United States Patent

[11] 3,585,814

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New York, N.Y.
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[33] Belgium
[31] 704,470

[54] **REFRIGERATED UNIT**
4 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **62/255,** 62/289, 62/502
[51] **Int. Cl.** **F25d 11/00**
[50] **Field of Search** 62/502, 510, 114, 332, 175, 335, 95, 289, 97, 255, 256

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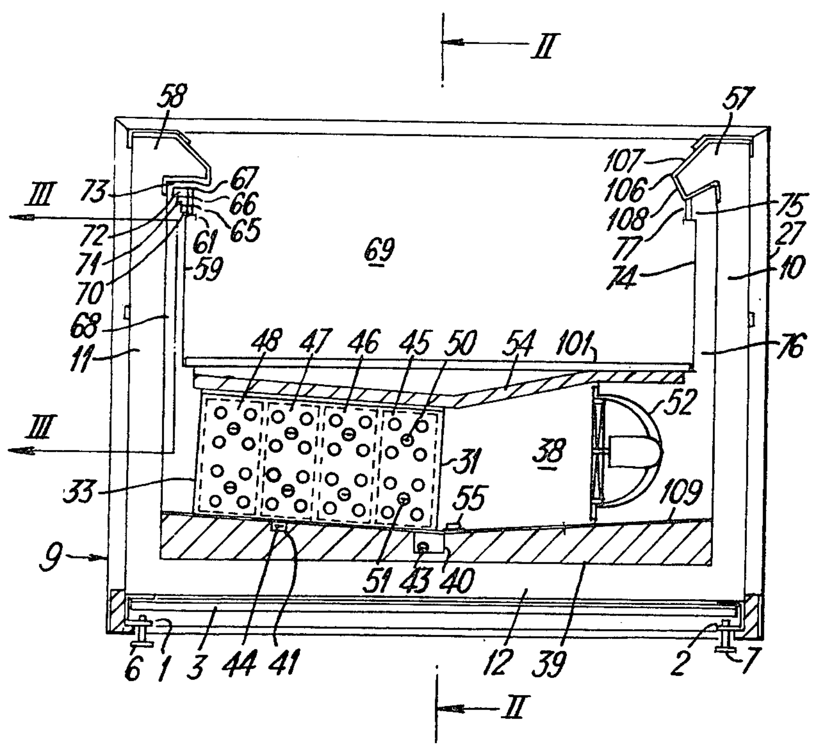
ABSTRACT: A self-contained refrigeration unit wherein two evaporators and fans associated therewith are mounted in a refrigeration space, the first evaporator operating at one evaporating temperature and the second evaporator operating at a lower evaporating temperature. The fans circulate air successively over the first and second evaporators, through a storage area input port, within the storage area of the refrigerator unit and to a storage area output port from which it is returned to the first evaporator. Deflector vanes are provided at the air input port to disperse the incoming air thereby preventing turbulence and to reduce the quantity of ambient air which enters the output port which is located at the side of the storage area opposite the side where the input port is located.



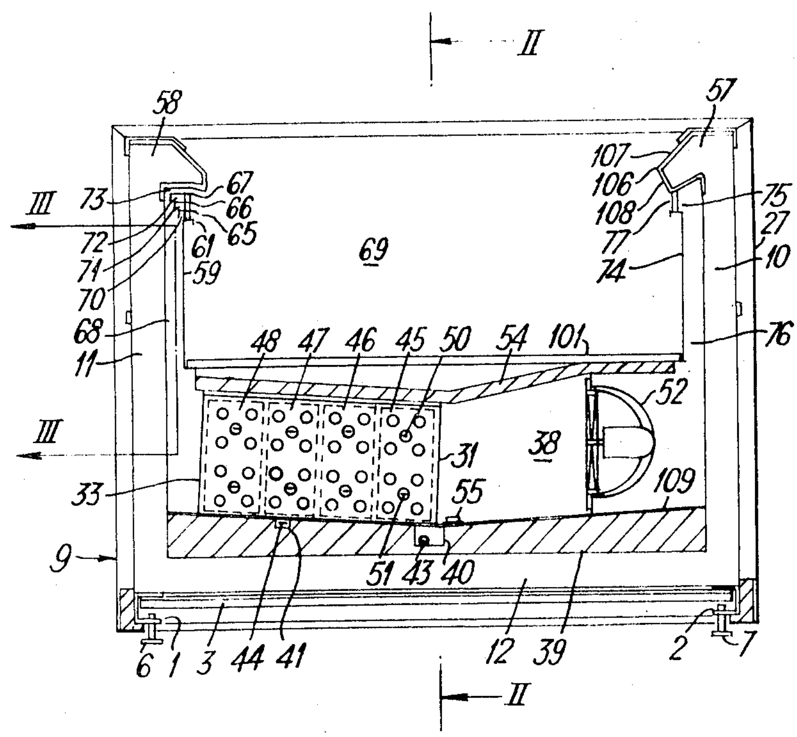


Fig. 1.

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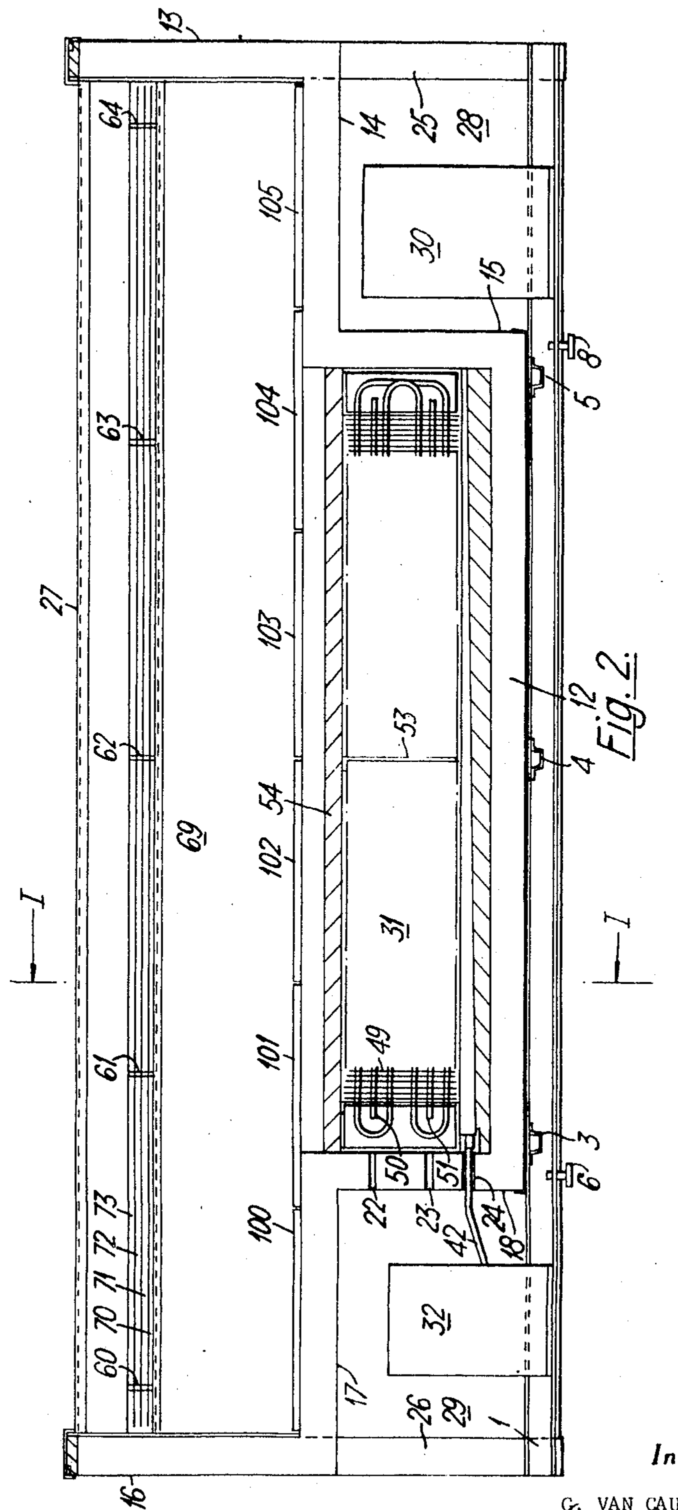

Fig. 2.

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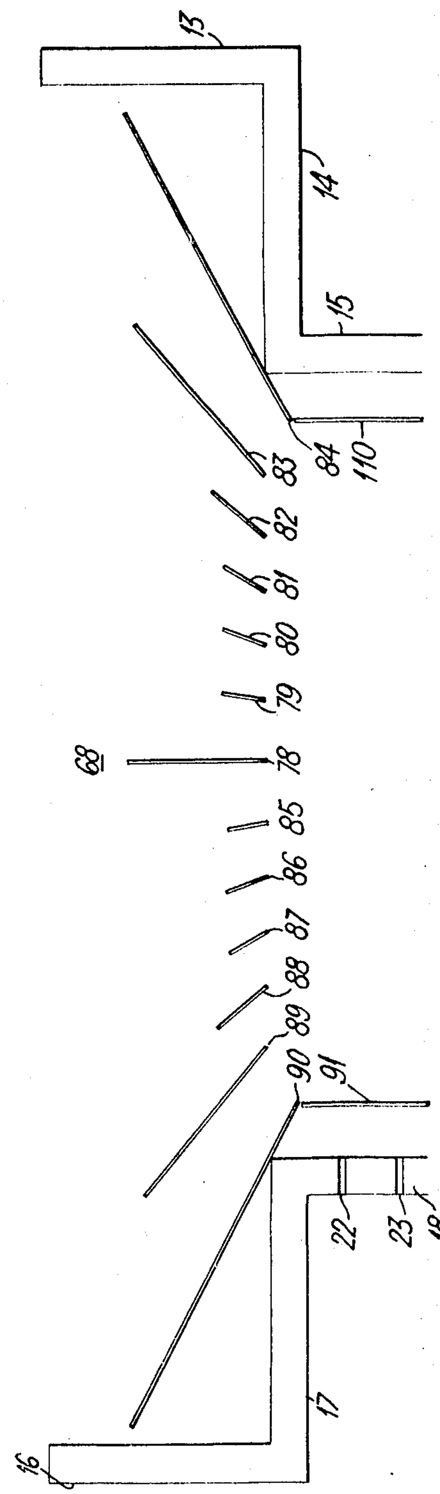

Fig. 3

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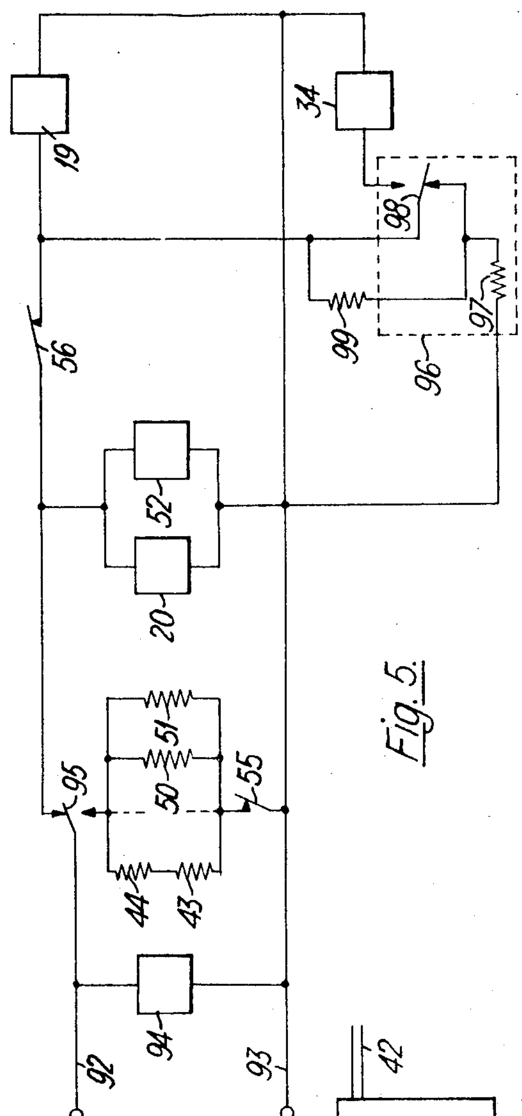

Fig. 5.

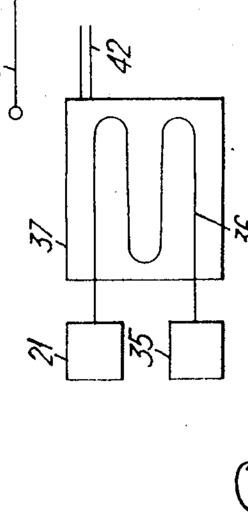

Fig. 4.

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REFRIGERATED UNIT

The present invention relates to a refrigerated unit including a cabinet with an area for storing goods and with a refrigeration space wherein two evaporators and air blowing means are mounted, the first of said evaporators operating at a first evaporation temperature which is higher than the second evaporation temperature at which said second evaporator operates and said air blowing means circulating air successively over said first and second evaporators and within said area over said goods.

Such a refrigerated unit is already known from U.S. Pat. No. 3,186,185.

It is an object of the present invention to provide an improved refrigerated unit of the above type wherein the heat to be evacuated is a minimum and the efficiency with which this heat is evacuated is a maximum.

Another object of the present invention is to provide a refrigerated unit which is self-contained.

The present refrigerated unit is particularly characterized in that said first and said second evaporator form part of a first and a second refrigerating circuit respectively.

It should be noted that a refrigerated unit including two evaporators which respectively form part of two separate refrigerating circuits is already known per se from U.S. Pat. No. 3,146,607. This known refrigerated unit is however not of the same type as the one of the invention.

Another characteristic of the present refrigerated unit is that said first and said second evaporator operate with a first and a second refrigerant respectively.

The invention also relates to a refrigerated unit including a first and a second motor which drives a first and a second compressor respectively, said first and second compressors forming part of a first and a second refrigerating circuit respectively. Such a refrigerated unit is already known from U.S. Pat No. 3,146,607.

The refrigerated unit according to the invention is particularly characterized in that it further includes electrical control means, for said first and second motors, which control said motors in such a manner that said second motor is started a predetermined time delay after said first motor.

The invention also relates to a refrigerated unit including a cabinet with an area for storing goods and with a refrigeration space including at least one evaporator and air blowing means for circulating air successively over said evaporator(s) and within said area over said goods.

The refrigerated unit according to the invention is particularly characterized in that it includes means for decreasing the axial velocity of said circulating air when entering said area through an inlet thereof, said axial velocity being measured along an axial direction corresponding to the shortest distance between said inlet and an outlet of said area for said circulating air.

The invention further also relates to a refrigerated unit with a refrigerating space wherein are mounted at least one evaporator and defrosting means, said defrosting means including heating resistances for said evaporator which is constituted by a serpentine tubing having radial fins characterized in this that first one of said heating resistances are mounted within tubular elements which are integral with said fins.

The invention also relates to a refrigerated unit including at least one refrigerating circuit with at least one evaporator and defrosting means for said evaporator, characterized in that said defrosting means include a drain channel which terminates in an evaporator pan through which passes the tubing interconnecting the compressor and the condenser of said refrigerating circuit.

The above mentioned and other objects and features of the invention will become more apparent and the invention itself will be best understood by referring to the following description of an embodiment taken in conjunction with the accompanying drawings in which:

FIG. 1 is a transverse cross section along line I–I in FIG. 2 of a refrigerated unit according to the invention;

FIG. 2 is a longitudinal cross section along line II–II of FIG. 1;

FIG. 3 is a longitudinal cross section along line III–III of FIG. 1;

FIG. 4 shows part of a refrigerating circuit forming part of the refrigerated unit of FIG. 1 to 3;

FIG. 5 shows an electrical control circuit for controlling the operation of this refrigerated unit.

Principally referring to FIG. 1 to 4, the refrigerated unit shown includes a supporting structure which is constituted by two longitudinal beams **1** and **2** having a U-shaped cross section and by three transverse beams **3**, **4**, **5**, secured to the upper flanges of the longitudinal beams **1** and **2**. Four legs such as **6**, **7**, **8** having a T-shaped cross section are screwed in the lower flanges of the longitudinal beams **1** and **2**.

An open-topped heat insulated outer cabinet **9** is secured to the above supporting structure. This insulated outer cabinet **9** has a front wall **10**, a backwall **11**, a bottom wall **12** and end walls **13—15** and **16—18**, the bottom wall **12** being substantially shorter than the front and back walls **10** and **11**. End wall **13—15** has a vertical portion **13**, an inwardly directed horizontal portion **14** and another vertical portion **15** with a plurality of holes (not shown). Likewise end wall **16—18** has a vertical portion **16**, and inwardly directed horizontal portion **17** and another vertical portion **18** with a plurality of holes such as **22**, **23** and **24**. The insulation used is for instance polyurethane.

The above insulated vertical portions **13** and **16** of the end walls **13—15** and **16—18** are downwardly prolonged by noninsulated vertical wall portions **25** and **26** respectively. Finally, the outer cabinet **9** is covered by an enveloping wall **27**.

The above supporting structure **1—5**, the front and back walls **10**, **11** and the end wall portions **14**, **15**, **25**, delimit a first chamber **28**, the bottom of which is constituted by a plurality of transverse beams (not shown) secured to the longitudinal beams **1**, **2**, and forming part of the supporting structure. Likewise, the supporting structure **1—5**, the front and back walls **10**, **11**, and the end wall portions **17**, **18**, **26**, delimit a second chamber **29**, the bottom of which is also constituted by a plurality of transverse beams (not shown) secured to the longitudinal beams **1**, **2**, and also forming part of the above supporting structure.

The refrigerated unit includes a first and a second refrigerating circuit which are each of a classical construction and include each at least a compressor, a condenser, expansion means and an evaporator, these devices being mutually coupled in this order.

Part **30** of the first refrigerating circuit includes the compressor, the condenser and the expansion means, the evaporator being indicated by reference numeral **31**. The motor driving the latter compressor is indicated by reference numeral **19** in FIG. **5**. Likewise part **32** of the second refrigerating circuit includes the compressor, the condenser and the expansion means, the evaporator being indicated by reference numeral **33**. The latter compressor and condenser are indicated by the reference numerals **21** and **35** in FIG. **4** and the motor driving the latter compressor **21** is indicated by reference numeral **34** in FIG. **5**. These compressor **21** and condenser **35** are intercoupled by a serpentine tubing **36** arranged in an evaporator pan **37** wherein a drain line **42** terminates. The above part **30** of the first refrigerating circuit is mounted in the first chamber **28**, and the above part **32** of the second refrigerating circuit is mounted in the second chamber **29**.

The front and backwalls **10**, **11**, the bottom wall **12** and the insulated end wall portions **15**, **18**, delimit a refrigerating space **38** on the bottom of which an insulating board **39** is arranged. This insulating board **39** is covered by a metal plate **108** and has a longitudinal groove **41** and a longitudinal drain channel **40** which communicates with space **38** through openings (not shown) in the metal plate **108**.

Drain channel **40** is located substantially in the middle of board **39** and groove **41** is located between drain channel **40** and back wall **11**. The thickness of insulating board **39** decreases, on the one hand, from its longitudinal edges towards the drain channel 40 and, on the other hand, from its transverse edge in contact with end wall portion 15 to its transverse edge in contact with end wall portion 18. Near the latter edge the drain channel 40 communicates with the above evaporator pan 37 of the second refrigerating circuit via drain line 42. A tubular element 43 wherein an electrical heating resistance (not shown) is mounted, is arranged in drain channel 40 and a similar tubular heating element 44 is provided in groove 41.

The above evaporators 31 and 33 are mounted side by side on the insulating board 39 and between the drain channel 40 and the backwall 11. Evaporator 31 includes three series connected identical evaporator elements 45, 46, 47, whereas evaporator 33 is constituted by a single evaporator element 48 which is similar to the elements 45, 46, 47. Each of these evaporator elements such as 45 is constituted by a serpentine coil having a plurality of transversally and vertically extending radial fins, such as 49, which are spaced apart longitudinally. This serpentine coil includes eight interconnected pipes which, when considered in cross section, are arranged at the angles of two adjacent squares.

Two tubular heating elements such as 50, 51, each enclosing a heating resistance, are mounted lengthwise of the evaporator element 45. These tubular elements 50, 51, are integral with the fins of this evaporator element. The heating resistances mounted in these tubular heating elements may be easily inserted in and removed from these elements since they are accessible from chamber 29 through holes such as 22, 23, in the end wall portion 18 of this chamber 29. Also the heating resistances mounted in the tubular heating elements 43, 44, may easily be removed from and inserted in these elements through suitable openings (not shown) in one of the end wall portions 15 or 18. The heating resistances mounted in the tubular heating elements 43, 44, are electrically connected in series and both connected in parallel with the parallel connected heating resistances mounted in the tubular elements 50, 51.

The above parts 30 and 32 of the first and second refrigerating circuits, mounted in the respective chambers 28 and 29, are coupled to the respective evaporators 31 and 33 through openings (not shown) in the end wall portions 15 and 18 respectively. Two fans 20 (FIG. 5) and 52 (FIG. 1) are mounted in the above refrigerating space 38 substantially at one fourth of the length of this space from the end wall portion 15 and 18 respectively.

A separating wall 53 is arranged in the refrigerating space 38 and extends from front wall 10 to backwall 11, the evaporator tubes passing through holes in this wall 53. A heat insulating board 54 rests on the evaporators 31, 33, and the housings of the fans 20 and 52 and thus constitutes the top wall of the refrigerating space 38.

A defrost regulating thermostat 55 is arranged on insulating board 39 and near drain channel 40, and a refrigeration controlling thermostat 56 (only shown in FIG. 5) is arranged in the refrigerating space 38 so as to be influenced by the air circulating in this space.

The front and backwalls 10 and 11 have inwardly directed beak-shaped portions 57 and 58 respectively. A wall 59 is suspended from the inwardly directed portion 58 of backwall 11 by means of a plurality of elements 60 to 64 which also support three louvers 65, 66 and 67. The suspended wall 59 and the backwall 11 delimit a longitudinally extending space 68 which communicates at one end with the rear part of evaporator 33 and at the other end with the display area 69 via four longitudinal inlet passages 70 and 73, delimited by the louvers 65 to 67.

Likewise wall 74 is suspended from the inwardly directed portion 57 of front wall 10 by means of a plurality of elements such as 75 which are similar to the above elements 60 to 64. The suspended wall 74 and front wall 10 delimit a longitudinally extending space 76 which communicates at one end with the space behind the fans 20 and 52 and at the other end with the display area 69 through the longitudinal air outlet passage 77. The suspended walls 59 and 74 are provided with L-shaped edges, the plates 100 to 105 being supported thereon. These plates 100 to 105 constitute a display area upon which goods may be stored.

In the above space 68 delimited by the backwall 11 and the suspended wall 59, are located 13 L-shaped deflector pieces 78 to 90 which are secured to this backwall 11. From the middle of this wall 11 wherein the deflecting piece 78 is mounted perpendicularly to the bottom 12 of the cabinet 9, the angles between the deflector pieces 79 to 84 and 85 to 90 and vertical planes which are parallel to the end walls 15, 16, gradually increase towards these end walls. These angles are respectively equal to 10°, 20°, 30°, 40°, 50° and 63°. An L-shaped plate 91 is further mounted in front of the openings 22, 23, in the end wall portion 18. A similar L-shaped plate 110 is mounted in front of the end wall portion 15.

Principally referring to FIG. 5, the electrical control circuit shown therein is adapted to control the operation of the motor 19 of the compressor of the first refrigerating circuit, of the motor 34 of the compressor 21, of the second refrigerating circuit, of the fans 20 and 52 and of the heating resistances in the tubular elements such as 43, 44, 50, 51. This electrical control circuit includes two power supply leads 92 and 93 coupled to the mains, a timer motor 94 of a classical construction periodically modifying the position of changeover contact 95, a time delay thermal relay 96 also of classical construction and including a resistance 97 and a heat controlled bimetallic changeover contact 98, and the above refrigeration and defrost controlling thermostats 56 and 55 represented by their break contacts.

Motor 19, which is a single phase AC motor, is connected across the power supply lines 92, 93, in series with the break contact of changeover contact 95 and thermostat break contact 56. Motor 34 which is also a single phase AC motor is connected across the same power supply lines 92, 93, in series with the break contact 56 and the make contact of changeover contact 98. Timer motor 94 is directly connected across the power supply lines 92, 93, and thermal relay 96 is connected across these lines in series with break contact of changeover contact 95 and thermostat break contact 56. A resistance 99 is hereby branched across the break contact of change over contact 98 so that it is normally short-circuited. The fans 20 and 52 are branched in parallel between the power supply leads 92, 93, via the break contact of changeover contact 95. The above heating resistances which will hereinafter be referred to as 43, 44, 50, 51, are connected in parallel across the same power supply leads 92, 93, via the make contact of this changeover contact 95 and the defrost thermostat break contact 55. Resistance 43 and 44 are hereby connected in series.

The operation of the above described refrigerated unit is described hereinafter.

The refrigerated unit which has a display surface of 2 m^2 is placed in an ambient atmosphere having a temperature of 20° C., a relative humidity of 50 percent and a velocity of 0.05 msec. This refrigerated unit is adapted to maintain goods stored in the display area at a temperature lower than −18° C., although every eight hours the evaporators 31 and 33 are brought at a temperature of 5° C. during a defrost period of maximum twenty minutes. The first refrigerating circuit operates with the refrigerant R12 and its evaporator 31 has a temperature of −30° C., and the second refrigerating circuit operates with the refrigerant R22 and its evaporator 33 has a temperature of −35° C. The fans 20 and 52 displace 180 m^3 of air per hour.

When the single phase mains is connected to the power supply lines 92, 93 compressor motor 19 is operated via the break contact of changeover contact 95 and the thermostat break contact 56 so that the first refrigerating circuit starts operating.

Simultaneously a current flows across the power supply lines 92, 93 via the break contact of changeover contact 95, thermostat break contact 56, resistance 99 short-circuited by break contact of changeover contact 98 and resistance 97.

Consequently, resistance **97** is heated so that after a predetermined time delay the associated bimetallic changeover contact **98** is operated. Due to this, compressor motor **34** is also branched across the power supply lines **92**, **93** so that also the second refrigerating circuit starts operating.

It should be noted that the time delay thus realized between the moments at which the motors **19** and **34** start operating, has been provided in order not to excessively load the single phase mains. When started, these motors indeed require a relatively high current.

It should also be noted that after changeover contact **98** has changed its position, resistance **99** is branched in series with resistance **97**, thus decreasing the current flowing through the latter resistance. This decreased current is however sufficient to maintain changeover contact **98** in its operative position. However, since the bimetallic element is thus slightly cooled, the changeover contact **98** is enabled to return more rapidly to its rest position when the motor **34** of the second refrigerating circuit is switched off, e.g. at the start of a defrost period.

When the mains are connected to the power supply lines **92**, **93** also the timer motor **94** and the fans **20** and **52** are operated. Consequently, a volume of 180 m^3 of air per hour is circulated from the refrigerating space **38** back to this space via evaporator **31**, evaporator **33**, longitudinal passage **68**, inlet openings **70** to **73**, display area **69**, outlet opening **77** and longitudinal space **76**. Plates **91** and **110** hereby prevent a turbulent movement of this air near the junction between the wall portions **14**, **15** and **17**, **18**.

In the longitudinal space **68** the circulated air is divided in a plurality of airstreams by the deflector pieces **78** to **90**, so that this air is brought into contact with the whole of the suspended wall **59**. By the louvers **65** to **67** these airstreams are further each divided in four air layers which are slightly inclined downwardly. In each of these air layers the air filets follow different directions since they make different angles with vertical planes which are parallel to the end walls **13**—**15** and **16**—**18**, these air filets being directed towards the one or the other of these end walls or the fictive prolongation thereof.

The aim of the louvers **65** to **67** is to provide air layers moving in a substantially laminar flow, thereby minimizing the intermixt or entrainment of ambient air and the migration of moisture from the ambient air in the display area.

Due to the oblique direction followed by each of the air filets in each of the four layers the axial velocity of each of these air filets is reduced, the axial direction being considered along a horizontal line in one of the above vertical lines. The laminar flow of the adjacent ambient air is thus changed into a turbulent flow due to which the amount of ambient air, which becomes intermixed or is entrained with the four air layers, is further reduced.

As well the deflector pieces **79** to **90** as the louvers **65** to **67** hence increase the operating efficiency of the refrigerated unit since the less ambient air is intermixed with the above four air layers the less heat the latter layers take up from the ambient air and the less these layers must be cooled by the refrigerating circuits.

Another measure which increases the efficiency of the refrigerated unit is the relatively thick horizontal protective air layer between the inwardly directed portions **57** and **58** and the end walls **13**—**15**, **16**—**18** of the cabinet **9**. This protective air layer is indeed substantially not affected by the air moving over the cabinet **9** so that substantially no ambient air is mixed with this air layer. The latter air layer will substantially also not be intermixed with the four laminar air layers flowing in the display area, as already mentioned.

Still another measure which increases the operation efficiency of the refrigerated unit is the location of the edge **106** at the crossing of the planes **107** and **108** of the inwardly directed portion **57** and the suitable inclination of these planes. This edge **106** is indeed located at a place where the temperature difference between adjacent horizontal air layers is maximum and the inclination of the surfaces **107** and **108** is such that the airstreams impinging thereon are deflected outside the cabinet **9** and through the outlet opening **77** respectively.

After a certain operation time of the refrigerated unit, the goods in the display area are at the required temperature lower than −18° C. The air when leaving this area through opening **77** has then a temperature of −21° C., a relative humidity of 100 percent and an absolute humidity of 1.06 g/m^3.

When this air is forced by fans **20** and **52** into contact with the tubes of evaporator **31** of the first refrigerating circuit, it is substantially completely dehumidified and cooled from −21° C. to −28° C. since the evaporator **31** operates at −30° C. This first refrigerating unit which is capable of eliminating about 680 kcal./h when 5.8 m^3/h of **R12** circulates therein also eliminates substantially all the losses occurring through the insulated walls.

When the thus dehumidified and cooled air is further forced by fans **20** and **52** into contact with the tubes of evaporator **33** of the second refrigerating circuit which operates at −35° C. and is capable of eliminating about 280 kcal./h when 0.205 m^3/h of **R22** circulates therein, it is further cooled from −28° C. to −32° C.

It **25** been found that when circulating 180 m^3 of air per hour and at a temperature of −32° C., the temperature of the stored goods did not become higher than −18° C.

From the above it follows that the circulating air is cooled in two steps successively by the first refrigerating circuit which includes the evaporator **31** which operates at a temperature of −30° C. and through which circulate 5.8 m^3/h of **R12** and by the second refrigerating circuit which includes the evaporator **33** which operates at a temperature of −35° C. and through which circulates 0.205 m^3/h of **R22**. This mode of operation has been adopted for the following reasons:

refrigerant **R12** is much cheaper than refrigerant **R22** so that it is advantageous to eliminate most of the heat by means of refrigerant **R12**;

the heat capable of being eliminated by the first refrigerating circuit however more rapidly decreases with decreasing temperature than the second heat capable of being eliminated by the second refrigerating circuit. More particularly, at −35° C. this heat is much larger for the second refrigerating circuit than for the first;

at the operation temperature of −30° C. of the evaporator **31** the temperature difference with that of the circulating air which at −21° C. is sufficient to have a good heat transfer from the air to the evaporator **31**. At this temperature the heat-elimination of the first refrigerating circuit is comparable to that the second refrigerating circuit would have at the same temperature. At this temperature the air is substantially completely dehumidified.

During the above refrigerating operation frost accumulations are built up on the fins of the evaporators **31** and **33** due to which the heat transfer of the circulating air to these evaporators decreases. In order to limit this decrease to a reasonable value, every eight hours timer motor **94** operates its associated changeover contact **95** and maintains this contact in the operated position for 20 minutes. Due to this the operation of the motors **19** and **34** and of the fans **20** and **52** is stopped and simultaneously a current starts flowing through the heating resistances **43**, **44**, **50**, **51** via the defrost thermostat break contact **55**.

The heating resistances in the tubular elements **50**, **51** and **44**, raise the temperature of the evaporators **31** and **33** to substantially +5° C. Hereby the radial fins of these elements which are also the fins of the evaporators **31**, **32**, provide for uniform and highly efficient distribution of the heat over the evaporators **31** and **33**. The water formed by the melting frost is drained through drain channel **40** and drain line **41** to evaporator pan **37**.

The heating resistance in the tubular element **44** prevents the accumulation of ice in the drain channel **40** which would impede rapid removal of the water formed by melting frost. Since the defrosting operation is carried out quickly with a minimum of interruption in the refrigerating operation, it is indeed necessary to provide for rapid removal of the water in this operation, otherwise the water still present in the drain channel would tend to freeze when the refrigerating cycle is again started.

It should be noted that the drain water collected in the evaporator pan 37 is evaporated by the refrigerant passing in the tubing 36 between compressor 21 and condenser 35 of the second refrigerating circuit. Thus, no tubing has to be provided for draining this water out of the room wherein the display unit is located. The refrigerated unit is hence really a self-contained unit.

As soon as the defrost controlling thermostat 55 detects a temperature of 5° C. it opens its break contact due to which the resistances 43, 44 and 50, 51 are switched off from the mains. The time interval elapsing between this moment and the moment the timer motor 94 returns its changeover contact 95 to its rest condition is used to realize the complete removal of the melted frost through drain channel 40.

When changeover contact 95 has reached its rest position, the motors 19 and 34 are again successively started since the thermostat break contact 56 is in its rest position. Indeed, the temperature of the air wherein this thermostat is located is relatively high immediately after a defrosting operation. Also the fans 20 and 52 are again started.

It should be noted that when during the normal operation of the refrigerated unit temperature measured by thermostat 56 decreases below a predetermined value, the corresponding break contact is opened. Due to this both motors 19 and 34 are stopped, but the fans 20, 52 continue operating. Independently from this fact a defrost operation may be started.

It should be noted that the separating wall 53 between the two fans 20, 52 has been provided in order to prevent a part of the amount of air displaced by one of these fans to enter the other fan when the latter is not operating, for instance due to a defect.

While the principles of the invention have been described above in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention.

I claim:

1. A. refrigerator unit comprising:

a cabinet including an area for storing goods and a refrigeration space;

a structure for supporting the cabinet;

a first evaporator which forms part of a first refrigeration circuit mounted in said refrigeration space;

a second evaporator which forms part of a second refrigeration circuit mounted in said refrigeration space,

said first evaporator operating at a first evaporating temperature and the second evaporator operating at a lower evaporating temperature than that of said first evaporator;

air blowing means circulating air successively over said first and second evaporators and within said storage area;

each of said refrigerating circuits comprising;

a motor;

a compressor driven by said motor;

a condenser; and

expansion means,

each of said motors, compressors, condensers, and expansion means being mounted together on said supporting structure; and

wherein said cabinet comprises a pair of lateral walls and a pair of end walls, each having an inwardly projecting horizontal portion such that the length of the lateral walls delimiting a lower part of the cabinet is smaller than the length of the lateral wall delimiting an upper part thereof, each of said compressors, said motors, said condensers, and said first and second refrigerating circuits being mounted on said supporting structure in first and second chambers located adjacent to the one and the other ends of said lower part of said cabinet respectively and both below said upper part thereof.

2. A refrigerator unit comprising:

a cabinet including an area for storing goods and a refrigeration space;

a structure for supporting the cabinet;

a first evaporator which forms part of a first refrigeration circuit mounted in said refrigeration space;

a second evaporator which forms part of a second refrigeration circuit mounted in said refrigeration space,

said first evaporator operating at a first evaporating temperature and the second evaporator operating at a lower evaporating temperature than that of said first evaporator;

air blowing means circulating air successively over said first and second evaporators and within said storage area;

each of said refrigerating circuits comprising;

a motor;

a compressor driven by said motor;

a condenser; and

expansion means,

each of said motors, compressors, condensers and expansion means being mounted together on said supporting structure; and

wherein said refrigeration space comprises defrosting means and a drain channel which terminates in an evaporator pan through which passes tubing interconnecting the compressor and the condenser of one of said refrigerating circuits; and

an evaporator pan mounted on said supporting structure so that said refrigerator unit is self-contained.

3. A refrigerator unit comprising:

a cabinet including an area for storing goods and a refrigeration space;

at least one evaporator mounted in said refrigeration space;

air blowing means mounted in said refrigeration space for circulating air successively over said evaporator and within said storage area;

air inlet means in said storage area;

air outlet means in said storage area;

wherein said cabinet comprises a pair of lateral walls;

a pair of end walls, each of which has an inwardly projecting horizontal portion such that the length of the lateral walls delimiting a lower part of the cabinet is smaller than the length of the lateral walls delimiting an upper part thereof;

an inner cabinet delimiting said storage area mounted in said upper part of said cabinet so that the lateral walls of said cabinet and said inner cabinet delimit first and second longitudinal spaces which at their one end both communicate with said area via said air inlet means and said air outlet means respectively and at their other end both communicate with said lower part of said cabinet which constitutes said refrigerating space; and

a plurality of deflector pieces which are mounted in said first longitudinal space and which, starting in the middle of said cabinet toward each of said end walls thereof making increasing angles with vertical planes which are parallel to said end walls so as to delimit passages, the cross sections of which increase toward said one end of said first longitudinal space for decreasing the axial velocity of said circulating air entering said storage area through said air inlet means by deflecting said air with respect to said axial direction before said air enters said area, said axial velocity being measured along an axial direction corresponding to the shortest distance between said air inlet means and said air outlet means.

4. A refrigerated unit comprising:

a cabinet including an area for storing goods and a refrigeration space;

at least one evaporator mounted in said refrigeration space;

air blowing means mounted in said refrigeration space for circulating air successively over said evaporator and within said storage area;

air inlet means in said storage area;

air outlet means in said storage area;

means for decreasing the axial velocity of said circulating air when entering said area through said inlet, said axial velocity being measured along an axial direction corresponding to the shortest distance between said inlet and said outlet;

wherein said cabinet comprises a pair of end walls and a pair of lateral walls having first and second inwardly directed portions respectively, said end walls and said inwardly directed portions delimiting an opening so that a protective zone of air is formed over said area,

wherein said air inlet and said air outlet are located below the first and second of said inwardly directed parts; and

wherein said second inwardly directed portion has a beak-shaped cross section and is delimited by first and second inclined planes, the inclinations of which are such that circulating air impinging on said first plane is deviated outside the cabinet and whereby circulating air impinging on said second plane is deviated toward said outlet.