

BLOWN GAS OUTLET APPARATUS

BACKGROUND OF THE INVENTION



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Field of the Invention

The present invention relates to a nozzle-type blown gas outlet
5 apparatus, which is disposed on a ceiling or a wall in a space to be air-
conditioned for blowing an air conditioning gas supplied into the space to
be air-conditioned, and specifically to the blown gas outlet apparatus,
which permits to prevent occurrence of condensation on the surface of the
edge portion of its outlet.

10 Description of the Related Art

There have conventionally been used, as a part of air-conditioning
equipment, many kinds of blown gas outlet apparatus for blowing
conditioned air supplied through a duct into a room space, in accordance
with intended use. Of these apparatus, the nozzle-type blown gas outlet
15 apparatus is adapted for the use in which a range of conditioned air must
be considered seriously. FIG. 4 shows an example of such a conventional
nozzle-type blown gas outlet apparatus. FIG. 4 is a schematic structural
cross-sectional view illustrating the conventional blown gas outlet
apparatus.

20 In FIG. 4, the conventional blown gas outlet apparatus 100 is
disposed on a ceiling 50. The apparatus is composed of a circular tubular
member, which is connected to a duct 51 to supply conditioned air into the
tubular member. The tubular member has, at the opening end thereof
facing a room space, an edge portion 101 formed so as to project outward.
25 In such a conventional blown gas outlet apparatus 100, the conditioned



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air as introduced from the duct 51 is blown in the opening direction and sent far away, thus performing an air conditioning process for the entire room space.

The conventional blown gas outlet apparatus providing with the above-described structure, has problems that partial components of the blown gas outlet apparatus 100 is cooled by a conditioned cold air blown during a cooling mode and a warm air introduced as the secondary air from the room comes into direct contact with portions of the blown gas outlet apparatus 100, which face the room space, thus causing occurrence of condensation. There have conventionally been carried out a thermal insulation process such as provision of hair-like material or adhesive thermal insulator on the entire surfaces of the blown gas outlet apparatus, in order to prevent the occurrence of condensation. Such a thermal insulation process complicates not only the structure of the blown gas outlet apparatus 100, leading to an increased manufacturing cost, but also the steps for manufacturing the apparatus, requiring much labor. The application of the thermal insulation process on the surfaces of the blown gas outlet apparatus 100 makes it hard to provide an appearance matched with the surrounding ceiling surface or wall surface, leading to limitation of installation place. In addition, even when the thermal insulation process is applied, the secondary air as introduced still comes into contact with the edge portion 101. As a result, dust contained the secondary air may attach onto the edge portion 101, or the surface may become moldy.

The edge portion 101 of the conventional blown gas outlet apparatus 100 has a function of causing a blown stream to go essentially straight so as not to go along the ceiling surface or the wall surface, thus ensuring a sufficient range of the air stream. The edge

portion 101 requires a prescribed projection length from the ceiling surface or the wall surface. Accordingly, the edge portion projecting from the ceiling surface or the wall surface may not match with the surrounding appearance, providing incompatibility.

SUMMARY OF THE INVENTION

An object of the present invention is therefore to provide a blow gas outlet apparatus, which permits to improve the introduction condition of the secondary air caused by a blown air stream, although the apparatus is composed as the nozzle-type, thus improving condensation prevention effect and providing a compatible apparatus with the surrounding condition.

In order to attain the aforementioned object, the blown gas outlet apparatus of the present invention comprises:

an inner nozzle disposed in a prescribed position of a ceiling or a wall, which faces a space to be air-conditioned, said inner nozzle being formed of a first tubular member through which an air conditioning gas supplied thereto is blown into said space; and an outer nozzle being formed of a second tubular member having a larger diameter than a diameter of said first tubular member, said second tubular member having an edge portion formed on its entire periphery of one opening end thereof so as to project outward by a prescribed length, said outer nozzle surrounding said inner nozzle so as to keep a prescribed distance to form a gap therebetween so that said edge portion faces said space to be air-conditioned and comes into contact with said ceiling or said wall;

wherein said inner nozzle has a plurality of openings formed in prescribed positions in at least a prescribed region in which said outer nozzle exists outside said inner nozzle, and said inner nozzle has a plurality of deflection members formed on an inside surface side in a vicinity of said openings, said deflection member preventing said air conditioning gas from flowing from an upstream side through said openings to an outside of said inner nozzle and a stream of said air conditioning gas flowing in said inner nozzle leads a gas existing in said gap into an inside of said inner nozzle through said openings.

In the present invention, the outer nozzle is disposed outside the inner nozzle and the gap having a prescribed distance is formed between

the inner nozzle and the outer nozzle. Due to existence of the gap, heat does not easily tend to transfer between the inner nozzle and the outer nozzle. As a result, the cooled inner nozzle does not easily absorb heat from the outer nozzle during a cooling mode, leading to almost no
5 reduction in temperature of the outer nozzle. In addition, even when warmer gas in the space to be air-conditioned is introduced and comes into contact with the surface of the outer nozzle, the introduced gas is not cooled to a dew point so as to prevent the occurrence of condensation on the surface of the outer nozzle, permitting to simplify the thermal
10 insulation structure of the outer nozzle to reduce manufacturing cost. The structure in which the inner nozzle through which the air conditioning gas flows is apart from the edge portion of the outer nozzle by a distance corresponding to the gap, improves the introduction condition of the secondary air. Accordingly, the secondary air does not easily come into
15 contact with the edge portion of the outer nozzle so as to inhibit the occurrence of condensation, the attachment of dust onto the edge portion of the outer nozzle and generation of mold, thus preventing the outlet and its surrounding portion from becoming dirty. Clean and good-looking appearance can therefore be maintained. In addition, the inner nozzle
20 through which the air-conditioning gas flows is apart from the ceiling surface or the wall surface, which is placed outside the outer nozzle. Such a structure suppresses sticking property of the stream onto the ceiling surface or the wall surface. Accordingly, it is possible to enhance the straight advance property of the stream and decrease the projection
25 length of the edge portion of the outer nozzle from the ceiling surface or the wall surface, thus avoiding incompatibility to the surrounding condition.

Said gap formed between said inner nozzle and said outer nozzle may communicate with said space to be air-conditioned and an inside

space defined by said ceiling or said wall. According to such a structure that the gap between the inner nozzle and the outer nozzle communicates with the space to be air-conditioned and the inside space defined by the ceiling or the wall, the blow of the air conditioning gas into the space to be
5 air-conditioned through the inner nozzle causes gas existing in the gap to be introduced into the gas stream blown from the inner nozzle. As a result, gas existing in the inside space defined by the ceiling or the wall flows into the above-mentioned gap in an amount corresponding to the amount of the introduced gas, thus causing occurrence of a gentle stream
10 directed to the space to be air-conditioned in the gap. It becomes harder for heat to transfer between the inner nozzle and the outer nozzle, thus making it possible to surely prevent heat of the outer nozzle from being absorbed by the inner nozzle during a cooling mode. The temperature of the outer nozzle can therefore be maintained so as to be substantially
15 identical to the temperature of the space to be air-conditioned. It is therefore possible to surely prevent the occurrence of condensation on the surface of the outer nozzle. In addition, no thermal insulation process such as provision of hair-like material or the like on the surface side of the space to be air-conditioned, which includes the edge portion of the outer
20 nozzle, is required, thus permitting design of the external appearance of the outer nozzle in a desired manner and providing a well-matched apparatus with the surrounding condition to improve the external appearance.

There may be adopted a structure that said inner nozzle has a
25 plurality of openings formed in prescribed positions in at least a prescribed region in which said outer nozzle exists outside said inner nozzle, and said inner nozzle has a plurality of deflection members formed on an inside surface side in a vicinity of said openings, said deflection member

preventing said air conditioning gas from flowing from an upstream side through said openings to an outside of said inner nozzle; and a stream of said air conditioning gas flowing in said inner nozzle leads a gas existing in said gap into an inside of said inner nozzle through said openings. In
5 such a feature of the present invention, the inner nozzle has the openings through which the gap communicates with the inside of the inner nozzle so that the gas existing in the gap is introduced into the inner nozzle through the openings, thus causing the occurrence of a stronger stream in the gap. As a result, it is possible to surely prevent the heat transfer between the
10 inner nozzle and the outer nozzle so that the temperature of the outer nozzle can be maintained so as to be identical with the temperature of the space to be air-conditioned. Accordingly, the thermal insulation process, which is to be applied to the outer nozzle, can be simplified, leading to a lower manufacturing cost and economizing remarkably the manufacturing
15 steps.

There may be adopted a structure that pressure difference is caused between said space to be air-conditioned and said inside space defined by said ceiling or said wall so as to generate a stream passing through said gap between said space to be air-conditioned and said inside
20 space defined by said ceiling or said wall. In such a feature of the present invention, the pressure difference is caused between the space to be air-conditioned, with which the gap formed between the outer nozzle and the inner nozzle communicates, on the one hand, and the inside space defined by the ceiling or the wall so that such a pressure difference between them
25 causes a gas stream having substantially the same temperature as the space to be air-conditioned, to be produced in the gap. As a result, it is possible to surely prevent the heat transfer between the inner nozzle and the outer nozzle so that the temperature of the outer nozzle can be

maintained so as to be identical with the temperature of the space to be air-conditioned. Accordingly, the thermal insulation process, which is to be applied to the outer nozzle, can be simplified, leading to a lower manufacturing cost and economizing remarkably the manufacturing
5 steps.

There may be adopted a structure that a duct for supplying said air conditioning gas into said inner nozzle is provided in said inside space defined by said ceiling or said wall, said duct having an outlet end, which is held in said gap between said inner nozzle and said outer nozzle so as to
10 be secured to said inner nozzle. In such a feature of the present invention, the outlet end of the duct, which is provided in the inner space defined by the ceiling or the wall, is connected to the inner nozzle by holding the above-mentioned outlet end between the inner nozzle and the outer nozzle. There is required no step for securing independently the duct to the inner
15 nozzle, thus improving efficiency of the connection operation of the duct.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic structural cross-sectional view illustrating a blown gas outlet apparatus of the first embodiment of the present invention;

20 FIG. 2 is a schematic structural cross-sectional view illustrating the blown gas outlet apparatus of the second embodiment of the present invention;

FIG. 3 is a schematic structural cross-sectional view illustrating the blown gas outlet apparatus of the other embodiment of the present
25 invention; and

FIG. 4 is a schematic structural cross-sectional view illustrating

the conventional blown gas outlet apparatus.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Now, embodiments of an apparatus of the present invention will be described in detail below with reference to the accompanying drawings.

5 First Embodiment of the Present Invention

The blown gas outlet apparatus of the first embodiment of the present invention will be described with reference to FIG. 1. In the first embodiment, there is shown an example in which the blown gas outlet apparatus used as a cooling equipment is disposed on a ceiling. FIG. 1 is
10 a schematic structural cross-sectional view illustrating the blown gas outlet apparatus of the first embodiment of the present invention.

As shown in FIG. 1, the blown gas outlet apparatus 1 of the present invention has an inner nozzle 2 and an outer nozzle 3. The inner nozzle 2 is formed of the first tubular member, which is disposed in a
15 prescribed position of the ceiling 50, which faces a room space to be air-conditioned. The inner nozzle 2 introduces an air conditioning gas supplied thereto into the room space. The outer nozzle 3 is formed of the second tubular member having a larger diameter than that of the first tubular member of the inner nozzle 2. The second tubular member has
20 an edge portion 3a formed on its entire periphery of one opening end thereof so as to project outward by a prescribed length. The outer nozzle 3 surrounds the inner nozzle 2 so as to keep a prescribed distance to form a gap therebetween so that the edge portion 3a faces the room space side and comes into contact with the ceiling 50.

25 The first tubular member of the inner nozzle 2 is disposed substantially perpendicularly to the ceiling 50. The inner nozzle 2 is

provided on prescribed positions on its outer periphery with a plurality of support members 2a, which are formed of heat insulating material to support the outer nozzle 3. The inner nozzle 2 is connected to a duct 51 above the ceiling 50 so that a conditioned air can be supplied from the duct 51 and blown from the opening end of the inner nozzle 2 locating in the room side into the room space. The inner nozzle 2 is provided on its outer peripheral surface with a heat insulating layer formed of hair-like material.

The outer nozzle 3 is secured to the inner nozzle 2 through the above-mentioned support members 2a so that the second tubular member of the former is coaxial with the first tubular member of the latter and the lower end of the above-mentioned edge portion 3a of the outer nozzle 3 is flush with the lower end of the inner nozzle 2, which is placed on the room space side. A gap 4 is formed between the outer nozzle 3 and the outer peripheral surface of the inner nozzle 2.

Now, description will be given below of a blowing operation in a cooling mode of the blown gas outlet apparatus having the above-described structure. The conditioned air supplied from the duct 51 enters the inner nozzle 2 to pass therethrough and is then blown from the opening end into the room space. The blow of a gas stream having a high velocity from the inner nozzle 2 causes air existing in the gap 4 between the inner nozzle 2 and the outer nozzle 3 to be introduced into the room side. In addition, gas existing in the inside space defined by the ceiling 50 flows into the above-mentioned gap 4 in an amount corresponding to the amount of the introduced gas, thus causing occurrence of a gentle stream directed to the room in the gap 4 (see FIG. 1). The inner nozzle 2 and the outer nozzle 3 are thermally separated from each other through the gas stream. As a result, there is almost no occurrence of heat transfer

between the inner nozzle 2 and the outer nozzle 3 so that the outer nozzle is not cooled, thus providing substantially the same temperature as the temperature of the room space.

On the other hand, blow of the conditioned air serving as the
5 primary air A from the inner nozzle 2 into the room space causes warm air in the room to be introduced as the secondary air B to reach the vicinity of the ceiling. Here, the gas stream introduced flows out of the gap 4 formed between the inner nozzle 2 and the outer nozzle 3, in addition to the fact that the inner nozzle 2 and the outer nozzle 3 are separated from each
10 other by the prescribed distance. As a result, the introduced secondary air B does not easily tend to reach the surface of the edge portion 3a of the outer nozzle 3, unlike the conventional apparatus, and there occurs almost no reduction in temperature of the outer nozzle 3, thus causing no occurrence of condensation on the surface of the edge portion 3a. In
15 addition, there is neither attachment of dust onto the edge portion nor generation of mold, thus preventing outlet and its surrounding portion from becoming dirty.

In the blown gas outlet apparatus of the first embodiment of the present invention, the outer nozzle 3 is disposed outside the inner nozzle 2
20 and the gap 4 formed between the inner nozzle 2 and the outer nozzle 3 communicates with the room space and the inside space defined by the ceiling 50. Accordingly, the blow of the conditioned air from the inner nozzle 2 into the room space causes the gentle stream directed to the gap 4 to be generated. As a result, there is almost occurrence of heat transfer
25 between the inner nozzle 2 and the outer nozzle 3 so that the temperature of the outer nozzle 3 is not reduced essentially. Even when the warmer air introduced from the room comes into contact with the surface of the outer nozzle 3, there is no occurrence of condensation. In addition, no

thermal insulation process such as provision of hair-like material or the like on the surface of the room space side of the outer nozzle 3, is required and the structure of the apparatus can be simplified to reduce the manufacturing cost, thus permitting design of the external appearance of the outer nozzle in a desired manner and providing a well-matched apparatus with the surrounding condition to improve the external appearance. Further, the inner nozzle 2 is separated from the ceiling 50, which is located outside the outer nozzle 3, thus suppressing sticking property of the blown stream onto the surface of the ceiling 50. Accordingly, it is possible to enhance the straight advance property of the stream and decrease the projection length of the edge portion 3a of the outer nozzle 3 from the surface of the ceiling 50, thus avoiding incompatibility to the surrounding condition.

In the above-described blown gas outlet apparatus of the first embodiment of the present invention, there is adopted a structure that the blown stream from the inner nozzle 2 causes the air existing in the gap 4 between the outer nozzle 3 and the inner nozzle 2 to be introduced to flow into the room side, thus generating the gas stream in the gap 4. There may be adopted alternatively a structure that pressure difference is caused between the room space and the inside space defined by the ceiling 50 so as to generate the gas stream in the gap 4 due to difference in pressure between them. According to such a structure, it is possible to surely prevent the heat transfer between the inner nozzle 2 and the outer nozzle 3, like the above-mentioned first embodiment, so that the temperature of the outer nozzle 3 can be maintained so as to be identical with the temperature of the room space, thus surely preventing the occurrence of condensation on the surface of the outer nozzle 3. Accordingly, the thermal insulation process, which is to be applied to the

outer nozzle 3, can be simplified, leading to a lower manufacturing cost.

Second Embodiment of the Present Invention

The blown gas outlet apparatus of the second embodiment of the present invention will be described with reference to FIG. 2. FIG. 2 is a
5 schematic structural cross-sectional view illustrating the blown gas outlet apparatus of the second embodiment of the present invention.

As shown in FIG. 2, the blown gas outlet apparatus of the second embodiment of the present invention has an inner nozzle 2 and an outer nozzle 3, which are the same as those of the first embodiment of the
10 present invention. With respect to different features from the first embodiment, the inner nozzle 2 has a plurality of openings 2b formed in prescribed positions of the inner nozzle 2, on the one hand, and a plurality of guide member 2c serving as deflection members formed on the inside surface in the vicinity of the above-mentioned openings 2b. The guide
15 members 2c prevent the stream of the air conditioning gas from flowing outside the inner nozzle 2.

The openings 2b are formed in the positions in a specific region in which the outer nozzle 3 exists outside the inner nozzle 2. Air existing in the gap 4 is introduced through the openings 2b into the stream of the
20 conditioned air flowing through the inner nozzle 2. The guide members 2c project inward from the upstream ends of the openings 2b on the inner surface of the inner nozzle 2. The guide members 2c prevent the conditioned air from flowing from the upstream side through the openings to the outside of the inner nozzle 2, thus performing a sure introduction of
25 air existing in the gap 4 into the inner nozzle 2.

Now, description will be given below of a blowing operation in a cooling mode of the blown gas outlet apparatus having the above-described structure. A conditioned air passes through the inner nozzle 2 and is blown from the opening end of the inner nozzle 2 into the room space in the same manner as the first embodiment. The blow of a gas stream having a high velocity from the inner nozzle 2 causes air existing in an adjacent zone to the room space in the gap 4 between the inner nozzle 2 and the outer nozzle 3 to be introduced into the room side and causes air existing in the remaining zone in the gap 4 to be introduced through the openings 2b into the stream of the conditioned air flowing through the inner nozzle 2.

Gas existing in the inside space defined by the ceiling 50 flows into the gap 4 in an amount corresponding to the amount of the introduced gas, thus causing occurrence of a gas stream directed to the room in the gap 4. The inner nozzle 2 and the outer nozzle 3 are thermally separated from each other through the gas stream. As a result, there is almost no occurrence of heat transfer between the inner nozzle 2 and the outer nozzle 3 so that the outer nozzle is not cooled, thus providing substantially the same temperature as the temperature of the room space. There is no occurrence of condensation on the surface of the room side of the outer nozzle 3, including the edge portion 3a in the same manner as the above-described first embodiment.

In the blown gas outlet apparatus of the second embodiment of the present invention, the inner nozzle 2 has openings 2b through which the gap 4 communicates with the inside of the inner nozzle 2. The gas existing in the gap 4 is introduced through openings 2b into the inner nozzle 2, thus causing the occurrence of a strong stream in the gap 4. As a result, it is possible to surely prevent the heat transfer between the inner

nozzle and the outer nozzle so that the temperature of the outer nozzle can be maintained so as to be identical with the temperature of the room space. Accordingly, it is possible to surely prevent condensation from occurring on the surface of the outer nozzle 3, and a thermal insulation process, 5 which is to be applied to the outer nozzle 3, can be simplified, leading to a lower manufacturing cost.

In the blown gas outlet apparatus of each of the first and second embodiments of the present invention, each of the inner nozzle 2 and the outer nozzle 3 has a circular opening. However, the shape of opening is 10 not limited only to the circle, and the opening may have the other shape such as a rectangular, an ellipse or the like.

In the blown gas outlet apparatus of each of the first and second embodiments of the present invention, the duct 51 for supplying the conditioned air is connected to the inner nozzle 2 by means of fastening 15 devices such as bands. The duct 51 may be connected to the inner nozzle 2 by holding the outlet end of the duct 51 between the inner nozzle 2 and the outer nozzle 3, as shown in FIG. 3. Such a connection structure in which the outlet end of the duct 51 is held between the inner nozzle 2 and the outer nozzle 3 to be connected to the inner nozzle 2, thus improving 20 efficiency of the connection operation of the duct.

According to the present invention as described in detail, the outer nozzle is disposed outside the inner nozzle and the gap having a prescribed distance is formed between the inner nozzle and the outer nozzle. Due to existence of the gap, heat does not easily tend to transfer between the 25 inner nozzle and the outer nozzle. As a result, the cooled inner nozzle does not easily absorb heat from the outer nozzle during a cooling mode, leading to almost no reduction in temperature of the outer nozzle. In

addition, even when warm gas in the space to be air-conditioned is introduced and comes into contact with the surface of the outer nozzle, the introduced gas is not cooled to a dew point so as to prevent the occurrence of condensation on the surface of the outer nozzle, permitting to simplify
5 the thermal insulation structure of the outer nozzle to reduce manufacturing cost. The structure in which the inner nozzle through which the air conditioning gas flows is apart from the edge portion of the outer nozzle by a distance corresponding to the gap, improves the introduction condition of the secondary air. Accordingly, the secondary
10 air does not easily come into contact with the edge portion of the outer nozzle so as to inhibit the occurrence of condensation, the attachment of dust onto the edge portion of the outer nozzle and generation of mold, thus preventing the outlet and its surrounding portion from becoming dirty. Clean and good-looking appearance can therefore be maintained. In
15 addition, the inner nozzle through which the air-conditioning gas flows is apart from the ceiling surface or the wall surface, which is placed outside the outer nozzle. Such a structure suppresses sticking property of the stream onto the ceiling surface or the wall surface. Accordingly, it is possible to enhance the straight advance property of the stream and
20 decrease the projection length of the edge portion of the outer nozzle from the ceiling surface or the wall surface, thus avoiding incompatibility to the surrounding condition.

According to an optional feature of the present invention, the gap between the inner nozzle and the outer nozzle communicates with the
25 space to be air-conditioned and the inside space defined by the ceiling or the wall, the blow of the air conditioning gas into the space to be air-conditioned through the inner nozzle causes gas existing in the gap to be introduced into the gas stream blown from the inner nozzle. As a result,

gas existing in the inside space defined by the ceiling or the wall flows into the above-mentioned gap in an amount corresponding to the amount of the introduced gas, thus causing occurrence of a gentle stream directed to the space to be air-conditioned in the gap. It becomes harder for heat to transfer between the inner nozzle and the outer nozzle, thus making it possible to surely prevent heat of the outer nozzle from being absorbed by the inner nozzle during a cooling mode. The temperature of the outer nozzle can therefore be maintained so as to be substantially identical to the temperature of the space to be air-conditioned. It is therefore possible to surely prevent the occurrence of condensation on the surface of the outer nozzle. In addition, no thermal insulation process such as provision of hair-like material or the like on the surface side of the space to be air-conditioned, which includes the edge portion of the outer nozzle, is required, thus permitting design of the external appearance of the outer nozzle in a desired manner and providing a well-matched apparatus with the surrounding condition to improve the external appearance.

According to an optional feature of the present invention, the inner nozzle has the openings through which the gap communicates with the inside of the inner nozzle so that the gas existing in the gap is introduced into the inner nozzle through the openings, thus causing the occurrence of a stronger stream in the gap. As a result, it is possible to surely prevent the heat transfer between the inner nozzle and the outer nozzle so that the temperature of the outer nozzle can be maintained so as to be identical with the temperature of the space to be air-conditioned. Accordingly, the thermal insulation process, which is to be applied to the outer nozzle, can be simplified, leading to a lower manufacturing cost and economizing remarkably the manufacturing steps.

According to an optional feature of the present invention, the

pressure difference is caused between the space to be air-conditioned, with which the gap formed between the outer nozzle and the inner nozzle communicates, on the one hand, and the inside space defined by the ceiling or the wall so that such a pressure difference between them causes

5 a gas stream having substantially the same temperature as the space to be air-conditioned, to be produced in the gap. As a result, it is possible to surely prevent the heat transfer between the inner nozzle and the outer nozzle so that the temperature of the outer nozzle can be maintained so as to be identical with the temperature of the space to be air-conditioned.

10 Accordingly, the thermal insulation process, which is to be applied to the outer nozzle, can be simplified, leading to a lower manufacturing cost and economizing remarkably the manufacturing steps.

According to an optional feature of the present invention, the outlet end of the duct, which is provided in the inner space defined by the

15 ceiling or the wall, is connected to the inner nozzle by holding the above-mentioned outlet end between the inner nozzle and the outer nozzle. There is required no step for securing independently the duct to the inner nozzle, thus improving efficiency of the connection operation of the duct.

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WHAT IS CLAIMED IS:

1. A blown gas outlet apparatus comprising:

an inner nozzle disposed in a prescribed position of a ceiling or a wall, which faces a space to be air-conditioned, said inner nozzle being formed of a first tubular member through which an air conditioning gas supplied thereto is blown into said space; and

an outer nozzle being formed of a second tubular member having a larger diameter than a diameter of said first tubular member, said second tubular member having an edge portion formed on its entire periphery of one opening end thereof so as to project outward by a prescribed length, said outer nozzle surrounding said inner nozzle so as to keep a prescribed distance to form a gap therebetween so that said edge portion faces said space to be air-conditioned and comes into contact with said ceiling or said wall;

wherein said inner nozzle has a plurality of openings formed in prescribed positions in at least a prescribed region in which said outer nozzle exists outside said inner nozzle, and said inner nozzle has a plurality of deflection members formed on an inside surface side in a vicinity of said openings, said deflection member preventing said air conditioning gas from flowing from an upstream side through said openings to an outside of said inner nozzle and

a stream of said air conditioning gas flowing in said inner nozzle leads a gas existing in said gap into an inside of said inner nozzle through said openings.

2. The apparatus as claimed in Claim 1, wherein:

said gap formed between said inner nozzle and said outer nozzle communicates with said space to be air-conditioned and an inside space defined by said ceiling or said wall.

3. The apparatus as claimed in Claim 2, wherein:

pressure difference is caused between said space to be air-conditioned and said inside space defined by said ceiling or said wall so as to generate a stream passing through said gap between said space to be air-conditioned and said inside space defined by said ceiling or said wall.

4. The apparatus as claimed in Claim 1, wherein:

a duct for supplying said air conditioning gas into said inner nozzle is provided in said inside space defined by said ceiling or said wall, said duct having an outlet end, which is held in gap between said inner nozzle and said outer nozzle so as to be secured to said inner nozzle.