United States Patent [19]

Frank et al.

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[45] **Feb. 18, 1975**

[54] **COOLING CONTAINER**

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Aug. 7, 1972 Germany 2238829

[52] **U.S. Cl.** **62/382**, 62/388, 62/420, 62/441, 62/457

[51] **Int. Cl.** **F25d 25/02**

[58] **Field of Search** 62/382, 384, 385, 388, 62/457, 419, 420, 440, 441, 443

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Assistant Examiner—Ronald C. Capossela
Attorney, Agent, or Firm—Burns, Doane, Swecker & Mathis

[57] **ABSTRACT**

A transportable refrigerating container including descending passage means operable to receive a gravity induced flow of coolant gas and having flow controlling aperture means providing individualized, controlled communication between the descending passage means and individual product compartments. The passage means comprises a plurality of individual passages located along each of two sides of the refrigerated compartment. Longer passages have a greater flow capacity or cross sectional area than shorter passages.

9 Claims, 15 Drawing Figures

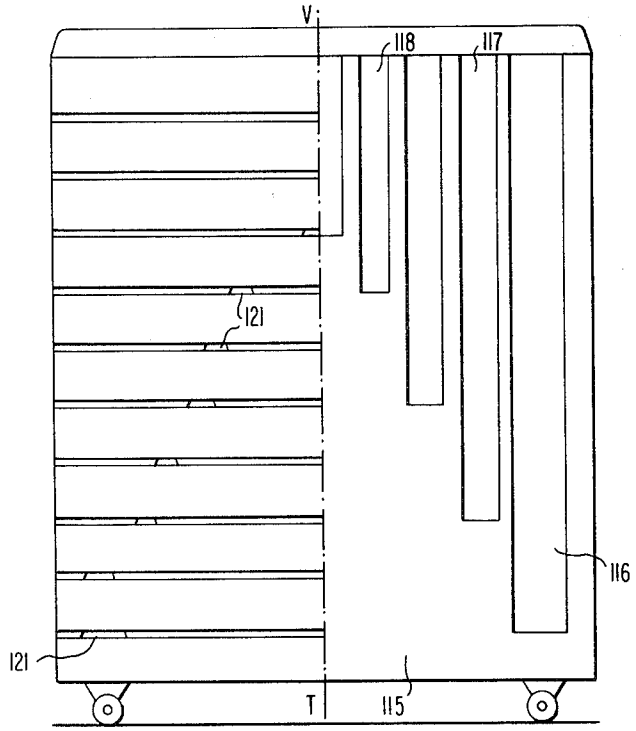


FIG. 1

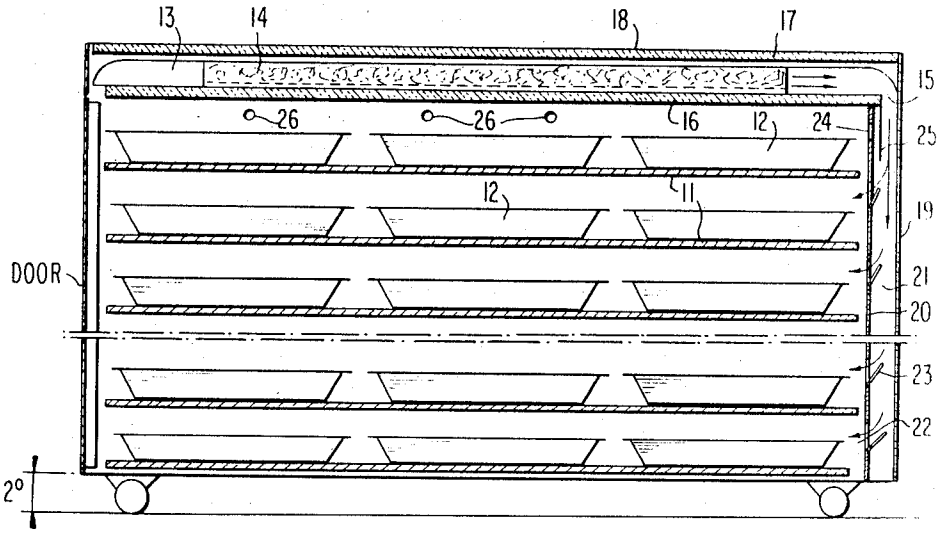


FIG. 2

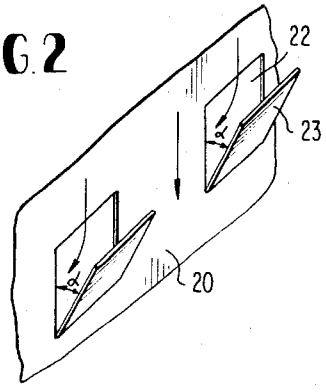


FIG. 4

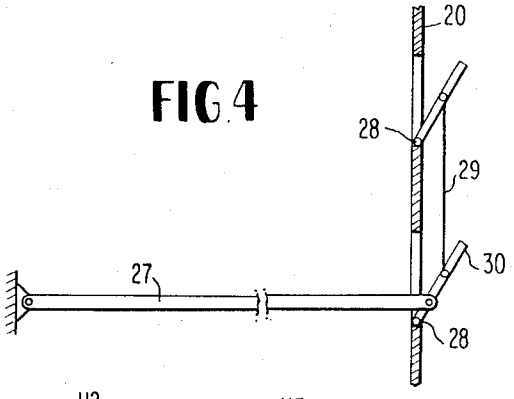
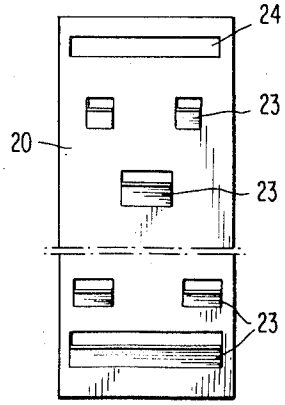


FIG. 3



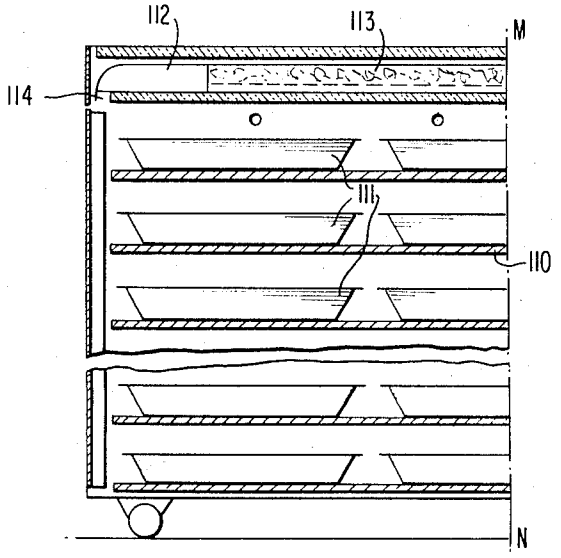
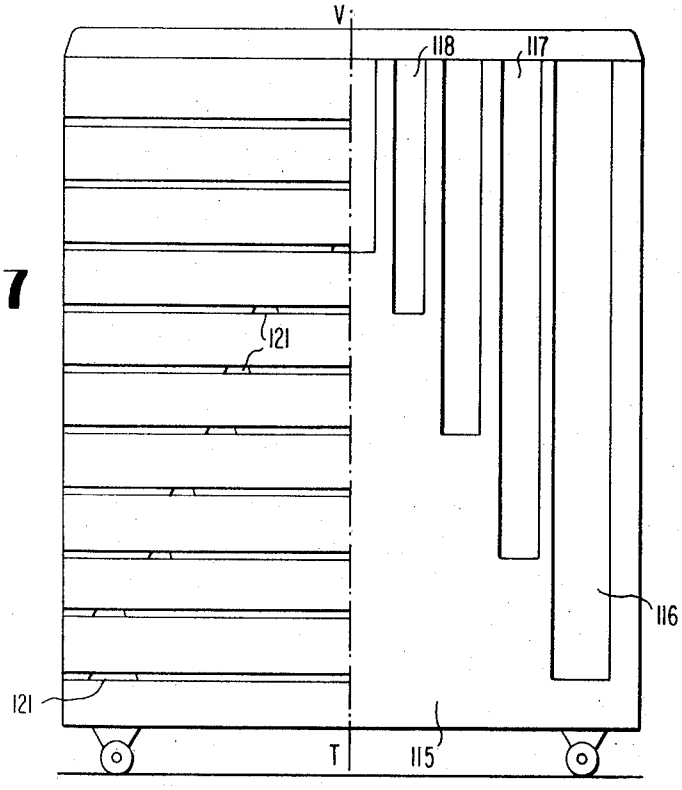


FIG. 5

FIG. 7



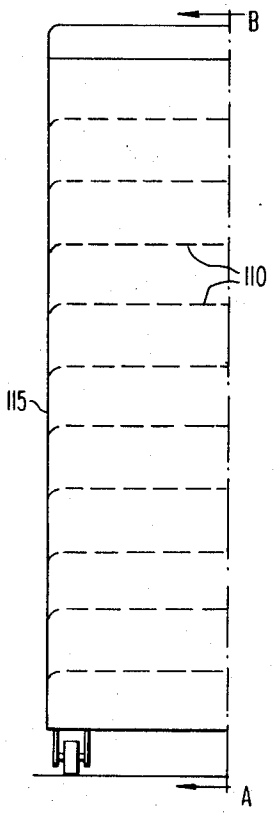


FIG. 6

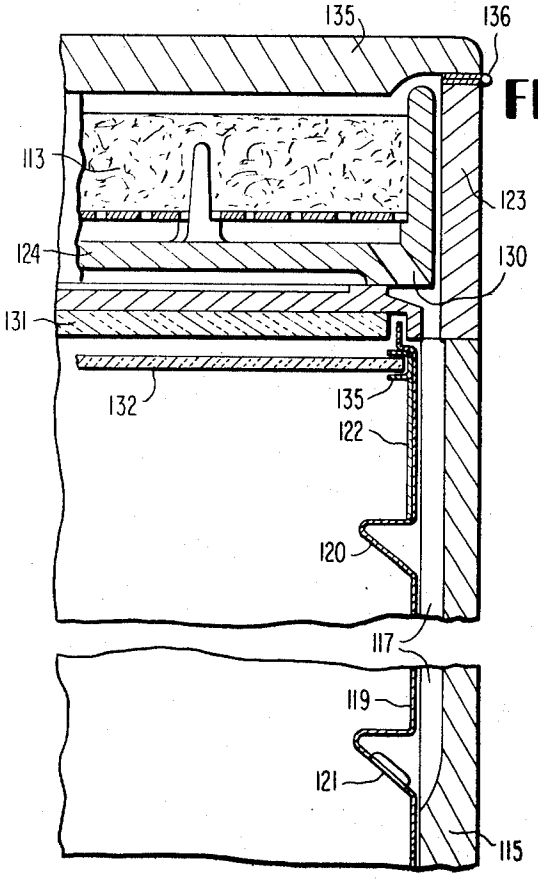


FIG. 8

FIG. 9

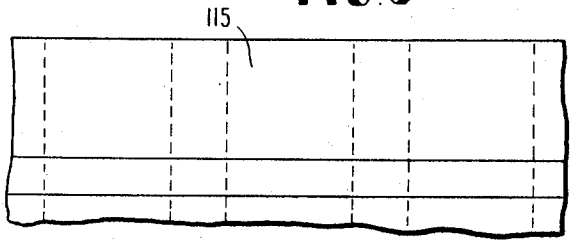




FIG. 9A

FIG. 11A

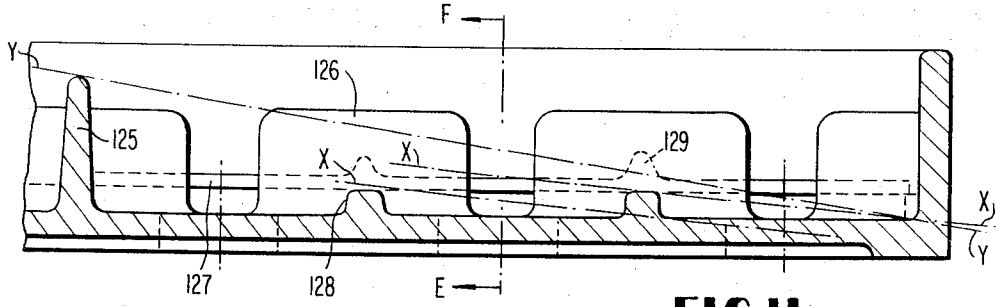
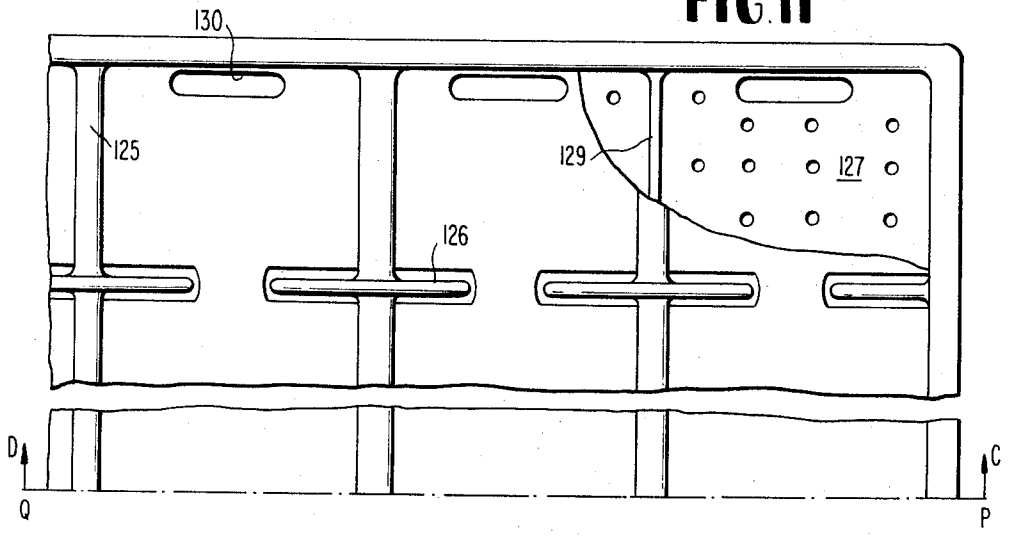


FIG. 11



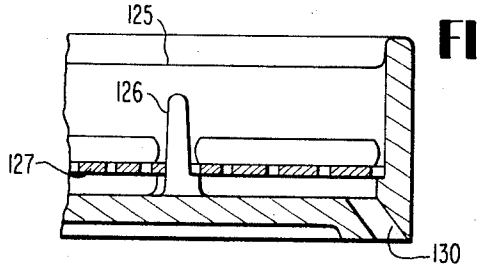
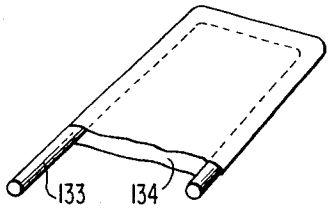


FIG. 11B

FIG. 12



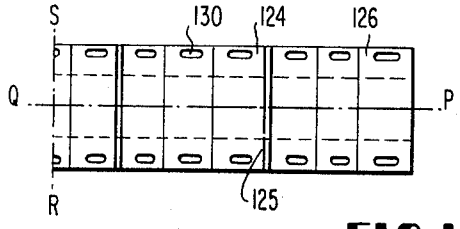


FIG. 10

COOLING CONTAINER

GENERAL BACKGROUND, OJBECTS, AND SUMMARY OF INVENTION

The invention relates to a refrigerating container to keep temperature sensitive products, such as food, pharmaceuticals, chemical products, etc., fresh and cool. Particularly, the invention relates to a transportable container having a work space subdivided in several chambers to receive the goods to be refrigerated and a compartment for a gasifying coolant, especially CO_2 in solid form (dry ice). Preferably, this latter compartment is located above said work space.

For keeping temperature sensitive products cool and fresh, movable containers are used today in which the cooling system consists of added consumable coolants. Beside nitrogen and freon, carbon dioxide especially comes into consideration as a comsumable coolant here. In gaseous form, carbon dioxide is heavier than air and in solid form at standard atmosphere pressure, in its own gaseous atmosphere has a temperature of −78.5°C. This solid CO_2, called dry ice, sublimates, i.e., it passes from a solid to a gaseous state, whereby at atmospheric pressure with the gas heating to 0°C of the neighborhood, 152.4 K. cal/kg are withdrawn.

Heretofore, this coolant is placed in the container, in the case of the known containers of the initially mentioned construction, in the form of prismatic slabs (plates) together with the material to be cooled, or it is arranged compactly above or beside the work space. This, however, results in the essential disadvantage that the cooling stream of gas fills the work space in an uncontrolled manner and that the temperature pattern developing in the work space is very uneven, in such a way that at certain places very low temperatures prevail, with the consequence of local freezing of the chilled goods, while at other places no sufficient cooling is assured. These disadvantageous effects occur at an increased degree, when using containers in air traffic, especially during the starting and landing phases of the airplanes which cause considerable inclinations of the containers.

To this it must be added that, particularly in air traffic, very variable ambient conditions may occur. In case of a modern airport with cold storage, the required quantity of dry ice is added to the filled container which is at a temperature of 12°–16°C upon leaving the cold storage. The quantity of coolant is here dimensioned such that the chilled goods remain chilled until served on the airplane. If, however, there is no cold storage at the airport, then such a quantity of dry ice must be the cup-like to the container after it being filled, such that the dry ice will be capable of cooling down the container itself and its contents from ambient temperature to, for example, cold storage temperature and to maintain this temperature of 12°–16°C until time for serving. From these variable possibilities of use and requirements there result, however, variable refrigerating problems, with which the customary containers cannot cope.

It is the task of the invention, therefore, to create a cooling container of the initially mentioned type, in which the cooling stream of gas flows controlled in such a way, that the temperature field pattern in the work space of the container will be as even as possible and to be sure, even under unfavorable circumstances, as the beginning of cooling, repeated opening of the container door, tipping and sloping movements of the container, etc.

A further task of the invention consists in creating a container which will cope with the stated variable conditions, whereby the degree of filling of the container with chilled goods and possibly also requirements of the chilled goods for variable cooling needs are still superposed as additional conditions.

According to the invention the solution of these problems is characterized by at least one descending shaft (chute) branching off from the coolant space, for receiving the developing cooling gas, and from which shaft openings, dividing the stream of cooling gas doseably or in segments into partial streams, branch off into the individual work space compartments.

In the invention one will insure that the cooling stream drops down in a defined direction of flow in the descending shaft by the action of gravity, whereby a partial stream is branched off for each compartment having chilled goods and which can be dosed exactly with a branch stream or segment which is adequate with respect to its cooling performance. Detailed experiments have shown that in this manner an even temperature field pattern quickly occurs in the container which is essentially independent of outside influences such as inclinations of the container during take-off of the plane in which the container is located. Beyond that, however, there also is the possibility, if desired, to produce temperature field patterns which are even within themselves but variable among each other, for instance, whenever chilled goods with variable cooling needs are placed in the container.

A further development of the invention concerns a cooling container with inserts arranged in levels one above the other, the topmost level serving for the coolant, especially in a movable container for keeping food in airplanes fresh and cool. Such containers, mostly called trolleys, are developed according to the invention in such a way that the descending coolant gas shaft, preferably extending over the entire height of the container and across one side or end of the device, is limited by an outside wall of said container and by a separating wall essentially parallel to the former, whereby the separating wall has sluice-like openings leading to the insertable levels of the work space.

If this container has only one door, then the descending shaft can be disposed on the container side opposite to the door, and the gap space between the door and insertable shelves can have escape openings for excess air and/or cooling gas, possibly in the form of leaks of the door hinges. In this way one will achieve a particularly exact guidance of the streams of cooling gas and especially the development of an even temperature field at the beginning of cooling will be accelerated, at a time when the container is still filled with air.

In order to ensure that the desired pattern or direction of flow, even in case of greater inclinations of the container, the insertions for the coolant can be slightly slanted toward the horizontal in such a way that it slopes toward the inlet for the descending shaft.

In the case of cooling containers with doors at two opposed sides, the arrangement advantageously is made such that two descending shafts are provided on opposed sides of the container and that at least one of the gap spaces, located between the other two container sides and the insertion levels or goods areas, has escape apertures for excess air and/or cooling gases,

possibly in the form of leaks of the door hinges. Further, the descending cooling gas shafts can also be disposed on both sides of the container, in which case it will be particularly effective to develop the doors on their sides with double walls, and to use the two walls of each door as boundaries for the descending shaft. These containers with descending shafts at opposed sides of the container are particularly insensitive—with regard to the temperature field pattern—to inclinations and tippings of the container.

In order to facilitate the controlled, segmented flow or division of the cooling gas stream into partial streams, the apertures in the separating wall or walls can be designed in such a way that they consist of perforations of the separating wall and of guide tongues or baffles assigned to the individual apertures and projecting from the separating wall into the descending coolant gas shaft. Advantageously, the apertures will have widths of passage which are variable among themselves, in such a way that the cross section increases from the topmost to the lowest inserting shelf, whereby the width of passage is determined by the cross section of the aperture and/or the position of the tongue. With that one will achieve that the cooling effect over the entire height of the container will be as even as possible. Nevertheless, it will not be possible to prevent completely, the phenomenon that in the topmost shelf for chilled goods, which is adjacent to the insert with the coolant, the temperature will drop lower, particularly during the period of the start of cooling. This may be desirable in some cases, perhaps whenever edible ice (ice cream) is to be stored in the topmost level. Whenever the same temperature is always wanted in the topmost insertion shelf as exists in the lower shelves below it, then according to the invention, the aperture of the topmost insertion shelf for chilled goods adjacent to the insert for coolants, can be provided with a closing lid and this insertion shelf can have closable apertures leading outside.

It has proved to be particularly effective whenever, in the case of the cooling container according to the invention, dry ice in form of a heap of dry ice tablets, little rods or cubes is used as coolant. This form of the dry ice, as compared to the customary solid dry ice slabs, has a considerably larger evaporation surface. This is of particular importance especially for the above-mentioned cooling containers in air traffic since, there, mostly only relatively short cooling times are required.

In order to adapt the cooling effect furthermore to the various conditions on the airport, the insertion of the coolant is developed especially according to the invention, as hereinafter described and claimed. Especially, insertion of the coolant is subdivided into shelves, which house the quantity of coolant required for the pertinent cooling task, whereby a heap of small dry ice rods is used advantageously, since such a heap has a larger surface than the dry ice slabs of the same weight and thus the quantity of cooling gas sublimated in the unit of time is larger.

DRAWINGS

In the drawings, embodiments of the invention are shown by way of example, namely:

FIG. **1** shows a cooling container in longitudinal section;

FIG. **2** is a perspective, fragmentary view of a separating wall of the FIG. **1** container showing sluice openings;

FIG. **3** is an end view of a separating wall of the FIG. **1** container;

FIG. **4** shows a section through the separating wall of FIG. **3** as provided with automatically adjustable guide tongues;

FIG. **5** is a longitudinal section up to the axis of symmetry M/N, or transverse median plane, through a prior art coolant trolley of customary design;

FIG. **6** is a half segment of a trolley, modified, as in the invention, oriented with FIG. **6** being a view showing a section plane A–B a perpendicular plane and extending along the longitudinal axis;

FIG. **7** shows the plane AB from FIG. **6,** with half a side wall exposed;

FIG. **8** shows, in a section format, the arrangement of the cool insert with the guidance of the cold stream as incorporated in the trolley of FIG. **6**;

FIG. **9** is an internal elevation view of the cooling gas channels in the side wall of the trolley of FIG. **6**;

FIG. **9A** is a transverse sectional view of the cooling gas channels depicted in FIG. **9**;

FIG. **10** is a fragmentary top plane view of the cooling insert of the FIG. **6** trolley provided with transverse divisions or longitudinally spaced functional coolant zones;

FIG. **11** is a fragmentary, further enlarged view of FIG. **10,** showing the cooling insert with details;

FIG. **11A** is a sectional view taken along the plane CD in FIG. **11**;

FIG. **11B** is a sectional view taken along the plane E–F in FIG. **11A**; and

FIG. **12** shows a special embodiment of a layer for absorbing the condensate and additionally insulating the inside space against the cooling insert.

DETAILED DESCRIPTION

In the embodiment shown in FIGS. **1** to **4,** we are dealing with a socalled trolley, therefore a mobile container for prepared food, as used in airplanes. Here the requirements for cooling performance are particularly high, because within a limited time, and in consideration of the least possible weight of the device itself and its charge of coolants, a heterogeneous combination of foods as to quantity and type must be kept cool in an environment mostly of 24°C., with the entire system being also subject to movements, for example, at starting of the plane.

FIG. **1** shows such a container in longitudinal section, in which the chilled goods **12** are kept on parallel flat shelves **11** and the dry ice **14** is disposed on the topmost shelf **13,** the cooling insert. A door is located in this container at its left end, as viewed in FIG. **1.** This cooling insert is connected on one narrow side or end of the container by means of a gap **15** with the work space of the shelves, in a manner yet to be described.

For thermal screening of the work or goods space against the cooling insert **13,** an insulating plate (board) **16** has been provided, which does not impede the gap **15.** Another insulating plate **17** curbs the heat transfer of the environment through the covering surface **18** of the container.

In order to guide the cooling stream, the entire container (including shelf **13**) in this example has been inclined relative to the horizontal by about 2°, so that the cold CO_2 gas developing in the cooling insert **13** will reach the gap **15** on account of its specific gravity being 1.5 times greater than that of the air still in the work

space. This inclination of the entire container is possible in case of the selected embodiment, since the contents to be cooled are not liquid in open bins (containers). Naturally the same effect could also be achieved by the fact that only the cooling insert has such an inclination, the chilled good inserts on the other hand being disposed horizontally.

A gate slit **25** is located at one end of shelf **13** and is followed by a descending shaft **21.** Shaft **21** is defined by the narrow side (i.e., end) wall **19** of the device and a separating wall **20,** parallel thereto. The cold stream in shaft **21** sinks to the bottom because of gravity. This cold descending stream can emerge from the shaft **21** through sluice-like apertures **22** which communicate with the work space between the shelves.

These sluice openings consist, according to FIG. **2,** of perforations of the separating wall **20** and of guide tongues **23.** These tongues are shown in case of the FIG. **2** embodiment simply by a rectangle constituted by three cuts and a bent edge, each tongue being bent into the inside of the descending shaft **21** and facing upwardly in an inclined or "baffle" manner.

Naturally other geometric forms are also possible for the guide tongues, and their position in the descending shaft **21** can be flat or arched. It has furthermore been recognized that the descending shaft **21,** at its lowest point, may be connected by apertures (which are not shown in the drawing) with the work space, so that condensate can emerge into the latter.

According to FIG. **1** and FIG. **3,** these sluice apertures, except for the opening of the insert of the topmost chilled goods shelf which is connected with the descending shaft **21** by way of a slit **24,** are provided for each of the chilled goods shelves, in such a manner that the effective width of passage means for emergence of the partial cooling stream into the shelves becomes larger with growing distance of the shelves from gap **15.** The projection of the aperture in the direction of the cooling stream is to be understood here as the width of passage. This width of passage is here defined therefore by the effective size of the "mouth" or flow capacity of each such passage in chute **15** as governed by width and/or height of the guide tongue and the bending angle α in FIG. **2.** Preferably the arrangement of FIG. **3** is to be selected, in which the sluice apertures **23** are disposed, displaced in the direction of the cooling stream and, as can be recognized, the opening angle α grows with the distance from the gap **25** and with it the above-mentioned width of passage. The increase in the size of the opening angle, in addition to increasing passage "mouth" size, tends to minimize the extent to which upper baffles **23** might "shield" lower baffles **23** and impede flow into their associated passages.

It is furthermore essential that the baffle plate which constitutes the slit **25,** and which runs across the entire width, screen the slit **24,** which represents the connection of he uppermost shelf for chilled goods with the descending shaft **12.** The reason for this is to avoid a too severe drop of temperature in the topmost cooling shelf. For the same purpose, bores or vents **26** are provided in the topmost cooling shelf, which lead into the open.

Each of the aperture means **24** and vent means **26** may be provided with selectively manipulatable closure means operable to selectively open (partially or fully) or close these openings.

The cooling container as in the invention can be filled in the customary cooling space at, for example, 6°C. with food dishes of this temperature, and then be charged with dry ice and put to use. By the inclination of the container or the shelf **13,** a path leading by gravity into the descending shaft **21** and through the sluice apertures **22** into the work space is forced upon the heavy CO_2 gas. After a relatively short time an even temperature field pattern develops in the container, as a reuslt of the distribution of the sublimated dry ice according to the invention. The required pressure balance or differential takes place via the leaks in the doors of the container and through the above-mentioned small bores **26** in the opposed long container walls between cooling insert and uppermost chilled goods shelf. By the arrangement of the bores **26** precisely at this spot, the most endangered topmost chilled goods shelf will be protected against freezing of the chilled goods.

It is apparent from FIG. **4** that, by the further development of the invention, an automatic control for the closing of the cooling stream by influencing the width of passage of the sluice openings **22** and thus of the partial cooling stream to the chilled goods shelves can be provided. In this connection, a rod **27** is provided which is connected on the one hand with the housing of the container and on the other hand with one movable guide tongue or baffle **30** and which moreover has a large temperature expansion coefficient. This rod **27** deflects the tongue **30,** which is connected via a swivel joint or pivot connection **28** with the separating wall **20.** The deflection is accomplished in such a way that in case of too much cooling the rod **27** contracts and the effective cross section or "mouth" size of passage of the sluice apertures is decreased. In case of too little cooling, the rod expands and this "mouth" size is enlarged. With the aid of the coupling rod means **29** it is possible to operate the sluice openings of several adjacent levels in the manner of levers by a single adjusting rod **27.**

Naturally, the embodiment shown can have numerous modifications.

Thus, the invention can also be realized in case of containers with two doors at the two narrow sides (ends), by making the latter with double walls and by developing the inside walls of the doors as separating walls with baffle plate **25** and sluice apertures **22.** In case of this embodiment, the function of the cooling stream depends even less on the inclination of the container. At a precisely horizontal position, the same quantity of cooling gas flows through the two descending shafts running on each end, inside the doors, and emerges through the sluice openings from both sides in the work space. The inflow of the cooling gas into the descending shafts can be facilitated still more by the coolant insert being buckled or bent in such a way that it slopes on both ends toward the inlet slits **25.**

Furthermore, the invention is not only limited to the described movable small containers, but it can also be used in case of stationary large containers, perhaps the well-known container in the so-called igloo construction. It is always essential in this case, however, that the developing cooling gas is guided as a homogeneous cooling stream with a definite direction of flow and that it is then doseably distributed to the individual chilled goods compartments.

For the explanations of the modifications of the invention according to FIGS. **6** to **12,** first of all, a trolley of customary construction will be described on the basis of FIG. **5.** In the FIG. **5** arrangement, the inside trolley space is divided in parallel planes **110** for the reception of the chilled goods **111.** Above the topmost work plane is the cooling insert **112** with the dry ice **113.** The stream of cooling gas drops, in this case, through a slot **114** along the door, without guidance, downward whereby either the left (or right) side is acted on more or less by the cooling gas as a result of the inclination and thus an undesirable, varible cooling is brought about at the sides of the door.

According to the invention the container now is developed according to FIG. **6** in such a way that the stream of cooling gas is fed under control inside the long side walls **115** to the spaces between the planes **110** which are to be cooled. The arrangement of the channels for controllably carrying the streams of cooling gas, according to FIG. **7** as shown by cut AB made longitudinally of the trolley, with the channels exposed to the right of exposure line VT, is made such that, with due consideration of the flow resistance, the channels leading to the lower planes, for example, **116** and **117,** are developed broader than those which supply the upper planes, for example, **118,** and that the broader channels are located on the sides of the door. (i.e., the channels on the right side of line VT would be a mirror image of the channel arrangement on the left side.)

One example for the guidance of the cooling stream in the side wall is shown in FIGS. **8, 9** and **9A00.**

The shaped side wall **115** (in sandwich type construction) has on its inside the channels, for example, **116,** 117, 118, already described. In the inside wall **119,** deep-drawn supports **120** for the planes **110** (inserts) have been developed. A part of at least some of these supports has outlet slits **121** on their underside for the cooling gas, and they are adapted in size to the width of the channel, i.e., the wider the channel, the wider the slit associated therewith. In the upper planes there are small discharge slits, since there the cold radiation of the walls suffices for the cooling. There also is an insulating layer **122** applied to the wall in order to dam up or limit the cold radiation through the wall itself.

For reinforcement of the walls **119** at about half the height, a plane surface connected detachably with the wall elements **119,** and not shown, may be provided.

In order to make possible a thorough cleaning of the trolley, the inside wall **119** can be removed.

The molded part **123,** closing the trolley on top, houses the cooling insert or drawer **124** in which is located the dry ice **113.** In the FIGS. **10, 11, 11A,** and **11B** and via the cuts or sections CD and EF, this cooling insert **124** is shown in detail.

FIG. **10** shows half the insert with its axes of symmetry P/Q (longitudinal) and R/S (transverse). The loading surface for the dry ice heap has been transversely divided by continuous transverse strips **125** and discontinuous longitudinal strips **126** into partial surfaces in such a way that, depending on the intended duration of cooling, the entire space of the cooling insert or partial spaces are filled with dry ice. The dry ice itself rests on a perforated bottom **127** on which there are formed continuous strips **129.** As shown in FIG. **11,** supporting rails **128** may support tray means **127.** Up to certain inclinations of the device, the strips on ribs **129** will prevent the heap of dry ice from slipping during the starting phase of an airplane. The above-mentioned strips **129** thus serve as holding and isolating strips and may be at least partly adjustable and/or variable in height.

The connection of the cooling insert with the channels in the lateral walls is accomplished by openings **130.** Between each two adjacent apertures there is each time a rail **128,** which rail tends to cause equal quantities of cooling gas to flow downwards through all the openings **130** even at an inclination of the trolley, as shown by lines X/X. The straight line Y/Y can be drawn just the same, which refers to a dry ice retention slope as provided by strips **125.** The oblong holes **130** can be of different lengths, in accordance with the width of their associated channels in the side walls.

At this juncture, it will be recognized that the FIG. **6–11B** embodiment is a species of the FIG. **1–4** invention, with the space between **124** and **127** providing a descending chute, branching off of which are central apertures **116, 117, 118.**

The insulation **31** (FIG. **8**) located on the underside of the cooling insert is of particular significance in order to prevent any undercooling of the topmost shelf or of the highest shelves by too great a degree of cold radiation through the base of the dry ice container.

In the first cooling phase, the heavy cold CO_2 gas presses the air in the container upwards, and through leaks of the container into the open air. Water vapor condenses from this air and is deposited mainly on the insulating layer as a top limitation of the space, and finally drips onto the chilled goods of the topmost shelf and generally defaces their appearance and value. The invention provides for an additional insulating plate **132** to be attached below the insulating layer **131** firmly connected with the molded piece **123,** the raw material of said plate **132** being permeable and permitting water vapor to pass through, but absorbing droplets of fog and holds them, whereby the originally great heat resistance of the raw material is reduced by the water absorption. At the outset, the lowest layer of the insulation **132** with a 0°C.-isotherm will constitute a "cold brake" or thermal barrier. The increase of the heat conductivity of this layer with the water absorption, which occurs during the cooling process in its first phase (the sublimation temperature of the dry ice does lie considerably lower in atmospheric air then a pure CO_2 atmosphere), serves to permit conductive cooling of the upper goods compartment while avoiding thermal shock due to a too abrupt cooling action at the outset. In other words, thermal shock due to excessive conductive cooling through layer **132,** at the outset, is avoided, but such conductive cooling is gradually implemented as the thermal conductivity of layer **132** increases.

This insulating layer **132** can be produced for example by a fabric of plastic, for example, PVC, which after use in a container is removed and dried and is removed after repeated use for hygienic reasons.

A further embodiment of barrier **132** is shown in FIG. **12,** where a "bag" **134** of special cellulose which absorbs or binds water is stretched across a resilient, U-shaped clip **133.** A holding device **135** secures this assembly. The **134** bag is detached from clip **135** and thrown away after use and, since it consists of cellulose, is simply burned.

According to this example the dry ice is housed in a sliding drawer **124** which, for the purpose of being charged, is pulled out of the molded piece **123.** In order

to simplify the charging process, and in order to use dosing aggregates for the quantities of dry ice required for the cooling task, and in order to be able to accomplish the charging in series or on the conveyor, the top covering **135** may be developed as a tightly closing lid (not permitting any admission of air), which is swivelably articulated by a hinge **136.**

If there is any desire to produce lower temperatures in the space of the top level, for example, for the storage of ice cream, etc., then a direct gas connection to the cooling insert and to this space must be established by one or more closeable and in one dimension controllable apertures, possibly communicating with channel means such as **118,** but which are not shown.

SCOPE OF INVENTION

In describing the invention, its principal advantages have been delineated and made apparent, and a variety of structural and functional modifications have been noted.

those skilled in the refrigerating art and familiar with this disclosure may recognize other additions, deletions, substitutes, or other modifications which would be deemed to fall within the scope of the invention as set forth in the appended claims.

What is claimed is:

1. In a transportable cooling container for keeping temperature-sensitive products cool and having

a work space for chilled products having a plurality of vertically displaced product compartments, and

a coolant compartment above said work space operable to contain a gasifiable coolant,

the improvement in said container comprising:

a pair of side walls operable to extend longitudinally of a direction of transportation and transversely of an axis of tilting of said container likely to occur during said transportation; and

a plurality of descending passages located along each of said longitudinally extending side walls, communicating with said coolant compartment and operable to receive a gravity flow of gasified coolant therefrom, and further communicating with diverse ones of said product compartments;

said descending passages being dimensioned such that the flow capacity of the descending passages of each side increases progressively so as to conduct to said product compartments a progressively greater flow of cooling gas relative to a downward direction of reference in a manner maintaining the temperatures of said product compartments substantially uniform.

2. A container as described in claim **1** wherein:

first insulating means provides insulation extending exteriorly along outer wall means of said descending passages; and

second insulating means provide insluation between said descending passages and an uppermost product compartment.

3. A container as described in claim **1** wherein descending passages for each compartment are located fore and aft of a longitudinal midpoint of said container on each said side of said container such that flow of cooling gas to each compartment is continued in similar proportions despite tilting of said container about said axis of tilting.

4. A container as described in claim **1** including thermal barrier means interposed between said coolant compartment and an uppermost one of said product compartments; and condensate absorbing insulating means spaced from said thermal barrier means and extending across the top of said uppermost product compartment; said insulating means being arranged to pass water vapor while absorbing water droplets in a manner tending to gradually increase the conductivity of said insulating means so as to avoid thermal shock at the beginning of a cooling phase.

5. A cooling container as described in claim **1** wherein:

said descending passages along each of said side wall means are formed, at least in part, by recesses within said longitudinally extending side wall means and are enclosed, at least in part, by a removable inner wall that extends along substantially the entire length of said side wall means.

6. A cooling container as described in claim **5** wherein:

said descending passages are arranged with longer passages thereof, which communicate with said lower ones of said product compartments, located adjacent fore and aft ends of said side walls.

7. A container as defined in claim **5** wherein said inner wall means includes indented sections defining supports for shelves of said compartments; and indented sections being provided with apertures, each communicating with one of said descending passages; said apertures being relatively dimensioned in accordance with the flow capacity of said associated descending passages.

8. A container as defined in claim **1** wherein said coolant compartment includes a base having longitudinally spaced openings at the sides thereof that communicate with said passages; said longitudinally spaced openings being divided by transversely extending rails on said base; a tray being disposed on said rails to carry said coolant; said tray being perforated to conduct coolant gas downwardly into the spaces defined by said tray and said rails; said rails being arranged to confine cooling gas within said spaces during limited tilting of said container about said transverse axis of tilting to tend to maintain uniform the flow of cooling gas through said openings.

9. Apparatus according to claim **8** wherein said base further includes transverse strips; said strips extending higher than said rails and serving to separate adjacently located ones of said trays to define coolant zones within said coolant compartment; said strips being arranged to confine cooling gases within said respective zones during limited tilting of said container about said transverse axis of tilting.

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