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(54) **Cooling unit for coffins with detachable refrigerating plate and liquid recovery**

Kühlgerät für Särge mit abnehmbarem Verdampfer und Rückgewinnung von Kältemittel

Appareil de refroidissement pour cercueils avec évaporateur détachable et récupération de réfrigérant

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EP-A- 0 230 595 **WO-A-89/12792**
DE-A- 2 549 922 **DE-A- 3 914 252**
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Description

[0001] The present invention concerns a cooling unit for coffins comprising a refrigerating circuit and a refrigerating plate which is in a situation of heat exchange with the interior of the coffin.

[0002] More particularly the invention concerns a cooling unit of the above-mentioned kind wherein the cooling unit consists of a detachable coil which a heat exchange refrigerating fluid flows therein.

[0003] Similar cooling units are known in the art, for instance the one described in the European Patent N° EP 230.595 of the same applicant.

[0004] The above embodiment includes a freon circulating cooling unit consisting of two parts, the first comprises all the elements of the refrigerating circuit, preferably contained in a transportable container, the second, namely the plate constituting the evaporator, consists of a preloaded coil connectable with, or detachable from the remaining part of the unit by means of rapid connections set up on the delivery and exit pipes to seal the corresponding parts of the refrigerating circuit after the relative detachment. All elements of the refrigerating circuit, with the exclusion of the plate, can be subsequently reused to be connected to another plate associated with another coffin.

[0005] On the contrary, the plate is a disposable element and it is left in the coffin after the final closure thereof, involving therefore the loss of the freon contained therein. It has to be considered that the amount of freon contained into the evaporator, in the normal operating conditions, is remarkably higher than the preloaded amount at room temperature.

[0006] Other losses, even though less substantial, take place at the time of disconnecting the evaporator from the remaining part of unit in correspondence of the rapid attachments, said losses being due to a difference between the pressure of freon contained in the coil and the external atmospheric pressure.

[0007] One of the drawback of the above cooling unit is due to the fact that, by using many times the reusable part of the refrigerating circuit, a gradual decrease of the amount of the fluid in the circuit takes place. Such decrease implies frequent and expensive circuit refilling operations as well as the availability of a tank of such a size as to contain a sufficient amount of fluid to assure a suitable operating duration to the reusable unit.

[0008] An additional drawback is due to the harmless freon leaking in the atmosphere, since, as it is well known, freon is a polluting fluid.

[0009] WO-A-8912792 relates to a method and apparatus to fully withdraw refrigerant from entire cooling unit, more specifically from an air conditioner installed on a car. It does not solve the problem to evacuate a part of the circuit only.

[0010] FR-A-2539620 refers to a unit including a refrigerating system comprising two different circuits. It also provides a cooling apparatus in which a portion of

the refrigerating circuit - the envelop - may be disconnected from the remaining part of the circuit to make the transportation easier. However the reference does not disclose nor teach any refrigerating fluid withdrawal from the portion of the circuit to be disconnected.

[0011] It is an object of the present invention to provide an improved cooling unit allowing the use of a detachable refrigerating plate, while avoiding any polluting fluid leaking.

[0012] Another object of the present invention is to provide a cooling unit which allows to recover the excess fluid contained in the refrigerating plate before its detachment from the remaining part of the cooling unit.

[0013] A further object of the present invention is to provide a cooling unit allowing to limit the fluid losses during detachment of the plate from the remaining part of the cooling unit.

[0014] The above objects are attained by the present invention which refers to a cooling units as claimed in claims 1 and 10.

[0015] Therefore, according to the invention, it is possible to carry out a fluid recovery operation from the refrigerating plate before the disconnection of said plate from the remaining part of the refrigerating circuit.

[0016] This and other advantages will appear more clearly from the following description which is provided with reference to the annexed drawings to illustrate the invention without any limiting purpose.

[0017] In the drawings:

- Fig. 1 is a schematic view of a first embodiment of the cooling unit according to the invention; and
- Fig 2 is a schematic view of a second embodiment according to the invention.

[0018] In the first embodiment according to invention said second circuit coincides with the cooling circuit and the heat exchange fluid is a freon containing refrigerating fluid.

[0019] The cooling circuit shown in Fig. 1 comprises therefore a compressor 1 delivering the fluid in the gaseous state to a condenser 3 through a pipe 2. In the condenser 3, conventionally cooled by a fan 4, the fluid liquefies by condensation and is recovered in a tank 5. From said tank 5 the fluid passes through a pipe 6 up to the inlet of a valve or an expansion capillary 7 whose outlet is then connected, through a delivery pipe 8, with the inlet pipe 9 of the evaporator 10.

[0020] In the preferred embodiment of the invention the reusable part of the cooling unit is contained in a transportable container 20 (shown in dotted line in Fig.1), while the refrigerating plate 25 comprises the evaporator 10 consisting of a refrigerating fluid preloaded flat coil 11, of the kind employed in the household refrigerators, known as roll-bond.

[0021] The outlet pipe 12 of the coil 11 is then connected with the return pipe 13 carrying back the fluid to

compressor 1.

[0022] The connection between pipes 8 and 9, as well as the connection between pipes 13 and 12, is achieved by means of rapid connections 14 connectable and detachable with respect to the corresponding rapid connections 15.

[0023] According to an advantageous embodiment of the invention a stop-valve 16 is provided on the refrigerating fluid delivery pipe upstream of the valve or the expansion capillary 7. This arrangement allows to discontinue the refrigerating fluid flow toward the evaporator 10 in a portion of the circuit in which said fluid is in liquid state.

[0024] Upstream of the evaporator 10 and on the pipe 13 an automatic single-acting valve 17, acting as a nonreturn valve, is preferably provided, said valve allows the refrigerating plate 25 isolation from the remaining part of the circuit before its detachment.

[0025] In order to discharge the refrigerating fluid from the refrigerating plate 25, before disconnecting said plate from the remaining part of the circuit, the valve 16 is turned off on the delivery pipe 8 and, simultaneously, the compressor 1 is switched on to draw the fluid from the coil 11 toward the reusable circuit part.

[0026] Once a sufficient emptying degree of the coil 11 is reached, the compressor 1 is shut off while the automatic, single-acting valve 17 prevents any return of the fluid to coil 11.

[0027] It is preferable that compressor 1 is operated independently of the temperature conditions of the refrigerating fluid, that, in the conventional cooling units, determinate the switch on or the shut off of the compressor during the usual operating cycles.

[0028] Such an arrangement may be obtained by parallel connecting suitable commutating devices, for instance a simple switch, with the contacts of the commutating device associated with the thermostat.

[0029] In such a way it is possible to carry out the coil 11 emptying in a fast and efficient manner independently of the usual operating cycle of the compressor 1.

[0030] In the preferred embodiment of the invention the coil 11 emptying cycle is carried out by means of suitable driving means comprising a control device 18 and at least a transducer 19 to provide information on the refrigerating fluid pressure conditions to the control device 18. To allow an entire automatization of the coil 11 emptying cycle it is advantageously used a control device 18 of the electromechanical or electronic kind, as well as an electrically actuated stop valve 16, as for instance a solenoid valve.

[0031] The coil 11 emptying cycle starts at the time in which the control device 18 receives a signal from the exterior, sent by an operator, for instance through the electrical connection 21. The control device 18 reacts by actuating the closure of the stop valve 16 through the electrical connection 22, as well as the switch on of the compressor 1 through the electrical connection 23. The

operation of the compressor 1 draws the refrigerating fluid from the coil 11 while the stop valve 16 plugs the delivery pipe upstream of the valve or expansion capillary 7.

[0032] During the coil 11 emptying, the transducer 19 provides the control device 18 with a variable electric signal as a function of the fluid pressure conditions downstream of the coil 11. The expression "variable electric signal" means either a continuous variable signal or a discontinuous variable signal, as for instance a two-level signal generated by respective conditions of open or closed circuit at the ends of the transducer.

[0033] When the refrigerating fluid pressure downstream of the coil goes below a predetermined threshold the transducer 19, through the electrical connection 24, indicates to the control device 18 the attainment of the optimum conditions to stop the coil 11 emptying cycle.

[0034] The control device 18 actuates then the switch off of the compressor 1 through the electrical connection 23 while the valve 17, suitably calibrated, avoids the fluid return into the coil 11.

[0035] In such a way it is possible to remarkably limit the amount of fluid remaining in refrigerating plate 25, reducing consequently the amount of the refrigerating fluid that, otherwise, will be lost by leaving the coil in the interior of the coffin. By limiting the amount of fluid, and therefore its pressure inside the coil 11, the dispersion of the refrigerating fluid in the atmosphere is drastically reduced, if not eliminated.

[0036] In the second embodiment of the invention the refrigerating circuit is different from said second circuit and the above two circuits are heat exchange coupled by a heat exchanger.

[0037] The cooling unit according to the invention, as shown in Fig.2, comprises a conventional closed refrigerating circuit 30 in which a freon containing heat exchange fluid flows, and a second circuit wherein a liquid heat exchange fluid flows having a low freezing point and a high boiling point, for instance a glycol. The above two circuits are heat exchange, preferably counter-current, coupled by means of distinct hydraulic pipes in a heat exchanger 31.

[0038] By employing two distinct circuits, and particularly a sealed refrigerating circuit, the refrigerating fluid dispersion in the environment is eliminated.

[0039] More particularly, the second circuit of the cooling unit comprises a pump 32 for the second heat exchange fluid circulation, a tank 33 for the recovery of said second fluid and a refrigerating plate 34 in which a coil 35 is embedded.

[0040] The refrigerating plate 34 is detachable from the remaining part of the circuit in a point where a pair of joints 36 are present. Such joints are for instance neoprene made couplings placed respectively upstream of the inlet pipe 37 and downstream of the outlet pipe 38 of the heat exchange fluid in the coil 35.

[0041] The pump 32 acting as a heat exchange fluid

circulating mean in the second circuit is preferably of positive-displacement kind. Said device allows to pump both the heat exchange fluid within the circuit and the necessary air to discharge the heat exchange fluid from the coil 35 and recovery same into the tank 33.

[0042] As a matter of fact, to carry out the emptying of the coil 35 a three way valve is provided, placed between the tank 33 and the pump 32, upstream of the latter with respect to the fluid flowing direction. Two ways of the valve are connected with the circuit, the third way is connected with the exterior to allow to pump air within the circuit and consequently draw the fluid from the coil 35. During the cooling unit normal operations the ways in communication with the remaining part of the circuit are open while the third way, in communication with the exterior, is closed.

[0043] The air inlet into the circuit allows then to recovery most of the heat exchange fluid that otherwise will be lost together with the refrigerating plate which is left in the coffin at the time the coffin is finally closed.

[0044] According to an advantageous feature of the invention, the coil 35 emptying operations are carried out in an automatic way by means of a control device 40 of electromechanical or electronic kind, furthermore the valve 39 is of electromechanical type, for instance an electrically driven solenoid valve.

[0045] In fact, before detaching the refrigerating plate 34, the operator sends a signal to the control device 40 through the electrical connection 41. The control device 40 actuates then the switching of the valve 39 through the electrical connection line 42 in order to close the way toward the tank 33 and put in connection the exterior with the portion of the circuit downstream of said valve.

[0046] In the same time of the switching of the valve 39, the control device 40 actuates, through the electrical connection line 43, the pump 32. The above operations give rise to the inlet of air into the circuit downstream of the valve 39 and the subsequent transfer of the heat exchange fluid through the circuit to the recovery tank 33.

[0047] A suitable sensor, for instance a thermal overloading sensor, allows the pump disconnection after a predetermined value of the coil emptying is reached. The plate 34 may therefore be detached from the reusable part of the cooling unit without any valuable loss of the heat exchange fluid.

Claims

1. Cooling unit for coffins of the kind comprising two different refrigerating circuits coupled by a heat exchanger (31), wherein a first heat exchange fluid circulates in the first refrigerating circuit, and a second refrigerating fluid circulates in the second refrigerating circuit connected with at least a refrigerating plate (34) in a situation of heat exchange with the interior of the coffin and at least a pump

(32) to carry out the flowing of such second heat exchange fluid in the second circuit, said refrigerating plate (34) consisting of a coil (35), set up detachable, by means of rapid connections (36) placed respectively upstream of the inlet pipe (37) and downstream of the outlet pipe (38) of the heat exchange fluid in said coil (35) to allow said coil (35) detachment from, or connection with the remaining part of said second circuit, characterized in that it comprises valve means (39) to stop the flowing of said second fluid in the delivery pipe (37) of said coil (35) and to allow the draining of said fluid from said coil (35), actuating or control means to actuate the operations of pump (32) and of said valve means (39), said actuating or control means actuating the operations of said pump (32) to evacuate the coil (35) after said valve means (39) have stopped the flowing of said second fluid in the delivery pipe of said coil (35) and being able to stop the operations of said pump (32) when the amount of said second fluid in said coil is lower than a predetermined value.

2. Cooling unit according to claim 1, characterized in that said first and second heat exchange fluids are different each other.
3. Cooling unit according to claim 2, characterized in that the thermal coupling between said circuits is effected in countercurrent.
4. Cooling unit according to claim 2, characterized in that said first heat exchange fluid, circulating in said first refrigerating circuit, is a freon containing refrigerating fluid and that said second heat exchange fluid, circulating in said second circuit, is a liquid heat exchange fluid having a low freezing point and a high boiling point.
5. Cooling unit according to claim 2, characterized in that said first circuit is a closed refrigerating circuit and that said second circuit comprises a tank (33) for the recovery of said second heat exchange fluid.
6. Cooling unit according to claim 2, characterized in that said pump (32) is a positive- displacement pump.
7. Cooling unit according to claim 2, characterized in that said valve means to stop said heat exchange fluid circulation comprise at least a three-way valve (39) placed upstream of said pump (32), two ways being connected with the circuit, the third way being connected with the exterior to allow air to be pumped into the circuit and the consequent emptying of said second fluid from the coil (35).
8. Cooling unit according to claim 2, characterized in

that said actuating or control means comprise a control device (40) capable to switch said three-way valve (39) placed on the delivery pipe toward said coil (35) and to actuate the switching-on of said pump (32), as well as a sensor suitable to actuate the switch off of said pump after a predetermined value of the coil emptying is reached.

9. Cooling unit according to claim 8, characterized in that said control device (40) is of electromechanical or electric type and that said three-way valve (39) is a electrically actuated solenoid valve.

10. Cooling unit for coffin of the kind comprising a refrigerating circuit in which a refrigerating fluid circulates therein, at least a refrigerating plate (25) in a situation of heat exchange with the interior of the coffin consisting of a coil (11), set up detachable, by means of rapid connections (14, 15) from the remaining part of the circuit, said refrigerating circuit including a compressor (1) for the circulation of said heat exchange fluid, a condenser (3), one or more expansion valve or similar devices (7), an evaporator (10) embedded into said refrigerating plate (25) consisting of said preloaded coil (11), characterized in that it comprises valve means (16) to stop the flowing of said fluid in the delivery pipe of said coil (11) and to allow the draining of said fluid from said coil (11), actuating or control means with a control device (18) to actuate the operations of said compressor (1) and of said valve means (16), said actuating means actuating the operation or switching-on of said compressor (1) to evacuate the coil (11) after said valve means (16) have stopped the flowing of said fluid in the delivery pipe (8) of said coil (11) and being able to stop the operations of said compressor (1) when the amount of said fluid in said coil (11) is lower than a predetermined value.

11. Cooling unit according to claim 10, characterized in that said heat exchange fluid is a freon containing refrigerating fluid.

12. Cooling unit according to claim 10, characterized in that it comprises at least a transducer (19) to provide said control device (18) with information on the refrigerating fluid pressure conditions to actuate the switching off of the compressor (1).

13. Cooling unit according to claim 12, characterized in that said control device (18) is of electromechanical or electronic kind and that said valve (16) is an electrically actuated solenoid stop-valve.

14. Cooling unit according to claim 12, characterized in that the information of said transducer (19) is given in form of an electrical variable signal as a function

of the heat exchange pressure conditions in said circuit downstream of the coil (11).

15. Cooling unit according to claim 12, characterized in that said transducer (19) is placed downstream of said rapid connections (14-15) on the return pipe (13) from said coil (11).

Patentansprüche

1. Kühleinheit für Särge der Bauart mit zwei verschiedenen, durch einen Wärmetauscher (31) gekoppelten Kühlkreisläufen, worin ein erstes Wärmetauschfluid im ersten Kühlkreislauf zirkuliert und ein zweites Kühlfluid im zweiten Kühlkreislauf zirkuliert, der mit mindestens einer Kühlplatte (34) im Falle eines Wärmetausches mit dem Innenraum des Sarges und mindestens einer Pumpe (32) verbunden ist, um das Strömen eines solchen zweiten Wärmetauschfluids im zweiten Kreislauf auszuführen, wobei die Kühlplatte (34) aus einer Schlange (35) besteht, die mittels stromaufwärts des Einlaßrohres (37) bzw. stromabwärts des Auslaßrohres (38) des Wärmetauschfluids in der Schlange (35) angeordneter Schnellverbindungen (36) lösbar montiert ist, um das Lösen der Schlange (35) vom restlichen Teil des zweiten Kreislaufes oder eine Verbindung mit diesem zu ermöglichen, dadurch gekennzeichnet, daß sie Ventileinrichtungen (39) aufweist, um das Strömen des zweiten Fluids im Förderrohr (37) der Schlange (35) zu stoppen und die Ableitung des Fluids aus der Schlange (35) zu ermöglichen, Auslöse- oder Steuereinrichtungen, um den Betrieb der Pumpe (32) und der Ventileinrichtungen (39) auszulösen, wobei die Auslöse- oder Steuereinrichtungen den Betrieb der Pumpe (32) auslösen, um die Schlange (35) zu leeren, nachdem die Ventileinrichtungen (39) das Strömen des zweiten Fluids im Förderrohr der Schlange (35) gestoppt haben, und den Betrieb der Pumpe (32) stoppen können, wenn die Menge des zweiten Fluids in der Schlange geringer als ein vorbestimmter Wert ist.

2. Kühleinheit nach Anspruch 1, dadurch gekennzeichnet, daß die ersten und zweiten Wärmetauschfluide voneinander verschieden sind.

3. Kühleinheit nach Anspruch 2, dadurch gekennzeichnet, daß die thermische Kopplung zwischen den Kreisläufen im Gegenstrom ausgeführt ist.

4. Kühleinheit nach Anspruch 2, dadurch gekennzeichnet, daß das im ersten Kühlkreislauf zirkulierende erste Wärmetauschfluid ein freonhaltiges Kühlfluid ist und das im zweiten Kreislauf zirkulierende zweite Wärmetauschfluid ein flüssiges Wärmetauschfluid mit einem niedrigen Gefrierpunkt

und einem hohen Siedepunkt ist.

5. Kühleinheit nach Anspruch 2, dadurch gekennzeichnet, daß der erste Kreislauf ein geschlossener Kühlkreislauf ist und daß der zweite Kreislauf einen Tank (33) für die Rückgewinnung des zweiten Wärmetauschfluids aufweist. 5
6. Kühleinheit nach Anspruch 2, dadurch gekennzeichnet, daß die Pumpe (32) eine Verdrängervakuumpumpe ist. 10
7. Kühleinheit nach Anspruch 2, dadurch gekennzeichnet, daß die Ventileinrichtungen, um die Zirkulation des Wärmetauschfluids zu stoppen, mindestens ein stromaufwärts der Pumpe (32) angeordnetes Dreiwegeventil (39) aufweisen, wobei zwei Wege mit dem Kreislauf verbunden sind und der dritte Weg mit dem Außenraum verbunden ist, um zu ermöglichen, daß Luft in den Kreislauf gepumpt wird, und das folgende Entleeren des zweiten Fluids aus der Schlange (35) zu ermöglichen. 15 20
8. Kühleinheit nach Anspruch 2, dadurch gekennzeichnet, daß die Auslöse- oder Steuereinrichtungen eine Steuerung (40), die das auf dem Förderrohr zur Schlange (35) angeordnete Dreiwegeventil (39) schalten und das Einschalten der Pumpe (32) auslösen kann, sowie einen Sensor aufweisen, der dafür geeignet ist, das Ausschalten der Pumpe auszulösen, nachdem ein vorbestimmter Wert der Entleerung der Schlange erreicht ist. 25 30
9. Kühleinheit nach Anspruch 8, dadurch gekennzeichnet, daß die Steuerung (40) von elektromechanischer oder elektrischer Bauart ist und daß das Dreiwegeventil (39) ein elektrisch betätigtes Solenoidventil ist. 35 40
10. Kühleinheit für einen Sarg der Bauart mit einem Kühlkreislauf, in dem ein Kühlfluid zirkuliert, mindestens einer Kühlplatte (25) im Falle eines Wärmetausches mit dem Innenraum des Sarges, die aus einer Schlange (11) besteht, die mittels Schnellverbindungen (14, 15) vom restlichen Teil des Kreislaufes lösbar montiert ist, wobei der Kühlkreislauf einen Verdichter (1) für die Zirkulation des Wärmetauschfluids, einen Verflüssiger (3), ein oder mehr Expansionsventile oder ähnliche Vorrichtungen (7) und einen in die aus der vorher beschickten Schlange (11) bestehende Kühlplatte (25) eingebetteten Verdampfer (10) enthält, dadurch gekennzeichnet, daß sie Ventileinrichtungen (16), um das Strömen des Fluids im Förderrohr der Schlange (11) zu stoppen und die Ableitung des Fluids aus der Schlange (11) zu ermöglichen, und Auslöse- oder Steuereinrichtungen mit einer Steuerung (18) 45 50 55

aufweist, um den Betrieb des Verdichters (1) und der Ventileinrichtungen (16) auszulösen, wobei die Auslöseeinrichtungen den Betrieb oder das Einschalten des Verdichters (1) auslösen, um die Schlange (11) zu leeren, nachdem die Ventileinrichtungen (16) das Strömen des Fluids im Förderrohr (8) gestoppt haben, und den Betrieb des Verdichters (1) stoppen können, wenn die Menge des Fluids in der Schlange (11) geringer als ein vorbestimmter Wert ist.

11. Kühleinheit nach Anspruch 10, dadurch gekennzeichnet, daß das Wärmetauschfluid ein freonhaltiges Kühlfluid ist.
12. Kühleinheit nach Anspruch 10, dadurch gekennzeichnet, daß sie mindestens einen Wandler (19) aufweist, um die Steuerung (18) mit Information über die Druckzustände im Kühlfluid zu versorgen, um das Ausschalten des Verdichters (1) auszulösen.
13. Kühleinheit nach Anspruch 12, dadurch gekennzeichnet, daß die Steuerung (18) von elektromechanischer oder elektrischer Bauart ist und das Ventil (16) ein elektrisch betätigtes Solenoid-Absperrventil ist.
14. Kühleinheit nach Anspruch 12, dadurch gekennzeichnet, daß die Information des Wandlers (19) in Form eines elektrisch veränderlichen Signals als Funktion der Druckzustände beim Wärmetausch im Kreislauf stromabwärts der Schlange (11) gegeben ist.
15. Kühleinheit nach Anspruch 12, dadurch gekennzeichnet, daß der Wandler (19) stromabwärts der Schnellverbindungen (14 - 15) am Rücklaufrohr (13) von der Schlange (11) angeordnet ist.

Revendications

1. Unité de réfrigération pour cercueils du type comprenant deux circuits de réfrigération différents couplés par un échangeur de chaleur (31), dans laquelle un premier fluide d'échange de chaleur circule dans le premier circuit réfrigérant, et un second fluide d'échange de chaleur circule dans le second circuit réfrigérant relié à au moins une plaque réfrigérante (34) dans une configuration d'échange de chaleur avec l'intérieur du cercueil et au moins une pompe (32) pour provoquer l'écoulement d'un tel second fluide d'échange de chaleur dans le second circuit, cette plaque réfrigérante (34) consistant en un serpentin (35), monté de façon amovible, au moyen de raccords rapides (36) placé respectivement en amont de la conduite d'admission (37) et en aval de la conduite de refou-

- lement (38) du fluide d'échange de chaleur dans ce serpent (35) de façon à permettre sa séparation du serpent (35), ou son branchement avec la partie restante du second circuit, caractérisée en ce qu'elle comporte des moyens de vanne (39) pour stopper l'écoulement du second fluide dans la conduite d'alimentation (37) du serpent (35) et pour permettre le drainage du fluide du serpent (35), des moyens de d'actionnement ou de commande pour commander le fonctionnement de la pompe (32) et les moyens de vanne (39), ces moyens d'actionnement ou de commande commandant le fonctionnement de la pompe (32) afin de vider le serpent (35) après que les moyens de vanne (39) aient stoppé l'écoulement du second fluide dans la conduite d'alimentation du serpent (35) et étant capables de stopper le fonctionnement de la pompe (32) lorsque la quantité du second fluide dans le serpent est inférieure à une valeur prédéfinie.
2. Unité de réfrigération selon la revendication 1, caractérisée en ce que les premier et second fluides d'échange de chaleur sont différents l'un de l'autre.
 3. Unité de réfrigération selon la revendication 2, caractérisée en ce que le couplage thermique entre les circuits est réalisé à contre-courant.
 4. Unité de réfrigération selon la revendication 2, caractérisée en ce que le premier fluide d'échange de chaleur, circulant dans le premier circuit de refroidissement, est un fluide de réfrigération contenant du fréon et en ce que le second fluide d'échange de chaleur, circulant dans le second circuit, est un fluide liquide d'échange de chaleur présentant un faible point de congélation et un point d'ébullition élevé.
 5. Unité de réfrigération selon la revendication 2, caractérisée en ce que le premier circuit est un circuit fermé de réfrigération et en ce que le second circuit comporte un réservoir (33) pour la récupération du second fluide d'échange de chaleur.
 6. Unité de réfrigération selon la revendication 2, caractérisée en ce que la pompe (32) est une pompe volumétrique.
 7. Unité de réfrigération selon la revendication 2, caractérisée en ce que les moyens de vanne pour stopper la circulation du fluide d'échange de chaleur comportent au moins une vanne à trois voies (39) placée en amont de la pompe (32), deux voies étant reliées au circuit, la troisième voie étant ouverte à l'extérieur afin de permettre le pompage de l'air dans le circuit et le vidage consécutif du second fluide du serpent (35).
 8. Unité de réfrigération selon la revendication 2, caractérisée en ce que les moyens d'actionnement ou de commande comportent un dispositif de commande (40) capable de changer la position de la vanne à trois voies (39) placée sur la conduite d'alimentation en direction du serpent (35) et de commander la mise en marche de la pompe (32), ainsi qu'un capteur approprié pour commander l'arrêt de la pompe après qu'une valeur prédéfinie de vidage du serpent a été atteinte.
 9. Unité de réfrigération selon la revendication 8, caractérisée en ce que le dispositif de commande (40) est du type électromécanique ou électrique et en ce que la vanne à trois voies (39) est une électrovanne commandée électriquement.
 10. Unité de réfrigération pour cercueil du type comprenant un circuit réfrigérant dans lequel circule un fluide réfrigérant, au moins une plaque réfrigérante (25) dans une configuration d'échange de chaleur avec l'intérieur du cercueil consistant en un serpent (11), monté de façon amovible au moyen de raccords rapides (14,15) de la partie restante du circuit, le circuit réfrigérant comportant un compresseur (1) pour la circulation du fluide d'échange de chaleur, un condenseur (3), une ou plusieurs soupapes de détente ou dispositifs similaires (7), un évaporateur (10) noyé dans la plaque réfrigérante (25) consistant en un serpent préchargé (11), caractérisé en ce qu'il comporte des moyens de vanne (16) pour stopper l'écoulement du fluide dans la conduite d'alimentation du serpent (11) et pour permettre le drainage du fluide du serpent (11), des moyens d'actionnement ou de commande avec un dispositif de commande (18) pour commander le fonctionnement du compresseur (1) et des moyens de vanne (16), les moyens d'actionnement commandant le fonctionnement ou la mise en marche du compresseur (1) afin de vider le serpent (11) après que les moyens de vanne (16) aient stoppé l'écoulement du fluide dans la conduite d'alimentation (8) du serpent (11) et étant capables de stopper le fonctionnement du compresseur (1) lorsque la quantité du fluide dans le serpent (11) est inférieure à une valeur prédéfinie.
 11. Unité de réfrigération selon la revendication 10, caractérisée en ce que le fluide d'échange de chaleur est un fluide réfrigérant contenant du fréon.
 12. Unité de réfrigération selon la revendication 10, caractérisée en ce qu'elle comporte au moins un transducteur (19) pour fournir au dispositif de commande (18) des informations sur les conditions de pression du fluide réfrigérant en vue d'activer l'arrêt du compresseur (1).

13. Unité de réfrigération selon la revendication 12, caractérisée en ce que le dispositif de commande (18) est du type électromécanique ou électrique et en ce que la vanne (16) est une électrovanne d'arrêt commandée électriquement. 5
14. Unité de réfrigération selon la revendication 12, caractérisée en ce que l'information du transducteur (19) est donnée sous la forme d'un signal électrique variable en fonction des conditions de pression de l'échange de chaleur dans le circuit en aval du serpentin (11). 10
15. Unité de réfrigération selon la revendication 12, caractérisée en ce que le transducteur (19) est situé en aval des raccords rapides (14,15) sur la conduite de retour (13) du serpentin (11). 15

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Fig. 1

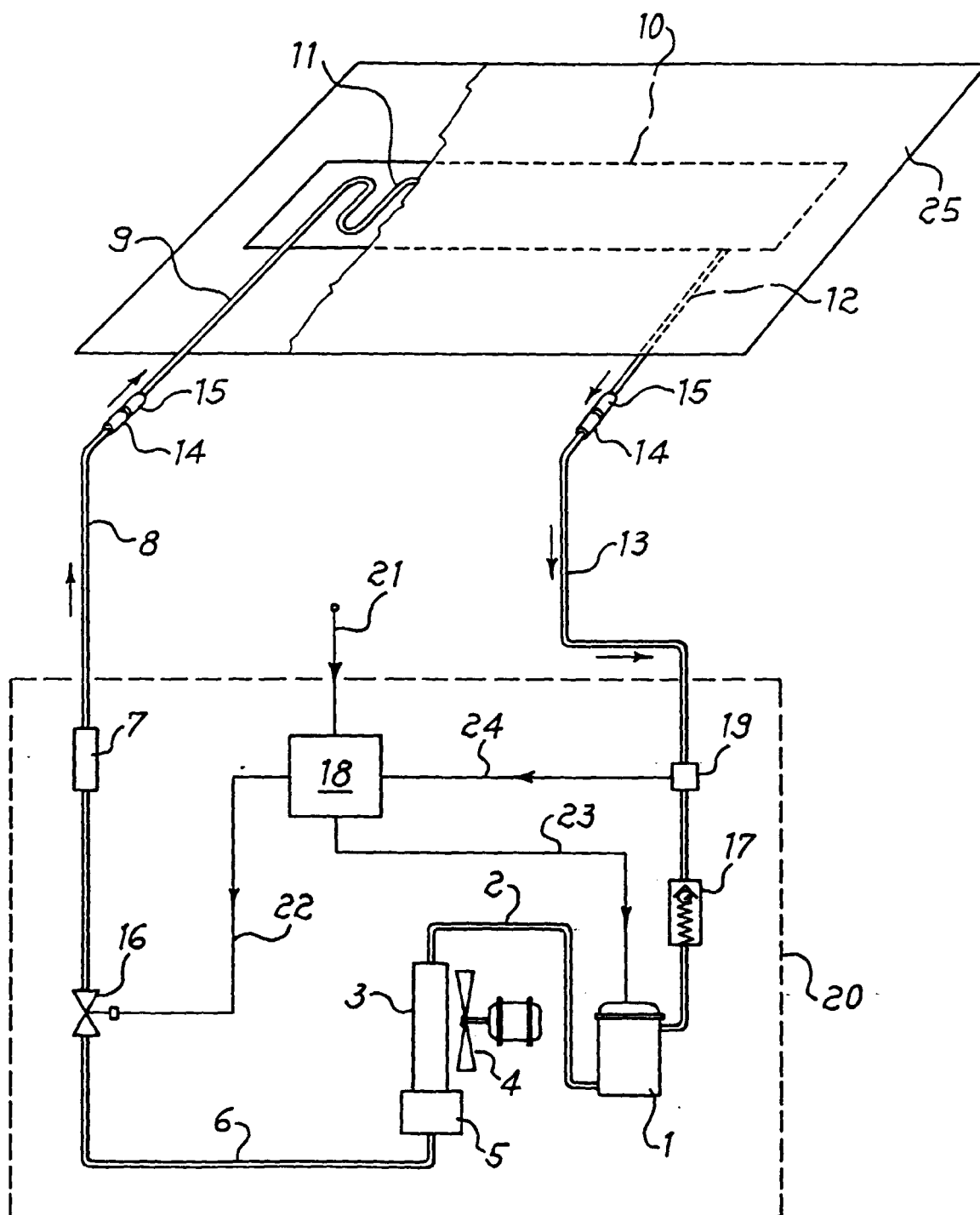


Fig. 2