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(54) **Method for reducing the moisture content of air of a defined space**

(57) Method for reducing the moisture content of air of a first defined space in communication with, via an entrance to said first defined space, at least one second defined space, the air of first defined space having lower moisture content than that of said at least one second defined space, whereby the reduction of the air moisture content is achieved by at least one means for dehumidified air. The reduction of the air moisture content is

achieved by dividing said at least one second defined space into two compartments arranged in series and communicating with each other via partition means, taking wholly or partially air having higher moisture content from the compartment of the second defined space located longest from the first defined space, dehumidifying said air, and feeding said dehumidified air wholly or partially to the compartment of the second defined space located closest to the first defined space.

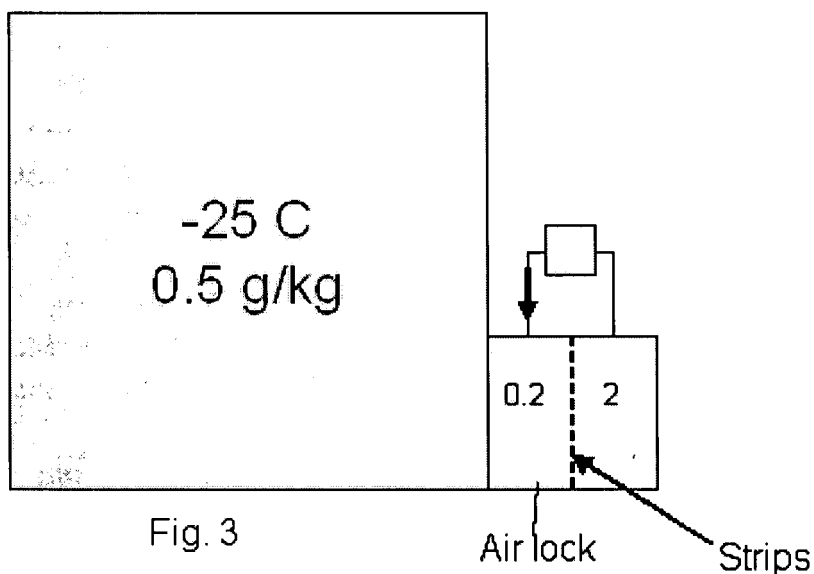


Fig. 3

Air lock

Strips

Description

Field of the invention

[0001] The present invention relates to a method for reducing the moisture content of the air of a first defined space in communication with, via an entrance to said first defined space, at least one second defined space, the air of first defined space having lower moisture content than that of said at least one second defined space, whereby the reduction of the air moisture content is achieved by at least one means for dehumidifying air.

Background of the invention

[0002] Although, in the description below reference is made to a cold-storage room, it should be noted that method according to the invention can be used in connection with other types of rooms or warehouses or defined spaces to which one should have access to and in which the air moisture content should be reduced compared with the air moisture content outside said defined space. One example is a room for manufacturing lithium batteries, the air moisture content of which is reduced.

[0003] A problem with cold-storage rooms for goods, to which one has access to through some type of entrance or door, is that the air outside said rooms usually have higher moisture content than the air inside said rooms, which results in the formation of air frost and ice on the surfaces of said rooms and the goods stored therein. This problem is accentuated on the surfaces of cooling equipment used for cooling said rooms.

[0004] One way of eliminating this problem is to arrange an air lock in connection with the door to the cold-storage room. To further improve the efficiency of the air lock it is known to supply dried air to said air lock. However, to dry said air energy is consumed, and due to increasing energy costs solutions are sought to reduce the energy needed to dry said air supplied to the air lock and to increase the degree of dryness of the air supplied to the cold-storage room.

[0005] In connection with, for instance, the room for manufacturing lithium batteries the problem with the formation of air frost and ice does not exist, but still has the problem with high energy costs, and also the aim at increasing the degree of dryness of the air supplied to said room.

[0006] The object of the invention is thus to obtain a more efficient way of providing the dried air to the cold-storage room or other spaces, the air of which has a less moisture content than the air outside said cold-storage room or space, to less costs and with higher degree of dryness. In so doing it is possible to use a dehumidifier or other means for drying/dehumidifying air with less capacity and which thus is less expensive.

[0007] This object is achieved according to the invention by a method for reducing the moisture content of air of a first defined space in communication with, via an

entrance to said first defined space, at least one second defined space, the air of first defined space having lower moisture content than that of said at least one second defined space, whereby the reduction of the air moisture content is achieved by at least one means for dehumidifying air,

characterized by

taking air having higher moisture content than the air of the first defined space, drying said air by said at least one means for dehumidifying air, and feeding said dehumidified air wholly or partially to the first defined space.

Brief description of the invention

[0008] A non-limiting example of the present invention will be described hereinafter with reference to the accompanying drawing on which Fig. 1 is a schematic view of a known arrangement of a cold-storage room having an air lock to which dehumidified air is supplied, Fig. 2 is a schematic view of the most generic form of the method according to the invention applied to at least one defined space in a series of one or several defined spaces, and Fig. 3 shows a cold-storage room having an air lock divided into two compartments, whereby the dehumidified air is supplied to the compartment of the air lock situated closest to the room which should contain air having low moisture content.

Description of preferred embodiments

[0009] Fig. 1 shows a cold-storage room the entrance of which is provided with an air lock according to prior art. Air from the air lock is fed to a dehumidifier which is dehumidified/dried by said dehumidifier, and the dried air is fed back to the air lock. In a typical case the air in the cold-storage room should have a moisture content of about 0.5 grams water/kg air at -25°C.

[0010] Fig. 2 is a schematic view of the most generic form of the method according to the invention applied to at least one defined space in a series of one or several defined spaces which are in communication with each other via some type of door or doorway. As can be seen from said Fig. 2 air with higher moisture content in a first defined space is fed to the dehumidifier, and the dried air is fed to a second defined space having air with lower moisture content than the first defined space. Preferably the first defined space is separated from the second defined space by some type of partition means, for instance, a plurality of elastic stripes positioned adjacent to each other or at least one swing door.

[0011] A preferred embodiment for carrying out the method according to the invention is shown in Fig. 3. The entrance to the cold-storage room is provided with an air lock. Said air lock is divided into at least two serially connected compartments by partition means, preferably of the type mentioned above. Air from the compartment of the air lock having highest moisture content is fed to a dehumidifier or some other type of means for dehumid-

ifying air and dried, and then feed wholly or partially to the compartment of the air lock located closest to the entrance of cold-storage room. Said entrance may be provided with some type of partition means, preferably of the above-mentioned type.

[0012] As can be inferred from the above the first defined space and the compartments of the second defined space have all communication with each other, although some type of partition means is or may be provided between said spaces.

[0013] In a typical example the air of the compartment having highest moisture content has a water content of 2 grams/kg air (indicated by numeral 2 in said Fig. 3). Said air is dried to a water content of 0.2 grams/kg air (indicated by numeral 0.2 in said Fig. 3) which results in a water content in the cold-storage room of less than 2 grams water/kg air, preferably 0.5 grams water/kg air, at a temperature of -25°C.

[0014] The method according to the invention is thus characterized by dividing said at least one second defined space into two serially connected compartments by said partition means, taking wholly or partially the air having higher moisture content from the compartment of the second defined space located longest from the first defined space, dehumidifying said air, and feeding said dehumidified air wholly or partially to the compartment of the second defined space located closest to the first defined space which has communication with the said compartment of the second defined space.

[0015] Of course, as is obvious for the man skilled in the art, the second defined space may be divided into more the two serially connected compartments, for instance, three.

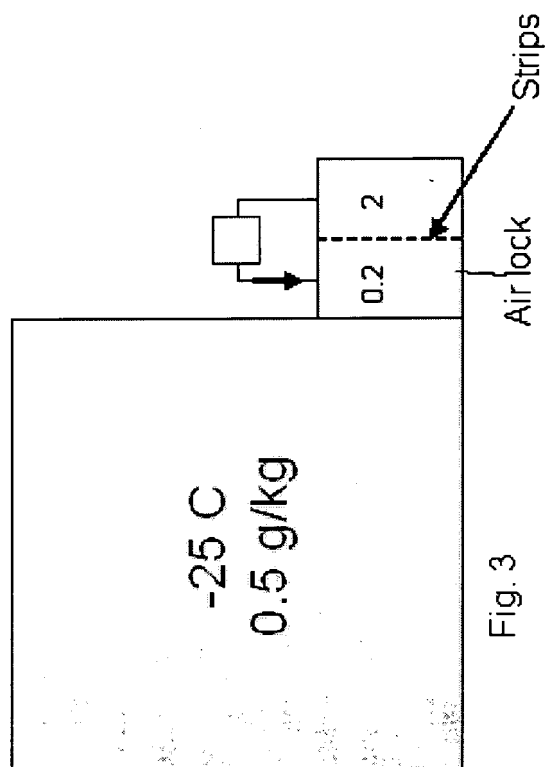
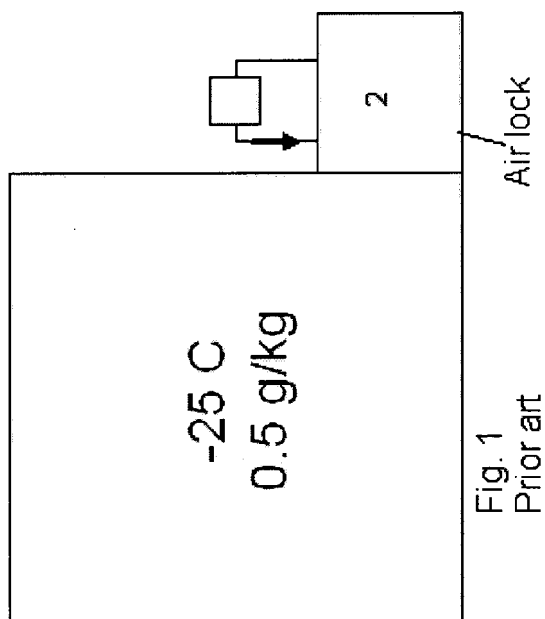
Claims

1. Method for reducing the moisture content of air of a first defined space in communication with, via an entrance to said first defined space, at least one second defined space, the air of first defined space having lower moisture content than that of said at least one second defined space, whereby the reduction of the air moisture content is achieved by at least one means for dehumidifying air,
characterized by

- dividing said at least one second defined space into two compartments arranged in series and communicating with each other via partition means,
- taking wholly or partially air having higher moisture content from the compartment of the second defined space located longest from the first defined space,
- dehumidifying said air, and
- feeding said dehumidified air wholly or partially to the compartment of the second defined space

located closest to the first defined space.

2. Method according to claim 1, **characterized by** said at least one second defined space being an air lock through which entrance is made to the first defined space.
3. Method according to claim 1, **characterized by** the entrance to the first defined space being provided with partition means.
4. Method according to claim 1, **characterized by** the means for drying air being at least one dehumidifier.
5. Method according to claim 1, **characterized by** the first defined space being a cold-storage room.
6. Method according to claim 1, **characterized by** the first defined space being a space having a moisture content of less than 2 grams water/kg air.
7. Method according to any of claims 1-6, **characterized by** forming the partition means of a plurality of stripes positioned adjacent to each other.
8. Method according to any of claims 1-6, **characterized by** forming the partition means of at least one swing door.



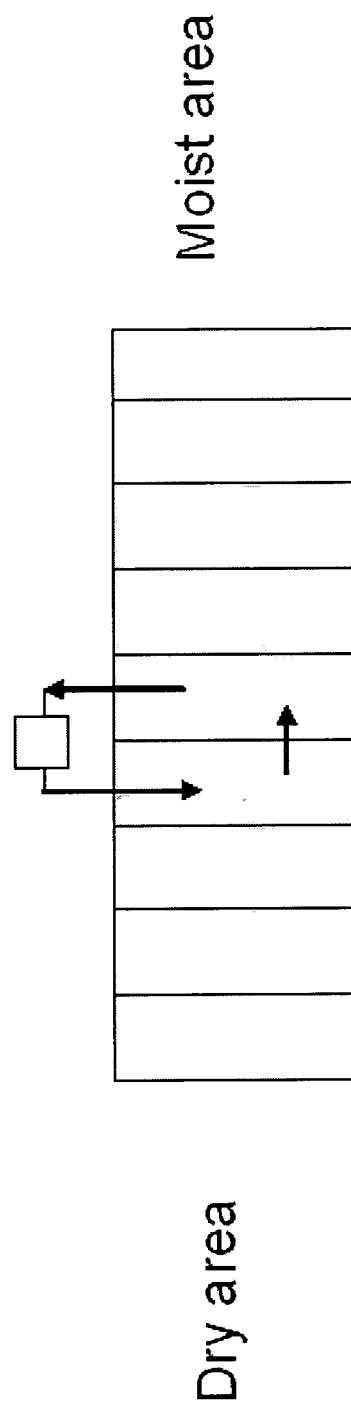


Fig. 2