ABSTRACT

A refrigeration condenser unit comprising a condenser housing having a grille covering the opening through which air is discharged from the housing, and a fan assembly attached to the grille.

1 Claim, 2 Drawing Figures
1. BACKGROUND OF THE INVENTION

1. Field of the Invention
This invention relates to refrigeration condenser units, and in particular to the mounting of the condenser fan assembly in such a unit.

2. Description of the Prior Art
Air conditioning systems for conditioning residences and other interior spaces frequently are of the type known as "split systems." Split systems comprise a refrigerant evaporator and associated parts disposed within the residence, and a compressor and a condenser which are contained in an outdoor housing. An electric fan assembly associated with the condenser generally draws air over the condenser to remove heat from refrigerant flowing through the condenser circuitry, and discharges the warmed air through a discharge opening in the housing. The proper mounting and operation of the fan assembly are very important, because the operation of the air conditioning system depends largely on the dissipation of heat from the condenser by air flowing over the condenser. The outdoor location of the fan assembly renders it susceptible to various sorts of damage.

For example, the operation of the fan motor can be seriously impaired if moisture or dirt enter the motor bearings. The likelihood of such damage is greater in those units wherein the fan shaft extends vertically upwardly, because water can run down the shaft into the bearings. Another type of injury to which these outdoor units are susceptible is movement of the fan assembly relative to the air discharge opening in the housing. The fan assembly has heretofore been attached either directly to the housing or to legs fastened to the housing walls. The supports for the fan assembly can be distorted during the shipment of the unit to the installation site, or after the unit has been installed at its outdoor location. Movement of the fan assembly relative to the discharge opening in the housing changes the path of flow of air through the opening, generally resulting in a reduction in the air flow rate. In addition, the incorporation of the foregoing types of motor mounts requires an expense whose removal or reduction would be advantageous.

SUMMARY OF THE INVENTION

An object of the present invention is to improve the means by which a condenser fan is mounted in a refrigeration condenser unit.

Another object of the invention is to mount a condenser fan in a refrigeration condenser unit so that the danger of moving the fan relative to the discharge opening in the housing of the unit is eliminated or significantly reduced.

A further object of the invention is to mount a condenser fan in an outdoor refrigeration condenser unit in a manner which protects the fan shaft against damage from moisture and dirt.

Yet another object of the invention is to mount a fan assembly in an outdoor refrigeration condenser unit in a manner which is economical and which improves the functioning of the fan.

Other objects will be apparent from the description to follow and from the appended claims.

2. DESCRIPTION OF THE PREFERRED EMBODIMENT

The foregoing objects are achieved according to a preferred embodiment of the invention by providing an outdoor condenser unit of an air conditioning system which comprises a housing for containing the condenser and the compressor of the system, and a fan assembly which is attached to a grille covering an air discharge opening in the top of the housing. The fan shaft extends downwardly into the housing and the fan is attached thereto. Thus, the fan assembly is located positively relative to this opening, and the shaft bearings are protected against moisture and dirt.

BRIEF DESCRIPTION OF THE DRAWINGS
FIG. 1 is a top plan view of an outdoor condenser unit incorporating the present invention, and FIG. 2 is a partial cross section of the unit taken in the direction indicated by the arrows 2—2 in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The embodiment of the invention described below comprises an outdoor refrigeration condenser unit which includes a housing for the condenser coil and the compressor of a refrigeration machine serving as part of an air conditioning system, an opening in the top of the housing for discharging from the housing air warmed by the condenser, a grille covering the air discharge opening, and a fan assembly attached to the grille. The fan assembly includes a motor fastened to the grille and having a rotatable shaft extending downwardly into the housing, and a fan attached to the shaft.

Referring now to the drawings, the outdoor portion of a split air conditioning system is shown. This outdoor portion comprises a housing 1 which contains the compressor (not shown) and the condenser coil 3 of the system. Refrigerant circulating through the system absorbs heat as it passes through the evaporator located in the space being conditioned, and discharges that heat as it condenses in condenser 3. In order to increase the rate of heat transfer from the condenser, a fan assembly 5 is provided for drawing air over condenser coil 3 to absorb heat given off by the refrigerant and to discharge the warmed air through a discharge opening 7 in the top of housing 1. A grille 9 covers opening 7 and is attached to housing 1 by means of bolts 11. Grille 9 comprises a plurality of concentric rings 13 which are attached to six equidistant radial arms 15. Bolts 11 pass through holes in the flattened outer ends of arms 15. The grille is preferably manufactured from corrosion resistant heavy wire stock because of its outdoor location. Grille 9 functions primarily to prevent the passage of large particles into housing 1 where they could damage the unit or impair its operation, and to protect persons from touching the fan described below.

Fan assembly 5 is attached directly to grille 9. To this end, arms 15 of the grille are bent inwardly at their inner end portions to form motor supports 17. Supports 17 cooperate to define a generally cylindrical motor mount. Fan assembly 5 includes a motor 19, a rotatable shaft 21, and a fan 23. The motor has a cylindrical casing from which extend a set of tabs 25, each tab 25 having an opening for receiving a support 17. Motor 19 is retained on supports 17 by virtue of the tight fit of the supports in tabs 25, or by means of nuts which are screwed onto the appropriately threaded lower ends of supports 17.
Motor 19 is thus mounted so that shaft 21 extends downwardly into the housing. Fan 23, which includes a set of propeller blades configured to maximize the flow of air as the fan rotates, is attached to shaft 21 by any conventional means. Since motor 19 is disposed on the discharge side of the fan 23, the flow of air to the fan is not at all impeded. The bearings for shaft 21 are located at the lower end of motor 19, and thus are protected against the movement of water, dust and dirt passing through grille 9. A cover or nameplate medallion 29 can advantageously be provided at the center of grille 9 for aesthetic reasons and to further protect the motor against the elements.

By mounting the fan assembly directly on grille 9, the fan is positively located relative to opening 7, and the fan will always be in its design location. The motor mounts which are normally required for mounting the fan assembly to the unit are entirely dispensed with, thus reducing the manufacturing expense of the unit. Access to the motor is very easy since all that is required is that bolts 11 be removed and the grille lifted from the housing and turned over. The mounting of fan assembly 5 to supports 17 is very simple and straightforward.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

We claim:
1. A refrigeration condenser unit comprising:
   a housing having a horizontal, top wall;
   an opening in the horizontal, top wall for passing air between the housing and the ambient surroundings;
   an independent grille mounted on the housing over the opening, said grille including a plurality of motor support members extending through the opening and a protective motor cover extending partially across the opening;
   a fan disposed in the housing for moving air through the opening; and
   a motor for rotating the fan, said motor being attached to the motor support members under the protective cover and having a rotatable shaft, the fan being attached to and rotatable by the shaft.

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