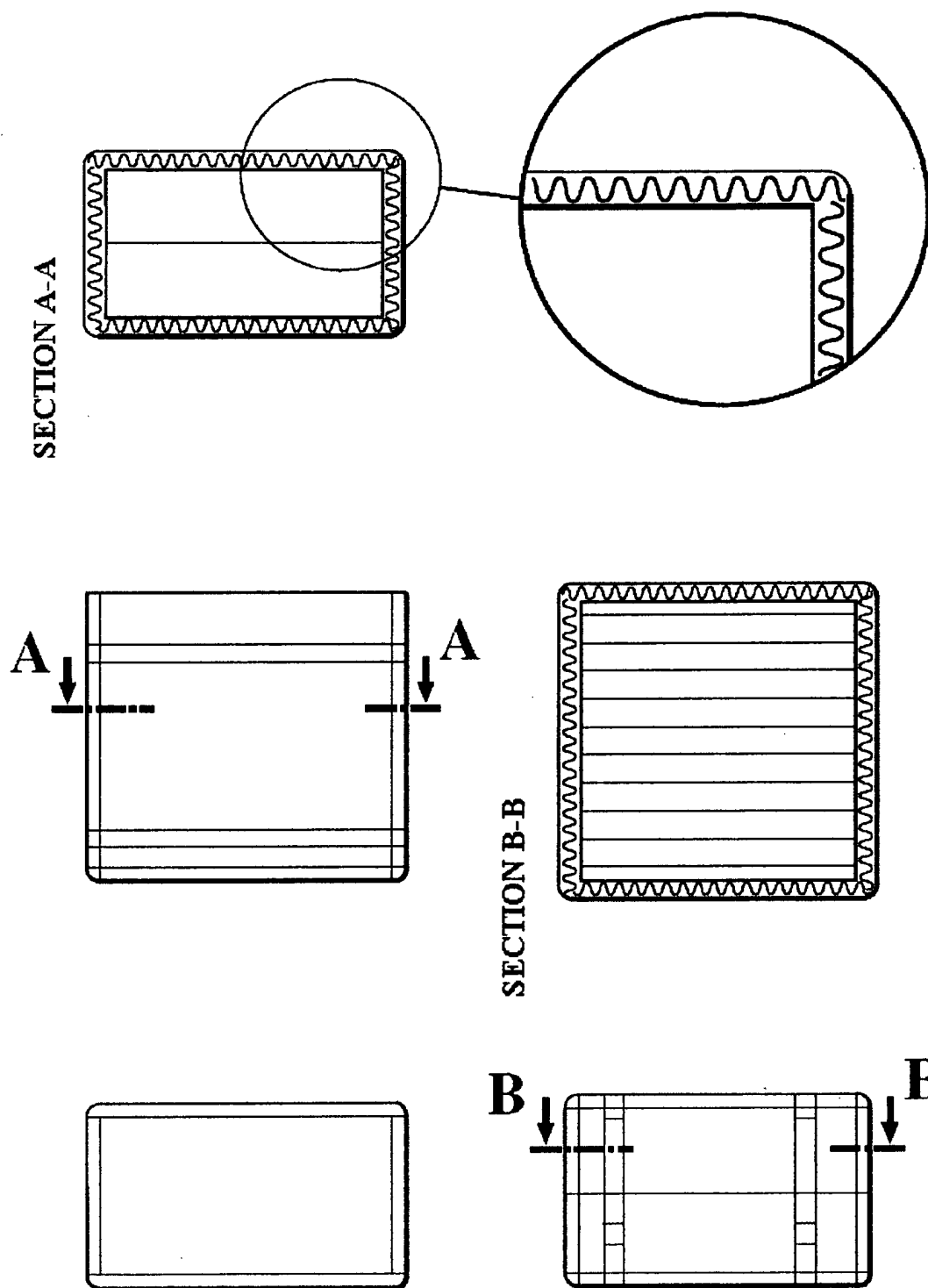


Fig.2

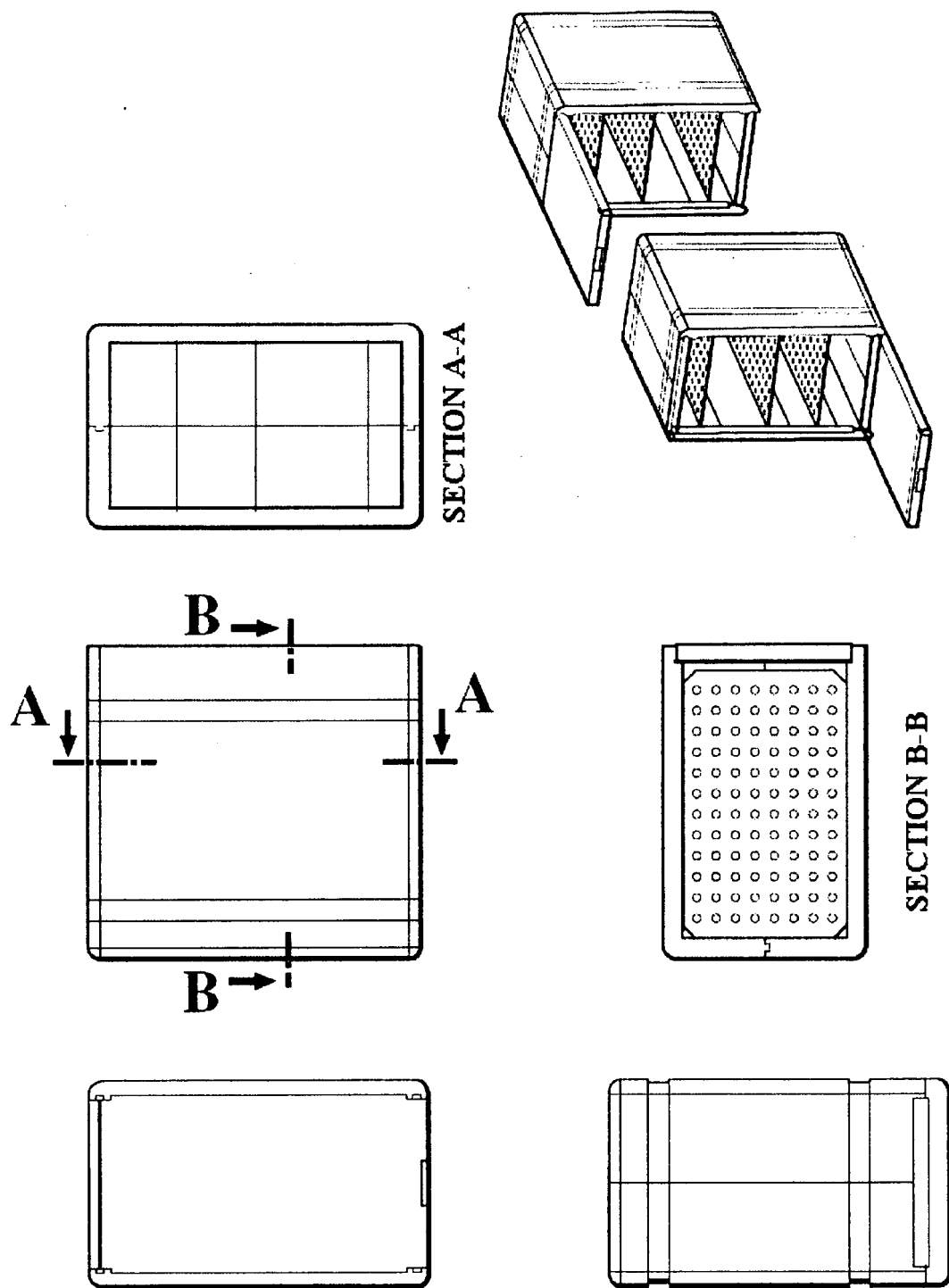


Fig.3

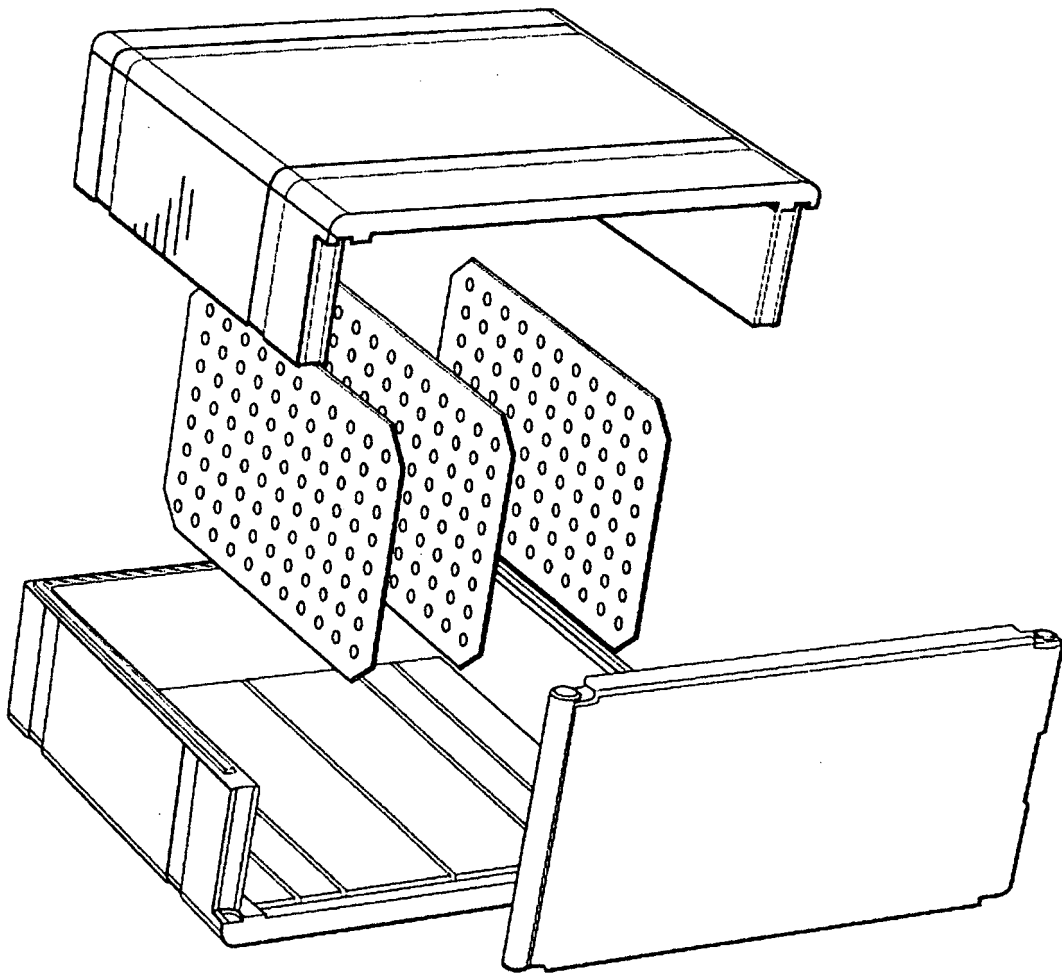


Fig.4