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(54) **Title:** ISLAND REFRIGERATED DISPLAY CASE

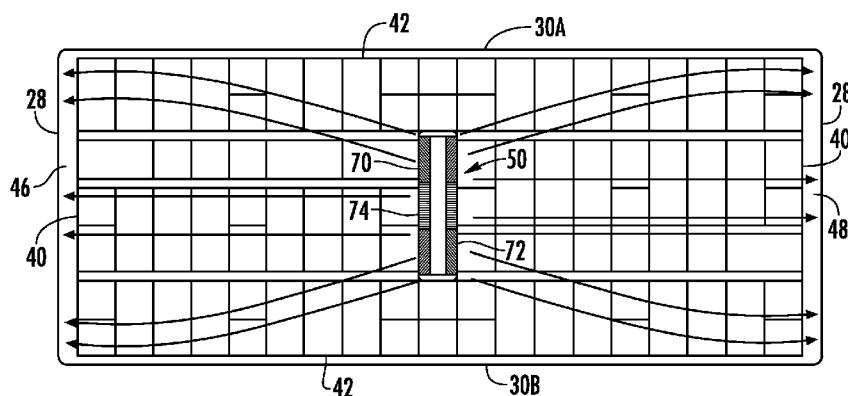


FIG. 9

(57) **Abstract:** A refrigerated display case includes a chest having a perimeter wall and a bottom wall cooperatively defining a product display space having a first cross-dimension; and a refrigerated air discharge conduit disposed in operative association with the product display space and having a longitudinal dimension being less than the first cross-dimension. In an island embodiment, the display case includes a liner chest having a plurality of side walls including a first pair of opposed parallel side walls and a second pair of opposed parallel side walls extending orthogonal to the first pair of opposed parallel side walls, and a refrigerated air discharge conduit extending parallel to the first pair of opposed parallel side walls. The second pair of opposed parallel side walls are spaced apart by a first distance and the discharge conduit extends along a longitudinal axis for a second distance shorter than the first distance.



Island Refrigerated Display Case

Cross-Reference to Related Application

[0001] Reference is made to and this application claims priority from and the benefit of U.S. Provisional Application Serial No. 61/477,416, filed April 20, 2011, and entitled ISLAND REFRIGERATED DISPLAY CASE, which application is incorporated herein in its entirety by reference.

Background of the Invention

[0002] This invention relates generally to refrigerated display cases and, more particularly, to island refrigerated display cases for merchandising a chilled or frozen food product.

[0003] Refrigerated display cases, also commonly referred to as refrigerated display merchandisers and refrigerated display cabinets, are well-known in the food merchandising industry for displaying to potential purchasers food products that must be maintained in a temperature-controlled environment to prevent spoilage or deterioration of quality or edibility. For chilled products, such as, for example, dairy products, fresh meats, packaged meats, poultry, cheeses and other fresh foods, the product stored in the interior product display space of the refrigerated display case is generally maintained at a temperature in the range of about 0 degrees C to about 7 degrees C (about 32 degrees F to about 44.5 degrees F), depending upon the particular food product. For frozen products, such as, for example, ice cream, frozen confections, frozen meats and poultry, and other frozen foods, the product stored in the interior product display space of the refrigerated display case is generally maintained at a temperature in the range of about -18 degrees C to about -15 degrees C (about -0.5 degrees F to about 5 degrees F) or other range below 0 degrees C (32 degrees F) depending upon the particular food product.

[0004] One type of refrigerated display cabinet in commercial use, generally in supermarkets, grocery stores and convenience stores, is commonly referred to as an island display case or chest. Display cases of this type have an interior display space wherein the product is displayed for convenient access by customers through a top opening. A typical island display case has a rectilinear box-like display chest

formed of four side walls and a bottom wall defining the product display space. The chest may have an open-top or a hinged or sliding top door that may be made, at least in part, of glass or other transparent material that permits potential customers to view the product displayed within the interior display space.

[0005] In a common embodiment of a conventional island display case, a refrigerated air discharge duct is disposed within the chest in an upper region of the display case. The discharge duct is mounted on a pedestal through which refrigerated air is delivered to the discharge duct from a refrigerated air supply duct beneath the floor of the chest. The discharge duct extends across the full width of the chest in parallel relationship a first pair of opposed side walls of the chest and typically midway between the first pair of opposed side walls. The discharge duct is provided with air registers on each side of the discharge duct through which refrigerated air flowing from the discharge duct passes and is directed outwardly from each side of the discharge duct into the product display space as parallel streams substantially parallel to the second set of opposed side walls of the chest. Thus, in island refrigerated display cases of this type, the refrigerated air discharge duct and pedestal assembly effectively divides the product display case within the chest into two individual display spaces separated by the refrigerated air discharge duct and pedestal assembly.

Summary of the Invention

[0006] It is desirable in most applications of island refrigerated display cases that the product stowed within the product display space be readily visible to potential customers. In island refrigerated display cases of the type hereinbefore described having a refrigerated air discharge duct that extends from wall to wall across the full width of the chest, the refrigerated air discharge duct impairs the visibility of the displayed product by potential customers.

[0007] In an aspect, the refrigerated display case of the invention provides for improved product visibility to potential customers. The refrigerated display case includes a liner chest having a perimeter wall and a bottom wall cooperatively defining a product display space having a cross-dimension, and a refrigerated air discharge conduit disposed within the product display space and having a

longitudinal dimension. The longitudinal dimension of the refrigerated air discharge conduit is less than the cross-dimension of the liner chest. Because the refrigerated air discharge conduit is foreshortened relative to the cross-dimension of the liner chest, rather than extending across the full width of the product display space as in the prior art, the visibility of the displayed product is improved. Additionally, the refrigerated display case of the invention provides increased product display volume for a given footprint as an additional portion of product display space is provided between each end of the foreshortened refrigerated air discharge conduit and the respective walls of the liner chest.

[0008] In an embodiment, the refrigerated display case is an island refrigerated display case having a liner chest including a plurality of side walls having a first pair of opposed parallel side walls, a second pair of opposed parallel side walls disposed orthogonal to the first pair of opposed parallel side walls and spaced apart by a first distance, and a refrigerated air discharge conduit extending along a longitudinal axis for a second distance and disposed parallel to the first pair of opposed parallel side walls, the second distance being shorter than the first distance. The ratio of the second distance to the first distance does not exceed 90 percent. In an embodiment, the ratio of the second distance to the first distance ranges from at least 50 percent to less than 90 percent.

[0009] With the refrigerated air discharge conduit being foreshortened relative to the cross-dimension of the liner chest, adequate distribution of refrigerated air across all portions of the product display space must be ensured. Accordingly, in an aspect of the invention, the refrigerated air discharge conduit is provided with one or more air discharge registers adapted to ensure adequate distribution of refrigerated air across all portions of the product display space. In another aspect, baffles may be provided in association with the return air inlets along the opposed side walls of the display case to further modify the distribution of refrigerated air across the product display space.

[0010] In an embodiment, the refrigerated air discharge conduit has a first air discharge register and a second air discharge register, the first discharge air register imparting a lateral directional component to air discharging therethrough generally toward a first side wall of the second pair of opposed parallel side walls and the

second discharge air register imparting a lateral directional component to air discharging therethrough generally toward a second side wall of the second pair of opposed parallel side walls. In this embodiment, the island refrigerated display case may further include a plurality of air flow baffles for deflecting air flow to a central portion of each of the first air return inlet and the second air return inlet. The lateral directional component imparted by the first discharge air register ranges from 10 degrees to 20 degrees outwardly relative to a longitudinal axis of the liner chest toward the first side wall of the second pair of opposed parallel side walls and the lateral directional component imparted by the second discharge air register ranges from 10 degrees to 20 degrees outwardly relative to a longitudinal axis of the liner chest toward the second side wall of the second pair of opposed parallel side walls.

[0011] In an embodiment, the refrigerated air discharge conduit has a first air discharge register, a second air discharge register and a third air discharge register disposed intermediate the first and second air discharge registers, the first discharge air register imparting a lateral directional component to air discharging therethrough generally toward a first side wall of the second pair of opposed parallel side walls, the second discharge air register imparting a lateral directional component to air discharging therethrough generally toward a second side wall of the second pair of opposed parallel side walls, and the third air discharge register imparting a substantially longitudinal directional component to air discharging therethrough substantially parallel to the second pair of opposed parallel side walls. The lateral directional component imparted by the first discharge air register ranges from 10 degrees to 20 degrees outwardly relative to a longitudinal axis of the liner chest toward the first side wall of the second pair of opposed parallel side walls and the lateral directional component imparted by the second discharge air register ranges from 10 degrees to 20 degrees outwardly relative to a longitudinal axis of the liner chest toward the second side wall of the second pair of opposed parallel side walls.

[0012] In another embodiment, the refrigerated air discharge conduit has a air discharge register imparting a substantially longitudinal directional component to air discharging therethrough toward each side wall of the first pair of opposed parallel side walls and substantially parallel to the second pair of opposed parallel side walls. In this embodiment, the island refrigerated display case includes a first

air flow baffle disposed in operative association with the first air return inlet for deflecting air flow away from a central portion of the first air return inlet, and a second air flow baffle disposed in operative association with the second air return inlet for directing air flow away from a central portion of the second air return inlet.

Brief Description of the Drawings

[0013] For a further understanding of the disclosure, reference will be made to the following detailed description which is to be read in connection with the accompanying drawing, wherein:

[0014] FIG. 1 is a perspective view of a island refrigerated display case as disclosed herein;

[0015] FIG. 2 is a longitudinal cross-section elevation view of the island refrigerated display case of FIG. 1;

[0016] FIG. 3 is a lateral cross-section elevation view of the island refrigerated display case of FIG. 1;

[0017] FIG. 4 is a plan view looking down on the island refrigerated display case of FIG. 1;

[0018] FIG. 5 is a plan cross-sectional view of a first embodiment of the refrigerated air discharge conduit as disclosed herein;

[0019] FIG. 6 is plan view of the product display space illustrating a first air flow pattern passing across the product space from the refrigerated air discharge conduit to the side air return inlets;

[0020] FIG. 7 is plan view of the product display space illustrating a second air flow pattern passing across the product space from the refrigerated air discharge conduit of FIG. 5 to the side air return inlets;

[0021] FIG. 8 is a plan cross-sectional view of a second embodiment of the refrigerated air discharge conduit as disclosed herein;

[0022] FIG. 9 is plan view of the product display space illustrating an air flow pattern passing across the product space from the refrigerated air discharge conduit of FIG. 8 to the side air return inlets;

[0023] FIG. 10 is a plan cross-sectional view of a third embodiment of the refrigerated air discharge conduit as disclosed herein; and

[0024] FIG. 11 is plan view of the product display space illustrating an air flow pattern passing across the product space from the refrigerated air discharge conduit of FIG. 10 to the side air return inlets.

Detailed Description of the Invention

[0025] Referring initially to FIGs. 1 - 4 of the drawing, there is depicted an exemplary embodiment of an island refrigerated display case, generally designated 20, for displaying chilled or frozen products. The display case 20 includes an outer cabinet 22 and a liner chest 24. The outer cabinet 22 has a bottom wall 26 and an outer wall 25. In the embodiment depicted in FIGs. 1 - 4, the outer wall 25 includes a first pair of opposed parallel side walls 28 and a second pair of opposed parallel side walls 30 that are interconnected to cooperatively form the outer wall 25 of the rectilinear outer cabinet 22.

[0026] The liner chest 24 has a bottom wall 32 and a perimeter wall 34 that cooperatively form the liner chest 24 and define a product display space 36 having a top opening 38. The perimeter wall 34 includes a plurality of side walls interconnected to cooperatively form the perimeter wall 34. In the embodiment depicted in FIGs. 1 - 4, the plurality of side walls includes a first pair of opposed parallel side walls 40 and a second pair of opposed parallel side walls 42. The first and second pairs of opposed parallel side walls 40, 42 cooperatively form the rectilinear perimeter wall 34 of the liner chest 24.

[0027] The inner chest 24 is positioned within the outer cabinet 22 in spaced relationship with the perimeter wall and with the bottom wall 26 of the outer cabinet 22. The upper portions of the perimeter walls of both of the outer cabinet 22 and the inner chest 24 may be made of glass or other transparent material to enhance the viewability of the product stowed in the product display space 36. With the inner chest 24 so positioned within the outer cabinet 22, a gap is provided between the bottom wall 32 of the liner chest 24 and the bottom wall 26 of the outer cabinet 22, as well as between the perimeter wall 34 of the inner chest 24 and the perimeter wall of the outer cabinet 22.

[0028] The respective gaps between the first pair of opposed side walls 40 of the liner chest 34 and first pair of opposed side walls 28 of the outer cabinet 22,

together with the gap between the bottom wall 32 of the liner chest 24 and the bottom wall 26 of the cabinet 22, form an air circulation duct 44. The opening 46 to the gap formed between one set of the first pair of opposed parallel side walls 40 of the liner chest 24 and the first pair of opposed parallel side walls 28 of the outer cabinet 22 constitutes a first air inlet 46 to the air circulation duct 44. The opening 48 to the gap formed between the other set of the first pair of opposed parallel side walls 40 of the liner chest 24 and the first pair of opposed parallel side walls 28 of the outer cabinet 22 constitutes a second air inlet 48 to the air circulation duct 44. The respective gaps between the second pair of opposed side walls 42 of the liner chest 24 and the second pair of opposed side walls 30 of the outer cabinet 22 may be filled with a heat insulation material.

[0029] A refrigerated air discharge conduit 50 is disposed within an upper region of the display case 20 below the top opening 27 to the outer cabinet 22 and positioned above the opening 38 to the product display space 36 defined by inner chest 24 as depicted in FIGs. 1-4. The refrigerated air discharge conduit 50 is positioned between and parallel to the first pair of opposed parallel side walls 40 of the liner chest 24. For example, in an embodiment, the refrigerated air discharge conduit 50 may extend, as depicted in FIGs. 1-4, along a longitudinal axis x-x positioned midway between and parallel to the first pair of opposed side walls 40 and orthogonal to a longitudinal axis y-y of the liner chest 24 extending parallel to the second pair of opposed parallel side walls 42 of the liner chest 24. The refrigerated air discharge conduit 50 is mounted atop a pedestal 52 that extends generally vertically upward from the bottom wall 32 of the liner chest 24 for supporting the refrigerated air discharge conduit 50. The pedestal 52 also defines a refrigerated air duct 54 that opens at its lower end through the bottom wall 32 to the air circulation duct 44 and opens at its upper end into the refrigerated air discharge duct 50.

[0030] The island refrigerated display case 20 further includes an air circulating fan 56 and an evaporator heat exchanger 58. In operation, the air circulating fan 56 draws air from the product display space 36 into and through the air circulation duct 44, passes the air over the evaporator heat exchanger 58 and then delivers the air back to the product display space 36 through the refrigerated air duct

54 and the refrigerated air discharge conduit 50. As the air passes over the evaporator heat exchanger 58, the air passes in heat exchange relationship with a refrigerant whereby the air is chilled.

[0031] In the embodiment depicted in FIGs. 1-3, the circulating fan 56 is disposed at the intersection of the air circulation duct 44 and the opening to the refrigerated air duct 54 and the evaporator heat exchanger 58 includes a first evaporator heat exchanger coil 58A disposed in the air circulation duct 44 on a first side of and upstream of the circulating fan 56 and a second evaporator heat exchanger coil 58B disposed in the air circulation duct 44 on a second side of and upstream of the circulating fan 56. The circulating fan 56 may be disposed centrally in the air circulation duct 44 beneath the opening to the refrigerated air duct 54 or may be disposed in the refrigerated air duct 54 near the lower end of duct 54 above the opening to the air circulation duct 44.

[0032] The evaporator heat exchanger 58 is disposed in a closed loop refrigerant circuit of a refrigerant vapor compression system that further includes a compression device 60, a condenser heat exchanger 63 and a condenser fan 64, which are arranged with the evaporator heat exchanger coils 58A and 58B in the refrigerant circuit and arranged according to a conventional refrigeration cycle. The compression device 60 may comprise a pair of refrigerant vapor compressors arranged in parallel flow relationship with each compressor associated with a single evaporator heat exchanger coil or the compression device 60 may be a single refrigerant vapor compressor associated with both evaporator heat exchanger coils.

[0033] In the embodiment of the free-standing island refrigerated display case 20 depicted in FIGs. 1-3, the refrigerant vapor compression system is fully contained within the display case 20 with the compression device 60, the condenser heat exchanger 62, the condenser fan 64 and other components of the refrigerant vapor compression system disposed in an equipment compartment 66 beneath the bottom wall 26 of the cabinet 22. However, it is to be understood that the particular type of the refrigerant vapor compression system employed and the particular arrangement of the system components is not germane to the invention disclosed herein.

[0034] As noted previously, the refrigerated air discharge conduit 50 disposed in the product display space 36 extends parallel to the first pair of opposed parallel side walls 40 of the liner chest 24. In conventional prior art island refrigerated display cases, the refrigerated air discharge conduit extends fully across the product display space thereby effectively dividing the product display space into two separate product display spaces, one on each side of the refrigerated air discharge conduit. Unlike those prior art island refrigerated display cases, in the island refrigerated display cases 20 disclosed herein, the refrigerated air discharge duct 50 is foreshortened relative to the maximum across dimension of the product display space 36.

[0035] Therefore, as best seen in FIG. 4, in the island refrigerated display case 20 disclosed herein, the product display space 36 extends not only on both sides of the refrigerated air discharge conduit 50, but also around both ends of the refrigerated air discharge conduit 50 so as to form a single continuous product display space 36. As a result, additional display volume is provided relative to a conventional prior art island display case with a liner chest having the same length, width and depth dimensions. In the island refrigerated display case 20 disclosed herein, product may be stacked in the additional display space provided around the longitudinally spaced ends of the refrigerated air discharge duct, thereby not only allowing more product to be stowed in the product display space 36, but also providing a more aesthetically pleasing presentation of product displayed in a continuous array.

[0036] Referring now to FIG. 4, which shows a plan view looking downwardly into the product display space 36 defined by the rectilinear liner chest 24, the product display space 36 has a first cross-dimension, i.e. depth d_1 , and the refrigerated air discharge conduit 50 has major dimension, i.e. length d_2 , also to be referred to herein as the second cross-dimension, which is less than the first cross-dimension. For example, in the illustrated embodiment, the length of the refrigerated air discharge conduit 50, that is the second cross-dimension, length d_2 , is 55% of the first cross-dimension, that is the depth, d_1 , of the rectilinear liner chest 24. However, the ratio of the second cross-dimension, d_2 , to the first cross-

dimension could have any value that does not exceed 90%, and generally in the range from at least 50% to less than 90%.

[0037] Referring now to FIGs. 5, 6 and 7, there is depicted a first embodiment of a refrigerated air discharge conduit 50 for use in connection with the island refrigerated display case 24 disclosed herein. The refrigerated air discharge conduit 50 includes a first air discharge register 70 and a second air discharge register 72 disposed in longitudinal relationship along the length of the refrigerated air discharge conduit 50. The first air discharge register 70 imparts a lateral directional component to air discharging therethrough thereby directing the air discharging therethrough generally toward a first side wall 30A of the second pair of opposed parallel side walls 30. Similarly, the second air discharge register 72 imparts a lateral directional component to air discharging therethrough thereby directing the air discharging therethrough generally toward a second side wall 30B of the second pair of opposed parallel side walls 30.

[0038] Therefore, as depicted in FIGs. 6 and 7, the air discharging from the air discharge registers 70, 72 of the refrigerated air discharge conduit 50 depicted in FIG. 5 enters the product display space 36 with a lateral directional component and a longitudinal directional component, rather a purely longitudinal component, and flows across the product display space 36 to the first and second return air inlets 46, 48 extending along the respective walls of the first pair of opposed parallel walls 28 of the liner chest 24.

[0039] To further alter the flow pattern of the air passing across the product display space 36, one or more baffles 80 may be disposed along the first pair of opposed parallel side walls 28 at selective positions to partially cover a portion or portions of the first and second air return inlets 46, 48. For example, as depicted in FIG. 7, the flow pattern shown in FIG. 6 for air flow discharging from the air discharge registers 70, 72 of the refrigerated air discharge conduit 50 may be altered to more uniformly distribute the air flow over the plan area of the product display space 36 by positioning a flow baffle 80 in each corner of the liner chest 24 to extend along and cover end portions of each of the air return inlets 46, 48 thereby deflecting the air flow to enter a central expanse of each air return inlet 46, 48.

[0040] Referring now to FIG. 8, there is depicted a second embodiment of a refrigerated air discharge conduit 50 for use in connection with the island refrigerated display case 24 disclosed herein. The refrigerated air discharge conduit 50 includes a first air discharge register 70, a second air discharge register 72 and a third air discharge register 74, with the first and second air discharge registers 70, 72 disposed in longitudinally spaced relationship along the length of the refrigerated air discharge conduit 50 with the third air discharge register 74 disposed between the first and second longitudinally spaced air discharge registers. The first air discharge register 72 again imparts a lateral directional component to air discharging therethrough thereby directing the air discharging therethrough generally toward a first side wall 30A of the second pair of opposed parallel side walls 30. The second air discharge register 72 again imparts a lateral directional component to air discharging therethrough thereby directing the air discharging therethrough generally toward a second side wall 30B of the second pair of opposed parallel side walls 30. The third air discharge register 74 simply directs the air discharging therethrough with a purely longitudinal directional component toward the first pair of opposed parallel side walls 28 of the liner chest 50.

[0041] Therefore, as depicted in FIG. 9, the air discharging from the air discharge registers 70, 72 of the refrigerated air discharge conduit 50 depicted in FIG. 8 enters the product display space 36 with a lateral directional component and a longitudinal directional component, rather a purely longitudinal component, while the air discharging from the central air discharge register 74 of the refrigerated air discharge conduit 50 depicted in FIG. 8 enters the product display space 36 with a purely longitudinal component. The air streams entering through the three air discharge registers 70, 72, 74 then flows across the plan area of the product display space 36 to the first and second return air inlets 46, 48 extending along the respective walls of the first pair of opposed parallel walls 28 of the liner chest 24.

[0042] Referring now to FIG. 10, there is depicted a third embodiment of a refrigerated air discharge conduit 50 for use in connection with the island refrigerated display case 24 disclosed herein. In this embodiment, the refrigerated air discharge conduit 50 includes an air discharge register 76 wherein the air discharging therethrough enters the product display space 36 in a longitudinal

direction to flow over the plan area of the product display space towards the first pair of opposed parallel side walls 28 of the liner chest. No lateral directional component is imparted by the air discharge register 76 to the air entering the product display space 36. To alter the flow pattern of the air passing across the plan area of the product display space 36 from a purely longitudinal flow substantially parallel to the second pair of opposed parallel side walls 30 and improve air flow distribution as depicted in FIG. 11, a baffle 80 may be disposed along each of the first pair of opposed parallel side walls 28 at a central position to partially cover a middle span of each of the first and second air return inlets 46, 48..

[0043] The air discharge registers 70, 72, 74 and 76 may have a honeycomb outlet grid structure or a simple slotted grid outlet structure 78. The desired degree of lateral directional component to be imparted to the air passing through the air discharge registers 70, 72 of the refrigerated air discharge conduits 50 depicted in FIGs. 5 and 8 depends upon the geometry of the liner chest 24. For example, in the depicted embodiment of the rectilinear liner chest 24, which has a longitudinal length to lateral depth plan area aspect ratio of about 1.6, the outlet grid structures of the air discharge registers 70, 72 are aligned at a 15 degree angle to the longitudinal axis y-y of the liner chest 24. In general, in other embodiments, the outlet grid structures of the air discharged registers 70, 72 are aligned at an angle to the longitudinal axis y-y in the range of from about 10 degrees to about 20 degrees. Of course, the outlet grid structure of the air discharge registers 74, 76 are aligned parallel to the longitudinal axis y-y of the inner chest 24.

[0044] The baffles 80 may be formed integral the respective side walls of the first pair of opposed parallel side walls 40 or formed as separate members secured to the respective side walls of the first pair of opposed parallel side walls 40 of the inner chest 40. It is to be understood that the purpose of the baffles is to deflect the air flow approaching the side air return inlets 46, 48 away from the selected portions of the air return inlets over which the baffles 80 are disposed and toward other portions of the air return inlets that are uncovered. However, it is not necessary that the baffles 80 completely cover and block all air flow from entering the selected portions of the air return inlets 46, 48 over which the baffles 80 are directly disposed.

[0045] Although the island refrigerated display case 20 is a rectilinear island display case as shown in and described herein with reference to the depicted exemplary embodiment, it is to be understood that a refrigerated air discharge conduit 50 that is foreshortened relative to the cross-dimension of the product display space defined by the liner chest is not limited in application to rectilinear island display cases. For example, the liner chest 24 and surrounding outer cabinet 22 could have a square planar section or an octagonal planar section or a generally oval planar section or other non-rectilinear planar section.

[0046] The terminology used herein is for the purpose of description, not limitation. Specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as basis for teaching one skilled in the art to employ the present invention. Those skilled in the art will also recognize the equivalents that may be substituted for elements described with reference to the exemplary embodiments disclosed herein without departing from the scope of the present invention.

[0047] While the present invention has been particularly shown and described with reference to the exemplary embodiments as illustrated in the drawing, it will be recognized by those skilled in the art that various modifications may be made without departing from the spirit and scope of the invention. Therefore, it is intended that the present disclosure not be limited to the particular embodiment(s) disclosed as, but that the disclosure will include all embodiments falling within the scope of the appended claims.

We Claim:

1. A refrigerated display case comprising:
an inner chest having a perimeter wall and a bottom wall cooperatively defining a product display space having a first cross-dimension; and
a refrigerated air discharge conduit disposed in operative association with the product display space and having a longitudinal dimension being less than the first cross-dimension.
2. An island refrigerated display case comprising:
a liner chest defining a product display space and having a plurality of side walls including a first pair of opposed parallel side walls and a second pair of opposed parallel side walls extending orthogonal to the first pair of opposed parallel side walls, the second pair of opposed parallel side walls spaced apart by a first distance; and
a refrigerated air discharge conduit extending along a longitudinal axis for a second distance and parallel to the first pair of opposed parallel side walls, the second distance being shorter than the first distance.
3. The island refrigerated display case as recited in claim 2 wherein a ratio of the second distance to the first distance does not exceed 90 percent.
4. The island refrigerated display case as recited in claim 2 wherein a ratio of the second distance to the first distance ranges from at least 50 percent to less than 90 percent.
5. The island refrigerated display case as recited in claim 2 wherein: the refrigerated air discharge conduit is disposed generally mid-distance between the second pair of opposed parallel side walls.
6. The island refrigerated display case as recited in claim 5 wherein the first pair of opposed parallel side walls and the second pair of opposed parallel side walls connect to form a continuous rectilinear perimeter wall of the liner chest.

7. The island refrigerated display case as recited in claim 2 further comprising:

a first air return inlet extending along a first side wall of the first pair of opposed parallel side walls; and

a second air return inlet extending along a second side wall of the first pair of opposed parallel side walls.

8. The island refrigerated display case as recited in claim 7 wherein the refrigerated air discharge conduit has a first air discharge register and a second air discharge register, the first discharge air register imparting a lateral directional component to air discharging therethrough generally toward a first side wall of the second pair of opposed parallel side walls and the second discharge air register imparting a lateral directional component to air discharging therethrough generally toward a second side wall of the second pair of opposed parallel side walls.

9. The island refrigerated display case as recited in claim 8 further comprising a plurality of air flows baffles operatively associated with each of the first air return inlet and the second air return inlet for deflecting air flow to a central portion of each of the first air return inlet and the second air return inlet.

10. The island refrigerated display case as recited in claim 8 wherein:
the lateral directional component imparted by the first discharge air register ranges from 10 degrees to 20 degrees outwardly relative to a longitudinal axis of the liner chest toward the first side wall of the second pair of opposed parallel side walls; and

the lateral directional component imparted by the second discharge air register ranges from 10 degrees to 20 degrees outwardly relative to a longitudinal axis of the liner chest toward the second side wall of the second pair of opposed parallel side walls.

11. The island refrigerated display case as recited in claim 7 wherein the refrigerated air discharge conduit has a first air discharge register, a second air discharge register and a third air discharge register disposed intermediate the first and second air discharge registers, the first discharge air register imparting a lateral directional component to air discharging therethrough generally toward a first side wall of the second pair of opposed parallel side walls, the second discharge air register imparting a lateral directional component to air discharging therethrough generally toward a second side wall of the second pair of opposed parallel side walls, and the third air discharge register imparting a substantially longitudinal directional component to air discharging therethrough substantially parallel to the second pair of opposed parallel side walls.

12. The island refrigerated display case as recited in claim 11 wherein:
the lateral directional component imparted by the first discharge air register ranges from 10 degrees to 20 degrees outwardly relative to a longitudinal axis of the liner chest toward the first side wall of the second pair of opposed parallel side walls; and

the lateral directional component imparted by the second discharge air register ranges from 10 degrees to 20 degrees outwardly relative to a longitudinal axis of the liner chest toward the second side wall of the second pair of opposed parallel side walls.

13. The island refrigerated display case as recited in claim 7 wherein:
the refrigerated air discharge conduit has a air discharge register imparting a substantially longitudinal directional component to air discharging therethrough toward each side wall of the first pair of opposed parallel side walls and substantially parallel to the second pair of opposed parallel side walls.

14. The island refrigerated display case as recited in claim 13 further comprising:

a first air flow baffle operatively associated with the first air return inlet for deflecting air flow away from a central portion of the first air return inlet; and

a second air flow baffle operatively associated with the second air return inlet for directing air flow away from a central portion of the second air return inlet.

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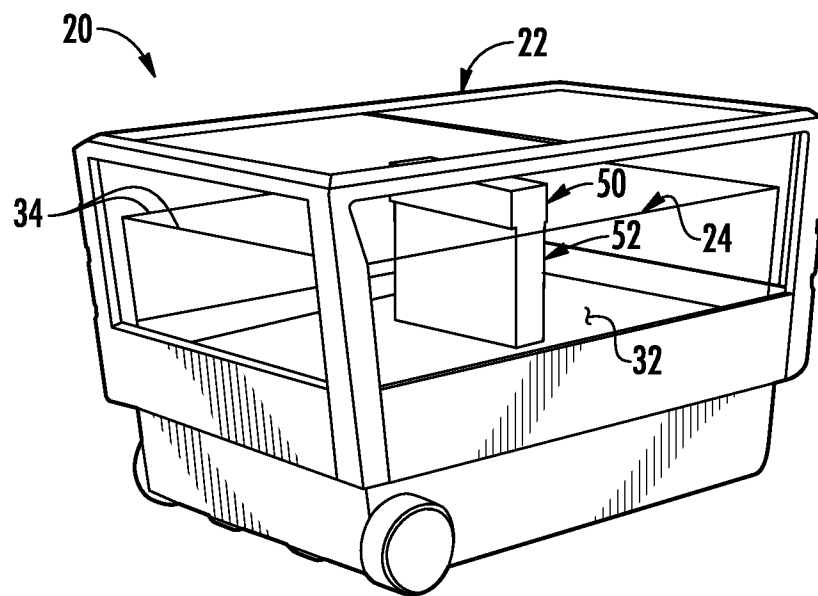


FIG. 1

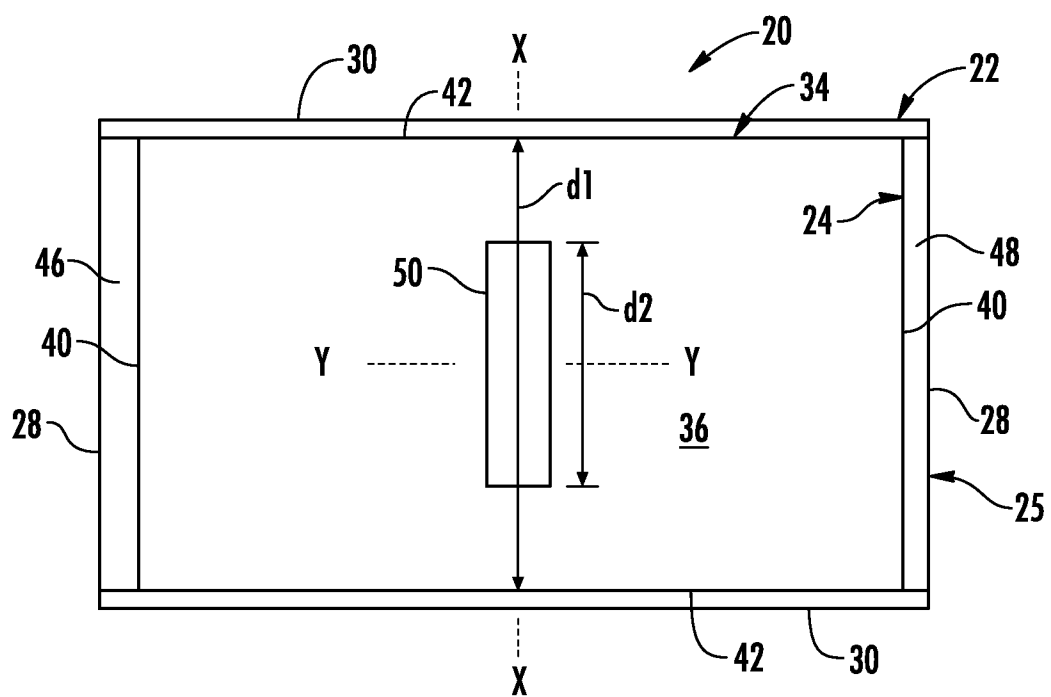


FIG. 4

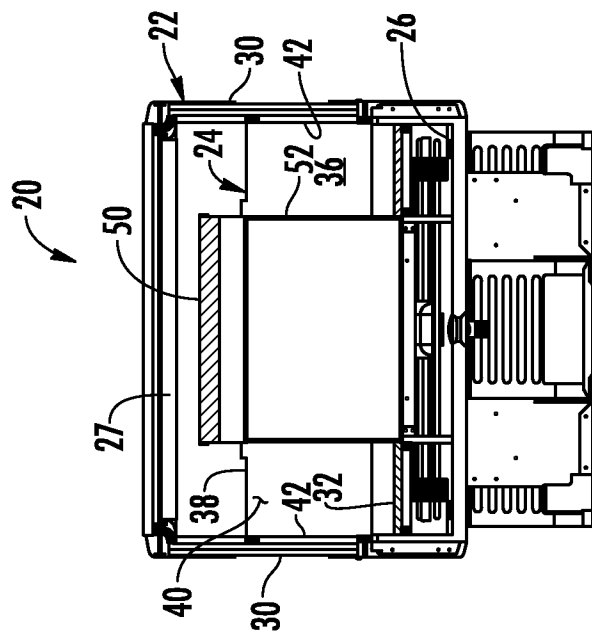


FIG. 3

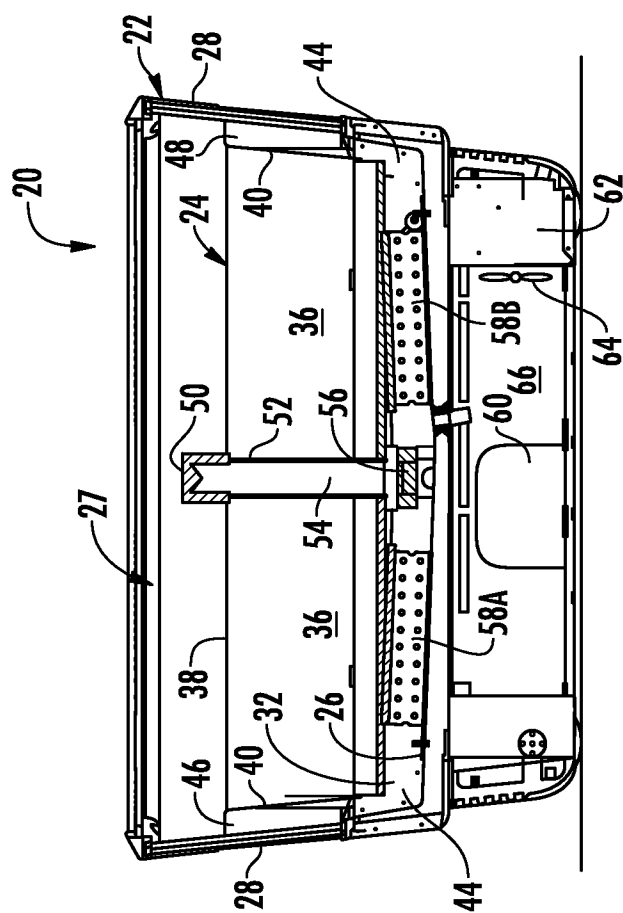


FIG. 2

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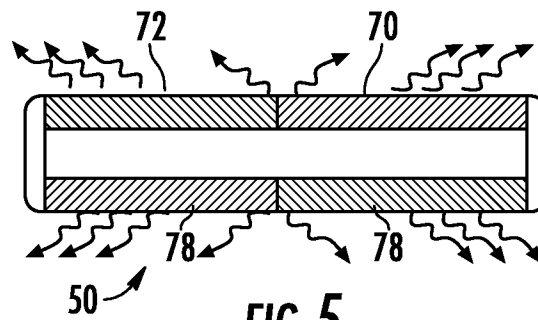


FIG. 5

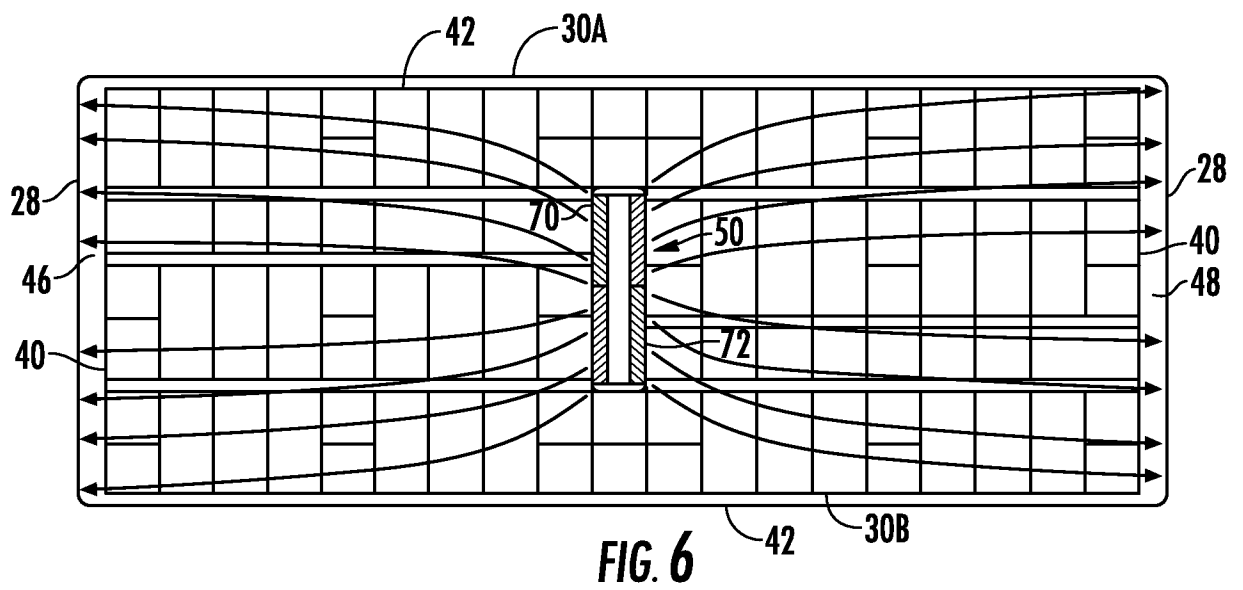


FIG. 6

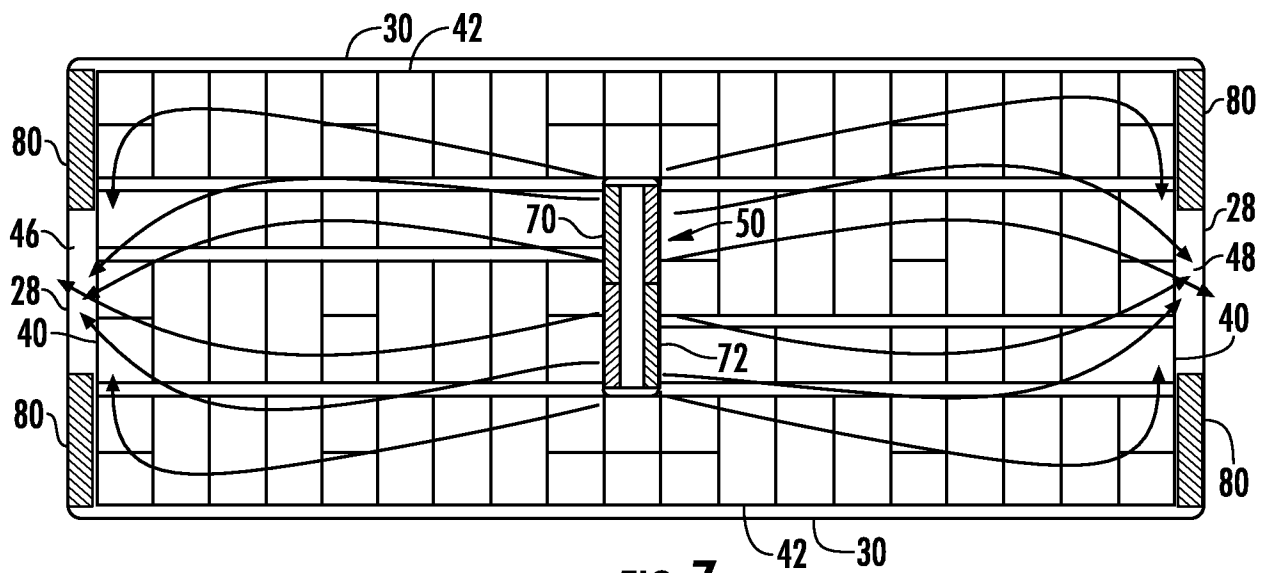


FIG. 7

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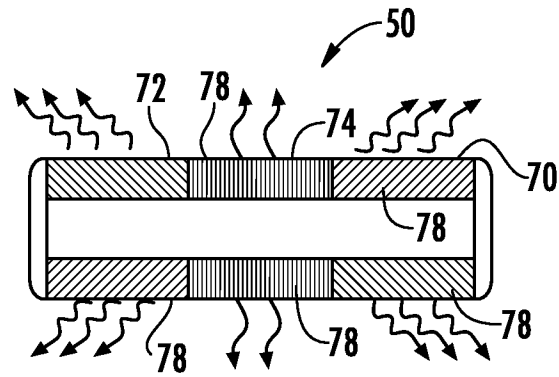


FIG. 8

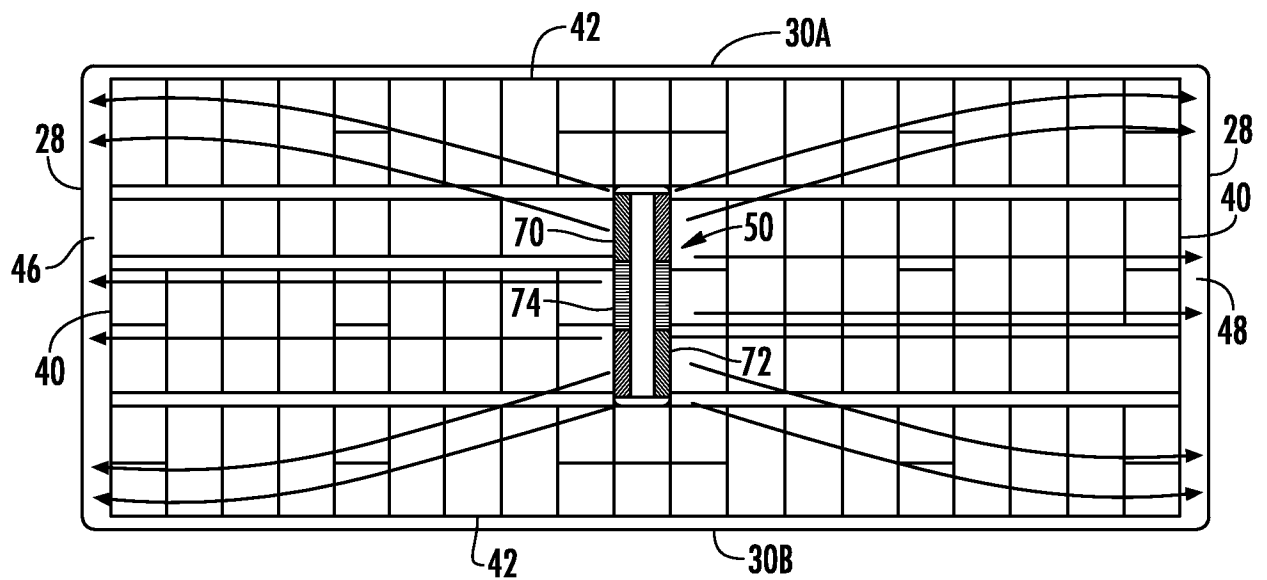


FIG. 9

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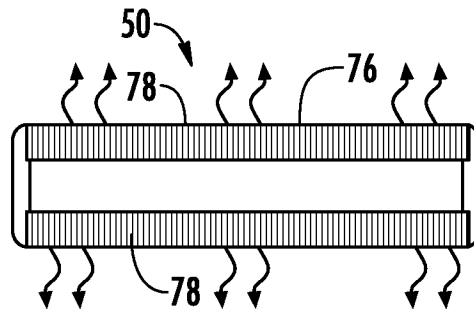


FIG. 10

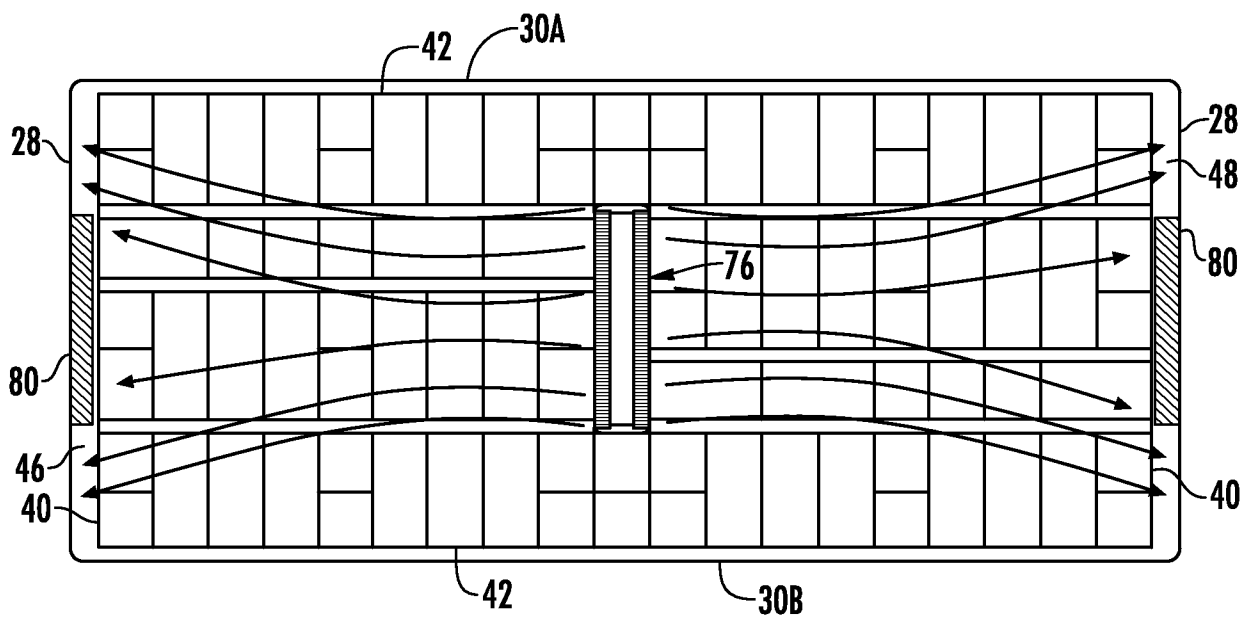


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/031097

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47F3/04 F25D1/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47F F25D

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 477 702 A (KENNEDY ET AL) 26 December 1995 (1995-12-26)	1-9,11, 13,14
Y	column 4, line 3 - column 5, line 61; figures 1-5	10,12
X	DE 43 01 148 A1 (LINDE AG) 21 July 1994 (1994-07-21) column 2, line 24 - line 30 column 3, line 1 - line 22; figures 2,3	1-7,13
X	DE 37 01 974 A1 (LINDE AG) 4 August 1988 (1988-08-04) column 2, line 23 - line 29 column 3, line 10 - column 4, line 13; figures 1-3	1-6
	----- -/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

3 May 2012

Date of mailing of the international search report

09/05/2012

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Authorized officer

Jacquemin, Martin

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/031097

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 666 497 A1 (ELEKTRO GROSSHANDEL THEODOR MAIER) 13 March 1992 (1992-03-13) page 4, line 1 - page 6, line 20; figure 1 -----	1-6
Y	US 6 381 976 B1 (KEMPIAK MICHAEL J [US] ET AL) 7 May 2002 (2002-05-07) column 1, line 23 - line 67 column 2, line 55 - line 67 column 3, line 23 - line 37; figure 5 -----	10,12

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/031097

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