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(54) Refrigerated cabinet.

(57) A refrigerated cabinet (10) which is particularly adapted for bar counters, and the like, is comparted into two or more cells (1, 2, 3) refrigerated at temperatures independently controllable and regulatable for each cell. Two or more refrigerated cells (1, 2, 3) are associated with a common refrigerating machine (6, 7, 8, 9) having its evaporator (9) housed in a cold-distributing chamber (19) which is separately connectable to each single refrigerated cell (1, 2, 3) through a corresponding fan (11, 12, 13) which is apt to generate an air flow from the cold-distributing chamber (19) toward the respective refrigerated cell (1, 2, 3). In each one of the refrigerated cells (1, 2, 3) a thermal detector is provided controlling both the refrigerating machine (6, 7, 8, 9) and the fan (11, 12, 13,) associated with the respective refrigerated cell - (1, 2, 3) whenever the temperature within said cell rises up to a higher limit, and until this temperature drops down to a lower limit.

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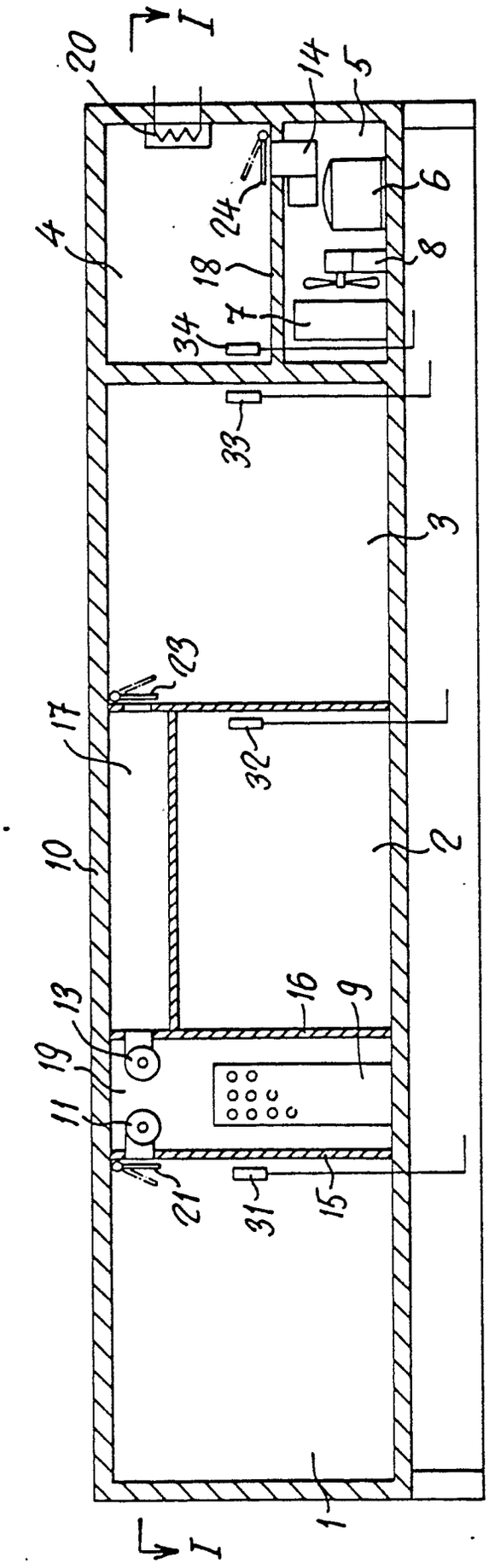


Fig.2

"Refrigerated Cabinet"

The object of the present invention is a refrigerated cabinet which is particularly suitable for bar counters, and the like, and which is comparted into two or more refrigerated cells, with the temperature of each cell being independently controllable and regulable.

In the known refrigerated cabinets of this type, in order to obtain the independent regulation of the temperature within the several refrigerated cells, each refrigerated cell is provided with its own refrigerating unit having a compressor, a condenser, and an evaporator. Obviously, this involves a correspondingly important expense and a considerably complicated construction, while also the useful volume of the refrigerated cells is reduced, since they occupy a greater space, for example, in a bar counter, or the like.

The invention aims to eliminate the above mentioned drawbacks, and to construct a refrigerated cabinet of the type as disclosed in the preamble, in which the independent separate control and regulation of the temperature within the several refrigerated cells are obtained in a simpler and more economical manner, and generally even with smaller overall dimensions.

This problem is solved by the invention in that two or more refrigerated cells in the refrigerated cabinet are associated with one common refrigerating machine having its evaporator housed in a cold-distributing chamber, which through normally closed communication means is separately connectable to each single refrigerated cell, a thermal detector being provided in each refrigerated cell for controlling both the refrigerating machine in parallel with the other detectors, and the means of communication between the respective refrigerated cell and the cold-distributing chamber, so that the refrigerating machine is set in operation, and the said communication means are simultaneously opened, whenever the temperature in the refrigerated cell rises up to a higher limit, and until this temperature drops down to a lower limit.

Therefore, in the refrigerated cabinet according to the invention, there is only one refrigerating machine which is associated with two or more single refrigerated cells in the cabinet, so that the relative technical equipment of the cabinet, and then the respective cost and overall dimensions are reduced. However, the temperature within each refrigerated cell in the refrigerated cabinet can be controlled and regulated independently and separately by means of an associated thermal detector which whenever the temperature in the respective cell rises up to a predetermined higher limit, sets the refrigerating machine in operation and simultaneously opens normally closed communication means provided between the refrigerated cell and a cold-distributing chamber, in which the evaporator of the refrigerating machine is housed. Whenever the temperature within the refrigerated cell drops down to a predetermined lower limit, the associated thermal detector stops the refrigerating machine and closes the means of communication between the refrigerated cell and the cold-distributing chamber containing the evaporator of said machine. The single refrigerated cells in the refrigerated cabinet according to the invention, are connectable separately, i.e., in parallel, to the cold-distributing chamber containing the evaporator of the only, common, refrigerating machine, and the thermal detectors associated with the several refrigerated cells control separately, i.e., in parallel, the refrigerating machine. The several refrigerated cells are then separately supplied with cold the one independently from the other and for a time differing according to their requirements, by only one associated refrigerating machine.

The refrigerating machine associated with the refrigerated cabinet according to the invention, and the communication means provided between the several refrigerated cells and the cold-distributing chamber, as well as the thermal detectors associated with the single refrigerated cells, may be made in any suitable manner. Preferably, according to one advantageous embodiment of the invention, the means of communication between each refrigerated cell and the cold-distributing chamber comprise a fan which is adapted for generating an air stream from the cold-distributing chamber to the associated refrigerated cell, and which is controlled by the respective thermal detector so as to be operated any time the temperature in the cell rises up to the predetermined higher limit, and as to be stopped as soon as the temperature in the cell drops down to the predetermined lower limit.

Preferably, according to a further embodiment of the invention, the fan provided between each refrigerated cell and the cold-distributing chamber is associated with a flap valve that can be opened by the action of the air stream generated by the fan, and that can be closed through the effect of its own weight, or of suitable return means, such as springs or weights.

Further features of the invention will appear in the other Dependant Claims.

One embodiment of the invention is diagrammatically shown in the annexed drawing, in which:

Figure 1 shows a refrigerated cabinet according to the invention, in a horizontal sectional view taken on line I-I in Figure 2.

Figure 2 is a vertical sectional view of this refrigerated cabinet, taken on the broken line II-II in Figure 1.

In the figures, numeral 10 denotes a refrigerated cabinet which is particularly designed for being incorporated in a bar counter, or the like, and which may be constructed and thermally insulated in any suitable manner. In the shown embodiment, the refrigerated cabinet 10 is comparted into four line-arranged cells 1, 2, 3, and 4, of which the cells 1, 2, and 3 are refrigerated cells, while the cell 4 is a temperate or warm cell, within which are warmed and/or kept at a controlled temperature the products that should be consumed in a warm or not iced condition, such as red wine, or the like. The temperate or warm cell 4 is smaller than the refrigerated cells 1, 2, 3, and under this cell a chamber 5 is provided, in which are placed the main elements of a refrigerating machine, more particularly, the motor-driven compressor 6 and the condenser 7 of said machine, as well as a fan 8 which is associated with the condenser 7. The evaporator 9 of said refrigerating machine is instead located in a cold-distributing chamber 19 provided between the two refrigerated cells 1 and 2. At least the refrigerated cells 1, 2, 3 and the cold-distributing chamber 19 are suitably insulated the one from the other and also from the outer atmosphere. Preferably, also the temperate or warm cell 4 and the chamber 5 in which the refrigerating machine is housed, are thermally insulated. Through ducts (not shown), the evaporator 9 housed in the cold-distributing chamber 19 is suitably connected to the refrigerating machine contained in chamber 5.

The cold-distributing chamber 19 can be connected separately, i.e., in parallel, to each one of the three refrigerated cells 1, 2, 3. In the shown embodiment, this connection is effected by means of fans 11, 12, 13, which are adapted for generating each an air stream from the cold-distributing chamber 19 toward the associated refrigerated cell 1, 2, 3. Each fan 11, 12, 13, is associated with a valve 21, 22, 23 made in form of a flap valve which is pivotable about an upper horizontal pivot, and which is so arranged that it is automatically opened under the action of the air stream generated by the associated fan 11, 12, 13, when this fan is operated, while it is also automatically closed, for example, through the effect of its own weight, or by the action of suitable return means, such as springs and/or weights (not shown), when the associated fan 11, 12, 13 is stopped, and so the air stream is discontinued. In figure 1, the closed position of the two valves 21 and 23 is shown with solid lines, and their opened position is shown by dash-and-dot lines.

In the shown embodiment, the two fans 11, 12 are mounted, together with the associated flap valves 21, 22, in correspondence of simple apertures provided in the partition walls 15 and 16 separating the cold-distributing chamber 19 from the contiguous refrigerated cells 1 and 2. The fan 13 which is meant for setting the cold-distributing chamber 19 in communication with the farthest refrigerated cell 3, is instead provided in correspondence of the inlet of a connecting duct 17 that passes across the adjoining refrigerated cell 2 and opens into the cell 3. The flap valve 23 associated with the said fan 13 is provided in correspondence of the outlet of the connecting duct 17 opening into the respective refrigerated cell 3.

Provided in each one of the refrigerated cells 1, 2, 3 is a thermal detector 31, 32, 33 that simultaneously controls both the refrigerating machine housed in chamber 5 and the fan 11, 12, 13 associated with the respective cell 1, 2, 3. The whole is so made that whenever the temperature within a refrigerated cell 1, 2, 3 rises up to a predetermined higher limit, that can be regulated on the respective thermal detector 31, 32, 33, this detector sets in operation both the refrigerating machine contained in chamber 5, and the fan 11, 12, or 13 associated with the respective refrigerated cell 1, 2, or 3, so that this cell receives the cold generated in the respective distributing chamber 19 by the evaporator 9 of the refrigerating machine, and which is withdrawn from this chamber through the air stream generated by the fan 11, 12, or 13. Whenever the temperature within the refrigerated cell 1, 2; or 3 drops down to a predetermined lower limit, that can be regulated on the thermal detector 31, 32, 33, this detector stops the refrigerating machine contained in chamber 5, and stops also the fan 11, 12, or 13 associated with the concerned refrigerated cell 1, 2, or 3, so that this cell is closed with respect to the cold-distributing chamber 19. The several thermal detectors 31, 32, 33 control the refrigerating machine in parallel, and then independently from one another, so that the temperature within the several refrigerated cells 1, 2, 3 is controlled and maintained separately. Therefore, periods of time may occur in which both the refrigerating machine and all the three fans 11,

12, 13 are inoperative, as well as periods of time in which the refrigerating machine is working, while only one, or two or three fans 11, 12, 13 are set in operation.

Preferably, the temperate or warm cell 4 is warmed and kept at the required temperature by using the heat generated by the condenser 7 of the refrigerating machine contained in chamber 5. For this purpose, the said cell 4 is connected to chamber 5 by means of a fan 14 which is adapted for producing an air stream from the chamber 5 toward the temperate or warm cell 4. The said fan 14 is provided in correspondence of an aperture in the partition wall 18 between the cell 4 and the chamber 5, and is associated with a flap valve 24 that is opened under the action of the air stream generated by the fan, while this valve is closed through the effect of its own weight and/or suitable return means, such as springs, or the like (not shown). In the temperate or warm cell 4 a thermal detector 34 is provided for controlling both the fan 14 and the refrigerating machine in chamber 5, in parallel with the thermal detectors associated with the refrigerated cells 1, 2, 3. Whenever the temperature in the temperate or warm cell 4 drops to a predetermined lower limit, the thermal detector 34 sets both the refrigerating machine and the fan 14 in operation so that the air stream generated by this fan conveys the heat generated by the condenser 7 of the refrigerating machine, from the respective chamber 5 to the temperate or warm cell 4. Whenever the temperature within this cell 4 rises up to a predetermined higher limit, the thermal detector 34 stops the refrigerating machine and the fan 14 associated with the said temperate or warm cell 4. In the shown embodiment, the only refrigerating machine associated with the refrigerated cabinet 10 is then operated any time one of the refrigerated cells 1, 2, 3 needs to be cooled (by the cold generated by the evaporator 9, and withdrawn from the distributing chamber 19 containing the said evaporator), and any time the temperate or warm cell 4 needs to be warmed (by the heat generated by the condenser 7, and withdrawn from the chamber 5 containing the said condenser).

However, the warming of the temperate or warm cell 4 may be at least partly effected also in a manner differing from the above-disclosed one, for example, by means of one or more electric resistances 20 controlled by the thermal detector 34.

Claims

1. A refrigerated cabinet (10) which is particularly adapted for bar counters, and the like, and is comparted into two or more refrigerated cells (1, 2, 3), with the temperature of each cell being independently controllable and regulatable, characterized in that two or more refrigerated cells (1, 2, 3) are associated with a common refrigerating machine (6, 7, 8, 9) having its evaporator (9) housed in a cold-distributing chamber (19) which through normally closed communication means (11, 21; 12, 22; 13, 23) is separately connectable to each single refrigerated cell (1, 2, 3), a thermal detector being provided in each one of the refrigerated cells (1, 2, 3) for controlling both the refrigerating machine (6, 7, 8, 9) in parallel with the other detectors, and the means (11, 21; 12, 22; 13, 23) of communication between the respective refrigerated cell (1,2, 3) and the cold-distributing chamber (19), so that the refrigerating machine (6,7,8,9) is set in operation, and the said communication means (11, 21; 12, 22; 13, 23) are simultaneously opened, whenever the temperature within the refrigerated cell (1, 2, 3) rises up to a higher limit, and until this temperature drops down to a lower limit.

2. The refrigerated cabinet according to claim 1, characterized in that the means of communication between each refrigerated cell (1, 2, 3) and the cold-distributing chamber 19 comprise a fan (11, 12, 13) which is adapted for generating an air stream from the cold-distributing chamber (19) toward the associated refrigerated cell (1, 2, 3), and is controlled by the respective thermal detector (31, 32, 33) so as to be operated or stopped simultaneously with the refrigerating machine (6, 7, 8, 9).

3. The refrigerated cabinet according to claims 1 and 2, characterized in that the fan (11, 12, 13) provided between each refrigerated cell (1, 2, 3) and the cold-distributing chamber (19) is associated with a flap valve (21, 22, 23) which can be opened by the action of the air stream generated by the fan (11, 12, 13), and can be closed through the effect of its own weight, or of suitable return means, such as springs or weights.

4. The refrigerated cabinet according to claims 1 to 3, characterized in that the fan (11, 12) and the respective flap valve (21, 22) associated with one refrigerated cell (1, 2), which is contiguous to the cold-distributing chamber (19) are provided in correspondence of an aperture in the partition wall (15, 16) between the said cell (1, 2) and the said

chamber (19).

5. The refrigerated cabinet according to claims 1 to 3, characterized in that the cold-distributing chamber (19) is connected through a duct (17) to at least one refrigerated cell, and the fan (13) is provided at the inlet of this duct, while the respective flap valve (23) is provided at the outlet of said duct.

6. The refrigerated cabinet according to any one of claims 1 to 5, characterized in that is comprises not only the refrigerated cells (1, 2, 3), but also at least one temperate or warm cell (4) associated with the warming means (14, 24; 20) controlled by a thermal detector (34) provided in the said cell (4).

7. The refrigerated cabinet according to claim 6, characterized in that the means for warming the temperate or warm cell (4) comprise at least one electric resistance (20).

8. The refrigerated cabinet according to any one of claims 6 or 7, characterized in that a chamber (5) containing at least the condenser (7) of the refrigerating machine, is connectable through normally closed communication means (14, 24) to the temperate or warm cell (4), while the thermal detector (34) provided in the said cell (4) controls both the refrigerating machine (6, 7, 8, 9) in parallel with the thermal detectors (31, 32, 33) for the refrigerated cells (1, 2, 3), and the said communication means, so that the refrigerating machine (6, 7, 8, 9) is set in operation, and the said communication means - (14, 24) are simultaneously opened, whenever the temperature within the temperate or warm cell (4) drops down to a lower limit and unit it rises up to a higher limit.

9. The refrigerated cabinet according to claim 8, characterized in that the communication means between the temperate or warm cell (4) and the chamber (5) containing the condenser (7) of the refrigerating machine, comprise a fan (14) which is adapted for generating an air stream from the chamber (5) containing the condenser (7) of the refrigerating machine, toward the temperate or warm cell (4), and which is controlled by the respective thermal detector (34) so as to be operated or stopped simultaneously with the refrigerating machine (6, 7, 8, 9).

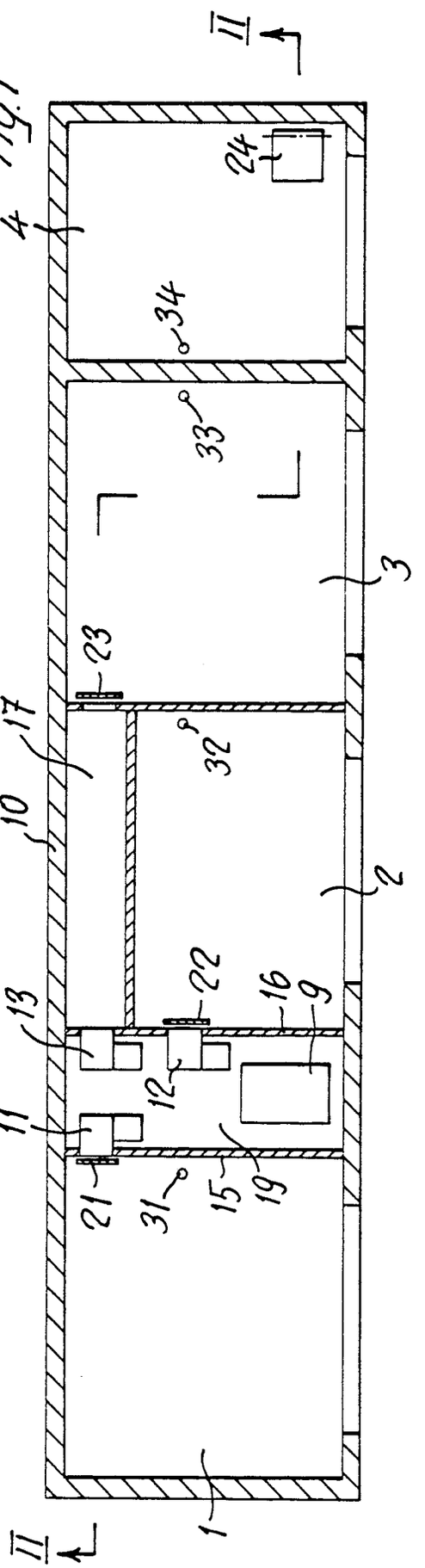

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Fig.1

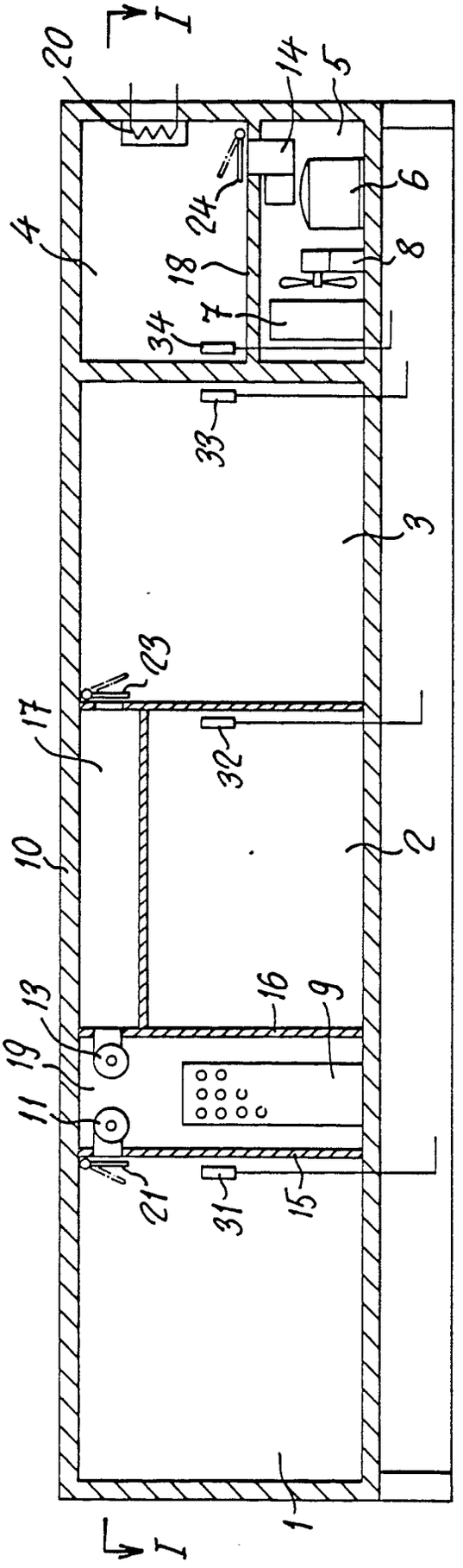

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Fig.2