

(19)



(11)

EP 2 499 062 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

28.12.2016 Bulletin 2016/52

(51) Int Cl.:

B65D 21/02 (2006.01) B65D 77/20 (2006.01)

(86) International application number:

PCT/NO2010/000413

(21) Application number: **10831846.0**

(22) Date of filing: **12.11.2010**

(87) International publication number:

WO 2011/062502 (26.05.2011 Gazette 2011/21)

(54) CONTAINERS FOR TRANSPORT OF FOOD

BEHÄLTER ZUM TRANSPORTIEREN VON NAHRUNGSMITTELN

RÉCIPIENT POUR LE TRANSPORT D'ALIMENT

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

• **JÖRGENSEN, Arvid**

N-7600 Levanger (NO)

(30) Priority: **13.11.2009 NO 20093338**

(74) Representative: **Curo AS**

Vestre Rosten 81

7075 Tiller (NO)

(43) Date of publication of application:

19.09.2012 Bulletin 2012/38

(56) References cited:

WO-A1-98/23500

WO-A1-03/031282

BE-A- 645 577

FR-A1- 2 869 592

GB-A- 912 839

GB-A- 1 146 029

GB-A- 2 143 213

JP-A- 7 060 922

US-A- 5 916 615

US-A1- 2004 016 208

US-A1- 2009 194 530

US-B1- 6 248 380

(72) Inventors:

• **BEKKEN, Svenn**

N-7263 Hamarvik (NO)

EP 2 499 062 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to a new type of EPS containers, according to the preamble of patent claim 1 and a method for production thereof in accordance with the preamble of claim 7.

Background

[0002] Food, especially fresh fish, is often transported in EPS containers (Expanded PolyStyrene). Transport in EPS containers is the least expensive and efficient way to transport fish. Such a container is light, functional, hygienic, robust and may be adjusted to a European pallet. The fish is placed into the container together with ice, possibly an absorbent, and finally a lid of EPS is laid onto the container, and fastened with straps. Such containers having a lid and straps are well known in prior art, for instance from Bewi AS.

[0003] During transportation, most of the ice will melt, and in order to prevent the food from lying in water, which would reduce the quality, most EPS containers are performed with holes for drainage, whereby superfluous water may drain out. During long transport(ation)s, water will thus flow out of the containers, and from the vehicle, such as a trailer. This water is mixed with fluids from the fish, and is thus unfavourable discharge. The alternative is to use sufficient amounts of absorbents, which i.a. is done for transportation by plane.

[0004] To fill the containers with ice instead of food is very unfavourable, and renders the transportation expensive. One may also use dry ice instead of wet ice, but dry ice is more expensive, and should not directly touch the food. The alternative for using EPS containers with ice, is to use other containers and perform other ways of cooling during the entire transport. The containers must also be strong enough to be stackable and to allow being moved and handled without danger for falling apart.

[0005] Many different types of trays or small containers of XPS - extruded polystyrene are known, for instance from JP 7060922. XPS are produced in flat plates, and an XPS-tray is produced by punching a tray from such an XPS plate. To perform the punching process, the plate must be relatively thin, and thus it is not possible to produce a container of XPS having sufficient strength. The thin walls are not providing sufficient insulation, and the XPS-trays must thus be cooled from the outside.

[0006] US 6,248,380 describe a container for food, such as minced meat, with so-called modified atmospheric packaging (MAP). However, this type container is not applicable to long distance transportation of fresh fish since the fish cannot preserve its quality and the container is not applicable to stacking.

[0007] FR 2 869 592 disclose a method for producing a container of EPS with a sealing film atop of the container. The main object of this method is to simplify production by performing sealing and cutting in a single operation. Sealing may be performed by heat welding.

There is no mention of using glue being activated at a temperature lower than the temperature where EPS begins to decompose or a peripheral track for accommodation of the film.

[0008] This document discloses a container and a method for making said container according to the preamble of claim 1 and 7.

Object

[0009] A main object is that the EPS containers according to the present patent application should be lighter and have smaller outer volume than known EPS containers having the same inner volume. A further object is that the containers should be air- and fluid tight, in order to render the atmosphere inside controllable. Yet another object is that the containers should provide better possibilities for branding.

The invention

[0010] The objects are achieved with an EPS container according to the characterizing parts of patent claim 1 and a method for production thereof in accordance with the characterizing part of patent claim 7. Further advantageous features are stated in the accompanied dependent claims.

[0011] The invention is related to a container having sidewalls and floor of EPS, wherein the traditional EPS lid is replaced by a plastic film being fastened directly to the EPS container. By using this film a substantial reduction of volume and weight is achieved, and a container is obtained being liquid and/or gas tight. Using a transparent plastic film further makes it easier for the end user to inspect the contents of the container, as it no longer needs to be opened to allow inspection of its contents. The film also offers a good possibility for branding, because it can be printed directly onto the plastic film. Directly printing onto EPS is possible, but the result is often poor, and it causes a lot of wreckage. The alternative is to use stickers, but that involves extra costs and work.

[0012] An adhesive is used to fasten the plastic film to the EPS container. Even if this adhesive is not supposed to contact the contents of the container directly, it is still an advantage to use an adhesive being approved by FDA for indirect contact with food. The adhesive must fasten well to EPS, and preferably have a lower melting point than EPS, so that the EPS is not deformed or melted when the adhesive is supplied. When EPS melts, styrene gas is produced, and styrene gas is possibly cancerous for humans.

[0013] By "gluing" it is in this application meant use of an adhesive/glue for fastening two parts to each other, releasably or durably. By "adhesive" it is meant any kind of fastening means being suitable for fastening two parts to each other, releasably or durably. Different types of adhesives may be used, preferably adhesives applied in one step, and activated in another, for instance adhe-

sives being activated by temperature, pressure, ultrasound or ultraviolet light. It may also be used adhesives applied in one step and cured in another. In an alternative embodiment, a kind of plastic firstly being applied to the EPS container is used, and when the plastic film is applied, the film is welded to the plastic already being applied to the EPS container. It is, of course, a premise that the plastic being applied to the EPS container adheres to EPS, and does not loosen during the welding. A preferred example of an adhesive being activated with heat, is ethylene vinyl acetate (CAS# 24937-78-8, also known as EVA). It is a copolymer of ethylene and vinyl acetate. The weight ratio of vinyl acetate is normally varying between 10 and 40%.

[0014] In an especially preferred embodiment, the adhesive is applied immediately after production of the container, in such a way that the adhesive is applied in a dry, controllable environment. The adhesive may also be applied after the contents of the container is put in place, but then water, ice or other elements might prevent optimal adhesion between adhesive and EPS. After the contents are placed in the container, the adhesive must be activated and the plastic film applied. If the characteristics of the adhesive so allows, it may also be moulded into the EPS container during production.

[0015] In an alternative embodiment, the upper edge of the sidewalls of the EPS container, is provided with a horizontal, peripheral track where the adhesive is placed, in such a way that the contact surface between EPS and adhesive is as large as possible without changing the thickness of the wall.

[0016] The plastic film being placed as lid on an EPS container, must also be approved for food, corresponding to the adhesive. The plastic film is preferably gas tight, and should have high tensile strength, for instance about 13 MPa. Furthermore it is a premise that the film fastens well to the adhesive, and that its properties does not change during the activation or curing of the adhesive; for instance it must have a melting temperature higher than the activation temperature of the adhesive, in cases where the glue should be activated by heat. In order to achieve a film having satisfying characteristics it may be an advantage to use a plastic film comprising several layers, a laminate. Besides, it is preferred to allow printing directly onto the plastic film, possibly on one of the layers if a laminate is being used, and that it is produced in a non-dewetting quality.

[0017] The invention also comprises a method for producing a container as described above, comprising the steps of

- moulding a container (1) having sidewalls and floor of EPS in a regular way,
- applying an adhesive on an upper edge of the sidewalls,
- laying a plastic film (5) over the container, and guiding it down at the least until contact with the adhesive is achieved.

[0018] The container is filled with desired contents after moulding or preferably after the adhesive is applied.

[0019] The method also comprises a further step for activating the glue after it is applied onto the container, and most preferably it is activated after the plastic film is put onto the box, in such a way that the adhesive will be activated through the plastic film. Finally it is an advantage that the plastic film is guided down until contact with the adhesive, and further until contact with the upper edge of the container is achieved.

[0020] By using EPS containers according to the present invention, one achieves reduced weight and reduced volume. Compared to use of traditional containers this offers large economic cuts upon transportation. When one also may achieve a completely gastight container, the fish may be packed in a controlled atmosphere, and this offers new methods for packaging and transporting fresh fish. For instance a reduction of the amount of ice will contribute substantially to further lower the costs for transportation.

[0021] By replacing the lids with a plastic film, the underside of the floor and the upper part of the sidewalls and/or upper edge may be performed with reciprocal designs, in such a way that the floor of an adjacent container being stacked on top, will function as an insulating lid. This gives a further reduction of the outer volume of the container, and allows more containers to be stacked in the height, without increasing the outer measures of the pallet. This reduces the transportation costs further.

Example

[0022] The invention will in the following be described in the form of an example, wherein a container having sidewalls and floor of EPS is provided with a plastic film lid, and wherein a number of containers are placed on a pallet. The example is shown in the enclosed drawings, where

Figure 1 shows a container having sidewalls and floor of EPS, while adhesive is applied at the upper edge of the sidewalls,

Figure 1a shows an enlarged section of Figure 1, where the track having applied adhesive is shown in detail,

Figure 2 shows the container of Figure 1, having a plastic film glued in place, and

Figure 3 shows a pallet of containers according to present invention, compared to a pallet of traditional containers.

[0023] Figure 1 shows a fish container 1 having sidewalls and floor of EPS (in this case an EPS having a melting temperature of 103°C is used) designed to achieve a plastic film as lid instead of a traditional EPS lid. The container is designed with a horizontal track on the upper edge of the sides of the container, wherein the track is designed to provide a carrier surface for the ad-

hesive. In the shown embodiment in Figure 1, and as shown in detail in Figure 1a, the adhesive 2 is applied to the track. The upper edges of the container is further provided with a discontinuous, elevated outer edge 3, which is opposite to recesses/grooves 4 in the underside of the container, in such a way that containers can be steadily stacked high.

[0024] In a specific preferred embodiment of the invention, a EVA adhesive, for example Krystal Lim FDA 105, is applied to the track 2, at a temperature where the adhesive is liquid or semi-solid, but under the melting temperature for EPS. Upon use of Krystal Lim FDA 105 this will be a temperature of about 70°C. Once the adhesive is applied, the container 1 is cooled and transported to the site of use, where fish and ice are placed into the container. When the desired contents are placed in the container, a plastic film 5, for instance a 40 µm thick two-layer plastic film of PE and EVA, wherein the EVA layer turns towards the adhesive, is placed over the container, and guided down towards the upper side of the container, until the plastic touches the adhesive. Then the adhesive is activated, preferably by heat, at a temperature higher than the melting temperature for the adhesive, but lower than the melting temperature for EPS. The activation of the adhesive may for instance be performed by using a frame being lowered onto the plastic film and heating the adhesive through it. In cases where the adhesive is Krystal adhesive FDA 105, the frame may have a temperature of 80°C. The frame must have the same shape as the adhesive 2, but may advantageously be narrower in order to avoid direct contact between the hot frame and the EPS container.

[0025] While the adhesive is being activated, the film 5 is lowered further, and preferably until the film is in contact with the upper edges of the container, in such a way that it is glued to the EPS container. A container provided with such a plastic film is shown in Figure 2.

[0026] There are several machines in prior art, for fastening plastic films as lids to trays of other materials, for instance plastic trays, preferably by lamination of plastic layers. With small adjustments these machines may also be used for fastening a plastic film to a container according to the present invention, which will be obvious to a person skilled in the art.

[0027] The savings by using plastic films 5 instead of traditional EPS lids 6, are large. A traditional lid weighs 200 gram, and a plastic film with adhesive, according to the example above, weighs about 15 g. The weight reduction per container will thus be about 185 g, and per pallet (24 containers) 24*185 g, i.e. 4,440 g. However, to ensure that a hole is not made in the lid of the uppermost containers, and to avoid loss of cold, it is preferred that the uppermost layer has traditional layers in addition, and the reduction per pallet will thus be (24-3) * 185 g = 3,840 g. The weight reduction of the containers themselves, due to new design having elevations and recesses comes in addition.

[0028] A lid adds about 2 cm to the height of a contain-

er, and the volume reduction per pallet (8 containers on top of each other) will thus be 7 * 2 cm; 14 cm. However, when the containers further are designed with elevations on the upper edge and opposite recesses on the underside of the floor, the containers can be stacked more closely than before, and the total volume reduction, having containers according to the present invention, is as shown in Figure 3, 23.9 cm, or about 230 litres.

[0029] Above is shown and described a preferred embodiment of the present invention. The Figures and example are only given to illustrate an embodiment and should not under any circumstances be interpreted as limiting to the invention which is defined by the enclosed claims.

Claims

1. Container (1) for liquid and/or gas tight transportation and/or storage of food, wherein the container comprises a lid (5) and has sidewalls and floor of expanded polystyrene (EPS), **characterized in that** the upper edges of the sidewalls of the container are designed with a horizontal track (2), and that said lid (5) comprises a plastic film attached to the container by gluing in the horizontal track (2) with an adhesive of a type being able to being heat activated at a temperature lower than the deformation temperature and/or melting temperature of EPS.
2. Container (1) according to claim 1, **characterized in that** the horizontal track (2) is designed to create a carrier surface for an adhesive.
3. Container (1) according to any one of claims 1 or 2, **characterized in that** the adhesive is applied onto the track (2) after the production of the container (1).
4. Container (1) according to any one of the proceeding claims, **characterized in that** the container having the plastic film (5) is gas tight.
5. Container (1) according to any one of the proceeding claims, **characterized in that** the underside of the floor and the upper part and/or edges of the sidewalls are provided with opposite designs (3, 4), in such a way that the upper part of the sidewall can be directed into the floor of a container being placed on top.
6. Container (1) according to claim 5, **characterized in that** the sidewalls have an outer, peripheral, elevated part (3) on the upper edge, and that the underside of the floor has opposite recesses (4).
7. Method for producing an EPS container (1) according to claim 1, by

a) moulding a container (1) having sidewalls and

floor of EPS in traditional way, **characterized in:**
 b) applying an adhesive (2) to the upper edges
 of the sidewalls,
 c) applying a plastic film (5) over the container,
 and guiding it downwards until it comes in con-
 tact with the adhesive (2),
 d) activating the adhesive,
 e) guiding the plastic film further down until con-
 tact with the upper edge of the container.

5

10

Patentansprüche

1. Behälter (1) zum flüssigkeits- und/oder gasdichten Transportieren und/oder Aufbewahren von Lebensmitteln, wobei der Behälter einen Deckel (5) aufweist und Seitenwände und einen Boden aus expandiertem Polystyrol (EPS) hat,
dadurch gekennzeichnet,
dass die oberen Kanten der Seitenwände des Behälters mit einer horizontalen Spur (2) ausgestaltet sind, und
dass der Deckel (5) eine Kunststoffolie aufweist, die an dem Behälter durch Verkleben an der horizontalen Spur (2) mit einem Haftmittel angebracht ist, welches von einer Art ist, die imstande ist, bei einer Temperatur hitzeaktiviert zu werden, die geringer ist als die Deformationstemperatur und/oder Schmelztemperatur des EPS.
2. Behälter (1) nach Anspruch 1,
dadurch gekennzeichnet,
dass die horizontale Spur (2) ausgestaltet ist, eine Trägeroberfläche für ein Haftmittel zu bilden.
3. Behälter (1) nach einem der Ansprüche 1 oder 2,
dadurch gekennzeichnet,
dass das Haftmittel auf die Spur (2) nach dem Herstellen des Behälters (1) aufgebracht wird.
4. Behälter (1) nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
dass der Behälter, welcher die Kunststoffolie (5) hat, gasdicht ist.
5. Behälter (1) nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
dass die Unterseite des Bodens und der obere Teil und/oder die Kanten der Seitenwände mit gegensätzlichen Ausgestaltungen (3, 4) vorgesehen sind, derart, dass der obere Teil der Seitenwand in den Boden eines Behälters, der obenauf platziert wird, angeordnet werden kann.
6. Behälter (1) nach Anspruch 5,
dadurch gekennzeichnet,

15

20

25

30

35

40

45

50

55

dass die Seitenwände einen äußeren, peripheren, erhöhten Teil (3) auf der oberen Kante haben und dass die Unterseite des Bodens eine gegensätzliche Aussparung (4) hat.

7. Verfahren zum Herstellen eines EPS-Behälters (1) nach Anspruch 1, mit

a) Formen eines Behälters (1), der in herkömmlicher Weise Seitenwände und einen Boden aus EPS hat;

gekennzeichnet durch:

b) Aufbringen eines Haftmittels (2) auf die oberen Kanten der Seitenwände,
 c) Aufbringen einer Kunststoffolie (5) über dem Behälter und deren nach unten Führen, bis sie in Kontakt mit dem Haftmittel (2) kommt,
 d) Aktivieren des Haftmittels,
 e) Führen der Plastikfolie weiter abwärts, bis zu einem Kontakt mit der oberen Kante des Behälters.

Revendications

1. Récipient (1) pour le transport étanche au liquide et/ou au gaz et/ou le stockage d'aliments, dans lequel le récipient comprend un couvercle (5) et présente des parois latérales et un fond de polystyrène expansé (EPS), **caractérisé en ce que** les arêtes supérieures des parois latérales du récipient sont conçues avec une piste horizontale (2) et **en ce que** ledit couvercle (5) comprend un film plastique attaché au récipient par collage dans la piste horizontale (2) avec un adhésif d'un type étant capable d'être activé à la chaleur à une température inférieure à la température de déformation et/ou à la température de fusion d'EPS.
2. Récipient (1) selon la revendication 1, **caractérisé en ce que** la piste horizontale (2) est conçue pour créer une surface porteuse pour un adhésif.
3. Récipient (1) selon l'une quelconque des revendications 1 ou 2, **caractérisé en ce que** l'adhésif est appliqué sur la piste (2) après la production du récipient (1).
4. Récipient (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le récipient présentant le film plastique (5) est étanche au gaz.
5. Récipient (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le côté inférieur du fond et la partie supérieure et/ou les arê-

tes des parois latérales sont dotées d'éléments de conception opposés (3, 4), de telle manière que la partie supérieure de la paroi latérale puisse être dirigée dans le fond d'un récipient étant placé dessus.

5

6. Récipient (1) selon la revendication 5, **caractérisé en ce que** les parois latérales ont une partie élevée, périphérique, extérieure (3) sur l'arête supérieure et **en ce que** le côté inférieur du fond présente des évidements opposés (4).

10

7. Procédé de production d'un récipient en EPS (1) selon la revendication 1, par :

- a) moulage d'un récipient (1) présentant des parois latérales et un fond en EPS de manière traditionnelle, caractérisé en : 15
- b) appliquant un adhésif (2) sur les arêtes supérieures des parois latérales,
- c) appliquant un film plastique (5) sur le récipient et le guidant vers le bas jusqu'à ce qu'il vienne en contact avec l'adhésif (2), 20
- d) activant l'adhésif,
- e) guidant le film plastique davantage vers le bas jusqu'au contact avec l'arête supérieure du récipient. 25

30

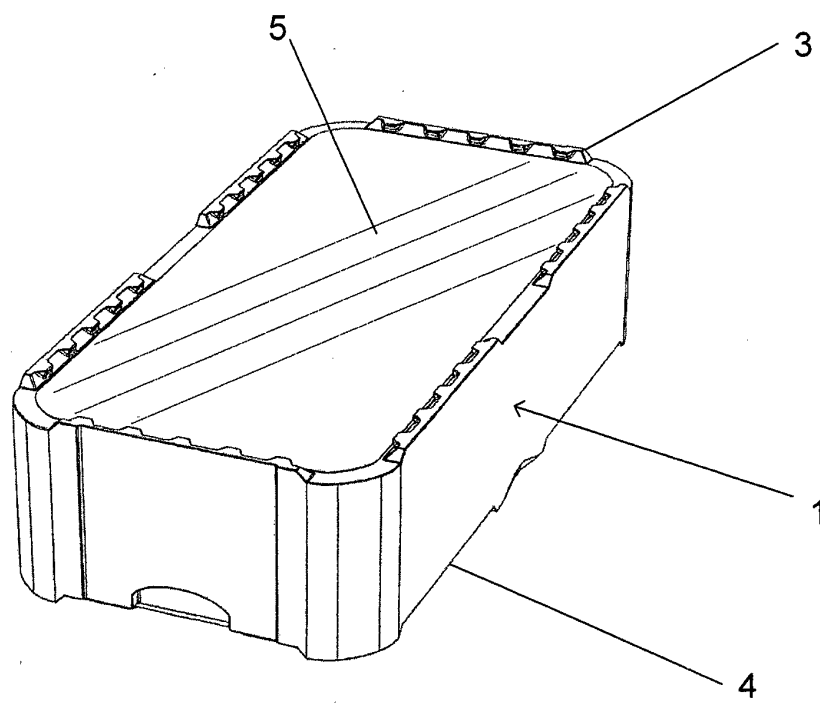
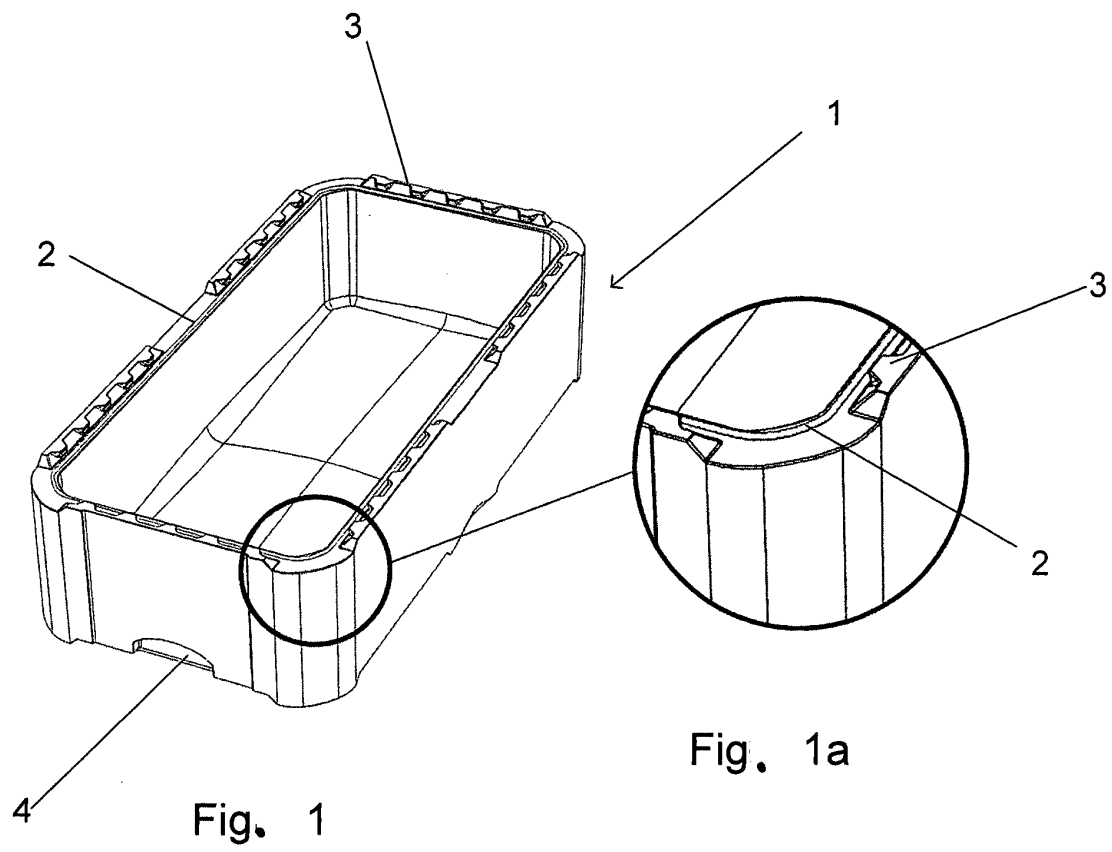
35

40

45

50

55



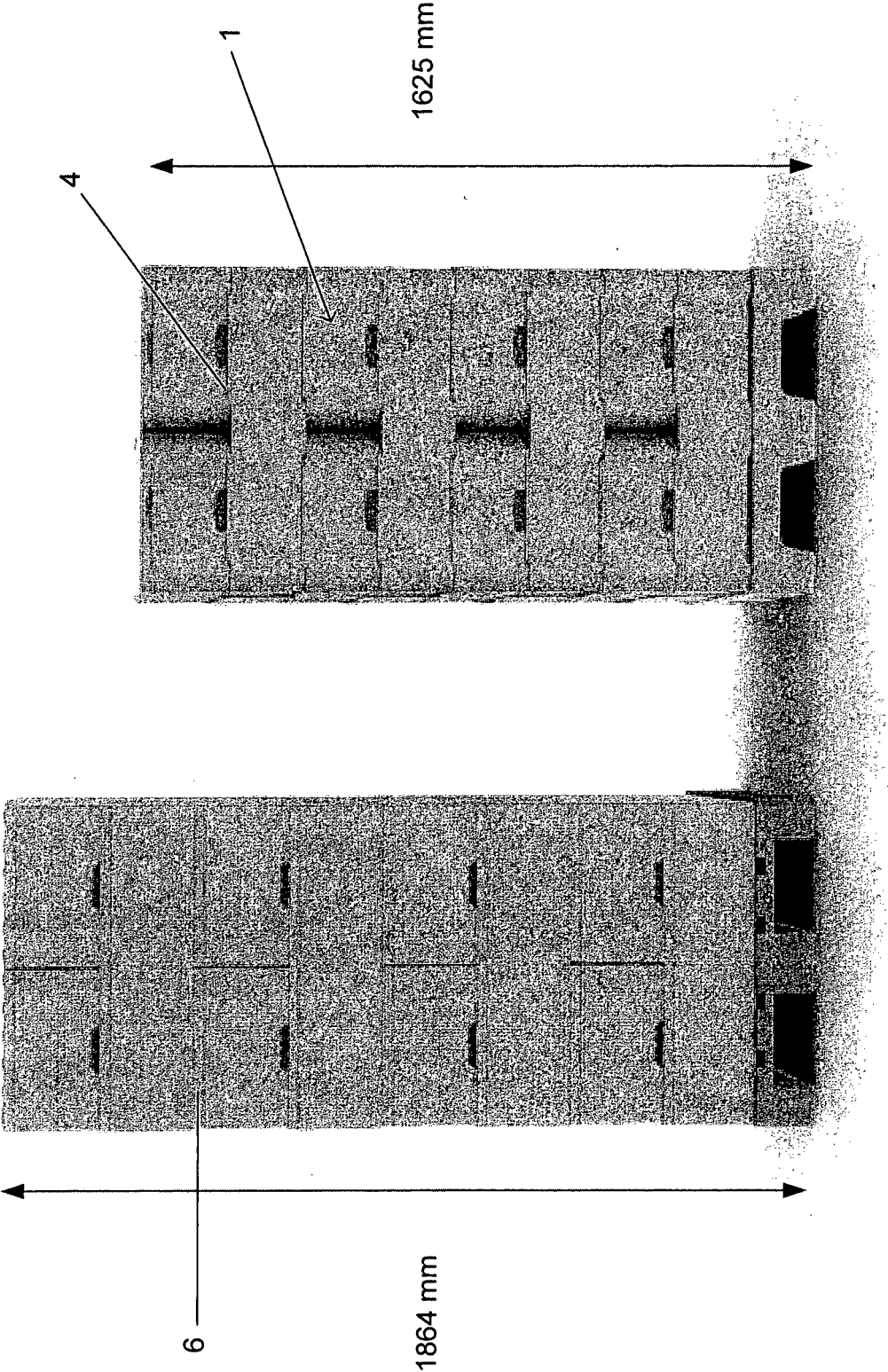


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 7060922 B [0005]
- US 6248380 B [0006]
- FR 2869592 [0007]