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(71) Applicants:
• **Haier Group Corporation**
Qingdao 266101 (CN)
• **Qingdao Haier Air Conditioner Gen Corporation,**
Ltd.
Qingdao 266101 (CN)

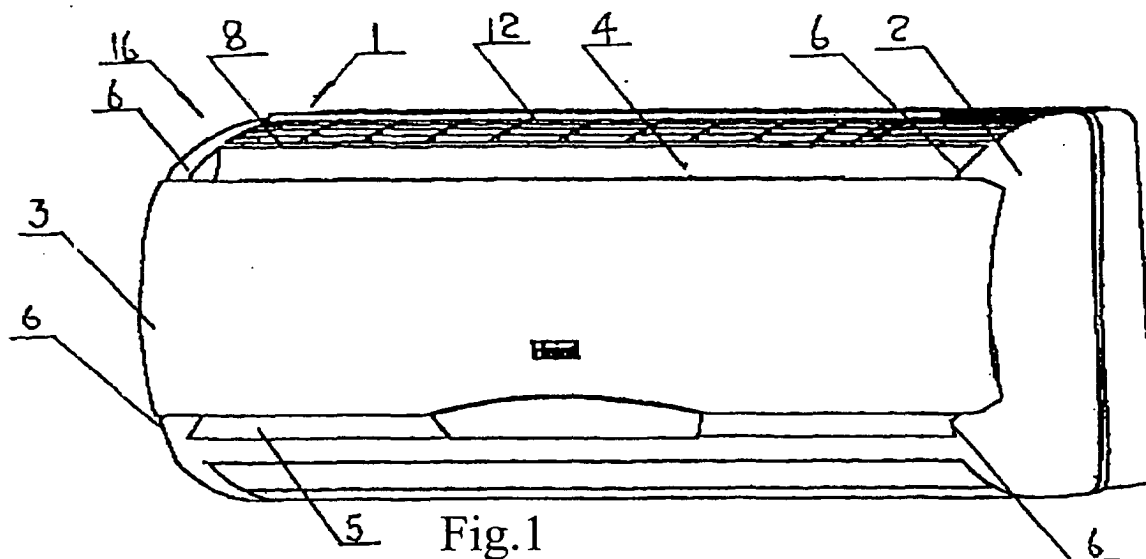
(72) Inventors:
• **Chu, Renzhen**
Qingdao 266101 (CN)
• **Gu, Dongzhao**
Qingdao 266101 (CN)
• **Zhang, Shouxin**
Qingdao 266101 (CN)
• **Wang, Yong**
Qingdao 266101 (CN)

(74) Representative: **Goddard, Heinz J., Dr.**
FORRESTER & BOEHMERT
Pettenkoferstrasse 20-22
80336 München (DE)

(54) **Indoor unit of wall-mounted air conditioner**

(57) The present invention provides an indoor unit of a wall-mounted air conditioner comprising a housing including a front cover. A close decorative panel instead of a suction grill unit is fitted on a front side of the front cover, and air inlet ports are disposed at upper and lower sides of the close decorative panel. In this arrangement, a plurality of long narrow grills arrayed in the front suc-

tion grill unit of a conventional indoor unit are replaced by a smooth close decorative panel, and air is sucked into the indoor unit from inlet ports disposed at the upper and lower sides of the close decorative panel. With this construction, dust is not likely to be accumulated on the decorative panel and can be easily cleaned, thus preventing air laden with dust from entering into the indoor unit.



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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of Chinese Patent Application No. 02135761.7 filed on November 2, 2002 in the State Intellectual Property Office of China, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to an indoor unit of a wall-mounted air conditioner, more particularly, to an improvement of an indoor unit of a conventional wall-mounted air conditioner.

2. Description of the Related Art

[0003] Generally, a housing of an indoor unit of a conventional wall-mounted air conditioner includes a front cover and a suction grill unit. The suction grill unit is mounted on the top surface of the front cover, and an cross flow fan, an evaporator and a filter unit are installed inside of the housing. The indoor unit of the wall-mounted air conditioner with the above construction has been widely used for several decades, however, it has been proven to be problematic in the following aspects. Firstly, the suction grill unit on a front side of the indoor unit is made of a plurality of grills, and the thin and narrow strips are arranged in an array close to each other. During operation of the air conditioner in a long time, contaminant such as dust will be accumulated on the suction grill unit. As the grills have a certain depth in a direction towards the inside of housing, the dust can be accumulated inside a deep gap among the grills. Accordingly, it is very difficult for the user to clean and remove the dust from the suction grill unit, and the accumulated dust will degrade the quality of the air sucked through the suction grill unit. With time going on, the air conditioner with above construction may eventually come into a failure in operation. Further, the conventional wall-mounted air conditioner is designed such that the suction grill unit is disposed on the front side of the indoor unit, thus spoiling the appearance of the air conditioner. Moreover, variations and changes of decorative designs are greatly limited, therefore, the manufacturers of conventional air conditioners can not provide indoor units of air conditioners with a good variety of aesthetic and pleasing decorative appearance.

SUMMARY OF THE INVENTION

[0004] The present invention has been made to solve at least one of the above mentioned problems. Accordingly, it is one object of the present invention to solve

the problem that grills are closely arranged in the front side of the suction grill unit and the dust accumulated on it is not easy to be cleaned and removed.

[0005] Additional aspects and advantages of the invention will be set forth in part in the description that follows, and in part, will be obvious from the description, or may be learned by the practice of the invention.

[0006] The forgoing and other aspects of the present invention are achieved by providing an indoor unit of a wall mounted air conditioner, comprising a housing including a front cover, characterized in that a close decorative panel instead of a suction grill unit is fitted on a front side of the front cover, and air inlet ports are disposed at upper and lower sides of the close decorative panel.

[0007] Preferably, the upper and lower inlet ports are defined by the front cover and the close decorative panel.

[0008] Preferably, the upper and lower inlet ports are opened at a portion in the upper and lower sides of the close decorative panel.

[0009] Further, the upper and lower inlet ports are defined by at least one of the arrangement that the upper and lower inlet ports are opened at a portion of the close decorative panel or the upper and lower inlet ports are defined by the front cover and the close decorative panel.

[0010] Preferably, the front cover is provided at two sides of its upper and lower portions with end portion panels projecting outwardly, and the close decorative panel is fitted between the upper and lower end portion panels. The upper and lower inlet ports defined by upper and lower edges of the close decorative panel and the end portion panels at the two sides and upper and lower bottom surfaces of the front cover are in shape of long-strip opening.

[0011] Preferably, the close decorative panel is an arc panel projecting outwardly. The arc panel projecting outwardly is advantageous for forming a wider air suction duct and achieving a more aesthetic and pleasing appearance.

[0012] Preferably, the close decorative panel is in shape of a cabinet and the upper inlet port is disposed at a top surface of the cabinet. A stepped portion is disposed at a lower part of the cabinet and the lower inlet port is opened at a portion of a platform of the stepped portion. In the arrangement with the above construction of cabinet, a complete close panel is formed on the front side of the indoor unit, and the upper and lower inlet port are disposed at the top surface and a portion of a platform of the stepped portion. An interior suction duct is formed inside the projected stepped portion. Further, the upper and lower inlet port substantially correspond directly to each other so that air flows smoothly through them, thus reducing resistance force against it and increasing the quantity of the flow air.

[0013] Preferably, the upper inlet port is one of the group consisting of an open inlet port, a frame grill inlet

port and a suction grill inlet port.

[0014] Preferably, a frame suction grill is disposed at a backside of the upper inlet port.

[0015] In this arrangement, a plurality of long narrow grills arrayed in the front suction grill unit of a conventional indoor unit are replaced by a smooth close decorative panel, and air is sucked into the indoor unit from inlet ports disposed at the upper and lower sides of the close decorative panel. With this construction, dust is not likely to be accumulated on the decorative panel and can be easily cleaned, thus preventing air laid with dust from entering into the indoor unit.

[0016] Further, the outer surface of the indoor unit of the air conditioner is configured to be close smooth decorative panel, as a result, aesthetic and pleasing decorative design can be applied to the whole close decorative panel by manufacturers of the air conditioners, thus indoor units with a good variety of aesthetic and particular appearance can be achieved.

[0017] Moreover, the inlet ports are disposed at the upper and lower sides of the indoor unit, and air is sucked into the upper and lower inlet ports corresponding to each other, thus increasing quantity of the sucked air in a more uniform flow rate and achieving an improved heat exchanging efficiency.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The above and other objects and advantages of the invention will become apparent and readily appreciated from the following description of the preferred embodiments, taken in conjunction with the accompanying drawings, in which:

FIG 1 is a perspective view of an indoor unit of wall-mounted air conditioner according to an embodiment of the present invention;

FIG 2 is a side sectional view of an indoor unit of wall-mounted air conditioner according to an embodiment of the present invention;

FIG 3 is an exploded perspective view of an indoor unit of wall-mounted air conditioner according to an embodiment of the present invention;

FIG 4 is one perspective view of an indoor unit of wall-mounted air conditioner according to a second embodiment of the present invention;

FIG 5 is another perspective view of an indoor unit of wall-mounted air conditioner according to a second embodiment of the present invention;

FIG 6 is a side sectional view of an indoor unit of wall-mounted air conditioner according to a second embodiment of the present invention;

[0019] In the drawings, the reference numeral 1 denotes a housing; 2 denotes a front cover; 3 denotes a close decorative panel; 4 denotes an upper inlet port; 5 denotes a lower inlet port; 6 denotes an end portion panel; 7 denotes an arc decorative panel; 8 denotes an up-

per bottom surface; 9 denotes an lower bottom surface; 10 denotes a cabinet; 11 denotes a stepped portion; 12 denotes a frame suction grill unit; 13 denotes a cross flow fan; 14 denotes an evaporator; 15 denotes an air suction duct and 16 denotes an indoor unit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] A preferred embodiment of the present invention will be described hereinafter in detail with reference to the attached drawings, wherein the like reference numerals refer to the like elements throughout. The present invention may, however, be embodied in many different forms and should not be construed as being limited to the embodiment set forth herein; rather, this embodiment is provided so that the present disclosure will be thorough and complete, and will fully convey the concept of the invention to those skilled in the art.

Embodiment 1

[0021] Referring to FIGs 1,2 and 3, a close arc decorative panel 7 projecting outwards is fitted on the front cover 2 of an indoor unit 16 of a wall-mounted air conditioner of the present invention. The front cover 2 is provided at two sides of its upper and lower portions with end portion panels 6 projecting outwardly. A space in shape of a groove is formed by the end portion panels at the two sides and the bottom surfaces. As a result, the upper and lower air inlet port 4 and 5 are formed into openings in shape of long-strip and defined by the upper and lower edges of the close decorative panels 7, two end portion panels 6 of the front cover 2 and the upper and lower bottom surfaces 8,9. Further, a frame suction grill unit 12 is disposed at the backside of the upper inlet port 4.

[0022] During suction operation, air can be simultaneously sucked into the indoor unit 16 through the upper and lower inlet ports 4, 5 and the frame suction grill unit 12. The air sucked through the upper and lower inlet ports 4, 5 is firstly directed into an air suction duct 15, then, guided into an evaporator 14, and discharged by an cross flow fan 13.

Embodiment 2

[0023] Referring to FIGs 4,5 and 6, the close decorative panel 3 of the first embodiment is replaced by a cabinet 10 in the second embodiment. The upper air inlet port 4 is opened at a top surface of the cabinet 10 and has the same construction as that of the frame suction grill unit 12. A stepped portion 11 is formed at the lower part of the cabinet 10, and a lower inlet port 5 is opened at a platform of the stepped portion 11. In this case, the lower inlet port 5 is hidden inside of the cabinet 10 without any exposure, thus a complete close panel is formed on the front side of the decorative panel 7. The upper

and lower inlet ports 4,5 are disposed at the top surface and a portion of a platform of the stepped portion and an interior air suction duct 15 is formed inside the projected stepped portion 11. Further, the upper and lower inlet ports 4,5 substantially correspond to each other directly so that air flows smoothly through them, thus reducing resistance force against it and increasing the quantity of the flow air.

[0024] During suction operation, air from the upper side is sucked in through the upper inlet port 4 and the frame suction grill unit 12, and air from the lower side is sucked in through the lower inlet port 5, then the sucked air is discharged through a evaporator 14 and an cross flow fan 13.

[0025] In addition to the above two embodiments, the upper and lower inlet port 4,5 can also take other forms of an alternative combination. For example, the upper inlet port 4 can be disposed at a portion of the close decorative panel 3, and the lower inlet port 5 can be formed by the close decorative panel 3 and the front cover 2. It can be easily appreciated by those skilled in the art the upper inlet port 4 can be formed by the close decorative panel 3 and the front cover 2 and the lower inlet port 5 can be disposed at a portion of the close decorative panel 3.

[0026] Although a few preferred embodiments have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of the which is defined in the claims and their equivalents.

[0027] The features disclosed in the foregoing description, in the claims and/or in the accompanying drawings may, both separately and in any combination thereof, be material for realising the invention in diverse forms thereof.

Claims

1. An indoor unit of a wall-mounted air conditioner, comprising a housing including a front cover, **characterized in that** a close decorative panel instead of a suction grill unit is fitted on a front side of the front cover, and air inlet ports are disposed at upper and lower sides of the close decorative panel.

2. An indoor unit of a wall-mounted air conditioner according to claim 1, wherein:

the upper and lower inlet ports are defined by the front cover and the close decorative panel.

3. An indoor unit of a wall-mounted air conditioner according to claim 1, wherein:

the upper and lower inlet ports are opened at a portion in the upper and lower sides of the close

decorative panel.

4. An indoor unit of a wall-mounted air conditioner according to claim 1, wherein:

the upper and lower inlet ports are defined by at least one of the arrangement that the upper and lower inlet ports are opened at a portion of the close decorative panel or the upper and lower inlet port are defined by the front cover and the close decorative panel.

5. An indoor unit of a wall-mounted air conditioner according to claim 2, wherein:

the front cover is provided at two sides of its upper and lower portions with end portion panels projecting outwardly;
the close decorative panel is fitted between upper and lower end portion panels; and
the upper and lower inlet ports defined by upper and lower edges of the close decorative panel and the end portion panels at the two sides and the upper and lower bottom surfaces of the front cover are in shape of long-strip opening.

6. An indoor unit of a wall-mounted air conditioner according to claim 5, wherein:

the close decorative panel is an arc panel projecting outwardly.

7. An indoor unit of a wall-mounted air conditioner according to claim 3, wherein:

the close decorative panel is in shape of a cabinet;
the upper inlet port is disposed at a top surface of the cabinet; and
a stepped portion is disposed at a lower part of the cabinet and the lower inlet port is opened at a portion of a platform of the stepped portion.

8. An indoor unit of a wall-mounted air conditioner according to claim 7, wherein:

the upper inlet port is one of the group consisting of an open inlet port, a frame grill inlet port and a suction grill inlet port.

9. An indoor unit of a wall-mounted air conditioner according to claim 6 or 7, wherein:

a frame suction grill is disposed at a backside of the upper inlet port.

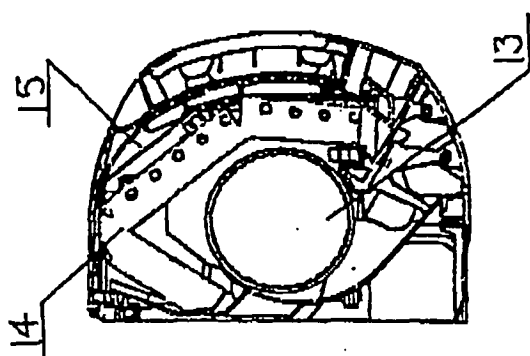


Fig. 2

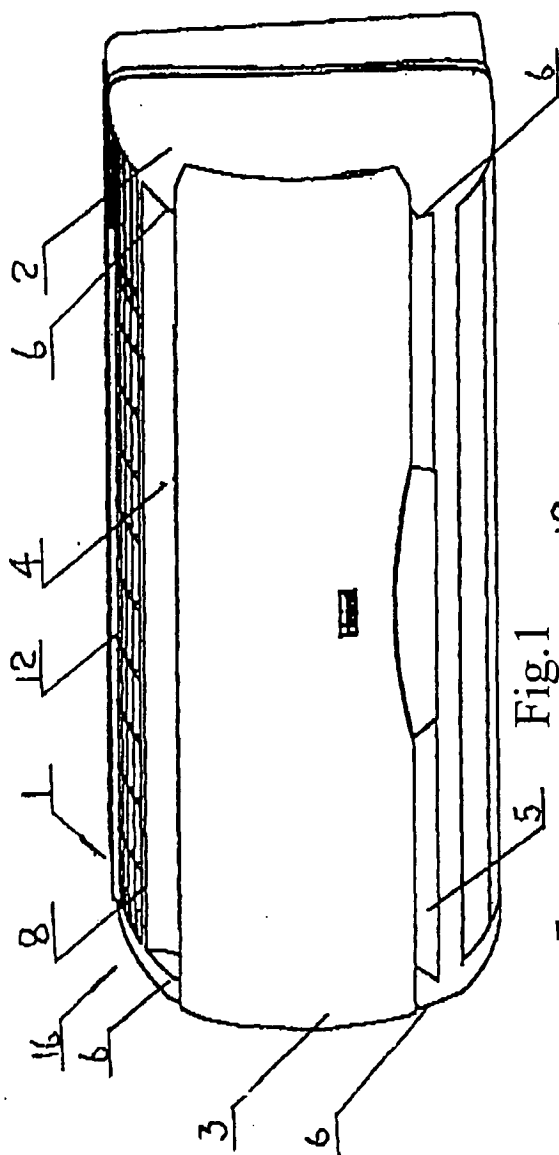


Fig. 1

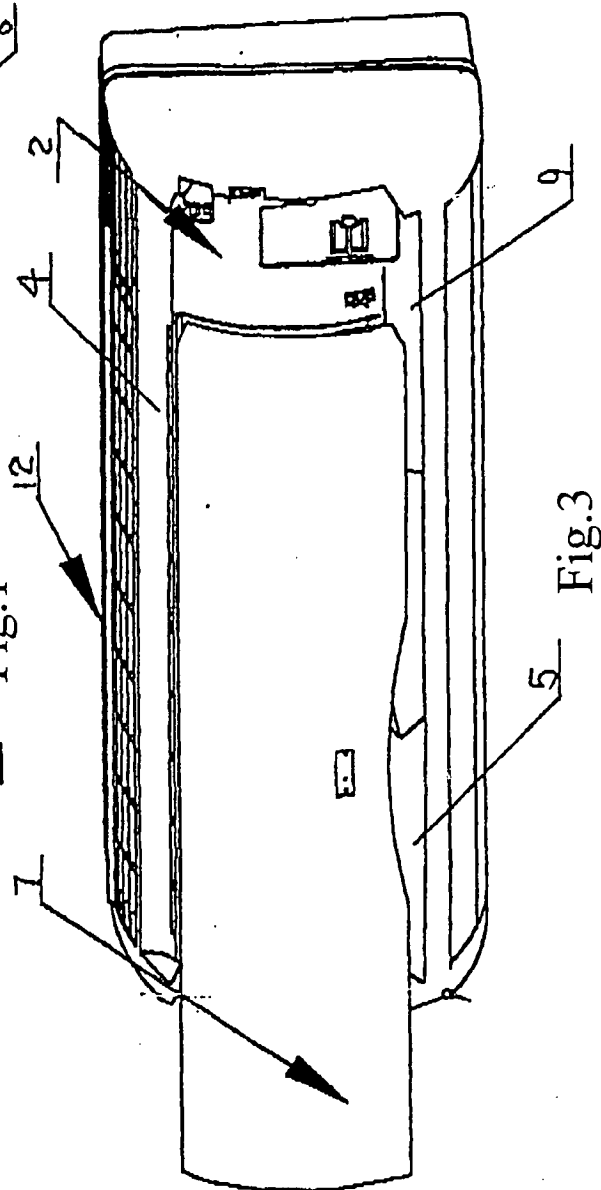


Fig. 3

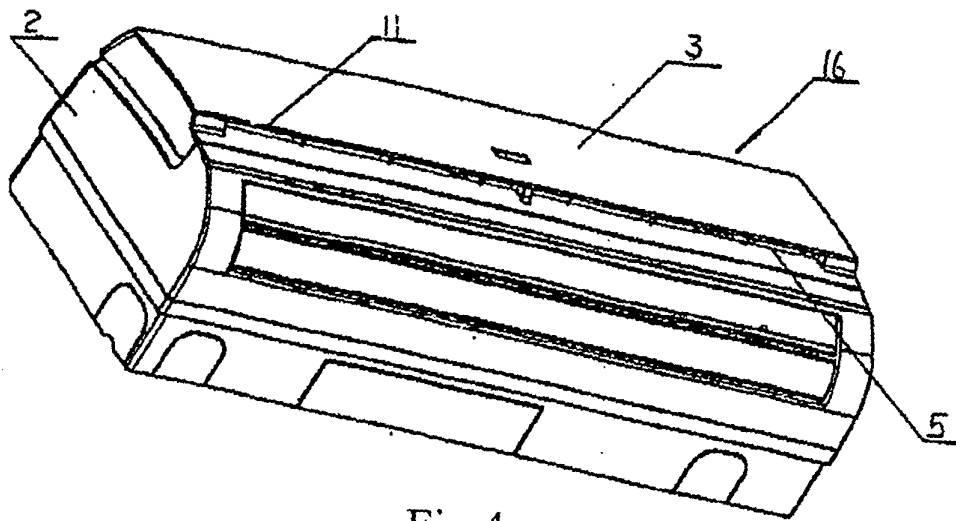


Fig. 4

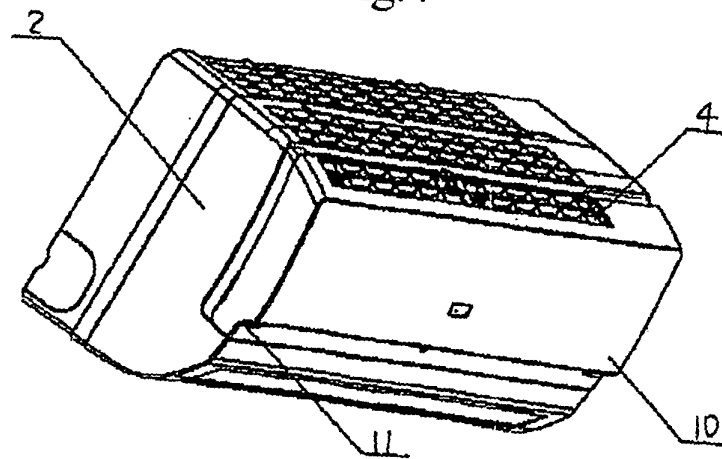


Fig. 5

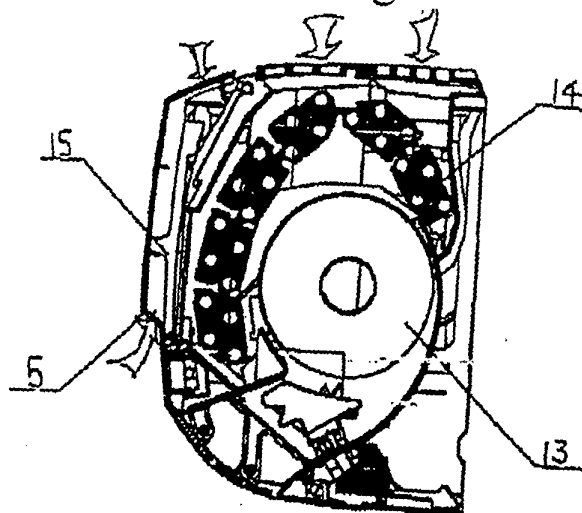


Fig. 6