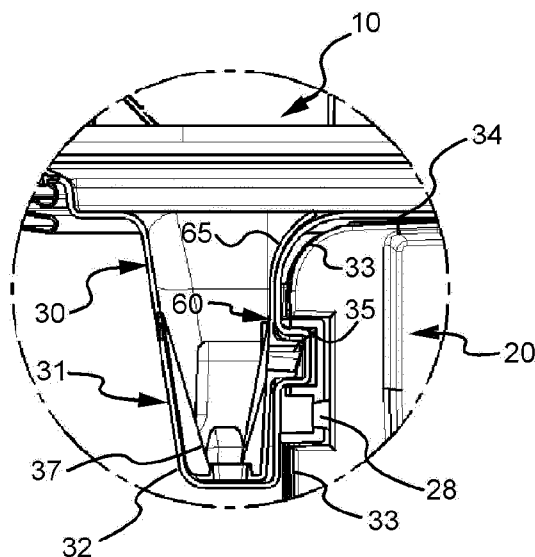




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[Continued on next page]

(54) Title: A COOLING DEVICE WITH REINFORCED LINER



FIGUR 4

(57) Abstract: Invention relates to a cooling device comprising a door (10) having an outer case (12) and an inner liner (30) attached to the outer case (12) at a distance wherein an expandable insulation material (14) is being filled; a support portion (32) protruding outwardly from the inner liner (30). A reinforcing member (60) is arranged inside the support portion so that minimizing contact of the insulation material (14) with an inner edge portion (33) of the support portion (32).



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SPECIFICATION

A COOLING DEVICE WITH REINFORCED LINER

5

TECHNICAL FIELD

The present invention relates to cooling devices whose one door is reinforced against deformation and particularly relates to cooling devices where a liner of the door is
10 reinforced against the insulation material pressure.

KNOWN STATE OF THE ART

The doors of cooling devices are obtained by the joining of an outer case and an inner
15 liner and by the filling of an expanding insulation material in between. In general, the inner liner is produced by the shaping of a thin plastic plate by means of thermoform or by means of a similar production method. On the inner liner, there is a support portion which projects outwardly and which generally extends downwardly in a parallel manner and in alignment with the two edges of the door. By means of the housings thereof, the support
20 portion carries the fixed shelves on the door.

In the cooling device door production, after the outer case and the inner liner are jointed, an insulation material like polyurethane, which is in expanding foam form, is filled into the space between the outer case and the inner liner. While the insulation material is
25 expanding inside the space, it applies pressure to the inner liner which is in the form of a thin plastic panel. In some constructions, this pressure leads to deformation in the inner liner.

In order to eliminate said problem, reinforcement members are placed inside the door. In
30 the patent US2007145874A1, a compartment member is provided which divides the support portion to at least two compartments, in order to provide support to the support portion on the cooling device door against the insulation material pressure. This compartment member is placed to the central middle part of the support portion. In this case, in the support portion which is divided into two parts, in the lower and upper

compartments, during solidifying of the insulation material, the shrinkage is vertical and the deformation in the door liner is prevented.

BRIEF DESCRIPTION OF THE INVENTION

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The object of the invention is to provide the rigidity of the cooling device doors.

Another object of the invention is to decrease the production cost of rigid cooling device door.

10

In order to realize the abovementioned objects, the present invention is a cooling device comprising a door having an outer case and an inner liner attached to the outer case at a distance wherein an expandable insulation material is being filled; a support portion protruding outwardly from the inner liner. In a preferred embodiment of the present invention, at least one reinforcing member is arranged inside the support portion so as to block movement of the insulation material against an inner edge portion of the support portion. In this case, while the insulation material expands and fills between the outer case and the inner liner, the insulation material is prevented from applying pressure to the inner edge portion, whose wall thickness is lower, on the inner liner and the insulation material is prevented from damaging said inner edge portion.

15

In a preferred embodiment of the present invention, the reinforcing member comprises at least one frame accommodated at the cavity of the support portion. The frame is fixed inside the cavity and in case the insulation material expands, the fixation of the reinforcing member can be realized in a simpler manner.

20

In a preferred embodiment of the present invention, the reinforcing member is essentially made of a plastic material. Thus, the reinforcing member has a low cost and at the same time, it can provide substantial resistance against the pressure of the expanding insulation material (for instance, polyurethane).

25

In a preferred embodiment of the present invention, the frame comprises a V-like cross-section of which two distal ends are in contact with the opposite lateral walls of the cavity.

In this case, the frame can be engaged to the cavity in a simple manner by applying pressure in the middle portion thereof.

5 In a preferred embodiment of the present invention, the reinforcing member comprises a snap portion mounted at a corresponding housing at the inner liner. In this case, the reinforcing member can be mounted to the inner liner in a simple manner.

10 In a preferred embodiment of the present invention, the support portion comprises at least one flap extending to the inner edge portion. The flap covers the inner edge portion and in case the insulation material expands, it blocks the access of the insulation material to the inner edge portion.

15 In a preferred embodiment of the present invention, form of the flap follows the form of the inner edge portion. Thus, the pressure of the insulation material applied on the flap is decreased because of the connection of the flap to the frame, and said pressure is distributed equally to the inner edge portion. This prevents the deformation of the support portion.

20 In a preferred embodiment of the present invention, the snap portion is arranged at the proximal end of the flap. Thus, in case the insulation material expands, this provides the compensation of the pressure of the insulation material on the flap in an easy manner.

25 In a preferred embodiment of the present invention, a guiding rail is mounted at the housing of the inner liner. The guide is mounted to the inner liner in a safe manner in a region without deformation and with a reinforcing member. In a preferred embodiment of the present invention, at least two opposite lateral walls of a shelf are movably attached to the guiding rail. Thus, a movable shelf is obtained in a safe region where there is no deformation in the support portion.

30 BRIEF DESCRIPTION OF THE FIGURES

The additional characteristics and the advantages of the subject matter invention can be obtained from the exemplary embodiments giving reference to the accompanied figures.

In Figure 1, the inner perspective view of a representative embodiment of a cooling device door with a liner and with the subject matter reinforcing member is given.

In Figure 2, the detailed zoomed view of part A illustrated in Figure 1 is given.

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In Figure 3, the top view of a representative embodiment of the subject matter is given.

In Figure 4, the detailed zoomed view of part B illustrated in Figure 2 is given.

10 In Figure 5, the perspective view of a representative embodiment of the subject matter reinforcing member is given.

THE DETAILED DESCRIPTION OF THE INVENTION

15 In Figure 1, the inner perspective view of cooling device door (10) is given. The door (10) has an outer case (12) and an inner liner (30) which peripherally joins with the outer case (12). On the mutual lateral portions of the inner liner (30), there is one each support portion (32) in protrusion form which extends orthogonally. The support portion (32) provides the shelves (20) to be mounted to the door (10) one above the other so as to
20 have a distance. On the part of the support portion (32) facing inwardly, a guiding rail (40) extends. In Figure 2, the shelves (20) and the guiding rail (40) are illustrated in detail. On a lateral wall (44) of the guiding rail (40), there are pluralities of openings (42) one above the other. The shelf (20) engages to the guiding rail (40) by means of a channel (26) opened on a lateral wall (22) so that said channel (26) faces outwardly. Since a button
25 (28), which exists on the shelf (20) lateral wall (22) and which can be accessed from outside, can be activated or deactivated by the placement of a locking member (not illustrated in the figure) to the opening (42) or by the removal of a locking member from the opening (42) respectively, said button (28) provides the shelf (20) to be placed to the opening (42) step in the vertical direction and thus provides the shelf (20) to have a
30 vertically adjustable position. The shelf (20) rests onto the support portion (32) and onto the main sheet (34) which is the liner's (30) wide surface extending transversely. The weight of the members to be placed to a base (24) of the shelf (20) and the own weight of the shelf (20) are transferred to the guiding rail (40) through the channel (26) and from here, these weights are transferred to the support portion (32). The part of the support

portion (32) where the stress distribution is most critical is the inner edge portion (33) where it connects to the main sheet (34) and where the inner liner (30) wall is thin.

In Figure 3, the top cross sectional view of the door (10) is given. The outer case (10) is made of metal material. The plastic inner liner (30) is fixed to the outer case (10) along the peripheral edges thereof. An expandable insulation material (14) fills between the inner liner (30) and the outer case (10). On an outer part (31) of the inner liner (30) facing outwardly, the support portion (32), which is formed by outward bending in a close manner to the lateral edges, has a tapering parallelogram cross section. In Figure 4, the zoomed view of the support portion (32) is given. A reinforcing member (60) is fixed inside a cavity (37) which is formed by the inner part of the support portion (32). The reinforcing member (60) is fixed to the support portion (32) through a fixation member (not illustrated in the figure) passing through a hole inside the bended portion (62) and through an opening (66) existing on the body in frame (61) form. The frame (61) length is close to the length of the portion where the guiding rail (40) will seat on the support portion (32). As illustrated in Figure 5, a protrusion (63) extends outwardly from the frame (61). There is a snap portion (64) on the protrusion (63). The snap portion (64) is obtained by the peripheral elongation of a hole. The snap portion (64) is mounted to the housing (35). There is a flap (65), which is in flat form, at the end of the protrusion (63). The flap (65) extends so as to cover the inner edge portion (33). The flap (65) extends in a parallel manner to the curved inner edge portion (33). The frame (61) is integrated to the flap (65). The flap (65) width is greater than the housing (35) width. Thus, after the insulation material (14) begins expanding between the outer case (12) and the inner liner (30), it prevents the insulation material (14) from approaching the region where the housing (35) exists in the support portion (32). In this case, while the insulation material (14) solidifies and shrinks, this does not affect the part of the inner liner (30) where the housing (35) exists. The frame (61) is so that the flap (65) engages to the inner edge portion (33). In case the inner edge portion (33) is in the form of a circle arc, the flap (65) structure is in the form of a circle arc following this. The frame (61) engages inside the cavity (37) by springing.

In different embodiments, inside the support portion (32), more than one frame (61) can be fixed onto one another in a distanced manner or in an adjacent manner.

REFERENCE NUMBERS

10 Door	36 Lateral wall
12 Outer case	37 Cavity
14 Insulation material	40 Guiding rail
20 Shelf	42 Opening
22 Lateral wall	44 Lateral wall
24 Base	50 Gasket
26 Channel	60 Reinforcing member
28 Button	61 Frame
30 Inner liner	62 Bended portion
31 Outer section	63 Protrusion
32 Support portion	64 Snap portion
33 Inner edge portion	65 Flap
34 Main sheet	66 Opening
35 Housing	

CLAIMS

1. A cooling device comprising a door (10) having an outer case (12) and an inner liner (30) attached to the outer case (12) at a distance wherein an expandable insulation material (14) is being filled; a support portion (32) protruding outwardly from the inner liner (30) characterized in that at least one reinforcing member (60) is arranged inside the support portion so as to block movement of the insulation material (14) against an inner edge portion (33) of the support portion (32).
2. A cooling device according to claim 1, wherein the reinforcing member (60) comprising at least one frame (61) accommodated at the cavity (37) of the support portion (32).
3. A cooling device according to claim 2, wherein the reinforcing member (60) is essentially made of a plastic material.
4. A cooling device according to claim 2-3, wherein the frame (62) is comprising a V-like cross-section of which two distal ends (67) are in contact with the opposite lateral walls (36) of the cavity (37).
5. A cooling device according to any one of the preceding claims, wherein the reinforcing member (60) comprising a snap portion (64) mounted at a corresponding housing (35) at the inner liner (30).
6. A cooling device according to any one of the preceding claims, wherein the support portion (32) comprising at least one flap (65) extending to the inner edge (33) portion.
7. A cooling device according to claim 6, wherein form of the flap (65) follows the form of the inner edge portion (33).
8. A cooling device according to claims 5-7, wherein the snap portion (64) is arranged at the proximal end of the flap (65).

9. A cooling device according to claim 5-8, wherein a guiding rail (40) is mounted at the housing (35) of the inner liner (30).
10. A cooling device according to claim 9, wherein at least two opposite lateral walls
5 (22) of a shelf (20) are movably attached to the guiding rail (40).

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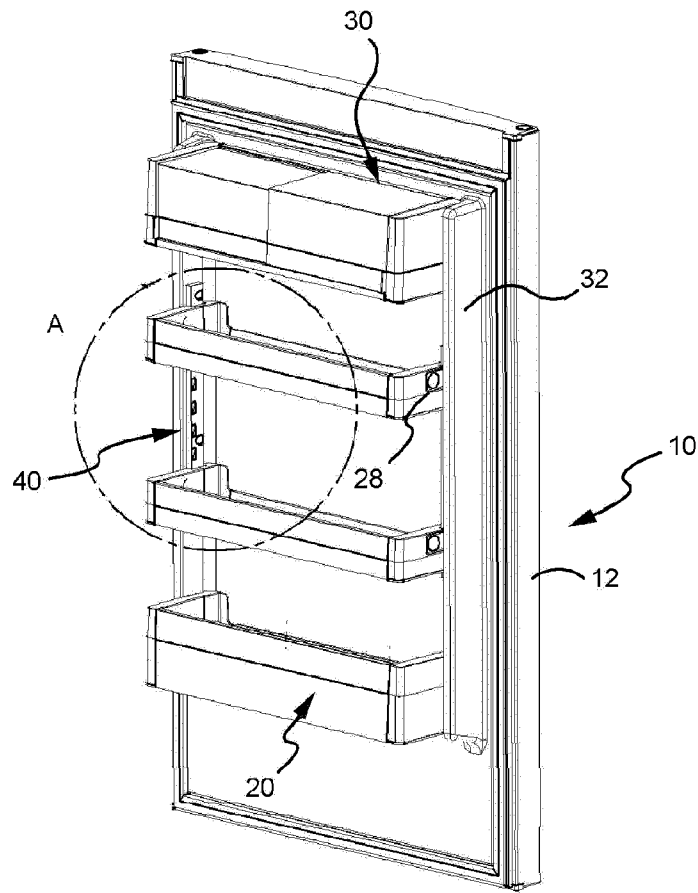


FIGURE 1

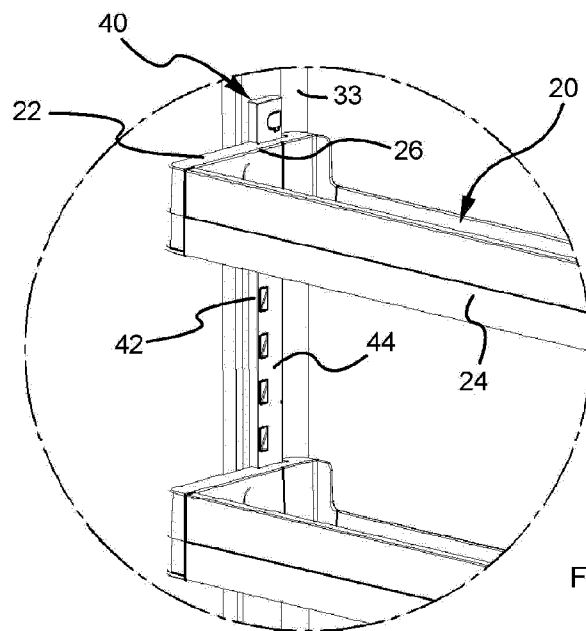


FIGURE 2

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