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(54) **Cooling unit for a food trolley**

(57) The invention relates to a cooling unit (1) suitable for use in, for example, a food trolley, transportation trolley, or another kind of transportation unit equipped for use in aeroplanes, or in train compartments, or in commercial kitchens, or in catering and the like, which trolley is substantially sealed and is provided with a door to allow food in various forms to be put in and taken out. The cooling unit (1) comprises dry ice slices (2) to be placed at the inside of the trolley.

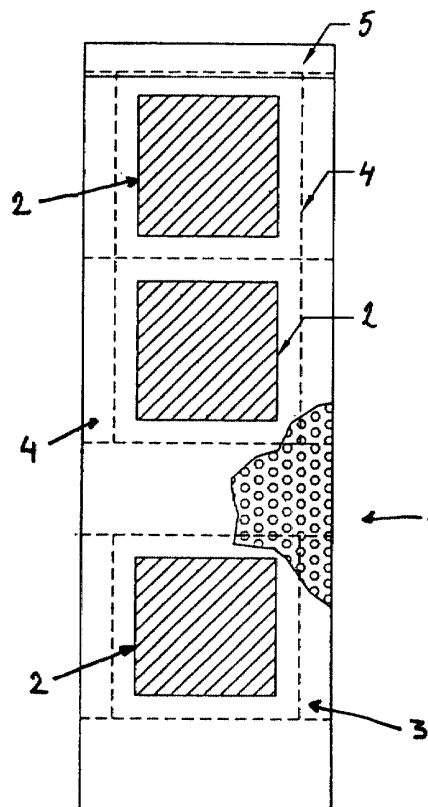


FIG. 1

Description

[0001] The invention relates to a cooling unit suitable for use in, for example, a food trolley, transportation 'trolley, or another kind of transportation unit equipped for use in aeroplanes, or in train compartments, or in commercial kitchens, or in catering and the like, which trolley is substantially sealed and is provided with a door to allow food in various forms to be put in and taken out.

[0002] The invention will be elucidated hereinbelow with reference to the utilization of the cooling unit in conjunction with a food trolley as used aboard aeroplanes. It will be obvious, however, that the cooling unit according to the invention is not limited to this application, but rather that it can also conveniently be used in other circumstances.

[0003] When a food trolley is used, for example, aboard an aeroplane, a pre-limiting condition is that the food on board be stored below 7°C. In the prior art this is accomplished by separately loading the aircraft before every individual flight in order to be able to guarantee that the food remains below this temperature value. A food trolley does not generate its own cooling and because of this pre-limiting condition, the food taken in will have to be loaded directly before each individual flight. Due to the ambient temperature, the food stored in the trolley will slowly warm up, which means that it can comply with the said pre-limiting conditions only for a limited period of time. However, the need exists for the possibility of loading an aircraft once only for a number of successive flights, in order to curtail the waiting time between flights. Of course, the pre-limiting condition of the food staying below 7°C, remains in force. The maintenance of this temperature limit directly influences the storage life and the perishability of the food. The waiting time between flights plays a role in particular when relatively short flights are involved, and the waiting time between the flights plays a relatively more important role. The existing trolleys that are used, for example in aircraft and catering, do not generate their own cooling. An electrically powered cooling device for maintaining a sufficiently low temperature meets with several problems. Among others, there is the problem that during transport there are no electrical facilities to feed the cooling device. Another problem is that such a cooling device takes up space, it constitutes extra weight, and requires maintenance, while the technical reliability of such a cooling device is questionable.

[0004] The known food trolleys are mobile or movable and exist, for example, in the form of the so-called standard carrier, which is executed as an insulated sealable aluminium cupboard in which horizontal shelves are placed carrying the food. Another form is that of the in-flight service cart, executed with uninsulated sandwich panels, that can be sealed by means of a door and also provided with horizontal shelves that are slid into the food trolley in recesses suitable for this purpose.

[0005] EP-A-0 609 962 discloses a cooling unit com-

prising dry ice slices placed at the inside of the trolley. Dry ice in this connection means carbon dioxide in a solid state of aggregation; its temperature is approximately -79°C. The advantage of using such dry ice is that it is odourless and tasteless, and therefore cannot negatively influence the food stored in the food trolley. In addition, the dry ice itself is moisture-free, which is obviously an advantage in connection with the absence of weight residues and the avoidance of leak water. A further important advantage is that dry ice in itself is germ- and bacteria-free, non-toxic, and in addition non-flammable.

[0006] It is the object of the invention to provide a cooling unit that can be used with the known food trolley, with which the various practical demands may be met.

[0007] To this end the cooling unit according to the invention is characterized primarily by the measure featuring in the main claim, while useful and preferred variations on the embodiment are specified in the sub-claims.

[0008] The cooling unit according to the invention provides for the use of insulating spacers between the dry ice slices and the inside of the door or wall of the food trolley. This prolongs to a considerable extent the period of time during which the cooling effect in the food trolley is effective thanks to the cooling unit according to the invention. A very suitable and simple low-cost way to provide such spacers may be realized by placing a sheet comprising air cushions between the pieces of dry ice and the door. For example, the air cushions may be part of a packing for the dry ice, arranged such that these are positioned between the dry ice and the door or wall of the trolley. The air cushions thus provide a suitable thermal insulation.

[0009] It is further preferred that at least facing inward, the film be permeable to gas. This prevents sublimation of the pieces of dry ice in the sealed film compartments. To this end the film may preferably be provided with perforations.

[0010] Preferably, the pieces of dry ice are wrapped in a film. This makes one thing and another convenient to handle. Desirably, the pieces of dry ice are individually wrapped in sealed compartments of film. In this way the pieces of dry ice are prevented from inadvertently becoming moved from a predetermined position at the inside of the trolley. A very suitable film to be used for this purpose is polyethylene film. From an environmental point of view, such a film has a very favourable profile.

[0011] Desirably, the film is provided with a fold-over by which the film can be suspended from the door of the trolley. This complies with the desired manageability of the cooling unit according to the invention, without compromising the available space in the food trolley.

[0012] It is believed that a person skilled in the art will find the foregoing description of the invention sufficiently clear and complete to be able to apply the same. Nevertheless, by means of a non-limiting exemplary embodiment, the cooling unit according to the invention will be further elucidated below, with reference to the drawing.

[0013] In Figure 1, the drawing shows a first embodiment and in Figure 2 a second embodiment of the cooling unit according to the invention.

[0014] The cooling unit shown in Figure 1, is especially suitable for use in combination with a food trolley such as the so-called inflight service cart, while the cooling unit shown in Figure 2 is also suitable for use in a food trolley, in particular the so-called standard carrier, and in a trolley used in the commercial kitchen. The cooling unit that is shown in both the figures carries reference number 1, and comprises slices of dry ice 2 to be applied at the inside of the door of the food trolley. Figure 1 shows that three slices of dry ice 2 are provided, while Figure 2, shows the application of two slices of dry ice 2. The slices of dry ice 2 are wrapped in a film 3. Each slice of dry ice 2 is contained in a sealed film compartment 4. The film is preferably made from polyethylene. At its top side, the cooling unit 1 is provided with a fold-over 5, by which the film 3 may be suspended from the door of the food trolley; this is mentioned here as one of the examples for mounting at the inside of the food trolley. At one side, which during use of the cooling unit 1 is directed toward the inside of the door or wall of the food trolley, a sheet is applied that is not shown in the figures, that may be part of the wrapping, preferably comprising air cushions to ensure that the slices of dry ice are not in direct contact with said door (not shown). The film 3 is further permeable for gas, to which end the same is provided with perforations.

5. A cooling unit according to one of the claims 1-4, **characterized in that** the slices of dry ice (2) are wrapped in a film (3).
- 5 6. A cooling unit according to one of the claims 1-5, **characterized in that** the slices of dry ice (2) are each wrapped individually in sealed film compartments (4).
- 10 7. A cooling unit according to claim 5 or 6, **characterized in that** the film is polyethylene film.
8. A cooling unit according to one of the claims 5-7, **characterized in that** the film (3) is provided with a fold-over (5) by which the film (3) can be suspended from the door.
- 15 9. A food trolley equipped with a cooling unit according to one of the claims 1-8.

Claims

1. A cooling unit suitable for use in, for example, a food trolley, transportation trolley, or another kind of transportation unit equipped for use in aeroplanes, or in train compartments, or in commercial kitchens, or in catering and the like, which trolley is substantially sealed and is provided with a door to allow food in various forms to be put in and taken out, and wherein the cooling unit comprises dry ice slices to be placed at the inside of the trolley, **characterized in that** during use, insulating spacers are provided between the dry ice slices (2) and the inside of the door.
2. A cooling unit according to claim 1, **characterized in that** a sheet comprising air cushions is placed between the pieces of dry ice and the inside of the trolley.
3. A cooling unit according to claim 1 or 2, **characterized in that** at least facing inward, the film (3) is permeable to gas.
4. A cooling unit according to claim 3, **characterized in that** the film is provided with perforations.

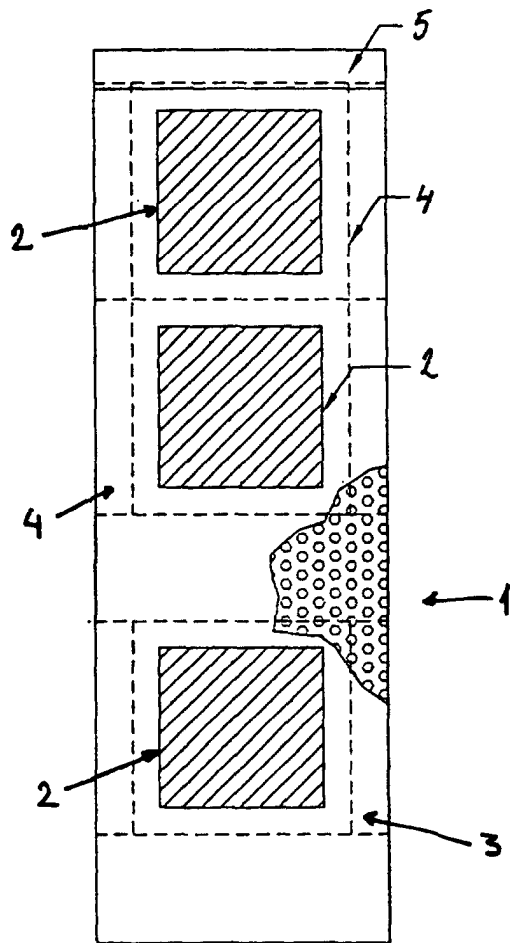


FIG. 1

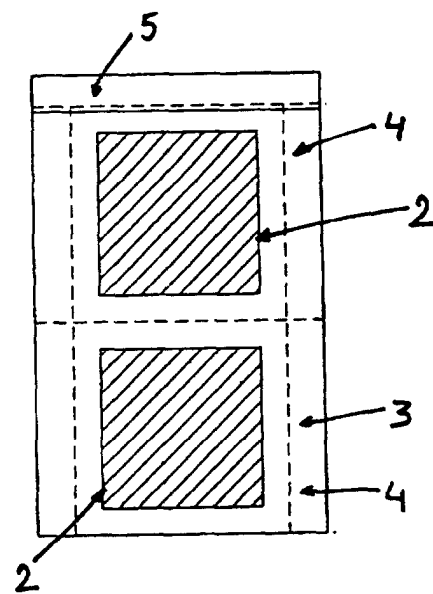


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 01 20 1782

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F25D B65D C01B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 August 2001	Examiner Yousufi, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 01 20 1782

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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23-08-2001

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