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(54) **Refrigerator cabinet**

(57) Refrigerator cabinet, especially for bringing bottles of wine to the proper serving temperature, comprising a refrigerating system with a heat exchanger (14a, 14b), which is arranged in a heat exchanger chamber (11, 12), a storage compartment (7) which is enclosed by outer cabinet walls (1, 2, 3, 4, 5) and by a cabinet door (6), and a partition wall (8) for delimiting a first (7a) and a second (7b) zone within said storage compartment. The partition wall is fixable at different positions within a zone size varying portion (9) of said storage compartment for allowing the sizes of the first and second zone to be varied.

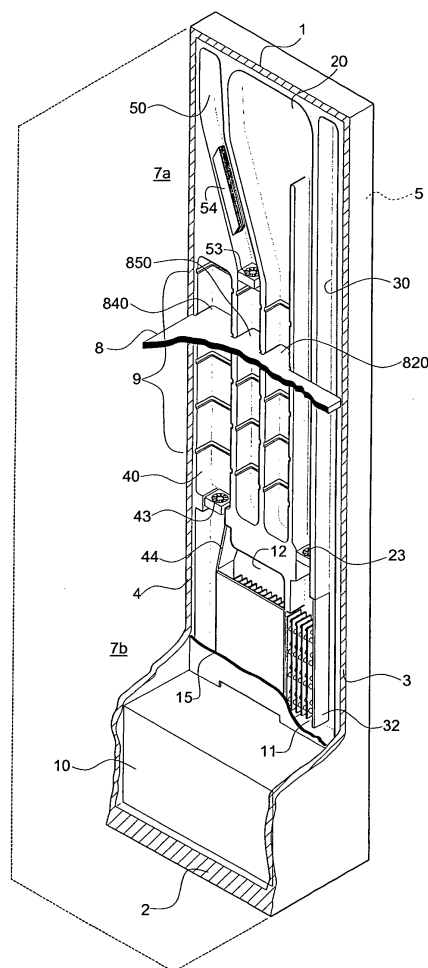


Fig. 2

Description

Field of the invention

[0001] The invention relates to a refrigerator cabinet, especially for bringing bottles of wine to the proper serving temperature. Such refrigerator cabinets are sometimes referred to as service wine cellars. The refrigerator cabinet according to the invention is especially suitable for storing or bringing bottles of wine to the respective optimal serving temperature, which wines are best served at different temperatures.

Background

[0002] Different wines are normally considered to be best served at different serving temperatures. Generally, many red wines are considered to be most tasteful when served at around 15-19 °C, whereas many white wines should be served at around 6-10 °C. Further, different wines within each group of red and white wines have a more precise optimal serving temperature within these general ranges. For instance, some red wines are best served at 15,5 °C, whereas other red wines are better at 18 °C. Normally, it is further considered that long term storing of wines, both red and white should better take place at around 11 °C. Especially for restaurants and the like there therefore exists a need for bringing the wines to be served within a relatively short period of time from the storage temperature to the desired serving temperature. For this purposes, so called service wine cellars might be used. Bottles of wine that are to be served for example the next day are brought from the long-term storage to a service wine cellar, where they adopt a more suitable serving temperature than the long term storage temperature.

[0003] Depending on for instance the season, the demand for different types of wine might vary. It is therefore desirable that the service wine cellars are able to handle varying amounts of bottles that are to be served at a higher and lower temperature.

Prior art

[0004] Previously known service wine cellars are normally constituted by a refrigerator cabinet, which comprises a refrigerating system and two compartments. A first, normally upper, compartment for red wines is kept at a higher temperature and a second lower compartment for white wines is kept at a lower temperature. In order to be able to meet the varying demand for red and white wines, the sizes of the upper and lower compartments might be varied by altering the vertical position of a movable partition wall, which divides the first and second compartment from each other.

[0005] A respective evaporator cools each compartment. The evaporators might be positioned on the inside of the back wall of each compartment. Alternatively the

evaporators might be placed in the back wall of each compartment and communicate with the respective compartment via air openings in the back wall. The evaporators might be connected in series and form part of a common refrigerator system. However, in such case a single temperature sensor for measuring and controlling the temperature is placed in one of the compartments. The temperature in the compartments cannot therefore be controlled individually. Alternatively, each evaporator may form part of a respective refrigerating system. Each compartment and refrigerating system may then be provided with a respective temperature sensor. This allows for better individual control of the temperature in each compartment but it also adds considerably to the cost of the service wine cellar.

[0006] In both cases, the evaporators or the air openings are arranged in the upper portion of the upper compartment and in the lower portion of the lower compartment, such that they don't interfere with that portion of the cabinet in which the partition wall is movable. Such placement of the evaporators or air openings is unfavourable for achieving a well-controlled and constant temperature gradient within the compartments.

[0007] At such known service wine cellars it might be possible to keep the temperature in an area close to the temperature sensor comparatively constant and at the desired temperature with comparatively high accuracy. However, the known systems provide little control of the temperature gradient within each compartment.

Summary of the invention

[0008] It is an object of the present invention to provide an improved refrigerator cabinet, which is suitable for bringing bottles of wine and the like to a desired serving temperature.

[0009] Especially, it is object to provide such a refrigerator cabinet which allows for varying the sizes of two or more compartments or zones kept at different temperatures and which provides for an improved control of the temperature and temperature gradients within each zone.

[0010] These and other objects are achieved by a refrigerator cabinet according to the preamble of claim 1, which refrigerator cabinet exhibits the special technical features as set out in the characterizing portion of claim 1.

[0011] The refrigerator cabinet according to the invention comprises a refrigerating system with a heat exchanger, which is arranged in a heat exchanger chamber, a storage compartment which is enclosed by outer cabinet walls and by a cabinet door and, a partition wall for delimiting a first and a second zone within said storage compartment, which partition wall is fixable at different positions within a zone size varying portion of said storage compartment, for allowing the sizes of the first and second zone to be varied. The cabinet is characterized by an air supply channel for supplying air of a first air flow, which circulates between a first heat exchanger

chamber and the first zone, to the first zone;

an air outlet channel for conducting air of a second air flow, which circulates between a second heat exchanger chamber and the second zone, from the second zone, which first and second circulating air flows are essentially separated from each other;

a number of orifices arranged along a portion of at least one of said air supply and air outlet channels for allowing communication between said at least one air channel and said storage compartment, which air channel portion extends along said zone size varying portion; and means for blocking the communication between said at least one air channel and one of said first and second zone, through said orifices, while allowing communication between said at least one air channel and the other of said first and second zone, through said orifices.

[0012] The inventors have realized that an enhanced control of the temperature gradient in each compartment or temperature zone of a cabinet may be obtained if cooled air is supplied to the bottom of the zone and drawn off from the top of the zone. By this means a homogeneous air-flow from bottom to top may be obtained. This reduces any uncontrolled circulation within the zones to thereby create a controlled and stable temperature gradient in each zone. The temperature in each zone will thereby increase gradually from the lower to the upper portion of the zone, in a well controlled manner. The inventors have further realized that such a well control temperature gradient within each zone may be utilized for storing bottles of wine which requires slightly different serving temperatures at different positions within one and the same temperature zone.

[0013] The invention renders it possible to create such a well defined homogeneous airflow from bottom to top in each zone even if the partition wall dividing two zones is movable for variation of the sizes of the zones.

[0014] According to the invention this is made possible by keeping the airflows communicating with the first and second zone respectively separated from each other and by at least one channel for supplying air to or drawing off air from at least one temperature zone. The channel communicates at one end with a heat exchanger chamber for bringing the air to a suitable temperature. Normally this means cooling the air. The other end of the channel exhibits a portion provided with orifices through which the channel communicates with the storage compartment housing the different zones. This portion of the channel extends along that portion of the complete storage compartment where the partition wall may be fixed at different positions for defining the sizes of the zones. Now, at any possible position of the partition wall, the means for blocking the airflow in the channel may be applied such that air passing to or from the heat exchanger chamber can only pass through orifices arranged at one side of the partition wall. Thus, only one of the two zones may communicate with the heat exchanger chamber through the channel.

[0015] If for instance the cabinet is of the upright type

with the first zone arranged on top of the other, the channel may be used for supplying air to the bottom portion of the upper zone. Since orifices are arranged along that portion of the cabinet at which the partition wall may be fixed it is accomplished that at least one orifice for supplying air from the channel is arranged at a lower part of the upper zone. In this case the blocking means prevents air supplied from the heat exchanger to enter the second zone, which would otherwise both reduce the airflow to the upper zone and affect the temperature in the lower zone. A fixed air outlet may be arranged in the upper portion of the upper zone, which outlet is connected with the heat exchanger chamber for recirculation.

[0016] The channel according to the invention may alternatively be used for drawing off air from the lower zone. In correspondence with what is described above, at least one orifice will always be positioned at an upper portion of the lower zone, irrespective of where the partition wall is positioned. Here, the blocking means prevents air to be drawn off from the upper zone and allows air to be drawn off from an upper part of the lower zone. A fixed air inlet may be arranged in the lower part of the lower zone for supplying air from the heat exchanger chamber to this zone.

[0017] Thus, the invention makes it possible keep the circulating air flows separated from each other, to supply air at a lower part of at least one temperature zone in a multiple zone cabinet and to draw off air from the upper part of the same zone, irrespective of where a movable partition wall is positioned. Thereby, a homogenous and well defined air flow within said zone may be achieved which creates a stable and well defined temperature gradient in the same zone. Since the temperature gradient in the zone is well defined and stable bottles of wine to be served with as little as 1 or even 0,5 °C difference in temperature may be placed on shelves at different levels in the zone to be brought to the respective desired temperature with high accuracy.

[0018] The means for blocking communication with one zone while allowing communication with the other, may be formed simply as blocking plugs which are introduced in the orifices arranged on the same side of the dividing wall as the zone which is not to communicate with the heat exchanger chamber in question. Naturally such plugs may be added removed or moved in relation to where the partition wall is positioned. However, the blocking means are suitably formed as a cut-off flange, which is insertable in the channel for cutting of the airflow through the channel at a level, which corresponds to the present position of the dividing wall. Such an embodiment facilitates handling since only one element need to be inserted for inactivating several orifices arranged in the zone, which is not to communicate with the heat exchanger. Especially if the cabinet comprises several channels of the above-described type, this embodiment facilitates cutting of several channels simultaneously by arranging a corresponding number of cut-off flanges on a common member.

[0019] Preferably one or several cut-off flanges are arranged on the partition wall. By this means the channel or the respective channels will be automatically cut off at the correct level when the partition wall is fixed at any of its possible positions.

[0020] As mentioned above a single channel may be used either for supplying air or drawing of air from one zone. However, the cabinet may also comprise two or several channels. Each channel is then arranged for supplying or drawing off air to or from one zone. In such case channels communicating with one and the same zone are connected to one and the same heat exchanger chamber, whereas channels communicating with different zones are connected to different heat exchanger chambers. With such an arrangement it is possible to achieve the precise and accurate temperature control, which is made possible by the invention, in several or all zones of a multiple zone compartment.

[0021] Preferably the cabinet comprises at least one ventilator for creating a forced airflow in a respective of said channels. By this means an even more precise control of the temperature in the respective zone may be obtained. In contrast to if air is circulated between the respective zone and its heat exchanger by natural convection, the use of a ventilator makes it possible to regulate the temperature in the zone both by regulating the refrigeration system comprising the heat exchanger and by regulating the airflow. Such two-parameter regulation is not only more precise, but also faster and more energy efficient.

[0022] When at least one channel is provided with a ventilator this channel preferably comprises means for preventing self-circulation through said at least one channel. Such means might for instance comprise a U-shaped portion of the channel, in which portion comparatively heavy cold air is stuck by influence of the gravitation to thereby obstruct self-circulation. With such self-circulation preventing means it is possible to completely block the air circulation through the respective zone and heat exchanger chamber, by simply inactivating the ventilator. Such an arrangement also leads to a faster and more precise control of the temperature in the zone.

[0023] In case the temperature in two or several zones are to be controlled by means of a respective channel. Each channel is preferably connected to a separate heat exchanger channel, such that regulation of the temperature in one zone does not affect the temperature in another zone. For achieving an optimal temperature regulation, the different air flows circulating through the different zones should if possible be kept completely separated from each other. This may be achieved by utilising a separate refrigeration system with a respective heat exchanger for cooling the respective airflows. Such an arrangement is however rather costly and space demanding. Alternatively and preferably the cabinet instead comprises a single refrigerator system with a single heat exchanger having a first portion which is arranged in a first heat exchanger chamber and a second portion which

is arranged in a second heat exchanger chamber. For reducing any mixing of the airflows the first and second heat exchanger chambers are preferably essentially hermetically sealed from each other. By this means a comparatively simple, space and energy efficient as well as cheap arrangement is made possible which arrangement still allows fast and accurate temperature control. The refrigeration system may be of any type such as a compressor based system or an absorption refrigerating system.

[0024] For enhancing the distribution of air within a single zone to thereby further stabilize the temperature gradient, the cabinet may comprise an air distribution channel. The air distribution channel operates in a similar way as the above-described channel, in regard of how and where the air distribution communicates with the zone when the partition wall is moved in order to change the size of that zone. The air distribution channel thus comprises a number of air distribution orifices arranged along a portion of said air distribution channel for communication between the storage compartment and the air distribution channel. This air distribution channel portion extends along the zone size varying portion, and the partition wall comprises a third cut-off flange which is insertable into said air distribution channel portion. The air distribution channel further comprises at least one fixed orifice arranged at a part of said single zone, which part is opposite to the partition wall. By this means an air circulation flow passing through the zone, the fixed orifice, the air distribution channel and through at least one of the orifices arranged in proximity to the partition wall back to the zone is created. Such a circulating flow further enhances the temperature gradient within the zone, especially when the partition wall is positioned such that this zone is comparatively large.

[0025] For further enhancing the air distribution circulating flow, the air distribution channel may comprise an air distribution ventilator.

[0026] The air distribution channel may also comprise a heater. By this means the zone, which is in communication with the air distribution channel may be heated in a simple and efficient manner. Such heating may be desirable especially for quickly heating red bottles of wine, which bottles have been previously stored at a storage temperature below the desired serving temperature. Heating of, for instance, a warmer zone for red wines may also be needed if the cabinet is operated in a room where the ambient temperature is comparatively low.

[0027] In order to fully utilize the storage volume of the cabinet, the partition wall preferably constitutes a shelf on which bottles can be placed. Such an arrangement further facilitates changing the sizes of the zones since the partition wall may then simply be interchanged with another shelf previously arranged at another position in the portion of the storage compartment allowing fixation of the partition wall.

[0028] The cabinet preferably comprises a number of shelves which are hermetical and arranged in sealing

contact with the side and back walls of the cabinet. Such shelves are suitable for placing a comparatively large number of bottles in the cabinet without the need for stacking the bottles on each other. The hermetic and sealing arrangement of the shelves further enhances the formation of a homogenous airflow within the respective zone, which in turn contributes to achieving a stable and desirable temperature gradient within the zone.

[0029] Further objects and advantages of the invention will be given in the following detailed description of a preferred embodiment and by the appending claims.

Brief description of the drawings.

[0030] In the following a exemplifying detailed description of embodiments will be given with reference to the figures in which:

Fig. 1 is a perspective partly transparent view of a refrigerator cabinet according to an embodiment of the invention.

Fig. 2 is a perspective view in accordance with fig. 1, with some parts cut away.

Fig. 3 is a cross section from the front of the refrigerator cabinet in fig. 1, when a movable partition wall is in a first position.

Figs. 3a-3e are cross sections along line 3a-3a, 3b-3b, 3c-3c, 3d-3d and 3e-3e respectively.

Fig. 4 is a cross section from the front of the refrigerator cabinet in fig. 1, when the movable partition wall is in a second position.

Figs. 4a-4e are cross sections along line 4a-4a, 4b-4b, 4c-4c, 4d-4d and 4e-4e respectively.

Detailed description of embodiments

[0031] First with reference to fig. 1 and 2 the refrigerator cabinet shown in the figures comprises a top 1 and a bottom 2 wall, two sidewalls 3, 4 a back wall 5 and a front door 6. These walls and front door enclose a storage compartment 7. The storage compartment 7 is divided into an upper compartment or upper zone 7a and a lower compartment or lower zone 7b by a horizontal partition wall 8. The partition wall 8 is fixable at different vertical positions along a mid portion 9 of the storage compartment 7. In figs. 1 and 2 the partition wall 8 is fixed in its second upper most position. By changing the position of the partition wall 8, the sizes of the upper 7a and lower 7b zones are changed. The mid portion 9 of the storage compartment 7, along which portion the partition wall 8 may be fixed at different positions, is in the following referred to as a zone size varying portion 9. A number of horizontal shelves 70 for supporting bottles lying down

are arranged in each of the zones 7a, 7b (see e.g. Fig. 3a). The shelves 70 are detachable, such that any of the shelves in the zone size varying portion 9 may be easily interchanged with the partition wall 8. The shelves 70 further comprises a flange 71 which projects downwards from the rear edge of each shelf and extend over a left hand horizontal portion of the shelves. In figures 3a and 4a the shelves are shown in cross section whereas in figs. 3b-3e and 4a-4e the shelves are shown in a side view to thereby indicate that the flanges do not extend over the entire width of the shelves but only over a portion of the width, which portion corresponds to the width of orifices 42, which orifices 42 will be explained more in detail below.

[0032] A refrigerating system housing 10 is arranged at the lower part of the cabinet, for accommodating a refrigerating system (not shown). The refrigerating system is in the embodiment shown a compressor based system but may be of any other kind, such as an absorption refrigerating system.

[0033] The top 1, bottom 2, side 3, 4 and back 5 walls comprise an insulation of polyurethane foam. As is most clearly seen in fig 2, the back wall 5 comprises a plurality of cavities formed in the insulation. These cavities form a first 11 and a second 12 heat exchanger chamber, which are separated by a dividing wall 13 (see fig. 2). A heat exchanger 14 in the form of a finned evaporator of the refrigerating system is arranged in the first 11 and second 12 heat exchanger chamber. A first portion of the heat exchanger 14a is arranged in the first chamber 11 and a second portion 14b in the second chamber 12. The dividing wall 13 is in close contact with the heat exchanger, such that the first 11 and second 12 heat exchanger chambers are essentially sealed off from each other. A front wall 16 is arranged in front of the second heat exchanger portion 14b. The front wall 16 is preferably comprises an insulating material in order to prevent condensation on its front side. The insulated front wall may also extend in front of the first heat exchanger portion 14a in order to prevent condensation on the plate 15 in front of both heat exchanger portions 14a, 14b.

[0034] The cavities further form four channels 20, 30, 40, 50 for conducting air between the heat exchanger chambers 11, 12 and the upper 7a and lower 7b zone of the storage compartment 7.

[0035] The cavities forming the heat exchanger chambers 11, 12 and the channels are separated from the storage compartment by means of a comparatively thin plate 15, which extends over the entire cross section above the housing 10 at the back of the storage compartment 7. The plate 15 exhibits a number of communication openings or orifices 21, 22, 31, 42, 51, 52 for passage of air between the storage compartment 7 and the respective channel 20, 30, 40, 50. The plate 15 also exhibits an orifices 41 for supplying air from the second heat exchanger chamber 12 to the second zone 7b in the lower part of the storage compartment 7. The orifices 21, 31 and 51 are arranged above the zone size varying

portion 9 of the storage compartment and they are therefore always arranged in the upper zone. The orifice 41 is arranged below the zone size varying portion 9 and is therefore always arranged in the lower zone 7b. The orifices 22, 42, 52 are arranged along the zone size varying portion 9 and each of them may thus be arranged in either the upper 7a or lower 7b zone, depending on the position of the partition wall 8. In the shown embodiment each of the orifices 22, 42, 52 comprises five identical orifices arranged one above the other in the zone size varying portion 9. As indicated above the width of the flanges 71 of the shelves 70 corresponds to the width of the orifices 42 such that the flanges 71 may block communication through the orifices 42.

[0036] A ventilator 23, 43, 53 is arranged in each of the respective channels 20, 40 and 50. A heater 54 is arranged in channel 50.

[0037] The partition wall 8 comprises three cut-off flanges 820, 840, 850, which are inserted through widened portions of the orifices 22, 42, 52, into the respective channel 20, 40, 50, when the partition wall is fixed at any of its positions along the zone size varying portion 9. When the cut-off flanges 820, 840, 850 are inserted in their respective channel 20, 40, 50, air is prevented to pass from one side of the flanges to the other in the respective channel.

[0038] Referring to figs. 2, 3, 3c, 3d and 3e the circulation of air through the upper zone and the first heat exchanger chamber will now be explained more in detail. The channel 20 is an air supply channel for supplying air from the first heat exchanger chamber 11 to the upper zone 7a. The air supply channel 20 comprises a first vertical portion 20a (figs. 3, 3d) and a second vertical portion 20b (figs. 3, 3c). These portions 20a, 20b are joined at a widened portion 20c, arranged at a level above the zone size varying portion 9 of the storage compartment 7. A ventilator 23 is arranged at the lower part of the first vertical portion 20a. The ventilator 23 draws air from the first heat exchanger chamber 11 and supplies the air through the first vertical channel portion 20a to the upper widened portion 20c. Here, a part of the air is supplied to the upper part of the storage compartment 7, through orifices 21. Since these orifices 21 are arranged above the zone size varying portion 9 of the storage compartment, the air supplied through these orifices 21 will always enter into the upper zone 7a. Part of the air continues down through channel portion 20b until it reaches cut-off flange 820. This part of the air is distributed into the upper zone 7a through those of orifices 22 that are arranged above the partition wall 8 along the zone size varying portion 9. Cut-off flange 820 prevents any part of the air from passing below the partition wall 8 and thereby from entering into the lower zone 7b. By this means the supply air to the upper zone 7a is evenly distributed into this zone 7a. The arrangement of orifices 22 along the zone size varying portion 9 also accomplishes that air is always supplied to a lower part of the upper zone 7a through an orifice 22 which is arranged above and in proximity to the par-

tion wall 8, irrespective of at which of its positions the partition wall is fixed.

[0039] In the embodiment shown in the figures the shelves 70 are arranged to allow air to pass through them. As illustrated in fig. 3e, air in the upper zone 7a is drawn off through two outlet openings 31 arranged in the plate 15. These outlet openings 31 are arranged above the zone size varying portion 9 and form a passage between the upper zone 7a and channel 30. The channel 30 constitutes an outlet channel for the upper zone 7a and is at its lower end connected to the first heat exchanger chamber 12. In the shown embodiment the outlet openings 31 are arranged at a certain distance from the top end of the channel 30 in order to enhance the vertical temperature gradient in the upper zone 7a. One or several such outlet openings may also or alternatively be arranged in the uppermost portion of the outlet channel 30 and upper zone 7a. At the lower end of channel 30, a wall 32 separates this channel 30 from the first heat exchanger chamber 11. This arrangement provides for that all air passing through the first heat exchanger chamber is forced to pass by the entire first heat exchanger portion 14a. Since the heat exchanger chamber 11 is arranged below respective upper portions of channels 20 and 30, self circulation in the circulation path formed of the first heat exchanger chamber 12, the supply channel 20, the upper zone 7a and the outlet channel 30 is prevented.

[0040] Now with reference to figs. 2, 3 and 3a circulation of air for cooling the lower zone 7b will be explained. An air supply channel 45 is formed between the front wall 16 of the second heat exchanger chamber 12 and the plate 15. Air passes from the top of the second heat exchanger chamber 12 through the supply channel 45 and the opening 41 into the lower portion of the lower zone 7b. The air passes up through the lower zone 7b by passing through the shelves 70. At the upper portion of zone 7b the air is drawn off through the one of orifices 42 arranged just beneath the partition wall 8 and enters channel 40, which forms an outlet channel for the lower zone 7b. The cut-off flange 840 which is inserted into the channel 40 prevents that air is drawn off from the upper zone 7a through any of the orifices 42 that are arranged above the partition wall, irrespective of the position of the partition wall. The flanges 71 of the shelves 70 arranged below the partition wall 8 blocks communication through the orifices 42 arranged along the zone size varying zone 9, below that orifice 41 which at any position of the partition wall 8 is arranged directly under the partition wall 8. By this means it is accomplished that air will be drawn off from the lower zone 7b, only through an orifice arranged at an upper portion of this zone 7b, irrespective of the positioning of the partition wall.

[0041] The air then passes down through outlet channel 40 by means of the ventilator 43 into the lower part of the second heat exchanger chamber 12. The lower portion of the outlet channel 40 is separated from the second heat exchanger 12 by a wall 44. The lower edge of this wall is arranged below the heat exchanger portion

14b and the upper edge of the front wall 16 is arranged above the heat exchanger portion 14b. Thereby self-circulation of the air circulating in the second heat exchanger chamber 12, the supply channel 45, the lower zone 7b and the outlet channel 40 is prevented, also during defrosting of the heat exchanger portion 14b if such defrosting means is provided.

[0042] Now with reference to figs. 2, 3 and 3b the functioning of channel 50 will be explained. The channel 50 constitutes an air distribution channel for the upper zone 7a. Especially when the partition wall is in a lower position it might be advantageous to enhance the circulation within the upper zone 7a in order to achieve a well defined and stable temperature gradient within this zone 7a. When the ventilator 53 arranged in the air distribution channel 50 is activated, air is drawn off from the zone 7a through the orifices 52 that are arranged above the partition wall 8. As for channels 20 and 40, the cut-off flange 850 prevents that air in the lower zone 7a is drawn off into the air distribution channel, irrespective of in which position the partition wall 8 is fixed. After having passed the ventilator 53 the air is reintroduced into the upper zone 7a through the orifices 51, which are arranged above the zone size varying portion 9. In case the temperature in the upper zone 7a is lower than desired, it is possible to activate the heater 54 to thereby heat the air circulating in the upper zone 7a and the air distribution channel 50. Such heating might be desirable for example if the ambient temperature is low or if the bottles placed in the upper zone 7a has been stored at a temperature below the desired serving temperature just before they are placed in the cabinet.

[0043] The temperature in both zones 7a and 7b are constantly being measured by a respective temperature sensor 61, 62. The temperature sensors 61, 62 are connected to a control system (not shown) for controlling the temperatures in the zones 7a, 7b. This is accomplished by regulating both the refrigerating system and the ventilators 23, 43. Even though one single refrigerating system is used for cooling both zones, the possibility to independently control the ventilators 23, 43 provides an excellent means for achieving a fast and accurate temperature control in both zones. The air distribution channel with the independently controlled ventilator and heater further enhances the possibility to such independent temperature control of both zones.

[0044] In figures 2, 3 and 3a-e the cabinet is shown when the partition wall is placed at an second upper most position in the zone sizes varying portion 9. Figures 4, 4a-4e shows the same cabinet when the partition wall 8 is positioned at its second lower most position, whereby the upper zone 7a is made larger and the lower zone 7b smaller. It is understood that the cabinet functions in the same way irrespective of the position of the partition wall 8. As can be seen from figs. 4a-4e, also in this position of the partition wall 8, air is supplied to the upper zone 7a at a lower portion of this zone, in proximity to the partition wall 8. Except being supplied at a lower portion, air

is also supplied through all of the orifices 22 arranged along the zone size varying portion 9 above the partition wall. Further, also at this position of the partition wall, it is accomplished that air is drawn off from an upper portion, in proximity to the partition wall, of the lower zone 7b. At this position of the partition wall 8 also the air distribution channel 50 communicates with the upper zone 7b through all orifices 52 arranged along the zone size varying portion above the partition wall 8.

[0045] In the illustrated embodiment of the cabinet the upper zone 7a constitutes a warmer zone for bringing bottles of red wine to a desired serving temperature. The lower zone 7b constitutes a colder zone for bottles of white wine and the like.

[0046] Experiments have shown that it is possible to maintain a set temperature of for example 17 °C with a temperature gradient of ± 2 °C over the height of the upper zone. Thus, the lower shelf 70 of this the upper zone will maintain 15 °C and the upper shelf 19 °C. The temperature difference varies linearly in the zone, such that the temperature difference between two successive shelves is constant for the entire zone. When for instance the partition wall is fixed as is illustrated in fig. 4, where there are eight shelves 70 arranged in the upper zone, the temperature will differ by 0,5 °C between each successive shelf. It is thus, by placing different wines at different shelves, possible to attain the correct serving temperature with very high accuracy. Experiments have shown that the same stable and precise temperature gradient control also applies to the lower zone. At the illustrated cabinet the set temperature of the upper zone can be chosen between 14 and 19 °C, where each such set temperature will exhibit a constant and linear temperature gradient of ± 2 °C over the height of this zone. The set temperature of the lower zone can be chosen between 6 and 10 °C with a correspondent temperature gradient of ± 3 °C over the height of this zone.

[0047] The embodiment illustrated in the figures is an example only. It is understood that the invention may be varied in a lot of different ways within the scope of the claims.

[0048] For instance instead of a single compressor based refrigerating system a separate refrigerating system could be used for each zone. The refrigerating system or systems may be of the absorption type or any other type.

[0049] Instead of being an upright cabinet with two zones arranged one above the other, the cabinet may be a so called side-by-side cabinet where the zones are arranged on beside the other.

[0050] The shelves may be hermetical and arranged in sealing contact with the side and back walls of the cabinet, such that air may pass from one side of each shelf to the other only between the front edge of each self and the front door. By such an arrangement the air-flow within each zone is even more well defined and a better control of the temperature gradient within each zone is achieved.

Claims

1. Refrigerator cabinet, especially for bringing bottles of wine to the proper serving temperature, comprising a refrigerating system with a heat exchanger (14a, 14b), which is arranged in a heat exchanger chamber,

a storage compartment (7) which is enclosed by outer cabinet walls (1, 2, 3, 4, 5) and by a cabinet door (6), and a partition wall (8) for delimiting a first (7a) and a second (7b) zone within said storage compartment, which partition wall is fixable at different positions within a zone size varying portion (9) of said storage compartment for allowing the sizes of the first and second zone to be varied,

characterized by

an air supply channel (20,) for supplying air of a first air flow, which circulates between a first heat exchanger chamber (11) and the first zone (7a), to the first zone ,

an air outlet channel (40) for conducting air of a second air flow, which circulates between a second heat exchanger chamber (12) and the second zone (7b), from the second zone, which first and second circulating air flows are essentially separated from each other,

a number of orifices (22, 42) arranged along a portion of at least one of said air supply (20) and air outlet (40) channels for allowing communication between said at least one air channel and said storage compartment, which air channel portion extends along said zone size varying portion, and means for blocking the communication between said at least one air channel and one of said first and second zone, through said orifices, while allowing communication between said at least one air channel and the other of said first and second zone, through said orifices.
2. Refrigerator cabinet according to claim 1, wherein said blocking means comprises a cut-off flange (820, 840), which is insertable into said air channel portion.
3. Refrigerator cabinet according to claim 2, wherein said cut-off flange (820, 840) is arranged on said partition wall (8).
4. Refrigerator cabinet according to any of claims 1-3, wherein the air supply channel (20) comprises a number of air supply orifices (22) arranged along a portion of said air supply channel for supplying air from the first heat exchanger chamber (11) to said storage compartment (7), which air supply channel portion extends along said zone size varying portion (9), wherein said partition wall (8) comprises a first cut-off flange (820) which is insertable into said air supply channel portion for allowing air supply to the first zone and preventing air supply from the first heat exchanger chamber to the second zone through said
5. Refrigerator cabinet according to any of claims 1-4, herein the air outlet channel (40) comprises a number of air outlet orifices (42) arranged along a portion of said air outlet channel for conducting air from said storage compartment (7) to the second heat exchanger chamber (12), which air outlet channel portion extends along said zone size varying portion (9), wherein said partition wall comprises a second cut-off flange (840) which is insertable into said air outlet channel portion for allowing an air flow from the second zone to the second heat exchanger chamber and preventing air to flow from the first zone to the second heat exchanger chamber through said air outlet orifices.
6. Refrigerator cabinet according to any of claims 1-5, comprising at least one ventilator (23, 43) for creating a forced airflow in a respective (20, 40) of said channels.
7. Refrigerator cabinet according to claim 6, wherein at least one (40) of the channels provided with a ventilator (43) comprises means (44) for preventing self circulation through said at least one channel.
8. Refrigerator cabinet according to any of claims 1-7, comprising a single refrigerator system with a single heat exchanger (14) having a first portion (14a) which is arranged in a first heat exchanger chamber (11) and a second portion (14b) which is arranged in a second heat exchanger chamber (12), which first and second heat exchanger chambers are essentially hermetically sealed from each other.
9. Refrigerator cabinet according to any of claims 1-8, comprising an air distribution channel (50) with a number of air distribution orifices (52) arranged along a portion of said air distribution channel for communication between the storage compartment (7) and the air distribution channel, which air distribution channel portion extends along said zone size varying portion (9), wherein said partition wall (8) comprises a third cut-off (850) flange which is insertable into said air distribution channel portion.
10. Refrigerator according to claim 9, comprising an air distribution ventilator (53) arranged in said air distributing channel (50).
11. Refrigerator according to claim 9 or 10, comprising a heater (54), which is arranged in said air distributing channel.
12. Refrigerator according to any of claims 1-11, wherein said partition wall (8) constitutes a shelf.

13. Refrigerator according to any of claims 1-12, comprising a number of shelves which are hermetical and arranged in sealing contact with the side and back walls of the cabinet.

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14. Refrigerator according to any of claims 1-13, comprising a number of shelves (70) which are provided with means, such as a flange (71) for blocking communication through at least one of said orifices (22, 42, 42) arranged in the zone size varying portion (9).

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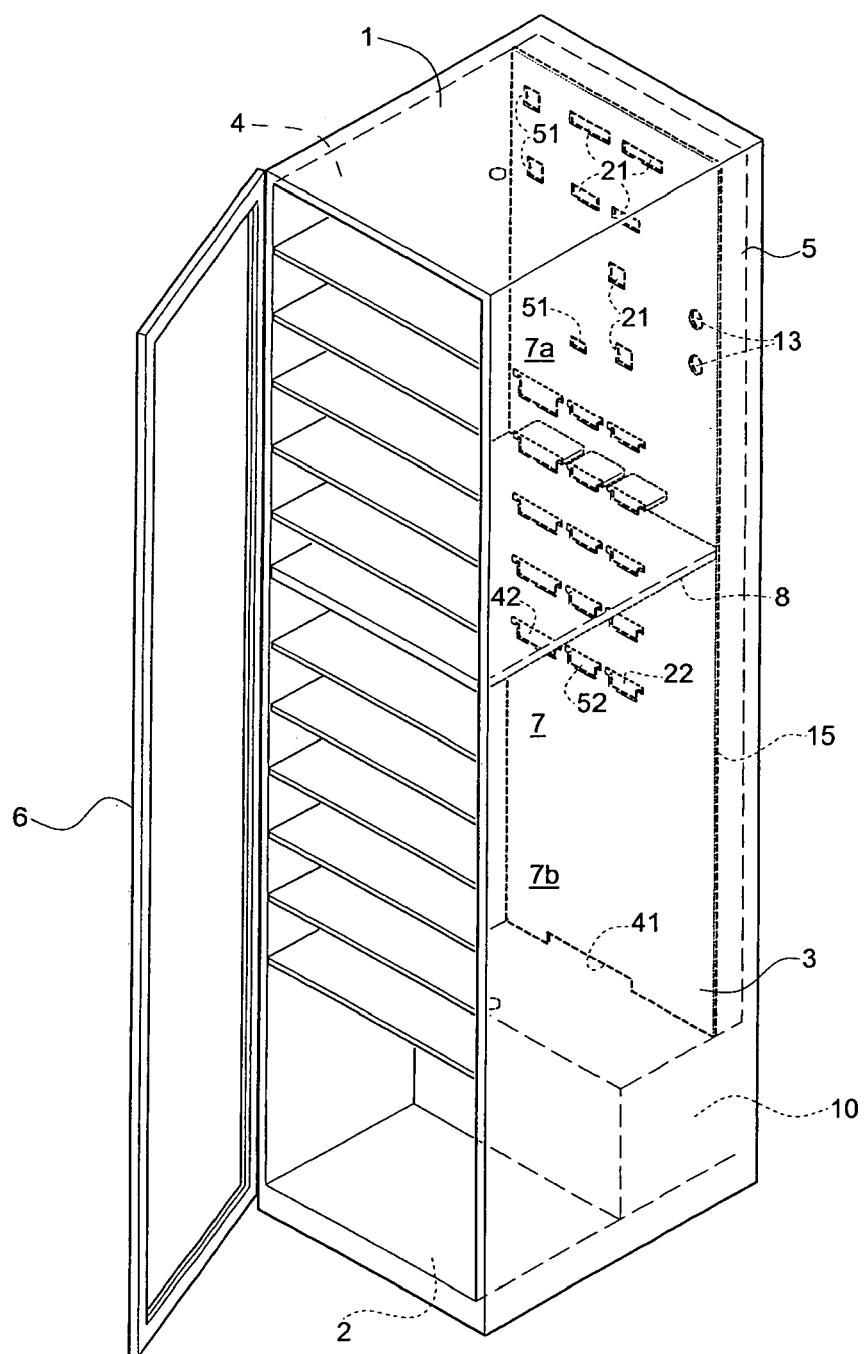


Fig. 1

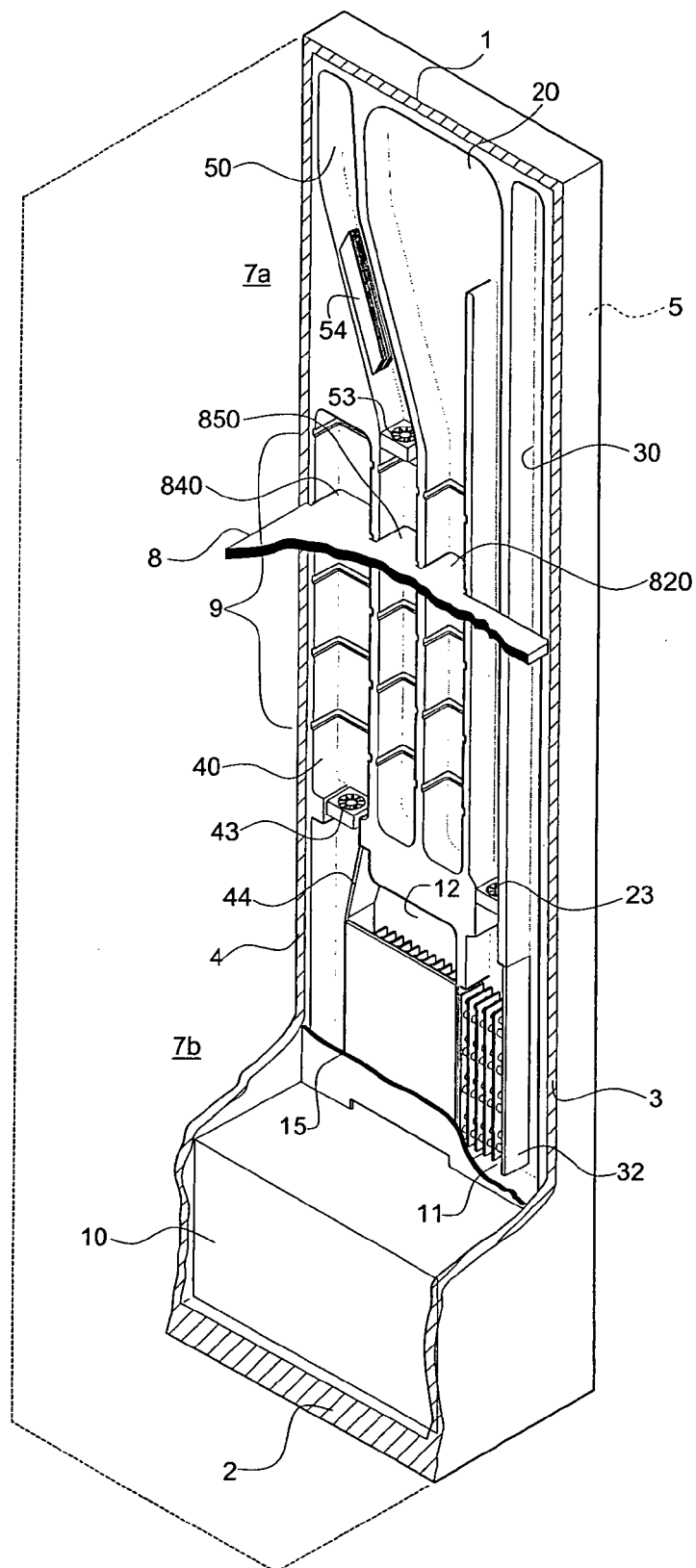


Fig. 2

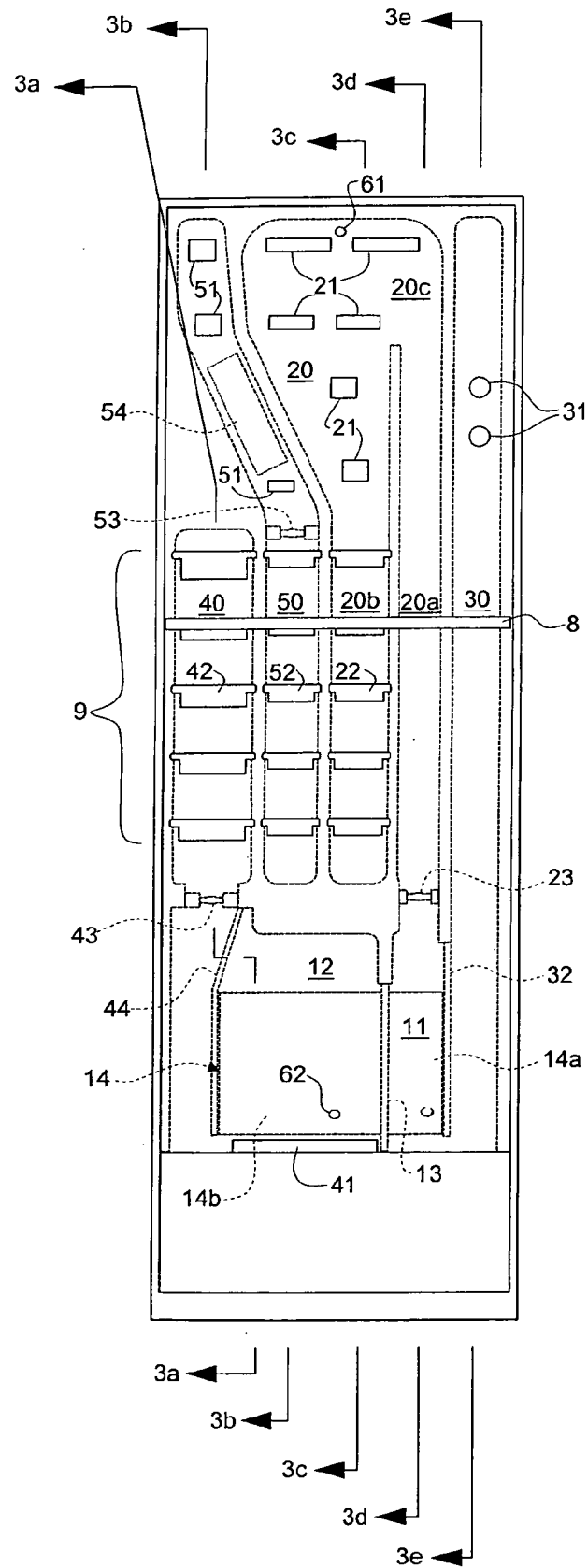


Fig. 3

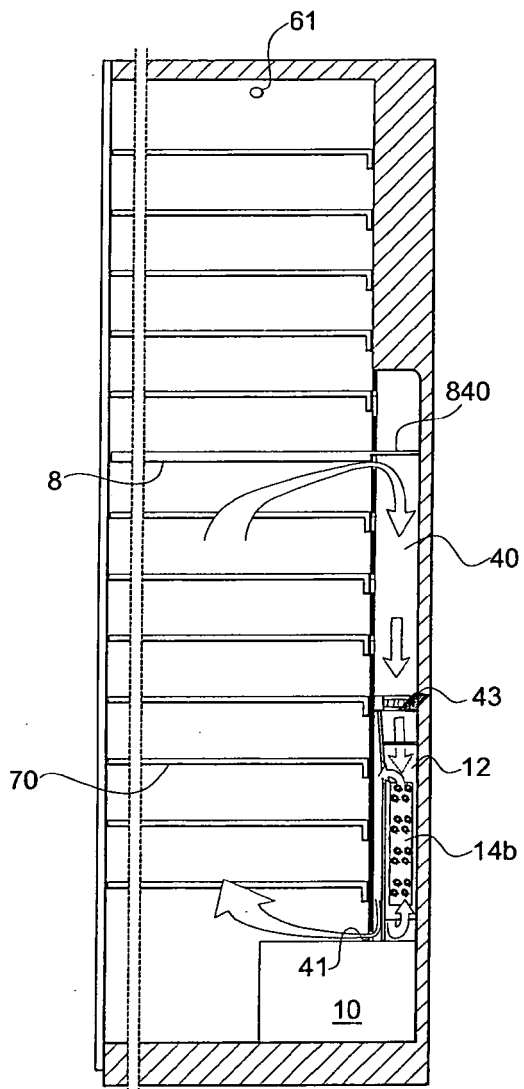


Fig. 3a

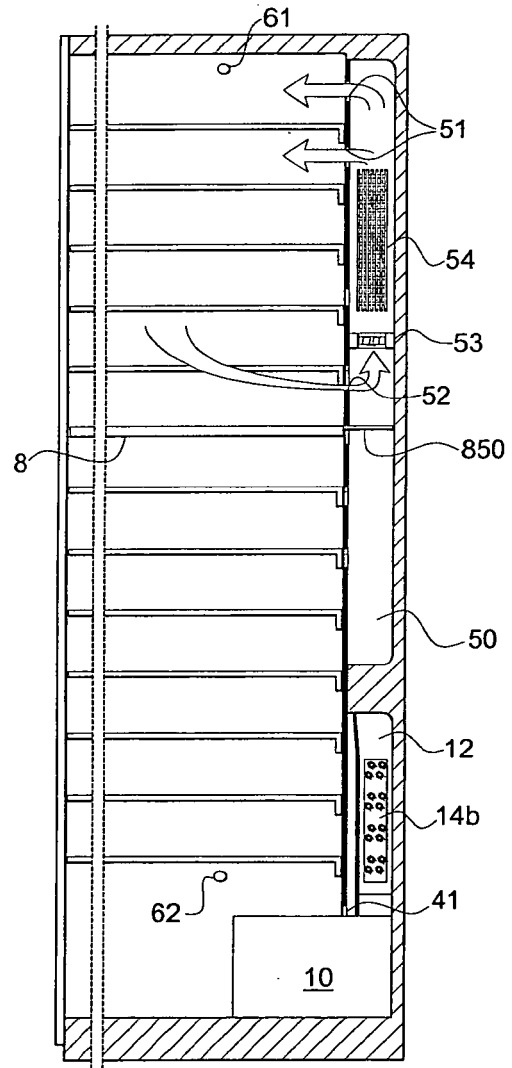


Fig. 3b

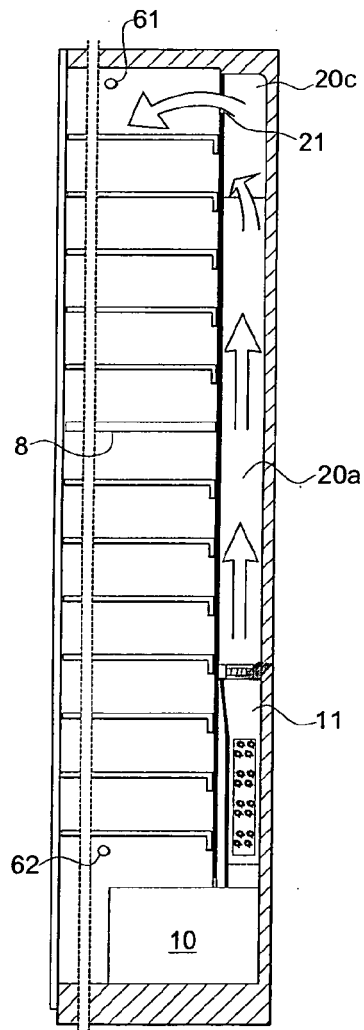


Fig. 3d

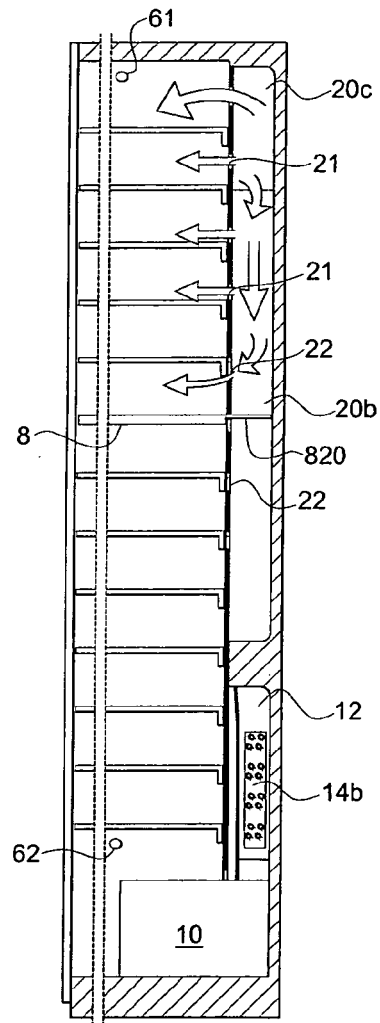


Fig. 3c

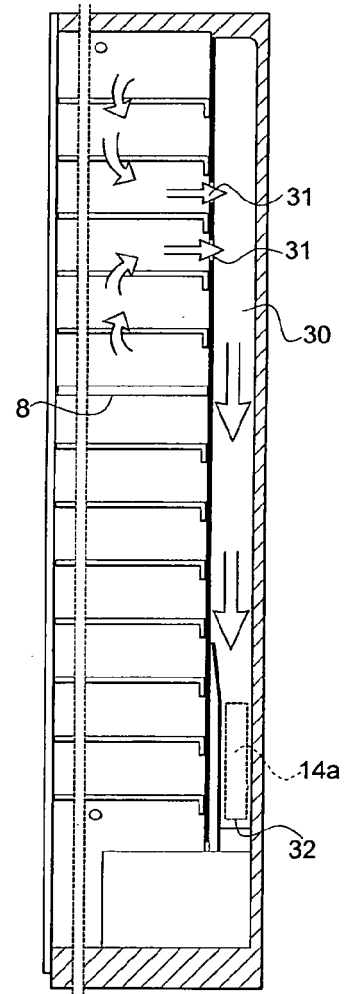


Fig. 3e

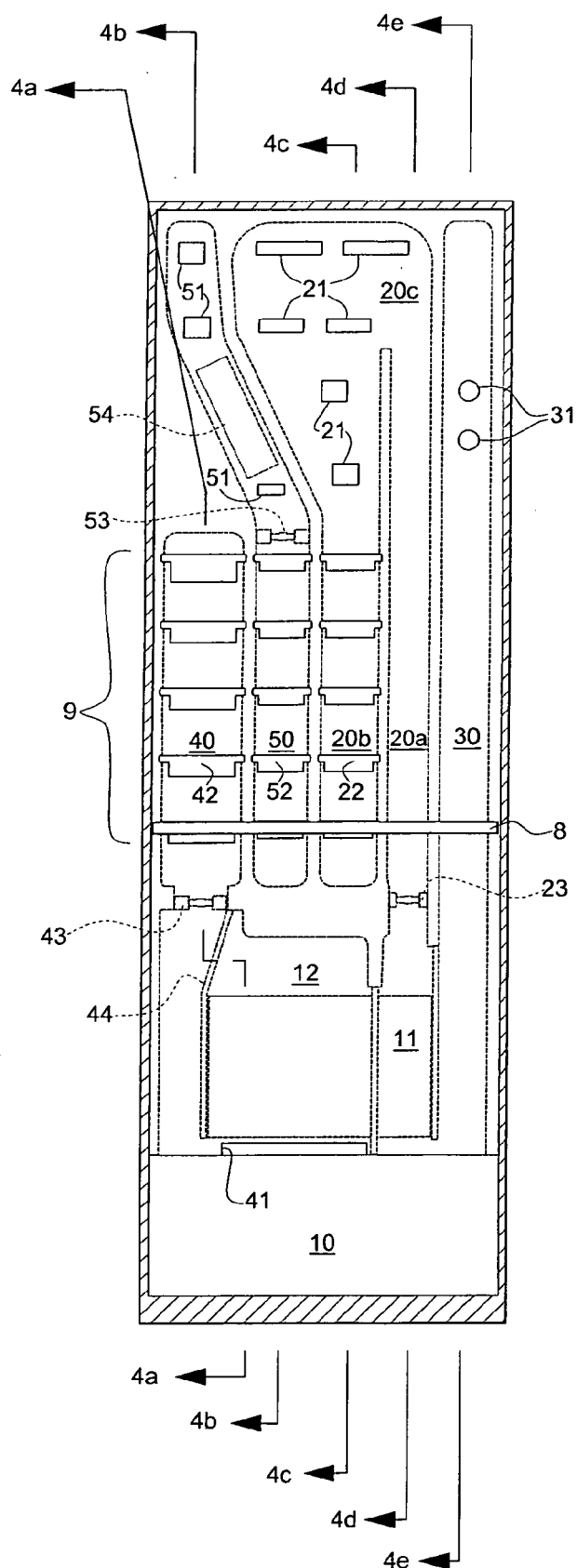


Fig. 4

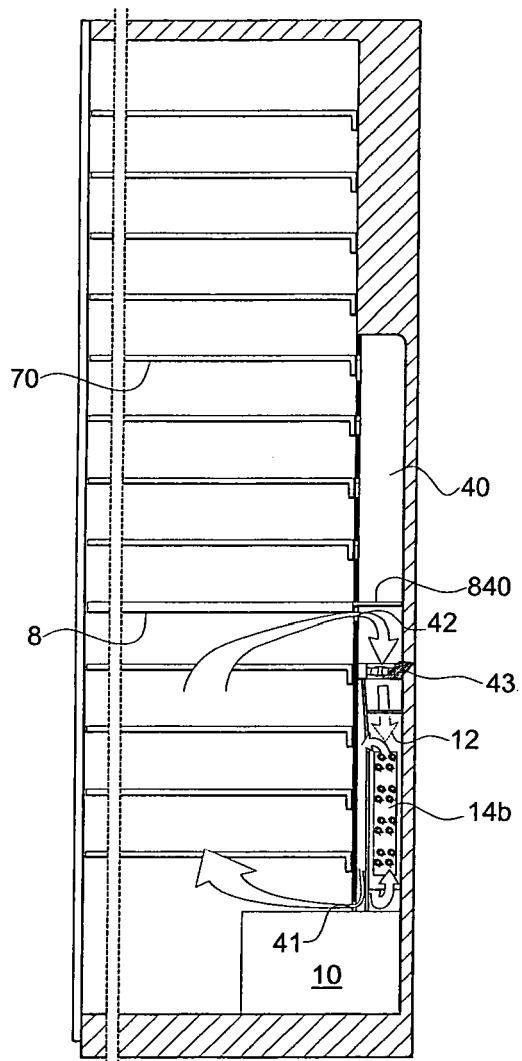


Fig. 4a

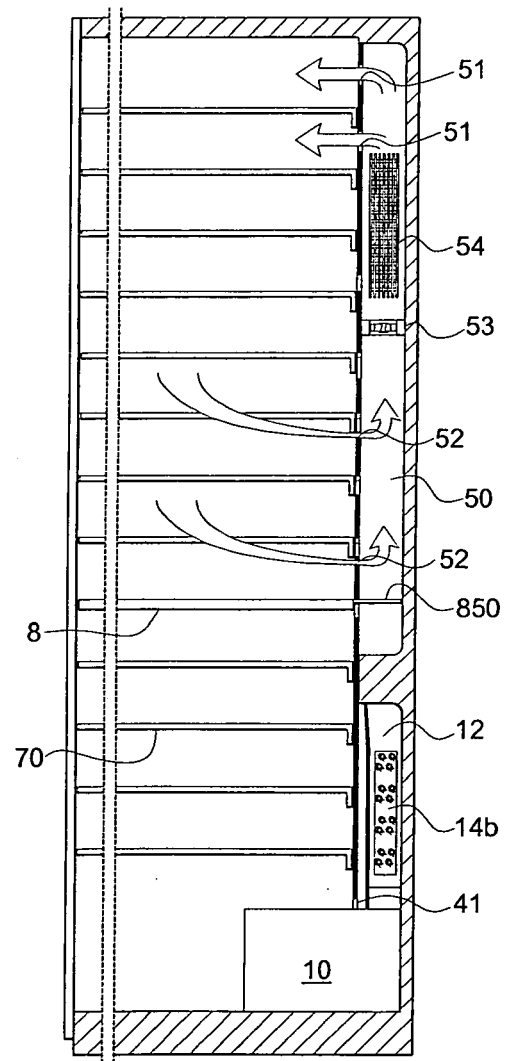


Fig. 4b

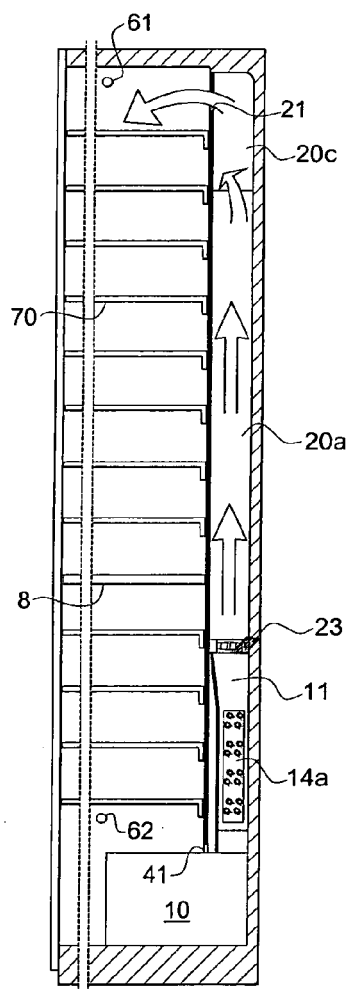


Fig. 4d

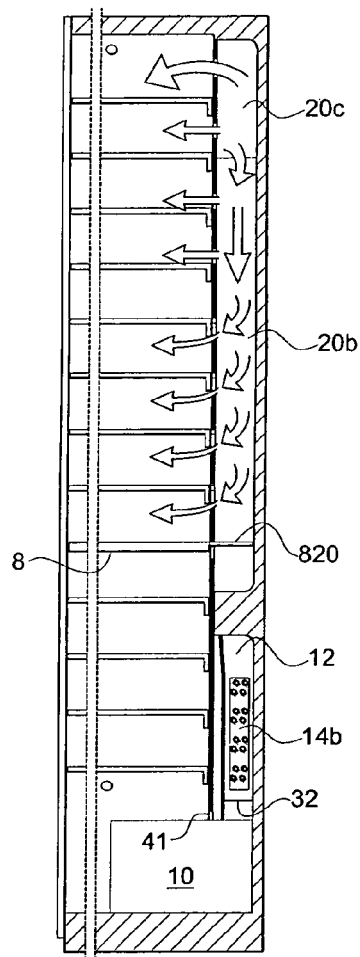


Fig. 4c

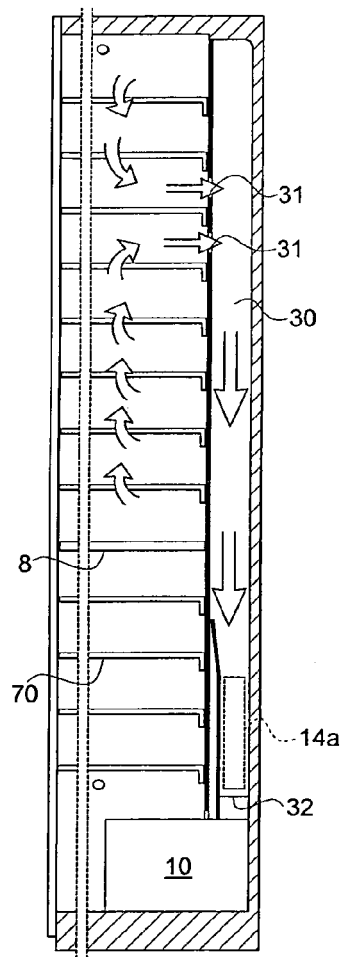


Fig. 4e