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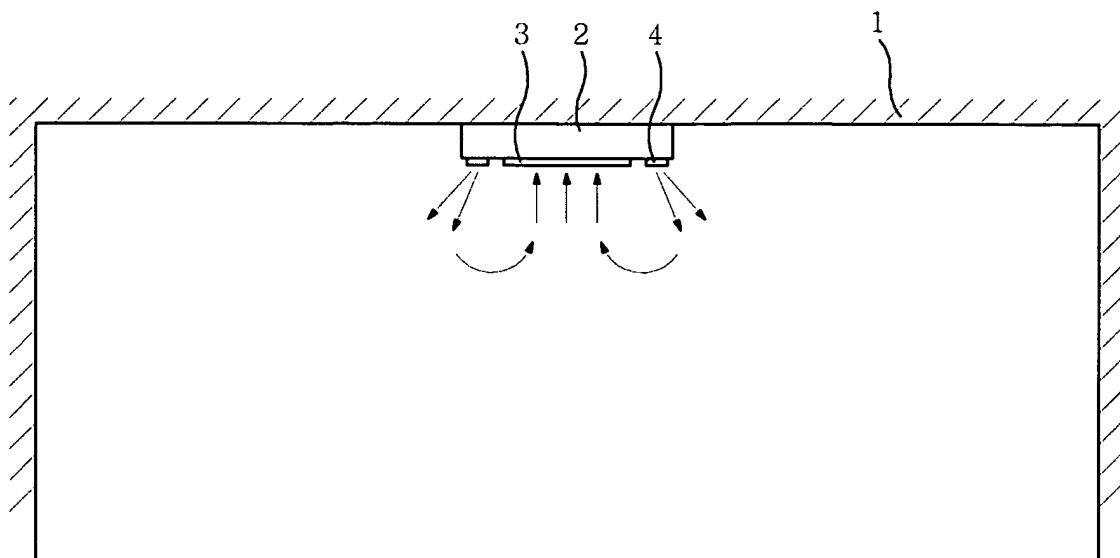
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(54) Ceiling-mounted heating and cooling apparatus

(57) A ceiling-mounted heating and cooling apparatus (10) is disclosed, which is capable of uniformly heating and cooling an indoor space in such a manner that a discharge air from a heating and cooling apparatus is discharged toward a portion distanced far from an inlet. In a ceiling-mounted heating and cooling apparatus which is installed at a ceiling of a certain building and includes a suction port (20) and a discharge port (11),

there is provided an improved ceiling-mounted heating and cooling apparatus, comprising a duct part (30) which is detachably installed at the discharge port and transfers a discharge air into the lower surfaces of the indoor of the building, wherein said duct part is a bellows or a telescope type unit. The indoor of the building can be uniformly heated or cooled by discharging discharge air further from the suction port of the ceiling-mounted heating and cooling apparatus.

FIG. 1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a ceiling-mounted heating and cooling apparatus (air conditioner), and in particular to a ceiling-mounted heating and cooling apparatus capable of uniformly heating and cooling an indoor space in such a manner that a discharge air from a heating and cooling apparatus is discharged toward a portion distanced far from an inlet.

2. Description of the Background Art

[0002] Generally, an air conditioner is referred to an air conditioning apparatus capable of achieving a temperature and moisture control and a purification wherein it is called an air purification apparatus, namely, a heating and cooling apparatus.

[0003] The heating and cooling apparatus is classified into a ceiling-mounted type in which it is installed on a ceiling, a stand type, namely, package type, a wall-mounted type in which it is installed on an inner wall, and a ceiling-embedded cassette type in which a part of the same is embedded into a wall and ceiling.

[0004] Figure 1 is a lateral view illustrating a conventional ceiling-mounted cassette type heating and cooling apparatus, and Figure 2 is a view illustrating a suction port and a discharge port formed at a lower surface of the heating and cooling apparatus of Figure 1.

[0005] As shown therein, the ceiling-mounted cassette type heating and cooling apparatus 2 is installed on a ceiling 1 of a certain building. A suction port 3 is installed at a center portion of the heating and cooling apparatus 2 for sucking indoor air. A discharge port 4 is installed for discharging the air that is sucked from the suction port 3 and is cooled and heated.

[0006] In the thusly constituted heating and cooling apparatus 2, the distance between the suction port 3 and the discharge port 4 is too small, so that the air discharged from the discharge port 4 does not reach the bottom surface of the indoor space, but is sucked by the suction port 3.

[0007] In particular, since hot air is lighter than cold air, the hot air is not flown toward the lower region. There is a structural problem that the hot air stays for a certain time period in the space near the ceiling and is sucked by the suction port 3.

SUMMARY OF THE INVENTION

[0008] Accordingly, it is an object of the present invention to overcome the above-described problems encountered in the conventional art.

[0009] It is another object of the present invention to provide a ceiling-mounted heating and cooling apparatus

in which heated or cooled air reaches a portion distanced far from a suction port wherein the heated or cooled air is not directly sucked by the suction port.

[0010] It is further another object of the present invention to provide a ceiling-mounted heating and cooling apparatus capable of uniformly heating and cooling an indoor space in such a manner that a heated or cooled air discharged from a ceiling-mounted heating and cooling apparatus is far outputted.

[0011] To achieve the above objects, in a ceiling-mounted heating and cooling apparatus which is installed at a ceiling of a certain building and includes a suction port and a discharge port, there is provided an improved ceiling-mounted heating and cooling apparatus, comprising a duct part which is detachably installed at the discharge port and transfers a discharge air into the lower surfaces of the indoor of the building, wherein said duct part is a bellows or a telescope type unit.

[0012] The duct part includes a guide part which is designed to guide an extension of the same in a longitudinal direction.

[0013] The guide part includes a moving part for extending one end of the duct part, and a driving part which drives the moving part.

[0014] The moving part includes a belt which rotates so as to extend one end of the duct part, and driving and driven pulleys connected between the both ends of the duct part through the belt, and said driving part includes a driving motor which is connected with the driving pulley and is installed on the ceiling for thereby driving the driving pulley, and a switch which is electrically connected so as to normally rotate or reverse-rotate the driving motor.

[0015] The duct part further includes a fan installed at an end of the duct part for thereby efficiently discharging the discharge air.

[0016] The duct part is inclined downwards from the discharge part and gets distanced more and more from the suction port to the outer side.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein;

Figure 1 is a lateral view illustrating a conventional ceiling-mounted heating and cooling apparatus;
Figure 2 is a bottom view illustrating a conventional ceiling-mounted heating and cooling apparatus;
Figure 3 is a bottom view illustrating a ceiling-mounted heating and cooling apparatus according to the present invention;
Figure 4 is a view illustrating a ceiling-mounted heating and cooling apparatus according to a first embodiment of the present invention;
Figure 5 is a view illustrating a ceiling-mounted heat-

ing and cooling apparatus according to a second embodiment of the present invention;

Figure 6 is a view illustrating a ceiling-mounted heating and cooling apparatus according to a third embodiment of the present invention;

Figure 7 is a view illustrating a ceiling-mounted heating and cooling apparatus according to a fourth embodiment of the present invention; and

Figure 8 is a view illustrating a ceiling-mounted heating and cooling apparatus according to a fifth embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] The preferred embodiments of the present invention will be described with reference to the accompanying drawings.

[0019] Figure 3 is a bottom view illustrating a ceiling-mounted heating and cooling apparatus according to the present invention, and Figures 4 through 8 are views of the first through fifth embodiments of the present invention.

[0020] As shown in Figure 3, in a ceiling-mounted heating and cooling apparatus 10 according to the present invention, a suction port 20 is installed at a center of the same for sucking an indoor air. A duct 30 is installed along each discharge port 11 formed at an outer side of the suction port 20 wherein the number of the duct 30 is the same as the number of the discharge ports 11. Here, the duct 30 is preferably formed in a pipe shape. In addition, the number of the ducts 30 is preferably two or four.

[0021] Figure 4 is a view of the first embodiment of the present invention. As shown therein, the duct 30 is installed along a ceiling 1 (Figure 1) from the discharge port 11 and a wall surface extended from the ceiling and has a certain length extendable from the wall surface to the bottom surface of the indoor, so that air can be uniformly spread in the interior. The duct 30 can be fixed at a ceiling or a wall surface using a bracket 31. The duct 30 may be divided into a ceiling duct 30a and a wall surface duct 30b wherein the ceiling and wall surface ducts 30a and 30b may be combined or separated.

[0022] Figure 5 is a view of the second embodiment of the present invention. As shown therein, the duct 40 of the second embodiment of the present invention is detachable from the discharge port 11. The duct 40 is formed in a bellows type of which the length is extendable. At this time, one end of the duct 40 is fixed at a roller 45 of a guide part by a fixture 43 so that the duct 40 can be guided by the guide part that is longitudinally installed. The roller 45 is installed and guided by a guide member 47. Here, the duct 40 can be divided into a ceiling duct 40a and a wall surface duct 40b. When each guide part is installed, the ceiling duct 40a is moved along a ceiling, and the wall surface duct 40b is vertically moved along a wall surface.

[0023] Figure 6 is a view of the third embodiment of

the present invention. As shown therein, the duct 50 of the third embodiment is detachable from the discharge port 11. The duct 50 is formed in a telescope type, so that the duct 50 can be extendable in multiple steps. At this time, one end of the duct 50 is fixed at a pinion 55 of the guide part by a fixture so that the duct 50 can be guided by a guide part of the other embodiment that is longitudinally installed. The pinion 55 is guided by a rack 57. The duct 40 is moved along the ceiling. Since the wall surface duct 50b is extendable like an extendable antenna, it is vertically moved along the wall surface.

[0024] Figure 7 is a view of the fourth embodiment of the present invention. As shown therein, in a ceiling duct 60a of the duct 60 of the fourth embodiment of the present invention, a guide part provided at one end of the duct 60 for moving the ceiling duct 60a is formed of a moving part capable of moving the ceiling duct 60a, and a driving part capable of driving the moving part. The ceiling duct 60a is fixed at one end of a belt 61 of the moving part by a fixture 62 of the moving part. The belt 61 is connected between driving and driven pulleys 63 and 65. Here, the driving pulley 63 is rotatable by a driving motor 67 of the driving part. The driving motor 67 is rotated in a normal direction based on an operation of a switch 69. The switch 69 controls the driving motor 68 based on a wired method. A certain wireless sensor may be installed between the switch 69 and the driving motor 67 for thereby wirelessly controlling the same.

[0025] An extendable part 80 may be installed at the wall surface duct 60b positioned at a wall surface for thereby automatically extending the wall surface duct 60b. In the extendable part 80, one end of a rope 85 is provided at the motor 81 and a pulley 83 rotated by the motor 81 and is wound or loosened based on a normal or reverse rotation of the pulley 81. The other end of the rope 85 is installed at an end of the wall surface duct 60b, so that one end of the wall surface duct 60b is extendable in an up and down direction, and the motor 81 is controlled by an additional switch.

[0026] Figure 8 is a view of the fifth embodiment of the present invention. As shown therein, a duct 70 is distanced far from the suction port 20 and is installed in a downward direction at an inclination angle in an outer direction of the suction port 20. The duct 70 may include an extendable part 80 of Figure 7, so that it can be automatically extendable. A fan 90 may be installed at an end of the duct 70 for thereby achieving an easier discharge of the air. The fan 90 may be adapted to the ducts 30, 40, 50 and 60, respectively.

[0027] In the present invention, since the discharge air is uniformly distributed into the indoor space by automatically or manually extending the ducts, the discharged air is not directly sucked into the suction part, so that the indoor air can be widely and uniformly circulated for thereby achieving an uniform heating and cooling operation in the indoor space.

[0028] As described above, in the present invention, the duct capable of being extendable so that the dis-

charge air from the suction port of the ceiling-mounted heating and cooling apparatus is installed at the discharge port, so that it is possible to uniformly heat or cool the inner space of the building.

[0029] In addition, in the present invention, it is possible to automatically extend the ducts.

[0030] As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described examples are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalences of such meets and bounds are therefore intended to be embraced by the appended claims.

[0031] A ceiling-mounted heating and cooling apparatus is disclosed, which is capable of uniformly heating and cooling an indoor space in such a manner that a discharge air from a heating and cooling apparatus is discharged toward a portion distanced far from an inlet. In a ceiling-mounted heating and cooling apparatus which is installed at a ceiling of a certain building and includes a suction port and a discharge port, there is provided an improved ceiling-mounted heating and cooling apparatus, comprising a duct part which is detachably installed at the discharge port and transfers a discharge air into the lower surfaces of the indoor of the building, wherein said duct part is a bellows or a telescope type unit. The indoor of the building can be uniformly heated or cooled by discharging discharge air further from the suction port of the ceiling-mounted heating and cooling apparatus.

Claims

1. In a ceiling-mounted heating and cooling apparatus which is installed at a ceiling of a certain building and includes a suction port and a discharge port, an improved ceiling-mounted heating and cooling apparatus, comprising:

a duct part which is detachably installed at the discharge port and transfers a discharge air into the lower surfaces of the indoor of the building,

wherein said duct part is a bellows or a telescope type unit.

2. The apparatus of claim 1, wherein said duct part includes a guide part which is designed to guide an extension of the same in a longitudinal direction.

3. The apparatus of claim 2, wherein said guide part includes a moving part for extending one end of the duct part, and a driving part which drives the moving

part.

4. The apparatus of claim 3, wherein said moving part includes a belt which rotates so as to extend one end of the duct part, and driving and driven pulleys connected between the both ends of the duct part through the belt, and said driving part includes a driving motor which is connected with the driving pulley and is installed on the ceiling for thereby driving the driving pulley, and a switch which is electrically connected so as to normally rotate or reverse-rotate the driving motor.

5. The apparatus of claim 1, wherein said duct part further includes a fan installed at an end of the duct part for thereby efficiently discharging the discharge air.

6. The apparatus of claim 1, wherein said duct part is inclined downwards from the discharge part and gets distanced more and more from the suction port to the outer side.

FIG. 1

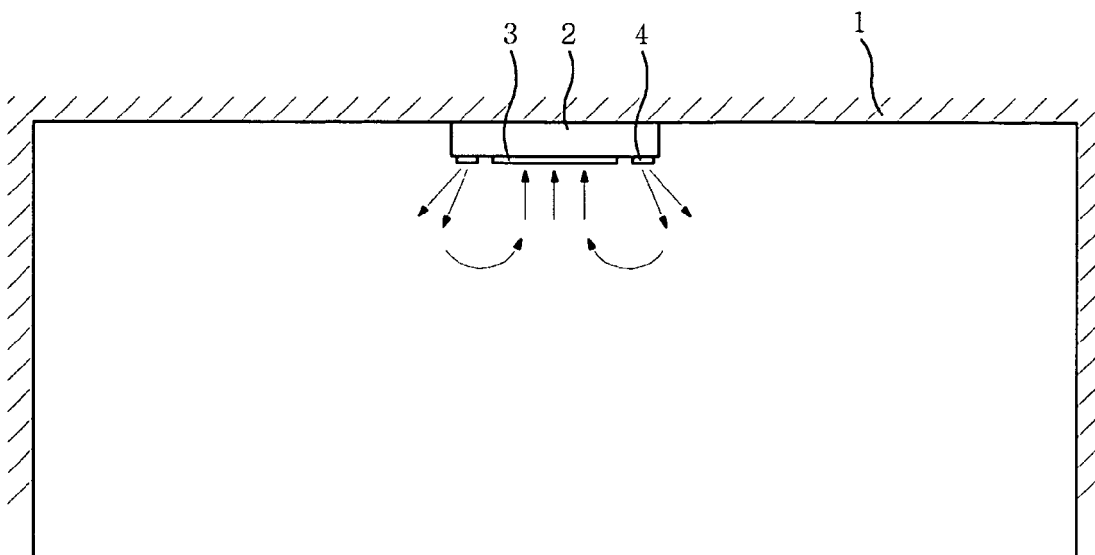


FIG. 2

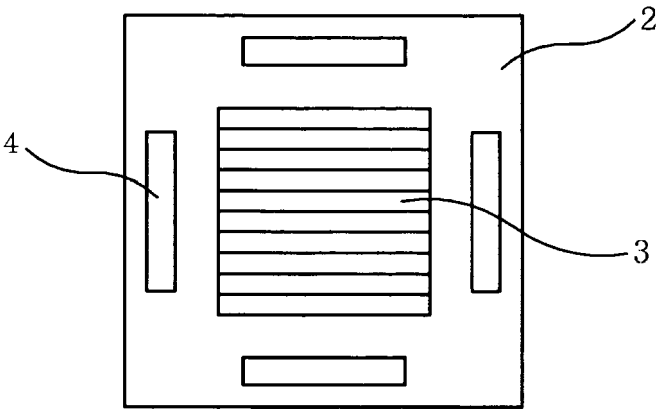


FIG. 3

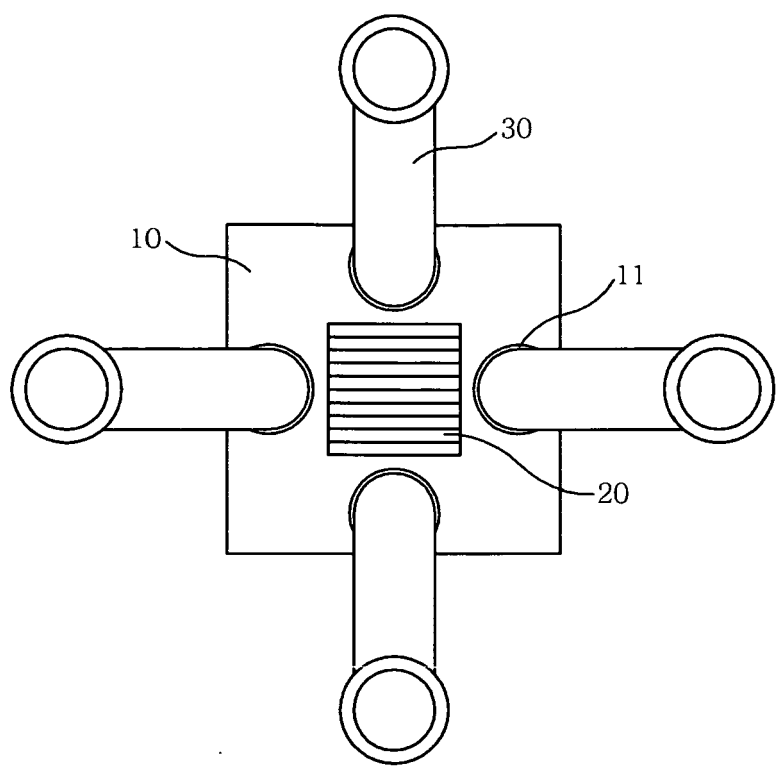


FIG. 4

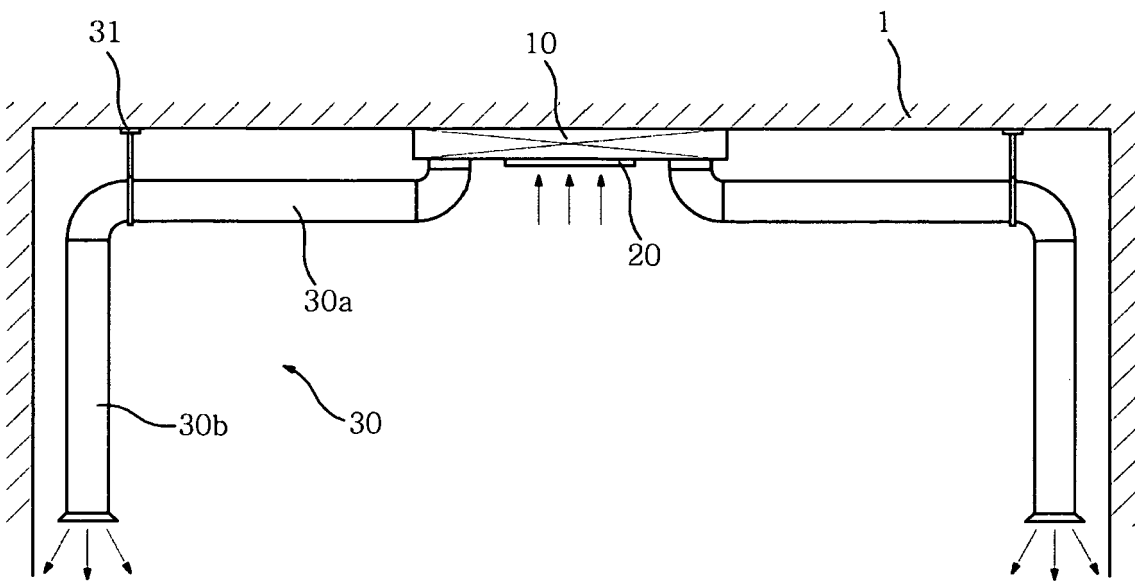


FIG. 5

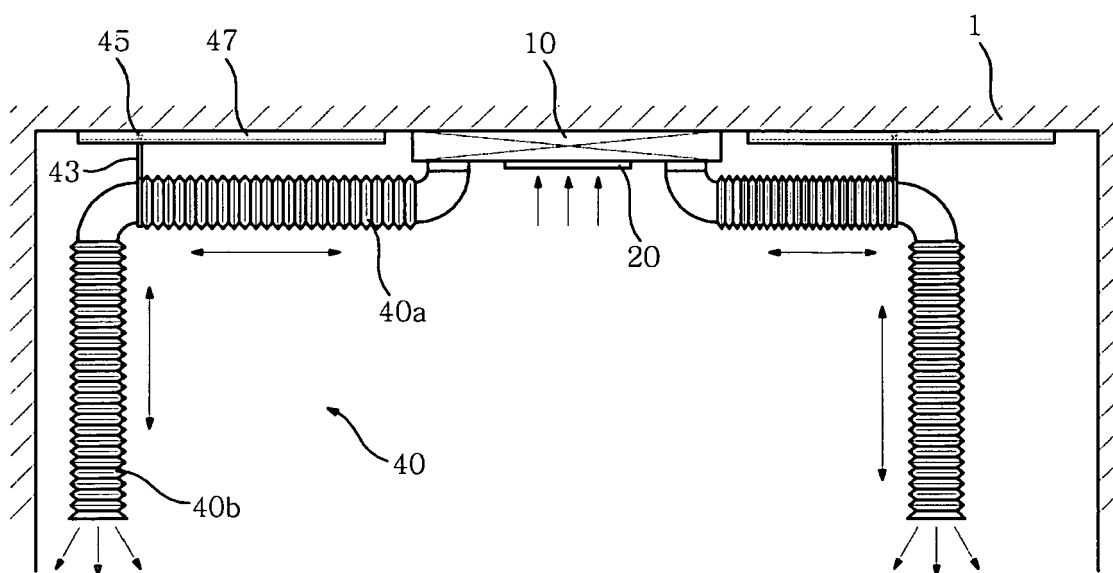


FIG. 6

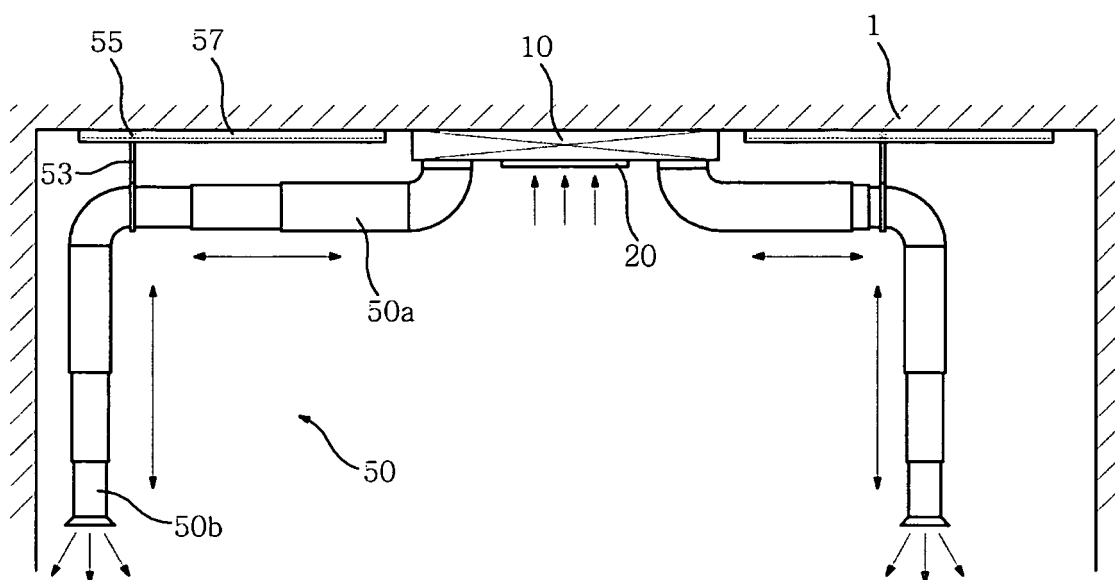


FIG. 7

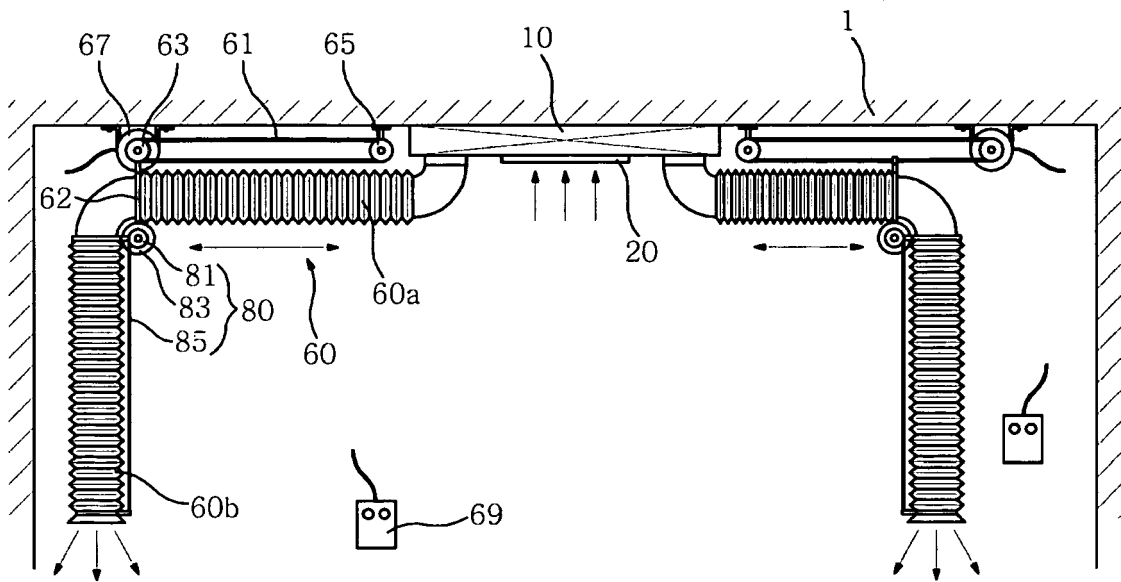


FIG. 8

