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(54) Insulated container and method for cooling cargo

Isolierter Behälter und Verfahren zur Kühlung von Fracht

Conteneur isolé et procédé de refroidissement d'une cargaison

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Description

[0001] The invention relates to an insulated container comprising side walls, a bottom wall, a top wall, a rear wall and a front wall, wherein the walls each comprise an inner face and outer face and an insulating layer of insulating material being located between the inner face and the outer face. The insulated container comprises further temperature control fluid distribution means for distributing temperature control fluid in the insulated container. Furthermore, the invention relates to a method for cooling cargo in an insulated container comprising sidewalls, a bottom wall, a top wall, a rear wall and a front wall, wherein the walls each comprise an inner face and an outer face and an insulating layer of insulating material, the insulated container further comprising temperature control fluid distribution means for distributing temperature control fluid in the insulated container, said method comprising the step of providing a temperature control fluid having a pre-defined temperature and/or humidity and providing a flow of said temperature control fluid inside the insulated container. The method and the container as cited above may be used for transportation of refrigerated or temperature-controlled cargo such as fresh fruit, flowers, fish or meat.

[0002] From EP 2 535 296 A1, an insulated container having sidewalls, a bottom wall, a top wall, a rear wall and a front wall is known. This known container is sized as an ISO freight container according to ISO 668 and has an appropriate thermal insulation. Furthermore, the container comprises an integral refrigeration unit for controlling the temperature inside the container. The temperature control of the goods to be transported with the insulated container is based on an air flow through the inner volume of the insulated container. The air is cooled by the refrigeration unit and flows through the volume of the container from the bottom to the top. Thus, cooled air is blown into the bottom wall of the insulated container, said bottom wall being provided with T-gratings.

[0003] There are several disadvantages to these known integral reefer containers. First, the cooling of the goods contained in the region opposite to the side where the refrigeration unit is located or the cooled air is introduced requires high energy input. Usually, the air speed at the door end or back wall is only 10 to 20 % of the air speed at the air guide inlet. Therefore, known containers need a high ventilation volume up to 6000 m^3/hour to compensate for this speed drop. Therefore, known containers have a very poor energy/effect ratio.

[0004] Furthermore, the open structure of the T-gratings and the uneven storage of the cargo inside the container create gaps between the cargo elements which constitute shortcuts for the blown air. Instead of passing through the goods, the air flows around the cargo elements directly back to the refrigeration unit. Thus, the cooling load of the blown air is not used efficiently. It has been shown that 83 % of the airflow lead to only 33 % of the cooling capacity whereas 17 % of the supplied airflow lead to 67 % of the cooling capacity.

[0005] Finally, the open structure of the T-gratings on the floor must be cleaned because it is in direct contact with the cargo. This is all the more important in the case that condensation occurs. However, the form of the T-gratings involves a difficult access to all areas of the floor with unreachable and uncontrollable cavities being difficult to be cleaned. Usually, the T-grating is made from extruded aluminum for structural purposes. Aluminum is in principle not desirable from a food safety point of view due to its ability to retain bacteria. From FR 2046306 an insulated container having the features of the preamble of claim 1 is known. EP 2 837 293 falling under Article 54(3) EPC discloses also a ripening chamber/container having some features of claim 1. It is an object of the invention to optimize the cooling effect on the cargo while reducing the amount of energy spent for cooling. Furthermore, it is an object of the invention to provide an insulated container and a method for cooling cargo with a better cooling performance in areas remote from the refrigeration unit and/or remote from the temperature control fluid input. Finally, it is an object of the invention to provide an insulated container that allows better hygienic performance.

[0006] The object of the invention is solved by an insulated container according to claim 1 and a method according to claim 12. According to the invention, an insulated container is disclosed comprising side walls, a bottom wall, a top wall, a rear wall and a front wall. The rear wall may comprise at least one door or gate such that the interior of the insulated container may be accessible in order to load or unload cargo. At the front wall, a refrigeration unit may be provided being adapted to provide a temperature control fluid having a predetermined temperature and/or humidity. Furthermore, the refrigeration unit may be adapted to control the air exchange rate between the interior of the insulated container and the surroundings.

[0007] While the invention is described by making reference to the exemplary embodiment of a temperature-controlled container, it should be clear that the invention may be used in conjunction with any cooled or air-conditioned room, in particular cold storage facilities.

[0008] The walls of the insulated container each comprise an inner face and an outer face and an insulating layer of insulating material. The insulating layer may comprise mineral wool, a rigid form or a vacuum insulation.

[0009] In some embodiments of the invention, the insulated container may comprise the size and/or the shape of an ISO freight container according to ISO 668.

[0010] The insulated container comprises temperature control fluid distribution means for distributing temperature control fluid in the interior of the insulated container. The temperature control fluid distribution means comprise at least two ducts being adapted to guide the temperature control fluid along the side walls of the container. If two ducts are present, one duct is used as a return duct to guide temperature control fluid from the interior volume of the container to the refrigeration unit. The other duct is used as a supply duct to guide temperature control fluid from the refrigeration unit to the interior volume of the container. In other embodiment of the invention, more than two ducts may be present, such that a plurality of supply ducts and/or a plurality of return ducts may be available to guide to the temperature control fluid inside the insulated container. These embodiments may allow for any of a more homogenous temperature distribution or faster cool down time.

[0011] The temperature control fluid may comprise a gas. In some embodiments of the invention, the gas may comprise ambient air. In other embodiments of the invention, the temperature control fluid may comprise a protective gas such as nitrogen or argon to a avoid ripening or oxidizing of the cargo inside the insulated container. In some embodiments of the invention, the temperature control fluid is heated or cooled to a predefined temperature by the refrigeration unit. In some embodiments of the invention, the temperature control fluid may be is loaded or unloaded with a predefined humidity by the refrigeration unit.

[0012] The at least two ducts each comprise at least one orifice or nozzle being adapted to allow a flow of temperature control fluid from one side wall of the container to the other side wall of the container. This feature has a plurality of advantages over known designs. Known containers use a flow from the bottom to the top of the container. Therefore, the container according to the invention has no need of a T-grating on the floor. Thus, no unreachable and uncontrollable cavities are present which are difficult to be cleaned.

[0013] Furthermore, the flow resistance of the temperature control fluid is only little affected by the amount of cargo present inside the insulated container. In known concepts, the flow of temperature control fluid from the T-grating to the interior volume is impeded by the cargo standing on the floor. This means, that a higher amount of cargo constraining a larger subsurface of the inner face of the bottom wall will lead to a lower flow of temperature control fluid and/or to an unwanted flow distribution. According to the invention, a flow from one side wall to the other side wall approximately perpendicular to the length of the insulated container is used which can easily penetrate the cargo stowed in crates or cradles.

[0014] Finally, the width of the insulated container between the side walls is usually smaller than the length or the height so that this shorter temperature control fluid flow can be easily controlled and the cooling capacity is used more efficiently.

[0015] In some embodiments of the invention, the insulated container or the room comprises, further an inflatable elastic bag being arranged on any of the top wall and/or the rear wall and/or the front wall and/or at least one side wall.

[0016] In some embodiments of the invention, said method comprises the step of providing an inflatable elastic bag on any of the top wall and/or the rear wall and/or the front wall and/or at least one side wall.

[0017] In the invention, the insulated container or the room further comprises a sealing element being attached to each of the side walls.

[0018] In some embodiments of the invention, at least one upper duct is located at the intersection of the side wall and the top wall. In some embodiments at least one lower duct is located at the intersection of the side wall and a bottom wall. In the corners of the insulated container, the upper and lower ducts are protected from mechanical damage.

[0019] In some embodiments of the invention, at least one orifice is formed by a gap between the inner face of a side wall of the insulated container and the boundary of the duct. This feature will result in the temperature control fluid flow originating from the orifice flowing approximately parallel to the side wall. This will result in a high pressure at the side wall located at the at least one supply duct and a displacement flow will be build out towards the opposite side wall. At the opposite side wall, at least one return duct is arranged which results in a low pressure area adjacent to this side wall so that a flow parallel to the sidewall in direction to the return duct is formed.

[0020] In some embodiments of the invention, the orifice may include a baffle. Such a baffle may be used to guide the temperature control fluid in a predefined direction. Furthermore, the baffle may be used to protect the orifice from dust or dirt entering the ducts.

[0021] In some embodiments, the baffle adjacent to a lower duct is designed to overlap the height of a freight pallet. In some embodiments, the baffle adjacent to an upper duct overlaps the maximum loading line. This feature has the advantage, that a parasitic temperature control fluid flow on top of the cargo or below the freight pallet is avoided so that a larger portion of the temperature control fluid is flowing through the cargo. The insulated container comprises further at least one sealing element being attached to each of the sidewalls. The sealing element will help avoiding parasitic temperature control fluid flows below the freight pallet so that the temperature control fluid flow is restricted to the cargo, thereby improving the use of the cooling capacity.

[0022] In some embodiments of the invention, the sealing element comprises a brush seal. A brush seal has low wear and is self-adjusting to different gap sizes between the side wall and the cargo.

[0023] In some embodiments, the sealing element is arranged at a distance from approximately 10 cm to approximately 20 cm from the inner face of the bottom wall. As a known pallet has usually a height of 15 cm, the sealing element will help to make a tight seal between the side wall and the freight pallet so that an unwanted and useless flow of temperature control fluid under the freight pallet can be avoided.

[0024] In some embodiments, the insulated container may comprise an inflatable elastic bag being arranged on any of the top wall and/or the rear wall and/or the front wall. Such an elastic bag can be in smooth contact with the cargo when inflated so that a tight seal between the cargo and the respective wall is made. This may avoid parasitic flows of the temperature control fluid around a block of cargo so that the cooling capacity is not only used at the outer surfaces of the cargo, but inside the cargo volume.

[0025] In some embodiments, the elastic bag is adapted to be filled with temperature control fluid. This allows the fully automatic operation of the elastic bag as the bag inflates automatically when the refrigeration unit is switched on and the flow of temperature control fluid forms inside the insulated container builds up. Additionally, this allows the elastic bag to provide radiant cooling when being filled with temperature control fluid at a controlled temperature.

[0026] In some embodiments, the insulated container may comprise further a groove in any of the top wall and/or the rear wall and/or the front wall, said groove being adapted to receive the elastic bag when being deflated. The elastic bag is protected inside the groove when not in use so that a damage during cargo handling may be avoided.

[0027] In some embodiments of the invention, the insulated container may comprise further at least one closed channel running in the bottom wall and/or the top wall. Temperature control fluid may be guided through these closed channels so that a temperature exchange between the cargo and the temperature control fluid by radiant heat becomes possible. As the channel running in the bottom wall is a closed channel, the entrance of dirt and ingress is impossible and other than known T-grates, the channel does not need frequent cleaning.

[0028] In some embodiments of the invention, the container comprises further at least one closed channel running in the rear wall or in the side wall(s) in the proximity of the door end. In some embodiments, the closed channel running in the bottom wall connects to at least one closed channel running in the top wall by means of the closed channel running in the rear wall. Thus, a single closed flow path may be provided from the top wall through the rear wall to the bottom wall.

[0029] In some embodiments of the invention, any of the inner faces of the bottom wall and/or the rear wall and/or the top wall are flat. This allows for easy cleaning of the interior volume so that the hygienic performance of the insulated container is improved.

[0030] The invention will be explained in greater detail on the basis of the attached drawings wherein

Fig. 1 shows a cross-sectional view of an empty container according to the invention.

Fig. 2 shows a cross-sectional view of an insulated container according to the invention with cargo.

Fig. 3 shows an upper duct in greater detail.

Fig. 4 shows the top wall of Fig. 2 in greater detail.

Fig. 5 shows an upper supply duct in greater detail.

Fig. 6 shows an upper return duct in greater detail.

Fig. 7 shows a lower supply duct in greater detail.

Fig. 8 shows a lower return duct in greater detail.

[0031] Fig. 1 shows a cross-sectional view of an insulated container 100. The insulated container 100 comprises a first side wall 110 and a second side wall 120. Furthermore, the container comprises a bottom wall 130 and a top wall 140. A rear wall and a front wall are not shown in Fig. 1. Each wall comprises an inner face 112, 122, 132 and 142 respectively. The inner faces of the walls delimit an interior volume 101.

[0032] Additionally, each wall comprises an outer face 111, 121, 131 and 141. Between the inner faces 112, 122, 132 and 142 and the outer faces 111, 121, 131 and 141, an insulating layer 150 of insulating material is present. The insulating material may be selected from any of mineral wool and/or rigid form and/or a vacuum insulation in some embodiments of the invention. The insulated container may have a width, a length and a height of a standardized ISO freight container.

[0033] At the bottom wall 130, feet 102 may be provided to allow easy handling of the insulated container by a fork lift.

[0034] The insulated container 100 comprises temperature control fluid distribution means 103. The temperature control fluid distribution means 103 comprise ducts 165, 175, 185 and 195 which are arranged in each corner of the interior volume 101. As can be best seen from Fig. 3, each temperature control fluid distribution means 103 comprises further an orifice 164 which is delimited against the interior volume 101 by means of a baffle 160. The baffle 160 may allow guidance of the flow emerging from the orifice 164 so that the temperature control fluid flows along the inner face 112 of the side wall 110.

[0035] Additionally, closed channels 105 are arranged on the inner face 142 of the top wall and the inner face 132 of the bottom wall 130 of the insulated container 100. Temperature control fluid flowing inside the closed channels 105 may allow cooling down the bottom and the ceiling of the insulated container so that radiant heat from the cargo may be removed from the insulated container 100.

[0036] In some embodiments of the invention, cargo such as bananas may be cooled down rapidly by providing a first flow of temperature control fluid penetrating the cargo by means of the temperature control fluid distribution means 103. After the cargo has reached its target temperature, the first flow of temperature control fluid may be stopped. Cooling power for steady state temperature control may be provided by circulating a second flow of temperature control fluid through closed channels

105. This method has the advantage that the cargo may not dry out as no first flow of temperature control fluid carrying humidity out of the interior 101 of container 100 has to be maintained fo prolonged periods of transportation.

[0037] Fig. 2 shows a container as detailed in Fig. 1 loaded with cargo 25. The cargo 25 is arranged on freight pallets 20. The container 100 may be loaded and unloaded in a known manner by means of a fork lift. As can be seen from Fig. 2, the seal 30 being arranged on the side walls 110 and 120 seals the freight pallet against the side walls so that an unwanted flow of temperature control fluid from one side to the other side under the cargo 25 is avoided.

[0038] Fig. 1 and Fig. 3 show an inflatable bag 35 being arranged on the top wall of the container 100. The inflatable bag 35 can be received in a groove 36 when deflated. Thus, damage of the inflatable bag 35 during loading and unloading of the container 100 can be avoided. Fig. 2 and Fig. 4 show the inflatable bag 35 during operation of the container 100. The inflatable bag 35 may be inflated with temperature control fluid so that a seal is provided between the cargo 25 and the inner face 142 of the top wall 140, thereby avoiding an unwanted flow of temperature control fluid over the cargo 25.

[0039] Fig. 2, Fig. 4, Fig. 5, Fig. 6, Fig. 7 and Fig. 8 explain the flow of temperature control fluid during operation of the container in greater detail. In the exemplary embodiment shown, two supply ducts 165 and 185 are provided adjacent to the first side wall 110 and two return ducts 175 and 195 are provided adjacent to the second side wall 120. Temperature control fluid enters the container close to the first side wall 110 by means of the supply ducts 165 and 185 and the orifice 164 and 184. The temperature control fluid is guided by the baffles 160 and 180 along the inner face 112 of the first side wall 110.

[0040] From the first side wall 110, the temperature control fluid enters the cargo 25 and flows to the second side wall 120. On its way, the temperature control fluid exchanges heat and/or humidity with the cargo 25. The cargo 25 may be arranged in crates or other appropriate packaging material and form in order to allow the passage of the temperature control fluid therethrough.

[0041] Close to the inner face 122 of the second side wall 120, the temperature control fluid flow is bent towards the intersection of the bottom wall and the side wall and the intersection of the top wall and the side wall. The temperature control fluid flows along the second side wall 122 and is sucked by the orifice 174 and 194 in the return ducts 175 and 195. Optional baffles 170 and 190 are provided to guide the flow along the inner face 122 of the second side wall 120. The temperature control fluid is then guided by the return ducts 175 and 195 to the refrigeration unit. The refrigeration unit will bring the temperature control fluid to a predetermined composition and/or temperature and/or humidity before the temperature control fluid will enter the container 100 again by means of the supply ducts 165 and 185.

[0042] While the invention has been described in terms of several embodiments, those skilled in the art will recognize that the invention is not limited to the embodiments described, but can be practiced with modification and alteration within the scope of the appended claims. The description is thus to be regarded as illustrative instead of limiting. Therefore, it is intended that this invention be limited only by the claims.

Claims

1. Insulated container (100) or room comprising side walls (110, 120), a bottom wall (130), a top wall (140), a rear wall and a front wall, wherein the walls each comprise an inner face (112, 122, 132, 142) and an outer face (111, 121, 131, 141) and an insulating layer (150) of insulating material being located between the inner face (112, 122, 132, 142) and the outer face (111, 121, 131, 141), the insulated container or the room further comprising temperature control fluid distribution means (103) for distributing temperature control fluid inside the insulated container (100) or room,
wherein the temperature control fluid distribution means (103) comprise at least two ducts (165, 175, 185, 195) being adapted to guide the temperature control fluid along the side walls (110, 120) and having each at least one orifice (164, 174, 184, 194) being adapted to allow a flow (40) of temperature control fluid from one side wall (110) of the container (100) or room to the other side wall (120) of the container (100) or room, **characterised in that** the container or room comprises further a sealing element (30) being attached to each side wall (110, 120), adapted to avoid temperature control fluid flows below a freight pallet.

2. Insulated container according to claim 1, wherein at least one upper duct (165, 175) is located at the intersection of a sidewall (110, 120) and the top wall (140) and/or wherein at least one lower duct (185, 195) is located at the intersection of a sidewall (110, 120) and the bottom wall (130).

3. Insulated container according to claim 1 or 2, wherein at least one orifice (164, 174, 184, 194) is formed by a gap between the inner face (112, 122) of a sidewall (110, 120) and a boundary of the duct (165, 175, 185, 195).

4. Insulated container according to any of claims 1 to 3, wherein the at least one orifice (164, 174, 184, 194) includes a baffle (160, 170, 180, 190).

5. Insulated container according to any of claims 1 to 4, wherein the sealing element (30) comprises a brush seal and/or wherein the sealing element (30)

is arranged at a distance from 10 cm to 20 cm from the inner face (132) of the bottom wall (130).

6. Insulated container according to any of claims 1 to 5, comprising further an inflatable elastic bag (35) being arranged on any of the top wall (140) and/or the rear wall and/or the front wall.

7. Insulated container according claim 6, wherein the elastic bag (35) is adapted to be filled by temperature control fluid.

8. Insulated container according to any of claims 6 or 7, comprising further a groove (36) in any of the top wall (140) and/or the rear wall and/or the front wall, said groove (36) being adapted to receive the elastic bag (35) when being deflated.

9. Insulated container (1) according to any of claims 1 to 7, comprising further at least one closed channel (105) running in the bottom wall (130) and/or comprising further at least one closed channel (105) running in the top wall (140) and/or comprising further at least one closed channel running in the rear wall.

10. Insulated container according to claim 9, wherein said closed channel (105) running in the bottom wall (130) connects to said at least one closed channel (105) running in the top wall (140) by means of said at least one closed channel running in the rear wall.

11. Insulated container according to any of claims 9 or 10, wherein any of the inner faces (132, 142) of the bottom wall (130) and/or the rear wall and/or the top wall (140) are flat and/or wherein said at least one closed channels (105) running in any of the bottom wall (130) and/or the rear wall and/or the top wall (140) are sealed against the interior volume (101) of the container.

12. Method for cooling cargo (25) in an insulated container (100) comprising side walls (110, 120), a bottom wall (130), a top wall (140), a rear wall and a front wall, wherein the walls each comprise an inner face (111, 121, 131, 141) and an outer face (112, 122, 132, 142) and an insulating layer (150) of insulating material being located between the inner face (112, 122, 132, 142) and the outer face (111, 121, 131, 141), the insulated container further comprising temperature control fluid distribution means (103) for distributing temperature control fluid in the insulated container (100), said method comprising the following steps:

- Providing a temperature control fluid having a predefined temperature and/or humidity, and
- Providing a flow of said temperature control fluid originating from one side wall (110) to the opposing side wall (120), wherein temperature control fluid flows below a freight pallet are avoided by means of at least one sealing element (30) being attached to each side wall (110, 120).

13. Method according to claim 12, wherein a predefined temperature of any of the bottom wall (130) and/or the top wall (140) and/or the rear wall is maintained by means of a temperature control fluid flowing in at least one closed channel (105) being located in any of the bottom wall (130) and/or the top wall (140) and/or the rear wall.

Patentansprüche

1. Isolierter Behälter (100) oder Raum, umfassend Seitenwände (110, 120), eine untere Wand (130), eine obere Wand (140), eine rückwärtige Wand und eine vordere Wand, wobei die Wände jeweils eine Innenfläche (112, 122, 132, 142) und eine Außenfläche (111, 121, 131, 141) sowie eine isolierende Schicht (150) aus isolierendem Material umfassen, die sich wischen der Innenfläche (112, 122, 132, 142) und der Außenfläche (111, 121, 131, 141) befindet, wobei der isolierte Behälter oder der Raum weiter ein Temperatursteuerfluidverteilungsmittel (103) zum Verteilen des Temperatursteuerfluids im Inneren des isolierten Behälters (100) oder Raums umfasst, wobei das Temperatursteuerfluidverteilungsmittel (103) mindestens zwei Leitungen (165, 175, 185, 195) umfasst, die so angepasst sind, dass sie das Temperatursteuerfluid entlang der Seitenwände (110, 120) führen und jeweils mindestens eine Öffnung (164, 174, 184, 194) aufweisen, die so angepasst ist, dass sie einen Strom (40) des Temperatursteuerfluids von einer Seitenwand (110) des Behälters (100) oder Raums zur anderen Seitenwand (120) des Behälters (100) oder Raums zulassen,
dadurch gekennzeichnet, dass der Behälter oder Raum weiter ein Dichtelement (30) umfasst, das an jeder Seitenwand (110, 120) angebracht und so angepasst ist, dass verhindert wird, dass ein Temperatursteuerfluid unter einer Frachtpalette strömt.

2. Isolierter Behälter nach Anspruch 1, wobei sich mindestens eine obere Leitung (165, 175) an der Schnittstelle einer Seitenrand (110, 120) und der oberen Wand (140) befindet und/oder wobei sich mindestens eine untere Leitung (185, 195) am Kreuzungspunkt einer Seitenwand (110, 120) und der unteren Wand (130) befindet.

3. Isolierter Behälter nach Anspruch 1 oder 2, wobei mindestens eine Öffnung (164, 174, 184, 194) durch einen Spalt zwischen der Innenfläche (112, 122) einer Seitenwand (110, 120) und einer Begrenzung der Leitung (165, 175, 185, 195) ausgebildet ist.

4. Isolierter Behälter nach einem der Ansprüche 1 bis 3, wobei die mindestens eine Öffnung (164, 174, 184, 194) eine Ablenkplatte (160, 170, 180, 190) aufweiset.

5. Isolierter Behälter nach einem der Ansprüche 1 bis 4, wobei das Dichtelement (30) eine Bürstendichtung umfasst und/oder wobei das Dichtelement (30) in einem Abstand von 10 cm bis 20 cm von der Innenfläche (132) der unteren Wand (130) angeordnet ist.

6. Isolierter Behälter nach einem der Ansprüche 1 bis 5, weiter umfassend einen aufblasbaren elastischen Beutel (35), der an der oberen Wand (140) und/oder der rückwärtige Wand und/oder der vorderen Wand angeordnet ist.

7. Isolierter Behälter nach Anspruch 6, wobei der elastische Beutel (35) so angepasst ist, dass er durch das Temperatursteuerfluid gefüllt wird.

8. Isolierter Behälter nach einem der Ansprüche 6 oder 7, weiter umfassend eine Nut (36) in der oberen Wand (140) und/oder der rückwärtige Wand und/oder der vorderen Wand, wobei die Nut (36) so angepasst ist, dass sie den elastischen Beutel (35) aufnimmt, wenn er entleert wird.

9. Isolierter Behälter (1) nach einem der Ansprüche 1 bis 7, weiter umfassend mindestens einen geschlossenen Kanal (105), der in der unteren Wand (130) verläuft, und/oder weiter umfassend mindestens einen geschlossenen Kanal (105), der in der oberen Wand (140) verläuft, und/oder weiter umfassend mindestens einen geschlossenen Kanal, der in der rückwärtigen Wand verläuft.

10. Isolierter Behälter nach Anspruch 9, wobei der geschlossene Kanal (105), der in der unteren Wand (130) verläuft, mit dem mindestens einen geschlossenen Kanal (105), der in der oberen Wand (140) verläuft, mittels des mindestens einen geschlossenen Kanals verbunden ist, der in der rückwärtigen Wand verläuft.

11. Isolierter Behälter nach einem der Ansprüche 9 oder 10, wobei die Innenflächen (132, 142) der unteren Wand (130) und/oder der rückwärtigen Wand und/oder der oberen Wand (140) flach sind und/oder wobei die mindestens einen geschlossenen Kanäle (105), die in der unteren Wand (130) und/oder der rückwärtigen Wand und/oder der oberen Wand (140) verlaufen, gegenüber dem Innenraumvolumen (101) des Behälters abgedichtet sind.

12. Verfahren zum Kühlen von Ladung (25) in einem isolierten Behälter (100), umfassend Seitenwände (110, 120), eine untere Wand (130), eine obere Wand (140), eine rückwärtige Wand und eine vordere Wand, wobei die Wände jeweils eine Innenfläche (111, 121, 131, 141) und eine Außenfläche (112, 122, 132, 142) sowie eine isolierende Schicht (150) aus isolierendem Material umfassen, die sich wischen der Innenfläche (112, 122, 132, 142) und der Außenfläche (111, 121, 131, 141) befindet, wobei der isolierte Behälter weiter das Temperatursteuerfluidverteilungsmittel (103) zum Verteilen des Temperatursteuerfluids im isolierten Behälter (100) umfasst, wobei das Verfahren die folgenden Schritte umfasst:

- Vorsehen eines Temperatursteuerfluids, das eine vorgegebene Temperatur und/oder Feuchtigkeit aufweiset, und
- Vorsehen eines Stroms des Temperatursteuerfluids, der von einer Seitenwand (110 ausgeht und zur gegenüberliegenden Seitenwand (120) verläuft, wobei Temperatursteuerfluidströme unter einer Frachtpalette mittels mindestens eines Dichtelements (30) vermieden werden, das an jeder Seitenrand (110, 120) angebracht ist.

13. Verfahren nach Anspruch 12, wobei eine vorgegebene Temperatur der unteren Wand (130) und/oder der oberen Wand (140) und/oder der rückwärtigen Wand mittels eines Temperatursteuerfluids aufrechterhalten wird, das in mindestens einem geschlossenen Kanal (105) strömt, der sich in der unteren Wand (130) und/oder der oberen Wand (140) und/oder der rückwärtigen Wand befindet.

Revendications

1. Conteneur (100) ou compartiment isolé comprenant des parois latérales (110, 120), une paroi inférieure (130), une paroi supérieure (140), une paroi arrière et une paroi avant, dans lequel les parois comprennent chacune une face intérieure (112, 122, 132, 142) et une face extérieure (111, 121, 131, 141) et une couche isolante (150) en matériau isolant qui est placée entre la face intérieure (112, 122, 132, 142) et la face extérieure (111, 121, 131, 141), le conteneur ou le compartiment isolé comprenant un moyen de distribution (103) pour un fluide de commande de température destiné à distribuer un fluide de commande de température à l'intérieur du conteneur (100) ou du compartiment isolé,
dans lequel le moyen de distribution (103) pour fluide de commande de température comprend au moins deux conduits (165, 175, 185, 195) qui sont adaptés pour guider le fluide de commande de température le long des parois latérales (110, 120) et ayant cha-

cun au moins un orifice (164, 174, 184, 194) qui est adapté pour permettre un écoulement (40) du fluide de commande de température depuis une paroi latérale (110) du conteneur (100) ou du compartiment vers l'autre paroi latérale (120) du conteneur (100) ou du compartiment,

caractérisé en ce que

le conteneur ou le compartiment comprend en outre un élément d'étanchement (30) qui est attaché à chaque paroi latérale (120, 110), adapté pour éviter un écoulement de fluide de commande de température au-dessous d'une palette de fret.

2. Conteneur isolant selon la revendication 1, dans lequel au moins un conduit supérieur (165, 175) est situé à l'intersection d'une paroi latérale (110, 120) et de la paroi supérieure (140) et/ou dans lequel au moins un conduit inférieur (185, 195) est situé à l'intersection d'une paroi latérale (110, 120) et de la paroi inférieure (130).

3. Conteneur isolé selon la revendication 1 ou 2, dans lequel au moins un orifice (164, 174, 184, 194) est formé par un intervalle entre la face intérieure (112, 122) d'une paroi latérale (110, 120) et une frontière du conduit (165, 175, 185, 195).

4. Conteneur isolé selon l'une quelconque des revendications 1 à 3, dans lequel ledit au moins un orifice (164, 174, 184, 194) inclut un déflecteur (160, 170, 180, 190).

5. Conteneur isolé selon l'une quelconque des revendications 1 à 4, dans lequel l'élément d'étanchéité (30) comprend un joint à brosse et/ou dans lequel l'élément d'étanchéité (30) est agencé à une distance de 10 cm à 20 cm depuis la face intérieure (132) de la paroi inférieure (130).

6. Conteneur isolé selon l'une quelconque des revendications 1 à 5, comprenant en outre un sac élastique gonflable (35) qui est agencé sur une paroi quelconque parmi la paroi supérieure (140) et/ou la paroi arrière et/ou la paroi avant.

7. Conteneur isolé selon la revendication 6, dans lequel le sac élastique (35) est adapté pour être rempli par le fluide de commande de température.

8. Conteneur isolé selon l'une quelconque des revendications 6 ou 7, comprenant en outre une gorge (36) dans une paroi quelconque parmi la paroi supérieure (140) et/ou la paroi arrière et/ou la paroi avant, ladite gorge (36) étant adapté pour recevoir le sac élastique (35) lorsqu'il est dégonflé.

9. Conteneur isolé (1) selon l'une quelconque des revendications 1 à 7, comprenant en outre au moins un canal fermé (105) circulant dans la paroi inférieure (130) et/ou comprenant en outre au moins un canal fermé (105) circulant dans la paroi supérieure (140), et/ou comprenant en outre au moins un canal fermé circulant dans la paroi arrière.

10. Conteneur isolé selon la revendication 9, dans lequel ledit canal fermé (105) qui circule dans la paroi inférieure (130) est connecté audit au moins un canal fermé (105) qui circule dans la paroi supérieure (140) au moyen dudit au moins un canal fermé circulant dans la paroi arrière.

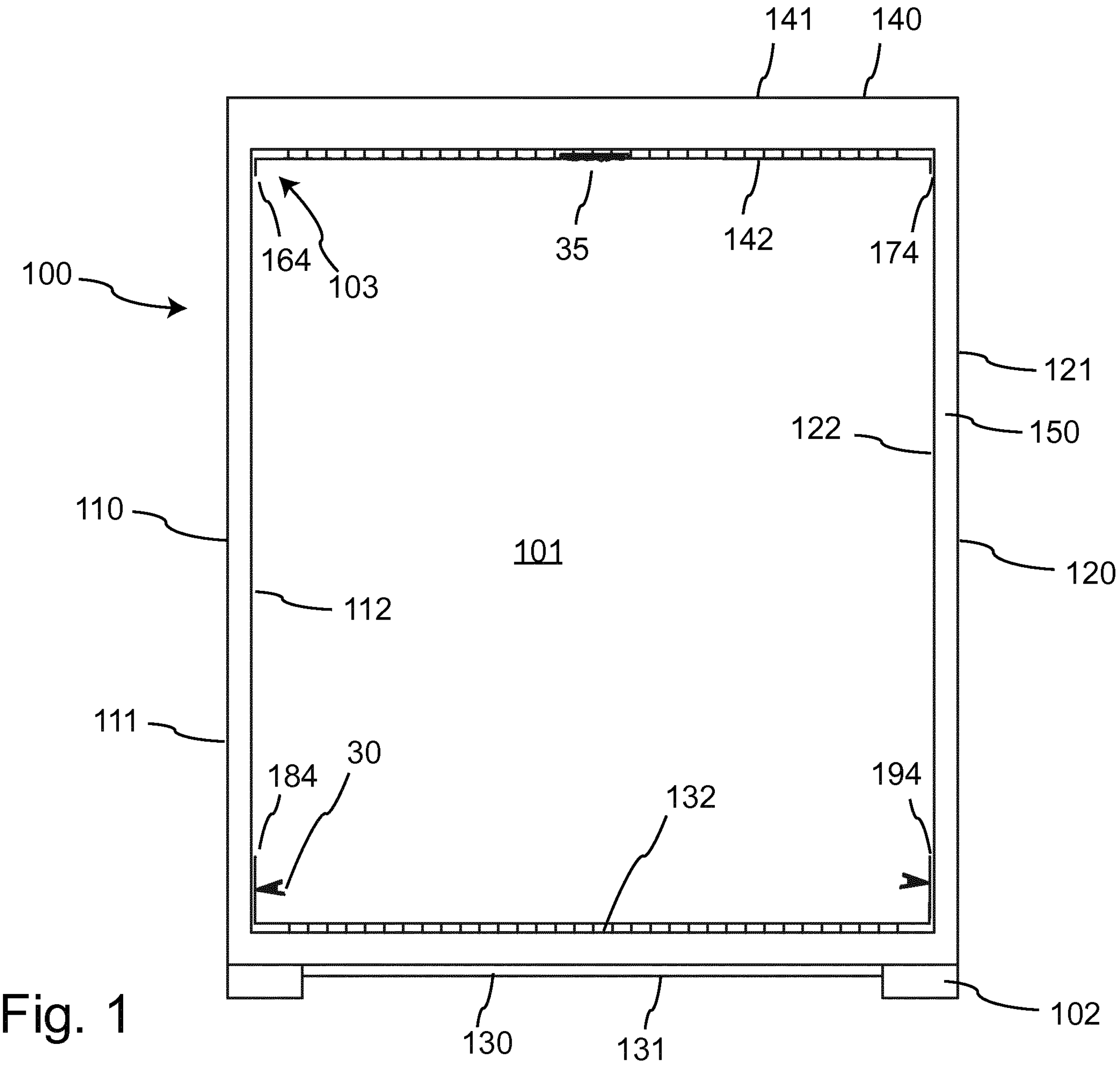
11. Conteneur isolé selon l'une quelconque des revendications 9 ou 10, dans lequel l'une quelconque des faces intérieures (132, 142) de la paroi inférieure (130) et/ou de la paroi arrière et/ou de la paroi supérieure (140) est plane et/ou dans lequel ledit au moins un canal fermé (105) circulant dans une paroi quelconque parmi la paroi inférieure (130) et/ou la paroi arrière et/ou la paroi supérieure (140) et isolé à l'encontre du volume intérieur (101) du conteneur.

12. Procédé pour refroidir du fret (25) dans un conteneur isolé (100) comprenant des parois latérales (110, 120), une paroi inférieure (130), une paroi supérieure (140), une paroi arrière et une paroi avant, dans lequel les parois comprennent chacune une face intérieure (111, 121, 131, 141) et une face extérieure (112, 122, 132, 142), et une couche isolante (150) en matériau isolant qui est située entre la face intérieure (112, 122, 132, 142) et la face extérieure (111, 121, 131, 141), le conteneur isolé comprenant en outre un moyen de distribution (103) pour un fluide de commande de température destiné à distribuer un fluide de commande de température dans le conteneur isolé (100), ledit procédé comprenant les étapes suivantes consistant à :

- fournir un fluide de commande de température ayant une température et/ou une humidité prédéfinie, et
- fournir un flux dudit fluide de commande de température qui prend son origine depuis une paroi latérale (110) vers la paroi latérale opposée (120), dans lequel des écoulements de fluide de commande de température au-dessous d'une palette de fret sont évités au moyen d'au moins un élément d'étanchéité (30) qui est attaché à chaque paroi latérale (110, 120).

13. Procédé selon la revendication 12, dans lequel une température prédéfinie d'une paroi quelconque parmi la paroi inférieure (130) et/ou la paroi supérieure (140) et/ou la paroi arrière est maintenue au moyen d'un fluide de commande de température qui s'écoule dans au moins un canal fermé (100) qui est situé dans une paroi quelconque parmi la paroi inférieure

(130) et/ou la paroi supérieure (140) et/ou la paroi arrière.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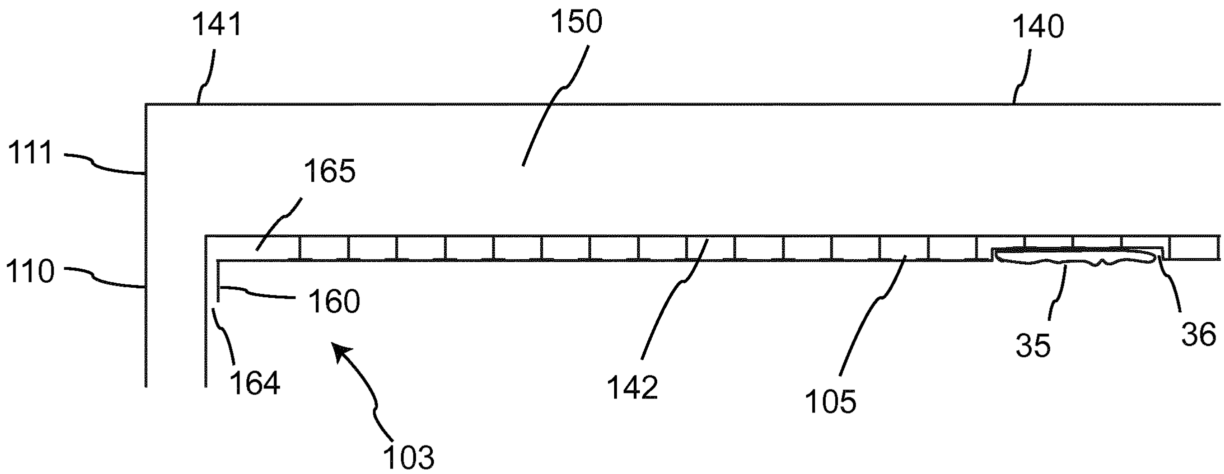
194
130
131
102

Fig. 1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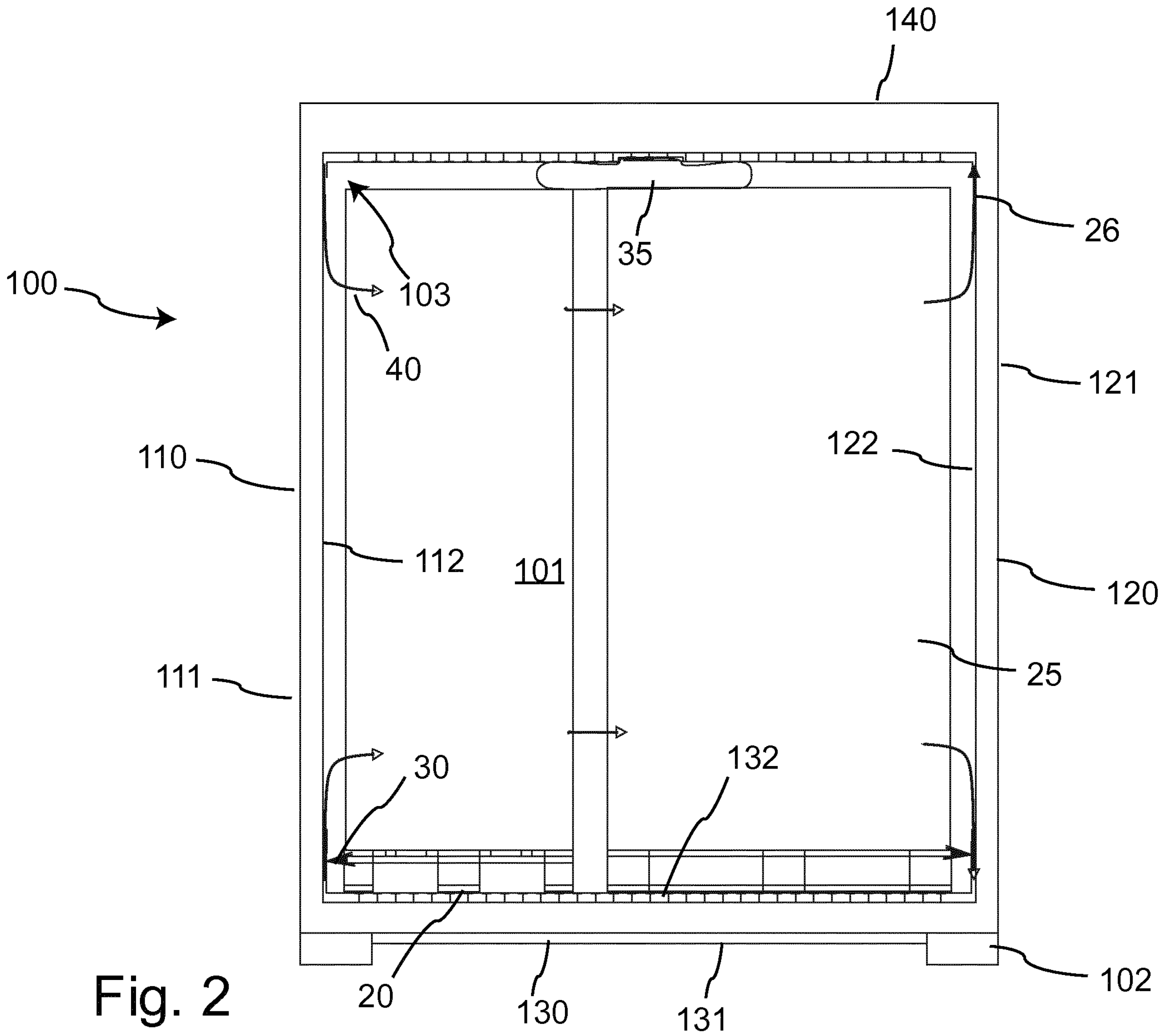
103

Fig. 3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112
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120
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132
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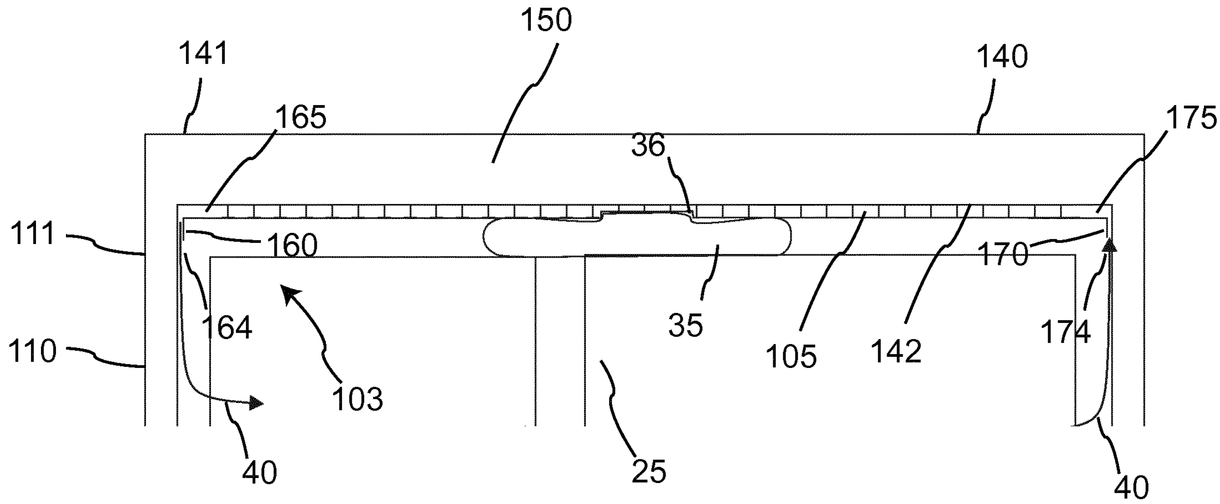
20
130
131

Fig. 2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170
164
35
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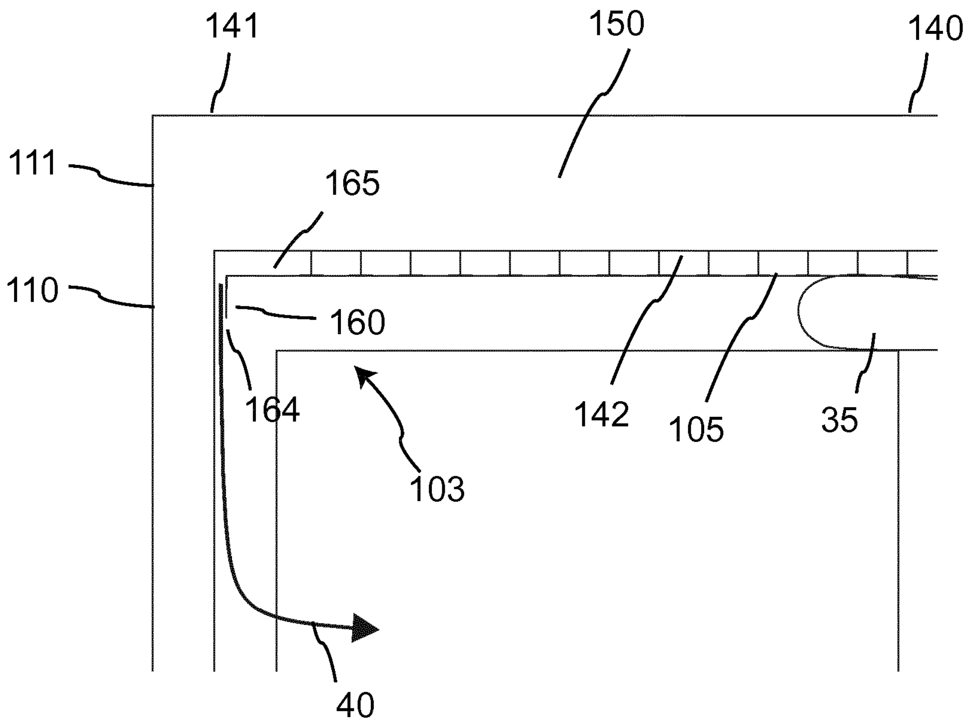
103
40
25
40

Fig. 4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35
103
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Fig. 5

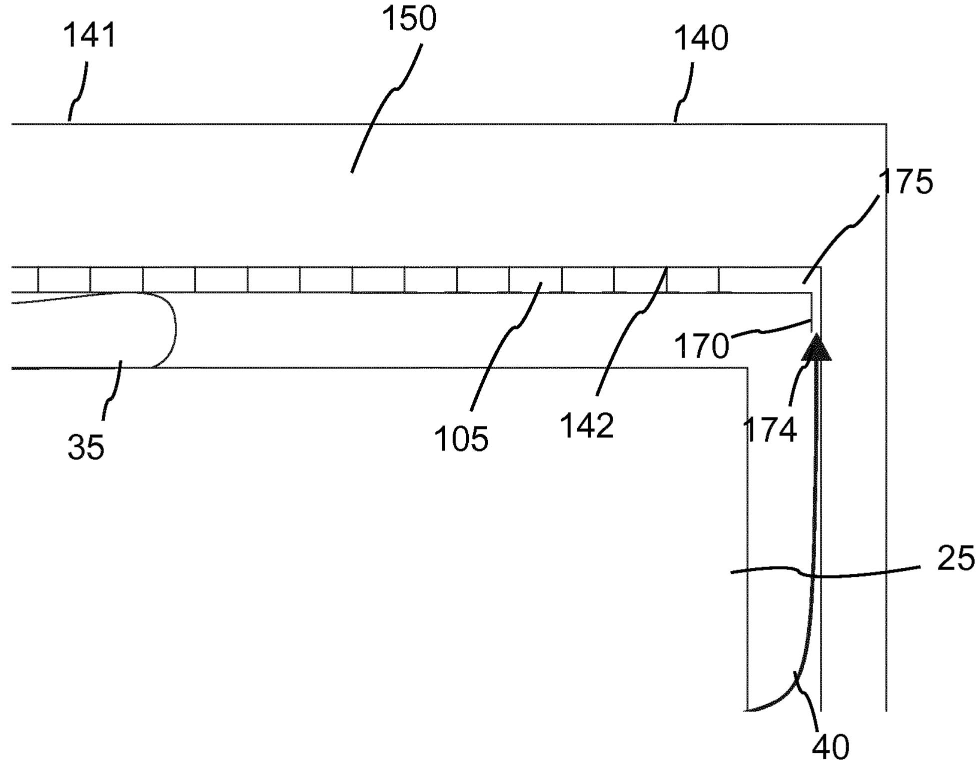
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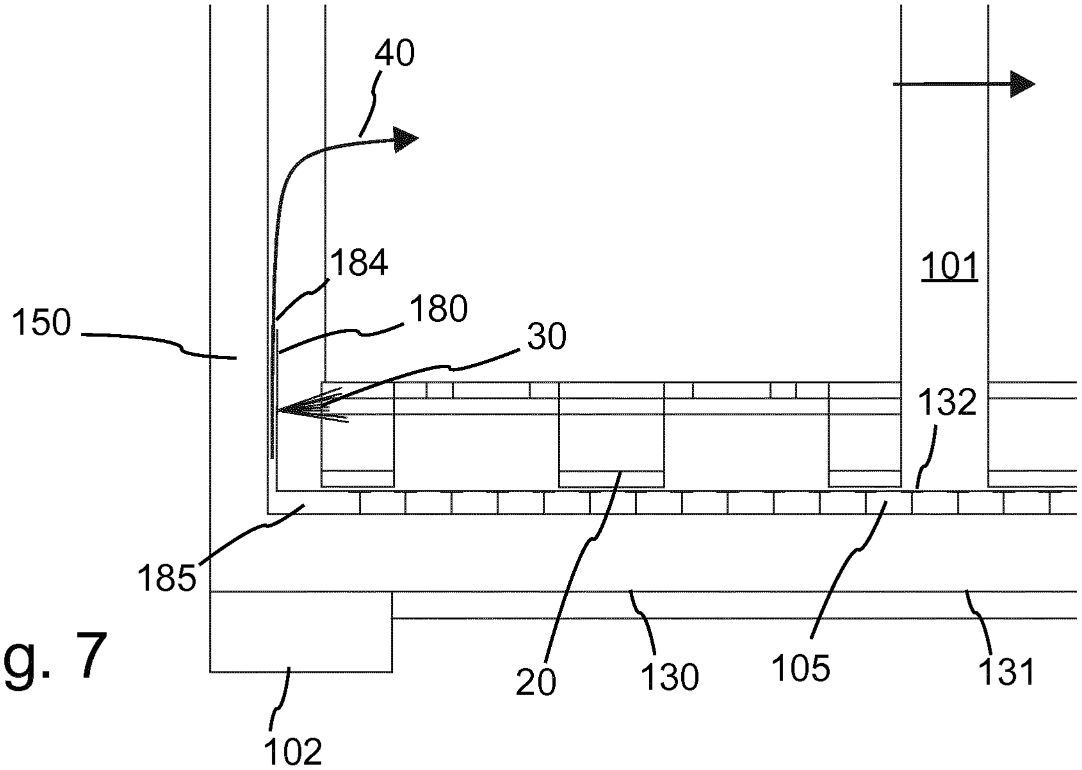
Fig. 6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132
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20
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105
131
102

Fig. 7

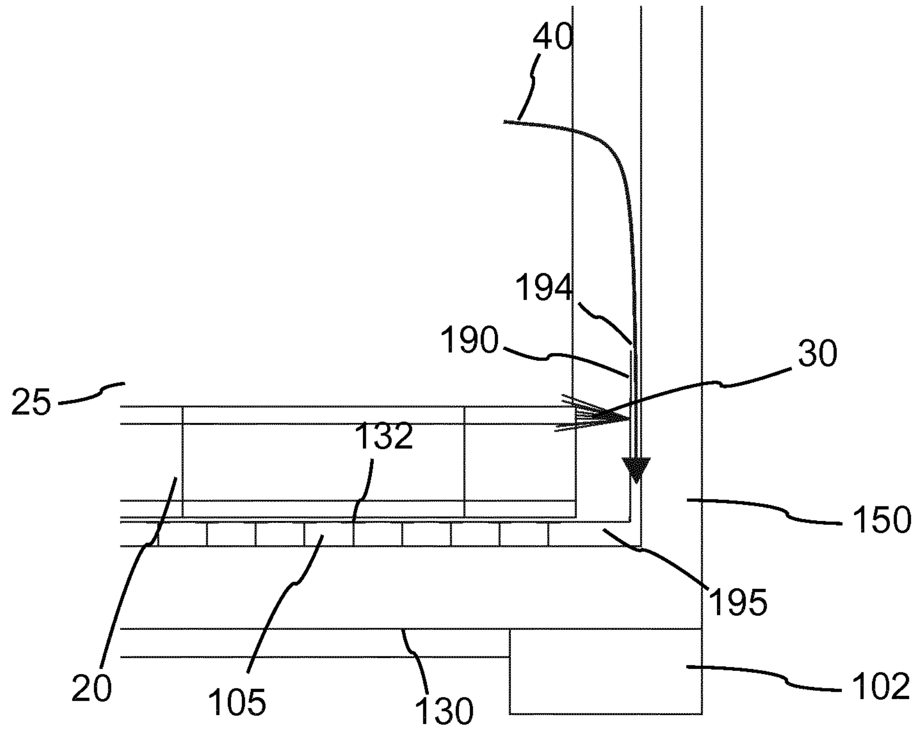
40
194
190
30
25
132
150
195
20
105
130
102

Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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