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Description

The present invention relates to an air refrigeration unit.

Among the various types of air refrigeration unit currently commercially available, one is substantially constituted by a cabinet, composed of a frame and of covering panels, in which an evaporator is conveniently arranged between the other refrigeration devices and a series of two fans.

A duct is defined in the cabinet, which contains the evaporator and the fans and is suitable for conveying air from a room and for returning it thereto after treating it.

A separate duct suitable for drawing external replacement air is also currently defined in said duct so as to terminate upstream of the evaporator.

However, since the outlet of said separate duct is arranged upstream of the evaporator, i.e. in a region where the suction effect of the series of fans is scarcely felt, and since said evaporator constitutes an element which induces a high load loss on the air flow as passes through it, the drawn replacement air flow-rate is extremely low and thus insufficient.

In order to solve this problem, an additional fan has been arranged in the separate duct, but this obviously entails an increase in cost for the entire apparatus.

The aim of the present invention is to provide an air refrigeration unit which solves the problem described above in known types.

A consequent primary object is to avoid resorting to an auxiliary fan for the external replacement air.

Another object is to provide a refrigeration unit which is not more complicated than current units.

Not least object is to provide an air refrigeration unit which can be used with conventional machines and facilities.

This aim, these objects and others which will become apparent hereinafter are achieved by an air refrigeration unit of the type which comprises: a box-like body composed of a supporting frame and covering panels; a refrigeration circuit comprising an evaporator; a battery of fans; a duct defined in the box-like body for conveying ambient air to and from the space to be conditioned; whereby the evaporator is arranged at a median position between the battery of fans and the other devices of the refrigeration circuit, and; whereby the evaporator and the battery of fans are arranged in the duct for conveying ambient air, said unit being characterized in that a further separate duct is defined in the unit which connects the region downstream of the evaporator to an opening for drawing outside replacement air.

Further characteristics and advantages of the invention will become apparent from the detailed description of an embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a perspective view of the air refrigeration unit according to the invention, without the covering panels;

figure 2 is a side view of the refrigeration unit of figure 1.

With reference to the above figures, the air refrigeration unit according to the invention comprises a frame 1 made of metallic elements defining a parallelepipedal box-like body 2 which is conveniently closed by covering panels, which are not illustrated.

The various air treatment elements are arranged in said body 2.

In particular, an evaporator 3 is arranged transversely and in an inclined position in a median region inside a duct 4 defined in said structure. The intake opening 5 of the evaporator 3 is arranged in a median lateral region in a position directly underlying an operation and control panel 6.

Said duct 4, which is substantially L-shaped, ends above the evaporator 3 in the region wherein a battery of two fans 7 is arranged, the delivery outlets 8 of said fans being directed upward and thus being suitable for returning the treated air into the room.

The other refrigeration devices, generally indicated by the reference numeral 10, are arranged below said evaporator 3 and are divided therefrom by means of a wall 9 which delimits the duct 4.

According to the invention, a separate duct 12, having a substantially rectangular cross-section and arranged vertically, is defined on the side opposite to said intake opening 5 in the unit between the walls 11 of the channel system 4 and the covering panels.

Said separate duct 12 is connected, in a downward position, by means of a flexible connecting hose 13, to an opening 14 which is defined in the bottom in the region of the devices 10 and is adapted for drawing outside replacement air.

In an upward position, said separate duct 12 has a lateral hole at which a cylindrical filter 15 is arranged; said filter connects said separate duct to the region downstream of the evaporator 3 immediately upstream of the axial suction inlet of one of the fans 7.

The fact that the outlet of the separate duct 12 is in the region downstream of the evaporator 3, i.e. in a region wherein the air suction produced by the fans 7 is felt considerably, causes an amount of replacement air sufficient to provide a sufficient replacement in the room to be drawn through said

outlet.

With this arrangement of the separate duct 12 it is therefore no longer necessary to use an additional fan as provided in current types.

In practice it has thus been observed that the air refrigeration unit according to the invention has achieved the intended aim and objects, the disadvantages observed in known types having been eliminated by defining in said unit a particular duct suitable for drawing replacement air.

The air refrigeration unit can be manufactured without particular problems by modifying the current structures and is more economical than known types by virtue of the fact that it does not have the additional fan.

In practice, the materials employed, so long as they are compatible with the contingent use, and the dimensions may be any according to the requirements.

Claims

1. An air refrigeration unit comprising:

- a box-like body (2) composed of a supporting frame (1) and covering panels;
- a refrigeration circuit comprising an evaporator (3);
- a battery of fans (7);
- a duct (4) defined in the box-like body (2) for conveying ambient air to and from the space to be conditioned;
- whereby the evaporator (3) is arranged at a median position between the battery of fans (7) and the other devices (10) of the refrigeration circuit, and;
- whereby the evaporator (3) and the battery of fans (7) are arranged in the duct (4) for conveying ambient air, characterized in that
- a further separate duct (12) is defined in the unit which connects the region downstream of the evaporator (3) to an opening (14) for drawing outside replacement air.

2. An air refrigeration unit, according to claim 1, characterized in that said evaporator (3) is arranged above said other refrigeration devices (10) and below said fans (7), and that said air conveyance duct (4) conveniently is L-shaped with lateral suction and upward delivery.

3. An air refrigeration unit according to one or more of the preceding claims, characterized in that said further duct (12) for replacement air is arranged vertically on the side opposite to the intake opening (5) of said ambient air duct (4).

4. An air refrigeration unit according to one or more of the preceding claims, characterized in that said replacement air duct (12) is defined between the inner walls (11) and the covering panels of said unit.

5. An air refrigeration unit according to one or more of the preceding claims, characterized in that said replacement air duct (12) is connected, by means of a flexible hose (13), to said intake opening (14) defined in the bottom of said box-like body (2) in the region of said other refrigeration devices (10).

6. An air refrigeration unit according to one or more of the preceding claims, characterised in that said replacement air duct (12) is connected to the region downstream of said evaporator (3) by means of a filter (15).

Patentansprüche

1. Luftkühleinheit, die enthält:

einen kastenartigen Körper (2), der aus einem Tragrahmen (1) und Abdeckplatten aufgebaut ist;
einen Kühlmittelkreislauf, der einen Verdampfer (3) besitzt;
eine Reihe von Gebläsen (7);
einen Kanal (4), der im kastenartigen Körper (2) ausgebildet ist, um Umgebungsluft zu und von jenem Raum zu fördern, der klimatisiert werden soll;
wobei der Verdampfer (3) in einer Mittelstellung zwischen der Reihe von Gebläsen (7) und den anderen Einrichtungen (10) des Kühlmittelkreislaufs angeordnet ist; und
wobei der Verdampfer (3) und die Reihe von Gebläsen (7) im Kanal (4) angeordnet sind, um Umgebungsluft zu fördern, dadurch gekennzeichnet, daß
ein weiterer getrennter Kanal (12) in der Einheit angeordnet ist, der den Bereich stromabwärts des Verdampfers (3) mit einer Öffnung (14) verbindet, um Ersatzaußenluft anzusaugen.

2. Luftkühleinheit gemäß Anspruch 1, dadurch gekennzeichnet, daß der Verdampfer (3) oberhalb der anderen Kühleinrichtungen (10) und unterhalb der Gebläse (7) angeordnet ist, und daß der Luftförderkanal (4) passend L-förmig ausgebildet ist, wobei er eine seitliche Ansaugung und eine nach oben gerichtete Förderung besitzt.

3. Luftkühleinheit gemäß einem oder mehreren der bisherigen Ansprüche, dadurch gekennzeichnet,

zeichnet, daß der weitere Kanal (12) für die Ersatzluft senkrecht an der Seite gegenüber der Einlaßöffnung (5) des Umgebungsluftkanals (4) angeordnet ist.

4. Luftkühleinheit gemäß einem oder mehreren der bisherigen Ansprüche, dadurch gekennzeichnet, daß der Ersatzluftkanal (12) zwischen den Innenwänden (11) und den Abdeckplatten der Einheit gebildet wird.
5. Luftkühleinheit gemäß einem oder mehreren der bisherigen Ansprüche, dadurch gekennzeichnet, daß der Ersatzluftkanal (12) über einen flexiblen Schlauch (13) mit der Einlaßöffnung (14) verbunden ist, die im Boden des kastenförmigen Körpers (2) im Bereich der anderen Kühleinrichtungen (10) ausgebildet ist.
6. Luftkühleinheit gemäß einem oder mehreren der bisherigen Ansprüche, dadurch gekennzeichnet, daß der Ersatzluftkanal (12) mit dem Bereich stromabwärts des Verdampfers (3) über einen Filter (15) verbunden ist.

Revendications

1. Appareil de réfrigération d'air comprenant :
 - un corps du genre caisson (2) composé d'un bâti support (1) et de panneaux de couverture,
 - un circuit de réfrigération comprenant un évaporateur (3),
 - une batterie de ventilateurs (7),
 - un conduit (4) formé dans le corps du genre caisson (2) pour le transport d'air ambiant vers l'espace à conditionner et depuis celui-ci,
 - l'évaporateur (3) étant placé dans une position médiane entre la batterie de ventilateurs (7) et les autres dispositifs (10) du circuit de réfrigération, et
 - l'évaporateur (3) et la batterie de ventilateurs (7) étant placés dans le conduit (4) de transport d'air ambiant, caractérisé par le fait
 - qu'il y est formé un autre conduit séparé (12) qui relie la région située en aval de l'évaporateur (3) à un orifice (14) d'aspiration d'air extérieur de remplacement.
2. Appareil de réfrigération d'air selon la revendication 1, caractérisé par le fait que l'évaporateur (3) est placé au-dessus des autres dispositifs de réfrigération (10) et au-dessous des ventilateurs (7) et que le conduit de transport d'air (4) est opportunément en forme de L avec aspiration latérale et refoulement vers le

haut.

3. Appareil de réfrigération d'air selon une ou plusieurs des revendications précédentes, caractérisé par le fait que l'autre conduit (12) d'air de remplacement est placé verticalement sur le côté opposé à l'orifice d'admission (5) du conduit d'air ambiant (4).
4. Appareil de réfrigération d'air selon une ou plusieurs des revendications précédentes, caractérisé par le fait que le conduit d'air de remplacement (12) est formé entre les parois intérieures (11) et les panneaux de couverture de l'appareil.
5. Appareil de réfrigération d'air selon une ou plusieurs des revendications précédentes, caractérisé par le fait que le conduit d'air de remplacement (12) est relié par un tuyau souple (13) à l'orifice d'admission (14) formé dans la base du corps du genre caisson (2) dans la région des autres dispositifs de réfrigération (10).
6. Appareil de réfrigération d'air selon une ou plusieurs des revendications précédentes, caractérisé par le fait que le conduit d'air de remplacement (12) est relié à la région située en aval de l'évaporateur (3) par un filtre (15).

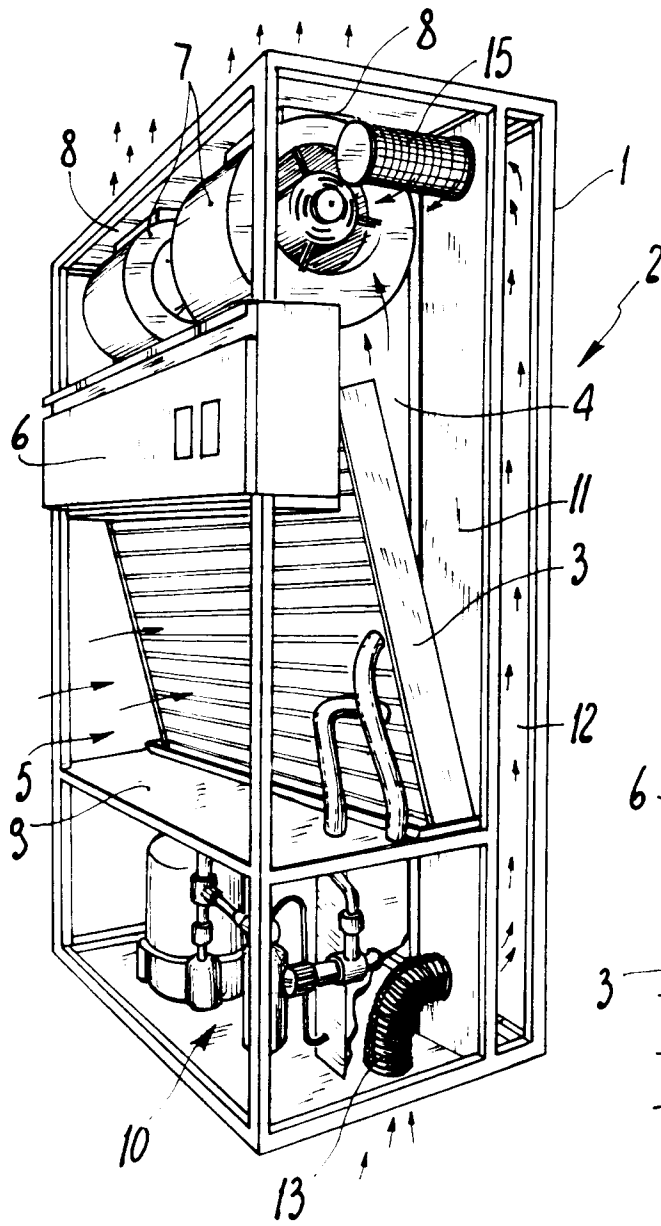


Fig. 1

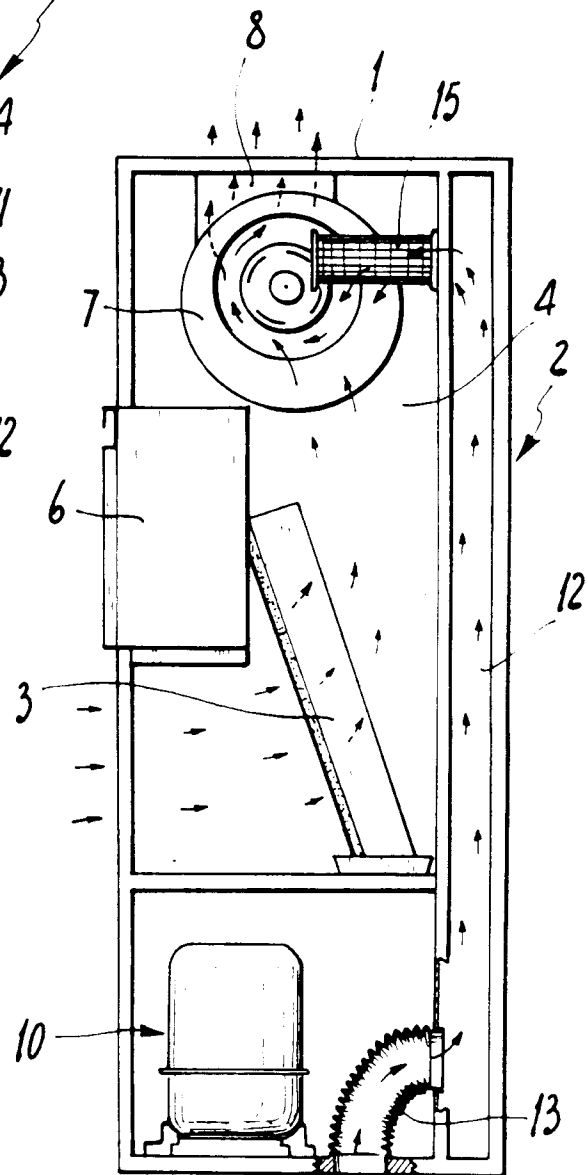


Fig. 2