The subject of the invention is a transport and storage container, forming a loading space for storage or transport, particularly of food products requiring storage in appropriate temperature. Transport and storage thermo-insulated container made of thermo-insulating material with high mechanical strength and low heat transfer coefficient, with swinging doors and a set of locks for locking, with at least one chamber segment (1), front plate (2) and door plate (3), whereby the chamber segment (1) is in a form of a rectangular prism open on both opposite ends and has the tongue (4) on the perimeter of the first open end, and a recess forming the groove (5) on the perimeter of the other open end. The open end of the first chamber segment (1) is enclosed with the front plate (2), which is provided with the groove (5B) for fitting the tongue (4) of the first segment, and the groove (5) of the last segment of the chamber (1) is closed with a foldable door plate (3) with the tongue (4B), the segments of the chamber (1) and the front plate (2) are joined together with the linking rods (8), which are placed in the spacing sleeves (6) of the chamber segment (1) and spacing sleeves (7) of the front plate (2).
**Transport and storage container**

The subject of the invention is a thermo-insulated transport and storage container, forming a loading space for storage or transport, particularly of food products requiring storage in appropriate temperature.

The container is a thermo-insulated chamber which, in stationary version, ensures storage of food products in particular, requiring storage in appropriate temperature, intended mainly for small commercial facilities. The container is installed on a chassis of a delivery vehicle and provides thermo-insulated enclosure for transport of food products in particular, requiring transport in appropriate temperature. The container installed on a chassis of a delivery vehicle is fitted with an intermediate frame and, after removing from the chassis it serves as a temporary store, to allow further use of the delivery vehicle without the need of immediate unloading.

Portable refrigerating chambers are known, which constitute one solid structure, provided with a control unit with complete refrigerating equipment, suitable for individual operation. One of the known solutions of this type is a refrigerating container in a form of a long rectangular prism, according to the Polish Patent Application P-226777. This container comprises a refrigerating chamber with insulted doors, made of thermo-insulating panels joined together with a spatial steel frame structure.

Polish Patent Description 157116 describes a portable refrigerating container which, in relation to the solutions commonly in use, while meeting good insulating criteria, has lower weight and is structurally suitable for transport. This effect is achieved through an appropriate design of the internal insulation layer, which is fixed to the container walls and roof with profiled
fasteners and insulating strips fixed to the shelves of the fasteners. The space formed between the container walls, roof and insulating strips, forming vertical walls and ceiling inside the container, is filled with insulating panels, fixed with adhesive materials. The panels are protected with sheet metal glued to their surface, and additionally fixed with fasteners to the insulating strips. The floor is made of lateral insulating strips with insulating panels placed between them, covered with hard insulating plate, the surface of which is additionally protected with sheet metal. This solutions aims to eliminate "thermal bridges" and, consequently to achieve good insulating properties.

There are delivery vehicles in common use, provided with a transport container forming thermo-insulated enclosure, for transport of goods, particularly foods in low temperatures. There are many types and designs of thermo-insulating enclosures in use, mounted on the chassis of delivery vehicles.

Each thermo-insulating body is made on specific request and according to individual user's requirements. It is also adapted to the specific chassis type. Support structures of the bodies are made of steel, aluminium or wood. The bodies have internal and external walls made of sheet metal, mostly aluminium. The thickness of the insulating layer, made mostly of polyurethane foam, is in the thermal insulating bodies ca. 40 mm, which allows to achieve the heat transfer coefficient $k \approx 0.4$.

Also sandwich panels are used for the walls of thermo-insulating enclosures. Such panels are covered with plain aluminium plate, and the insulation material is polyurethane foam.

Also sandwich walls are used with the coat of glass fibre and polyester resin laminate. Much better thermal insulation is achieved this way.

Each wall forms one panel - it is built as a whole part and has specific dimensions specified in the design. The insulating material is polyurethane foam, injected and foamed between two walls of the enclosure (internal and external) or cut into panels of blocks and laminated.
The lamination technology allows precise control of foam density and elimination of air bubbles during the foaming process, which create thermal bridges.

The essence of the solution is the transport and storage container with at least one chamber segment, front plate and door plate. The chamber segment has the form of a rectangular prism open on both opposite ends, with tongue on the perimeter of the first open end, and a recess in the perimeter of the other open end, forming a groove. The open end of the first chamber segment is enclosed with a front plate, provided with a groove for inserting the tongue of the first chamber segment, and the groove of the open end of the first chamber segment engages with the tongue of the next segment. The groove of the last chamber segment is enclosed with a folding door plate with a tongue. The chamber segments and front plate are joined with linking rods, placed in spacing sleeves of the chamber segment and of the front plate.

In the first variant, the container has linking rods which also intersect the metal frame, in which the hinges and locks of the front plate are mounted.

In the second variant, the last segment of the container chamber, close to the door plate, has a frame mounted, comprising: upper beam, lower beam and linking rods, whereby the rods are permanently bonded with the side locks.

An advantage of the thermo-insulating transport and storage container, according to the invention, is its low weight as compared to the currently available solutions, stability of insulating properties, easy installation, possibility to compose containers of different length of repeatable segments, ease of repair involving replacement of a damaged segment without special tools. The use of repeatable segments considerably reduces the cost of setting up a container.

The container, according to the invention, has very good thermo-insulating properties, has no metallic components forming the framework or connecting parts in conventional solutions, which results in thermal bridges impairing the insulating property of the enclosure. All connections are made by
direct engagement of the insulating material, eliminating the need for any intermediate components and the need to use any seals. The container, according to the invention, eliminates the degradation of insulating material and formation of voids, particularly in the upper parts of the enclosure, which are inaccessible to the user. During container use, no thermal bridges occur due to the degradation of the insulating layer, thus the container of the invention retains stability of its thermo-insulating properties.

Owing to the reduced weight (compared to the solutions currently in use), the container mounted on a delivery vehicle chassis, increases the payload, reduces the cost of transport and CO2 emission.

Example of the subject of the invention is shown in the illustration, in which Fig. 1 shows the segment of a container chamber, Fig. 2 shows a two-segment transport container partially disassembled, and Fig. 3 shows alternative container set up, with a closing mechanism for reduced transfer of heat.

The chamber segment 1 shown in Fig. 1 has a tongue 4 around its entire perimeter on one end, with the height and width equal \( \frac{1}{2} \) of the segment wall thickness, and on the other end, groove 5 with identical dimensions as the tongue 4, whereby the tongues 4 are on the outside of the segment. The chamber segment 1 is fitted with four metallic sleeves 6, located in the corners of the chamber segment 1, intended for positioning the linking rod 8. The metallic spacing sleeves 6 are equal in length to the total length of the chamber segment 1, shorter by the height of the tongue 4. In the lower part, chamber segment 1 has a recess 9 to accommodate the bottom beam 13. To the first chamber segment 1, the front plate 2 is mounted as shown in Fig.2. The front plate 2 has the special groove 5B around the perimeter, and the front plate 2 has spacing sleeves 7 in the corners, with the length equal to the thickness of the front plate 2, through which the linking rods 8 are led. To the first segment of the chamber 1, enclosed with the front plate 2, the next three segments are
connected in such a manner that to the socket formed by the groove 5 of the front segment, the tongue 4 of the next chamber segment 1 is fitted. Linking rods 8 are let through the sleeves 6 of the chamber segment 1 and sleeves 7 of the front plate 2, with locking nuts screwed onto their threaded ends with a flange 19. The lock nuts with the flange 19 press the front plate 2 on one side to the chamber segments 1, and the last segment of the chamber 1 on the other side. However, as shown in fig. 2, the last chamber segment 1 is advantageously pressed with the metallic frame 20. The metallic frame 20 increases rigidity of the entire structure and allows easy installation of hinges and locking devices for the door plate 3.

Fig. 3 shows alternative closure solution of the last segment of the chamber 1. In this version, with the use of door plates 3 with a flange, thermal insulation was improved. The metallic frame 20 was not applied, and the last segment of the chamber is pressed directly with four nuts with flanges 19, which do not protrude outside the outline of the last segment of the chamber 1. The door plate 3 is composed of two identical parts with tongues. Both parts are permanently connected with the external hinge 10. The door plate 3 is connected permanently with the long hinge 11 with the upper beam 12 of the external frame. The upper beam 12 is located on the outside of the last top segment of the chamber 1 and connected to the lower beam 13 with linking rods 14. To the linking rods 14, side locks 15 are permanently fixed, in a form of an angle bar close in length to the height of the door plate 3. The side locks 15 are additionally provided with swinging arms 18 which, after swinging to horizontal position, increase the closing moment of the door plate 3. The engagement of swinging arms 18 with the corresponding tongues of the door plate 3 allow fixing the side locks 15 in position.

To hold the door plate 3 in a suspended position, the upper part of the plate 3 is permanently linked with the internal wall of the chamber 1 segment on both sides with gas shock absorbers 16. The container is provided with a floor protection plate 17, made of a material resistant to mechanical damage.
**Patent claims**

1. Transport and storage container made of thermo-insulating material with high mechanical strength and low heat transfer coefficient, with swinging doors and a set of locks for locking, characterised in that it has at least one chamber segment (1), front plate (2) and door plate (3), whereby the chamber segment (1) is in a form of a rectangular prism open on both opposite ends and has the tongue (4) on the perimeter of the first open end, and a recess forming the groove (5) on the perimeter of the other open end, the open end of the first chamber segment (1) is enclosed with the front plate (2), which is provided with the groove (5B) for fitting the tongue (4) of the first chamber segment (1), whereas the groove (5) of the open end of the first chamber segment (1) interlocks with the tongue (4) of the next segment, and the groove (5) of the last segment of the chamber (1) is closed with a foldable door plate (3) with the tongue (4B), the segments of the chamber (1) and the front plate (2) are joined together with the linking rods (8), which are placed in the spacing sleeves (6) of the chamber segment (1) and spacing sleeves (7) of the front plate (2).

2. Container according to Claim 1 characterised in that the linking rods (8) also intersect the metal frame (20), in which the hinges and locks of the front plate (3) are mounted.
3. Container according to Claim 1 characterised in that the last chamber segment (1) close to the door plate (3) has a frame mounted, composed of: the upper beam (12), lower beam (13) and linking rods (14), whereby the linking rods (14) are permanently joined with the side locks (15).
1. Transport and storage container made of foam thermo-insulating material, characterized in that it has at least one chamber segment (1), front plate (2) and foldable door plate (3), whereby the chamber segment (1) is in a form of a rectangular tube open on both opposite ends and has the tongue (4) on the perimeter of the first open end, and a recess forming the groove (5) on the perimeter of the other open end, the open end on the first chamber segment (1) is enclosed with the front plate (2), which is provided with the groove (5B) for fitting the tongue (4) of the first chamber segment (1), whereas the groove (5) of the open end of the first chamber segment (1) interlocks with the tongue (4) of the next chamber segment (1), and the groove (5) of the last chamber segment (1) is closed with a foldable door plate (3) with the tongue (4B), the chamber segments (1) of the container and the front plate (2) are joined together with the linking rods (8), which are placed in the spacing sleeves (6) of the chamber segment (1) and short spacing sleeves (7) of the front plate (2).

2. Container according to claim 1 characterized in that the linking rods (8) also intersect the metal frame (20), in which hinges and locks of the foldable door plate (3) are mounted.

3. Container according to claim 1 characterized in that the last chamber segment (1) close to the foldable door plate (3) has a frame mounted, composed of: the upper beam (12), lower beam (13) and vertical rods (14), whereby the vertical rods (14) are permanently joined with the side locks (15).
**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B65D21/08 B65D81/38 B65D43/22

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)
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practical, search terms used)
EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<td>FR 2 432 446 Al (ISOBOX BARBIER SA ISOBOX BARBIER SA [FR]) 29 February 1980 (1980-02-29) page 5, line 15 - page 6, line 28 figure 4</td>
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X Further documents are listed in the continuation of Box C. 

X 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 document 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

**Date of the actual completion of the international search**

23 March 2012

**Date of mailing of the international search report**

02/04/2012

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Authorized officer

Piolat, Olivier
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