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(54) **Low temperature showcase**

Niedrigtemperatur-Schauvitrine

Présentoir à basse température

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Description

[0001] This invention relates to a low temperature showcase according to the preambule of claim 1, and e.g. as disclosed in US-A-4964281.

[0002] Figure 3 illustrates a known low temperature showcase 61 comprising a heat insulating body 62, a heat insulating wall 63 and a storage chamber partition wall 64. An outer air passage 65 is formed between the heat insulating body 62 and the heat insulating wall 63, an inner air passage 66 is formed between the heat insulating wall 63 and the storage chamber partition wall 64. The outer passage 65 and the inner passage 66 are completely sectioned so that together they form a complete double structure. A fan 67 is mounted in the outer passage 65, and a fan 68 is mounted in the inner passage 66. When each of the fans 67 and 68 is operated, cool air moves within the outer air passage 65 in the direction of arrow A2 and within the inner air passage 66 in the direction of arrow B2. Air is admitted into the outer and inner air passages 65 and 66 through an inlet which can be cleaned and maintained by lifting up deck pan 69 in the direction of the arrow.

[0003] Figures 4 and 5 illustrate another known low temperature showcase 81 (see US-A-4964281) in which air passage 83 is formed in the bottom portion of a heat insulating body 82. Outer air passage 84 and an inner air passage 85 communicate with the air passage 83 and together form a double structure in a back portion of the heat insulating box body 82. These outer and inner air passages 84 and 85 are separated by a partition wall 86. Air flows into the bottom air passages 83 through an inlet which can be cleaned and maintained by lifting up deck pan 92 in the direction of the arrow. Figure 5 shows one fan 87 for supplying the outer air passage 84 and two fans 88 for supplying the inner air passage 85 positioned in the bottom passage 83. The fans are mounted in substantially the same plane in a row across the width of the low temperature showcase 81. A partition 89 is provided in the outlet side of fan casing 93 for the fan 87 which supplies the outer air passage 84 and the fans 88 which supply the inner air passage 85. An outer air passage opening 90 and inner air passage openings 91 are formed in the partition member 89. When the fans 87,88 are in operation, a flow of air is created in the direction of the arrow. Thus, air in the bottom air passage 83 is blown by the fan 87 into the outer air passage 84 through opening 90 and opening 94 in the partition wall 86. Similarly, air from the bottom air passage 83 is blown by each fan 88 into the inner air passage 85 through its respective opening 91 provided in the partition member 89.

[0004] In the known low temperature showcase 61 shown in Figure 3, the outer air passage 65 is covered by the heat insulating wall 63 and the inner air passage 66 is interrupted by the fan 68 so cleaning and maintaining the drain which flows into the outer and inner air passages 65 and 66 is not easy.

[0005] In the known low temperature showcase 81 shown in Figures 4 and 5 in which the fans 87,88 for the outer and inner air passages 84,85 are arranged in a row across the width of the showcase, the air passage openings 90 and 91 in the partition wall 89 are small so the static blowing pressure is increased which creates a problem as the amount of the air flow passing through the outer passage 84 is reduced.

[0006] It is an object of the present invention therefore to provide a low temperature showcase which overcomes or substantially reduces the problems of the prior art showcases just described.

[0007] In accordance with the present invention, there is provided a low temperature showcase comprising a bottom air passage provided in the bottom portion of a heat insulating body, an outer air passage and an inner air passage which communicate with said bottom air passage, a plurality of fans for supplying air to said outer and inner passages provided in said bottom air passage, a partition provided in an outlet for said fans, an outer air passage opening provided in said partition through which air is blown from a fan into the outer air passage and an inner air passage opening which is provided in the partition through which air is blown from a fan into the inner air passage, at least said outer air passage opening being formed in substantially all of the area in a longitudinal direction of said partition.

[0008] Preferably, the fans are arranged in the bottom air passage across the width thereof and in substantially the same plane.

[0009] In the preferred embodiment, the showcase comprises a bottom portion blowing passage which is provided in a bottom portion of a heat insulating box body, an outer side blowing passage and an inner side blowing passage which are communicated with the bottom portion blowing passage, have a double structure and are provided in a back portion of the heat insulating box body, a plurality of fans for the outer side blowing passage and fans for the inner side blowing passage which are provided in the bottom portion blowing passage so as to be positioned within substantially the same plane, a partition member which is provided in an outlet side of a plurality of fans, an outer side blowing passage opening which is provided in the partition member and through which a blowing wind of the fan for the outer side blowing passage is introduced to the outer side blowing passage, and an inner side blowing passage opening which is provided in the partition member and through which a blowing wind of the fan for the inner side blowing passage is introduced to the inner side blowing passage, wherein at least the outer side blowing passage opening is formed in substantially all around the area in a longitudinal direction of the partition member.

[0010] Preferably, a fan casing for mounting the fan is provided, the fan casing having a partition plate which sections between a fan chamber for mounting the fan for the outer side blowing passage and a fan chamber

for mounting the fan for the inner side blowing passage, the partition member is constituted by a wall portion of the fan casing, and the outer side blowing passage opening and the inner side blowing passage opening are provided in the wall portion.

[0011] In accordance with the present invention, since at least the outer air passage opening is formed in substantially all around the area in a longitudinal direction of the partition member, the outer air passage opening is increased so the blowing static pressure is reduced and it is possible to increase an amount of the wind blowing in the outer air passage. Furthermore, since the bottom portion blowing passage has no dividers in it, its cleaning and the maintenance can be easily performed thereby improving operability.

[0012] A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a cross sectional view showing the bottom portion of a low temperature showcase of the present invention;
Figure 2 is a perspective view showing the fan casing and heat insulating wall of a low temperature showcase of the present invention;
Figure 3 is a cross sectional view showing the bottom portion of a prior art low temperature showcase;
Figure 4 is a cross sectional view showing the bottom portion of another prior art low temperature showcase; and
Figure 5 is a perspective view showing the fan casing and a heat insulating wall of the low temperature showcase of Figure 4.

[0013] Referring to Figure 1 there is shown a low temperature showcase 1 of the present invention which comprises a heat insulating body 2, a heat insulating partition wall 3 provided at an interval with respect to the heat insulating partition wall 3. An outer air passage 5 is formed between a back portion of the heat insulating box body 2 and the heat insulating partition wall 3, and an inner air passage 6 is formed between the heat insulating partition wall 3 and the storage chamber partition wall 4. A cooling device (not shown) is located in the inner air passage 6. A bottom air passage 7 communicates with the outer air passage 5 and the inner air passage 6 is formed in the bottom portion of the heat insulating body 2. A deck pan 8 is provided on the bottom passage 7, and a storage chamber 9 on which goods can be displayed is provided above the deck pan 8. In this case, cleaning and a maintenance of a drain which flows into the bottom air passage 7 are performed by lifting up the deck pan 8 in the direction of the arrow.

[0014] Arranged in the bottom air passage 7 (see Figure 2) are one fan 11 for the outer air passage 5 and two fans 12 for the inner air passage 6, these fans being arranged in a row across the width of the low temperature showcase 1 and in substantially the same plane. The fans 11,12 for the outer and inner air passages 5,6 are mounted in fan casing 13. The fan 11 for the outer air passage 5 is mounted in air chamber 14 and each fan 12 for the inner air passage 6 is mounted in the fan chamber 15. A partition 16 separates the fan chambers 14 and 15 from each other. A wall portion 17 which acts as a partition is provided in one side of the heat insulating wall 3 of the fan casing 13. An outer air passage opening 18 is formed below the wall portion 17 in all the area of the low temperature showcase 1 in a widthwise direction (a lengthwise direction), and an outer air passage inlet 20 is formed in the heat insulating wall 3 in all the area of the low temperature showcase in a widthwise direction (a longitudinal direction). Further, an inner air passage opening 19 is formed in wall 17 on the surface facing each fan 12 in fan chamber 15. On assembly, the wall portion 17 of the fan casing 13 and the periphery of the outer air passage inlet 20 of the heat insulating wall 3 are brought into contact with each other.

[0015] The operation of the showcase is as follows:

[0016] A current of cool air A1 flows into the outer air passage 5 and a current of cool air B1 flows into the inner side air passage 6. When the fans 11,12 for the outer and inner air passages 5,6 are operated, cool air in the storage chamber 9 is drawn into the fan casing 13 through suction port or inlet 21 provided in a lower portion of the front surface of the low temperature showcase 1. Cool air sucked into the fan chamber 14 for the outer air passage 5 is introduced into the outer air passage 5 through the outer air passage opening 18 and the outer air passage inlet 20 after which it travels upwardly to be blown out from an outer air passage outlet (not shown) into the storage chamber 9. At the same time, cool air sucked into each fan chamber 15 is introduced to the inner air passage 6 through the inner air passage opening 19 after which it travels upwardly where it is cooled via the cooling device (not shown) and blown out from an inner side blowing passage outlet (not shown) into the storage chamber 9.

[0017] In accordance with the present invention, since the outer air passage opening 18 is formed in all the area in the longitudinal direction of the wall portion 17, the outer air passage opening 18 is enlarged so blowing static pressure is reduced and it is possible to increase the blowing amount of the outer air passage 5. Further, since the bottom blowing passage 7 has no partition or dividers in it, it is easy to clean and maintain thereby improving operability.

[0018] Although the heat insulating wall 3 is provided between the outer air passage 5 and the inner air passage 6, it may be a partition wall.

[0019] In accordance with the invention, since at least the opening for the outer side air passage is formed in substantially all of the area of the partition member in the longitudinal direction, the opening for the outer air passage is enlarged so the blowing static pressure is reduced and it is possible to increase the amount of blown air in the outer air passage. Further, since the bot-

tom portion air passage does not have any partitions in it, it is easy to clean and maintain so its operability is improved.

Claims

1. A low temperature showcase comprising a bottom air passage (7) which is provided in the bottom portion of a heat insulating body (2), an outer air passage (5) and an inner air passage (6) which communicate with said bottom air passage (7), a plurality of fans (11,12) for the outer and inner passage (5,6) provided in said bottom blowing passage (7), a partition (16) provided in an outlet for said fans (11,12), an outer air passage opening (18) provided in the partition (16) through which air is blown from a fan (11) into the outer air passage (5), and an inner air passage opening (19) which is provided in the partition (16) through which air is blown from a fan (12) into the inner air passage (6), **characterized in that**, at least said outer air passage opening (18) being formed in substantially all of the area in a longitudinal direction of said partition (16).

2. A low temperature showcase as claimed in claim 1 wherein the fans (11,12) are mounted in a casing (13) provided with a partition (16) which separates each fan chamber (15) for each fan (12) for the outer air passage (5) from fan chamber (14) for the fan (11) for the inner air passage (6), said partition (16) comprising a wall portion (17) of the fan casing (13), the outer air passage (5) opening and the inner air passage opening being provided in said wall portion (17).

3. A low temperature showcase as claimed in claim 1 or claim 2 wherein the fans are arranged in the bottom air passage (7) across the width thereof and in substantially the same plane.

4. A low temperature showcase as claimed in any preceding claim wherein the inner and outer air passages (5,6) have a double structure and are provided in a back portion of the heat insulating body (2).

Patentansprüche

1. Tieftemperaturvitrine, umfassend einen unteren Luftkanal (7), der im unteren Teil eines wärmeisolierenden Körpers (2) vorgesehen ist, einen äußeren Luftkanal (5) und einen inneren Luftkanal (6), die mit dem genannten unteren Luftkanal (7) in Verbindung sind, eine Mehrzahl von Lüftern (11, 12) für den äußeren und den inneren Kanal (5, 6), die in dem genannten unteren Gebläsekanal (7) vorgesehen sind, eine in einem Auslass für die genannten Lüfter (11, 12) vorgesehene Trennwand (16), eine in der Trennwand (16) vorgesehene äußere Luftkanalöffnung (18), durch die Luft von einem Lüfter (11) in den äußeren Luftkanal (5) geblasen wird, und eine in der Trennwand (16) vorgesehene innere Luftkanalöffnung (19), durch die Luft von einem Lüfter (12) in den inneren Luftkanal (6) geblasen wird, **dadurch gekennzeichnet, dass** wenigstens die genannte äußere Luftkanalöffnung (18) im Wesentlichen im gesamten Bereich in einer Längsrichtung der genannten Trennwand (16) ausgebildet ist.

2. Tieftemperaturvitrine nach Anspruch 1, bei der die Lüfter (11, 12) in einem Gehäuse (13) montiert sind, das mit einer Trennwand (16) versehen ist, die jede Lüfterkammer (15) für jeden Lüfter (12) für den äußeren Luftkanal (5) von der Lüfterkammer (14) für den Lüfter (11) für den inneren Luftkanal (6) trennt, wobei die genannte Trennwand (16) einen Wandabschnitt (17) des Lüftergehäuses (13) umfasst, wobei die Öffnung des äußeren Luftkanals (5) und die Öffnung des inneren Luftkanals in dem genannten Wandabschnitt (17) vorgesehen sind.

3. Tieftemperaturvitrine nach Anspruch 1 oder Anspruch 2, bei der die Lüfter im unteren Luftkanal (7) über dessen Breite und im Wesentlichen in derselben Ebene angeordnet sind.

4. Tieftemperaturvitrine nach einem der vorherigen Ansprüche, wobei der innere und der äußere Luftkanal (5, 6) eine Doppelstruktur haben und in einem hinteren Teil des wärmeisolierenden Körpers (2) angeordnet sind.

Revendications

1. Une vitrine à basse température comprenant un passage inférieur d'air (7) pratiqué dans la portion inférieure du corps isolant thermiquement (2), un passage supérieur d'air (5) et un passage intérieur d'air (6) qui communique avec ledit passage inférieur d'air (7), une pluralité de ventilateurs (11, 12) pour le passage extérieur et le passage intérieur (5, 6) pratiqués dans ledit passage de ventilation inférieur (7), une cloison (16) montée dans une sortie pour lesdits ventilateurs (11, 12), une ouverture extérieure de passage d'air (18) pratiquée dans la cloison (16), à travers laquelle l'air est soufflé par un ventilateur (11) dans le passage extérieur d'air (5) et une ouverture intérieure de passage d'air (19) qui est pratiquée dans la cloison (16) à travers laquelle l'air est envoyé par un ventilateur (12) dans le passage intérieur d'air (6), **caractérisée en ce que** au moins ladite ouverture extérieure de passage d'air (18) est pratiquée dans pratiquement la totalité de la région située dans une direction longitudinale de

ladite cloison (16).

2. Une vitrine à basse température selon la revendication 1, dans laquelle les ventilateurs (11, 12) sont montés dans un carter (13) dans lequel est prévue une cloison (16) qui sépare chaque chambre de ventilateur (15) de chaque ventilateur (12) en vue du passage de l'air extérieur (5) depuis la chambre de ventilateur (14) pour le ventilateur (11) pour le passage intérieur d'air (6), ladite cloison (16) consistant en une portion de cloison (17) du carter de ventilateur (13), l'ouverture du passage extérieur d'air (5) et l'ouverture du passage intérieur d'air étant pratiquées dans ladite portion de la cloison (17).

3. Une vitrine à basse température selon la revendication 1 ou la revendication 2, dans laquelle les ventilateurs sont répartis dans le passage inférieur d'air (7) sur toute sa largeur et pratiquement dans le même plan.

4. Une vitrine à basse température selon l'une quelconque des revendications précédentes, dans laquelle les passages intérieur et extérieur d'air (5, 6) ont une structure double et sont pratiqués dans une portion postérieure du corps thermiquement isolant (2).

FIG. 1

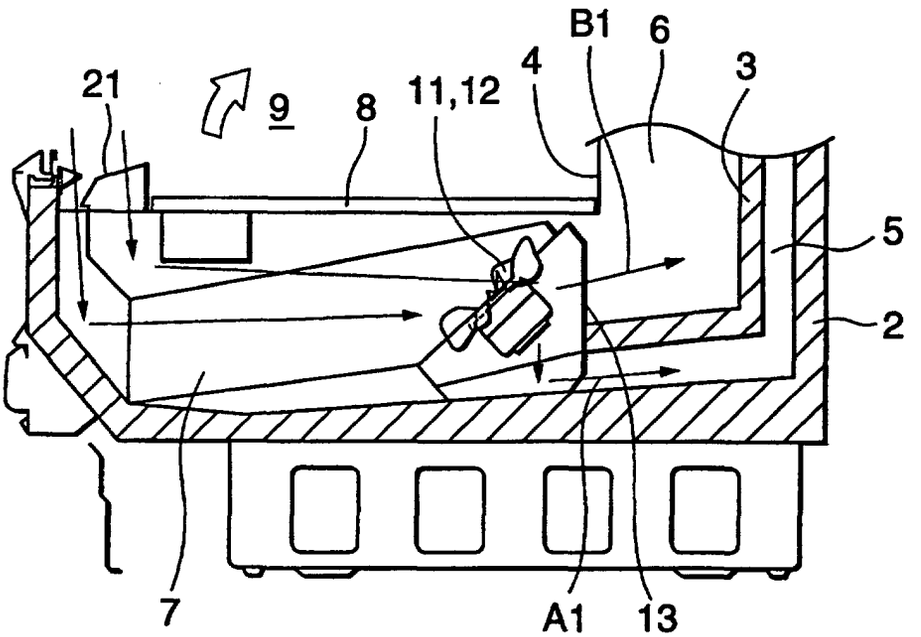

FIG. 2

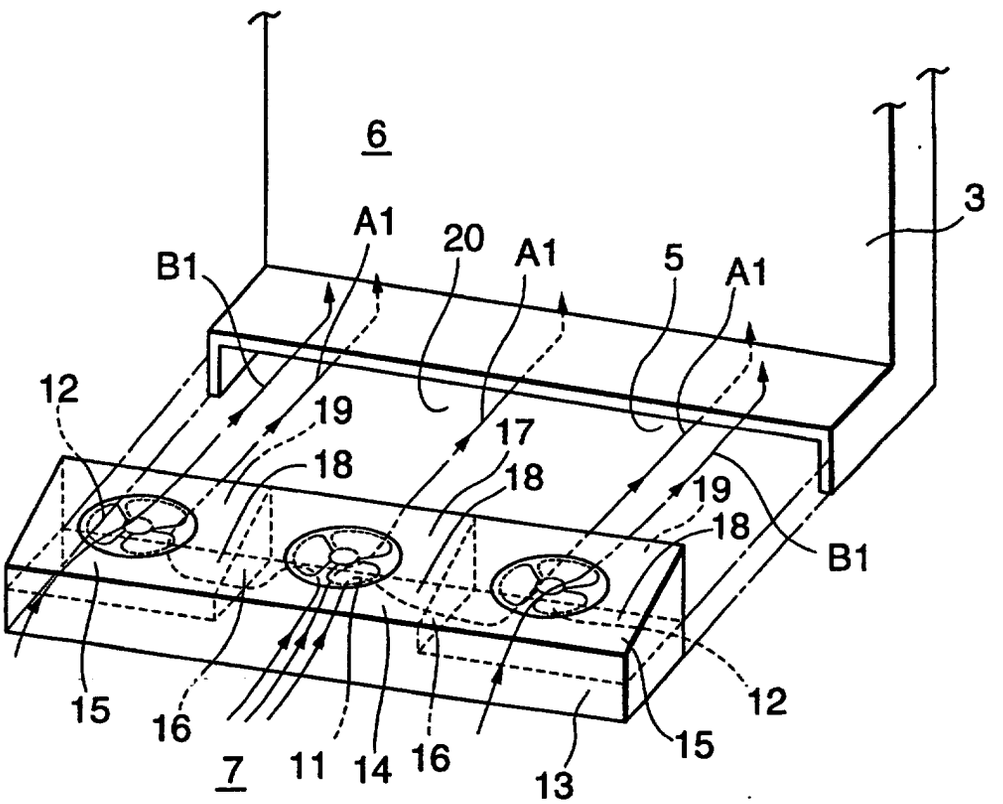

FIG. 3

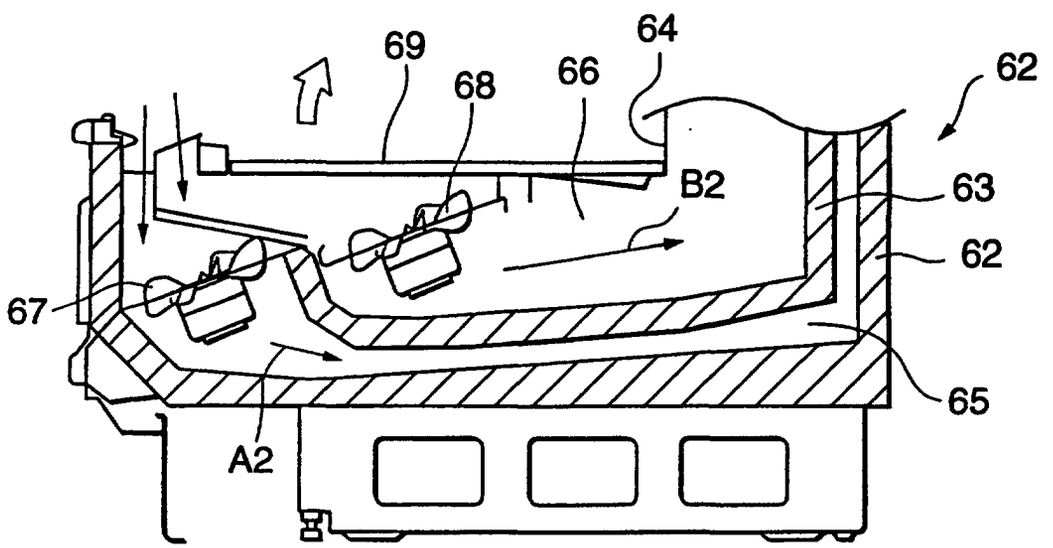

FIG. 4

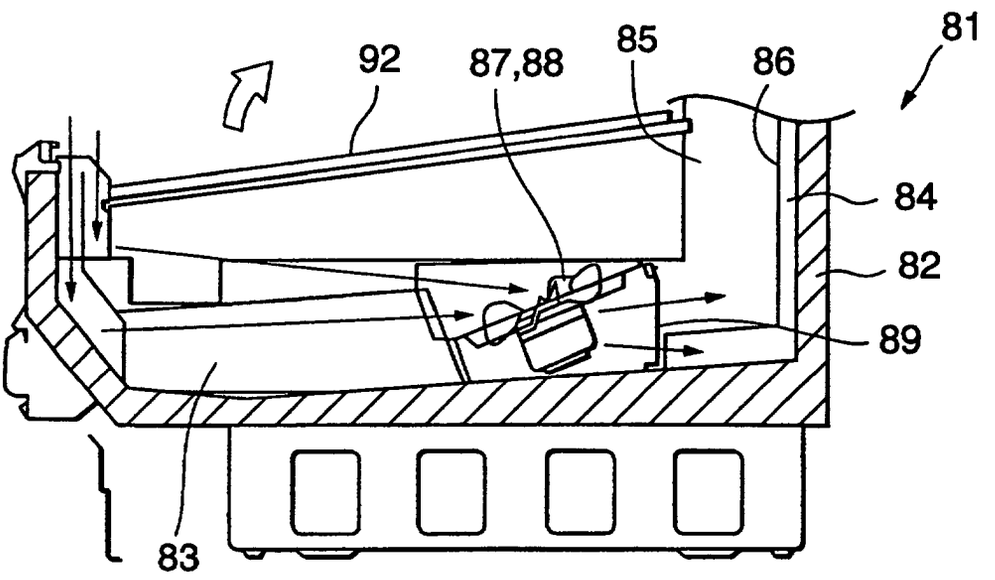

FIG. 5