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(54) **WINDOW TYPE AIR CONDITIONER**

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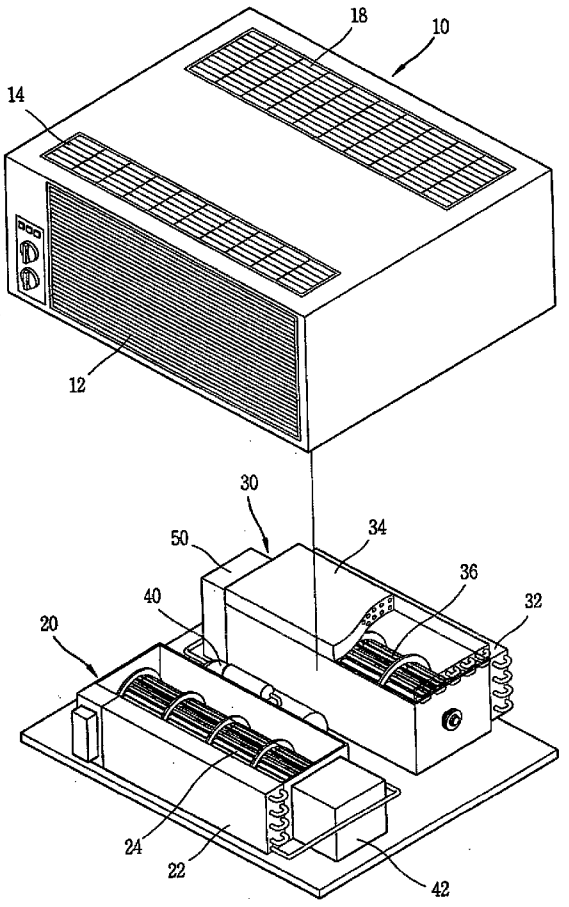
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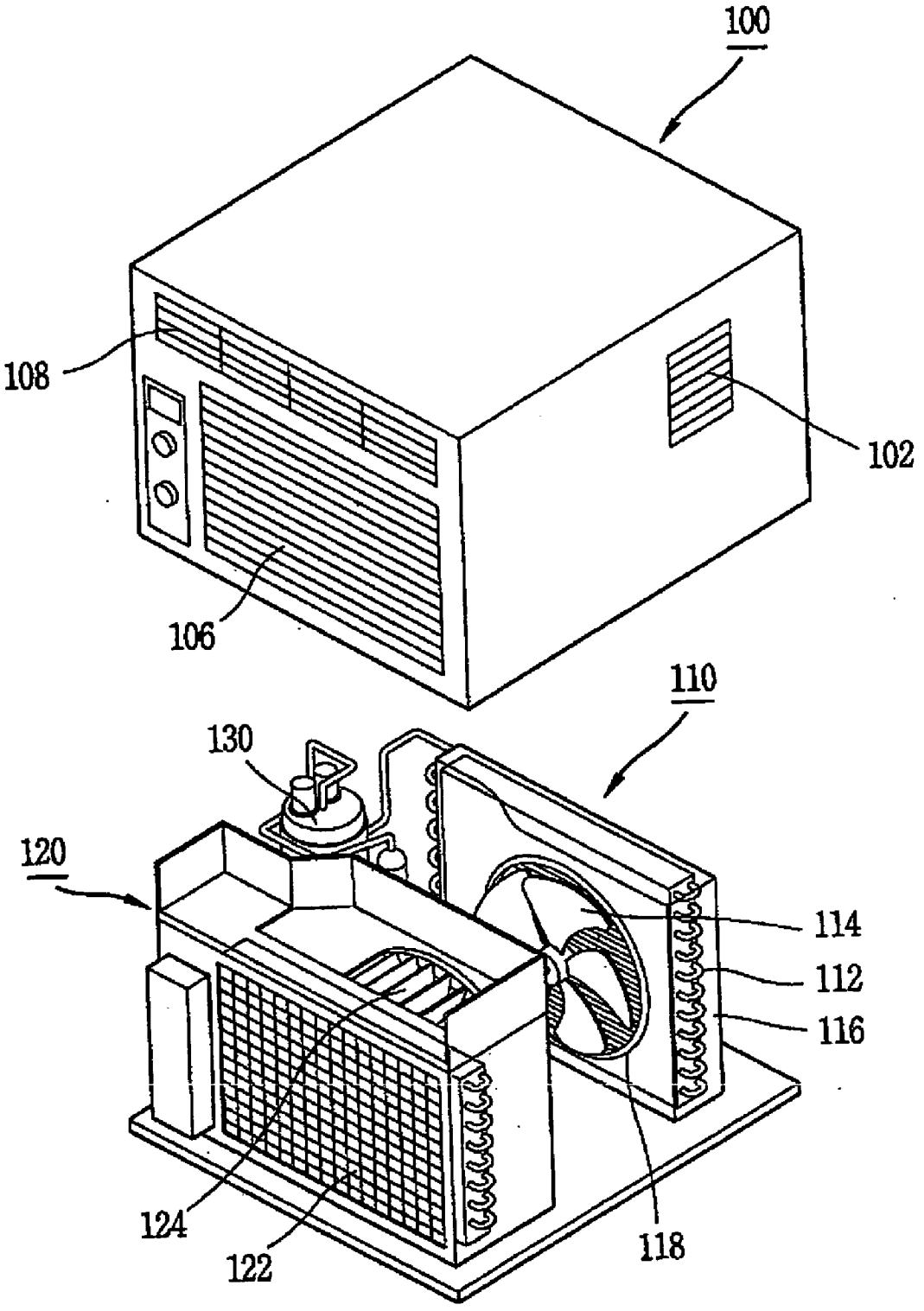
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(57) **ABSTRACT**

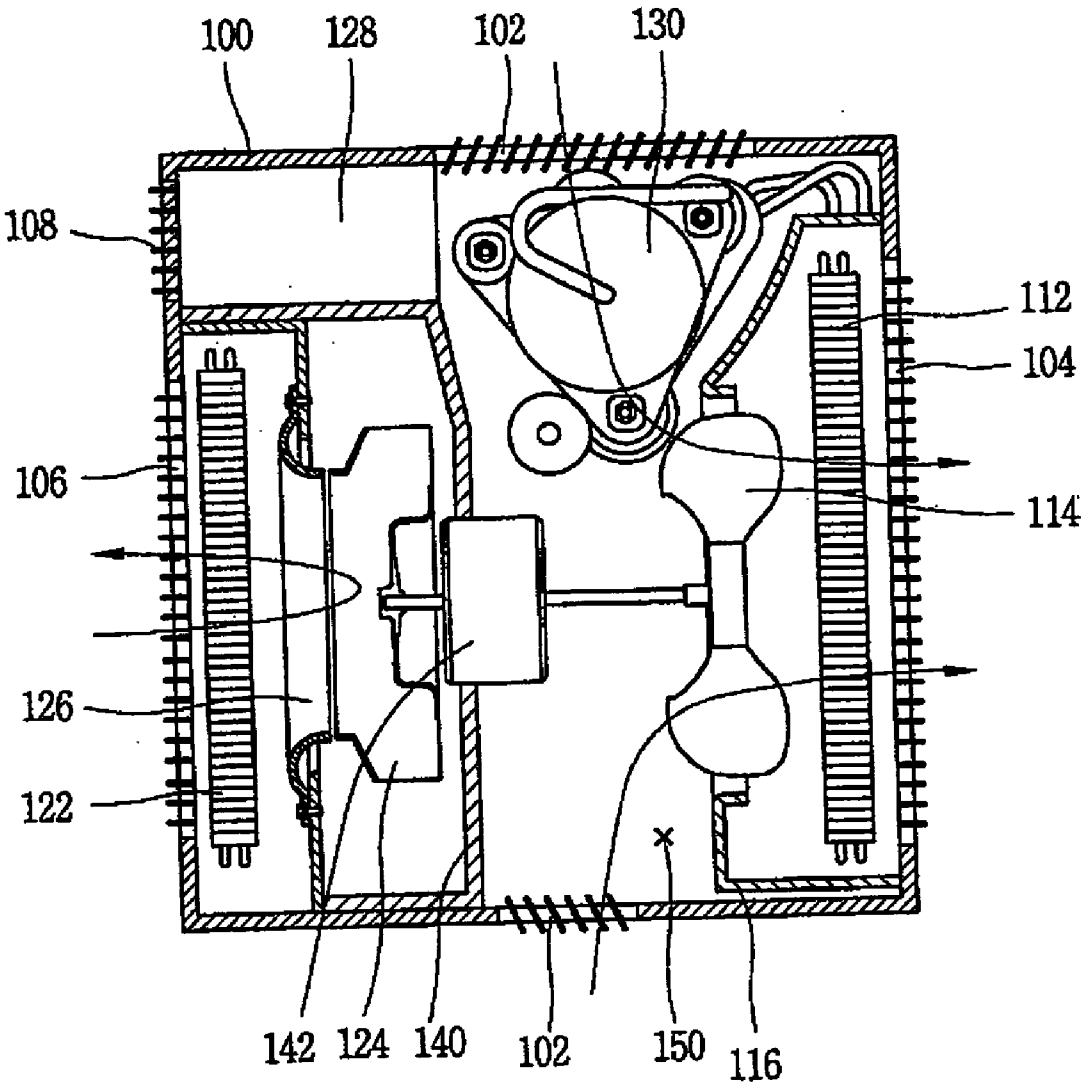
A window type air conditioner comprises: an indoor unit mounted inside a case positioned at the indoor side thus to be heat-exchanged with the indoor air; an outdoor heat exchanger mounted inside a case positioned at the outdoor side thus to be heat-exchanged with the outdoor air; and an outdoor cross flow fan for generating a blowing force so that the out-door air can pass through the outdoor heat exchanger and for sucking the outdoor air in a circumferential direction thereof and thereby discharging the outdoor air in the circumferential direction thereof. According to this, noise is lowered, the air volume lowering due to a channel resistance is prevented, and the entire size of the air conditioner is minimized.



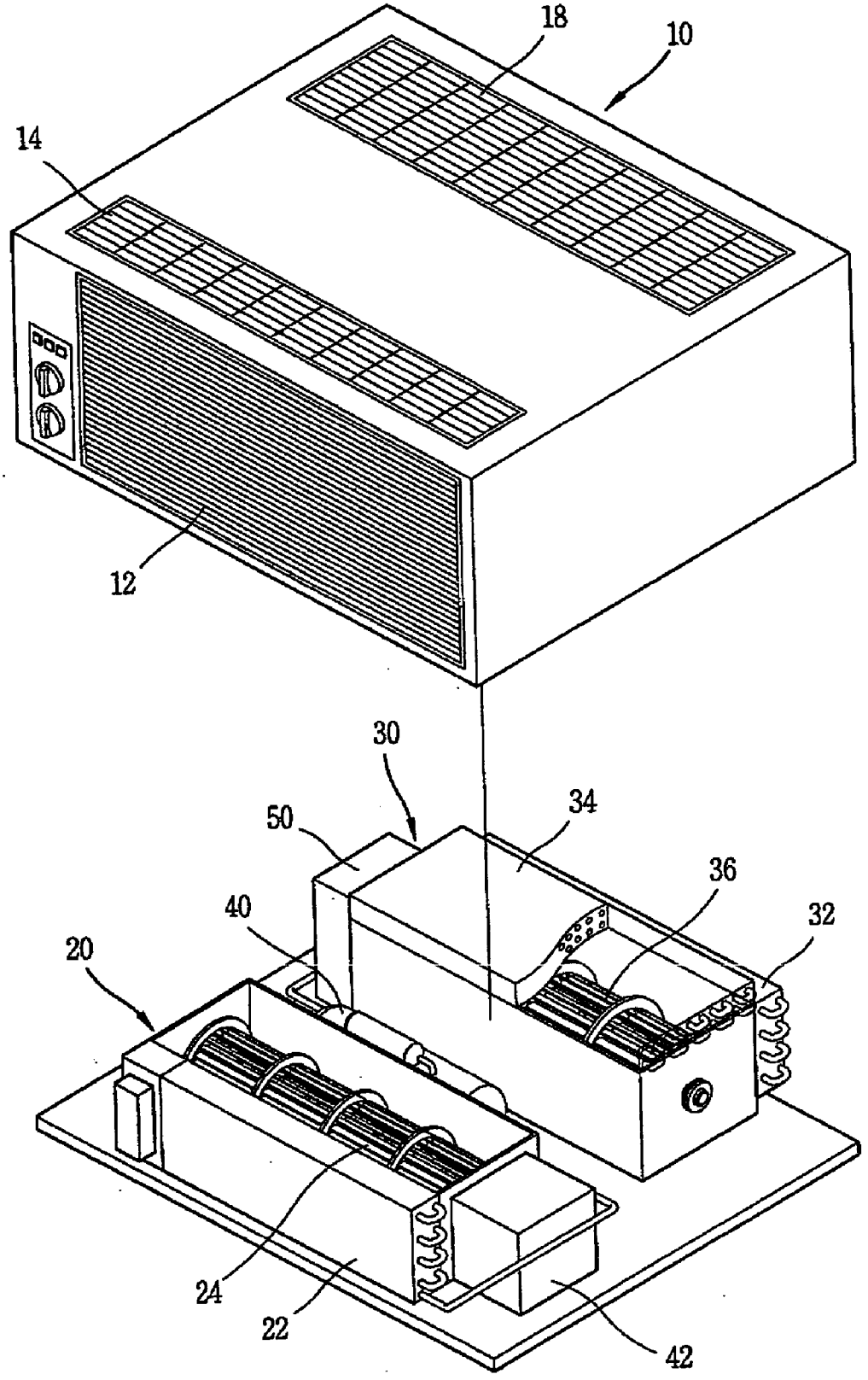
[Fig. 1]



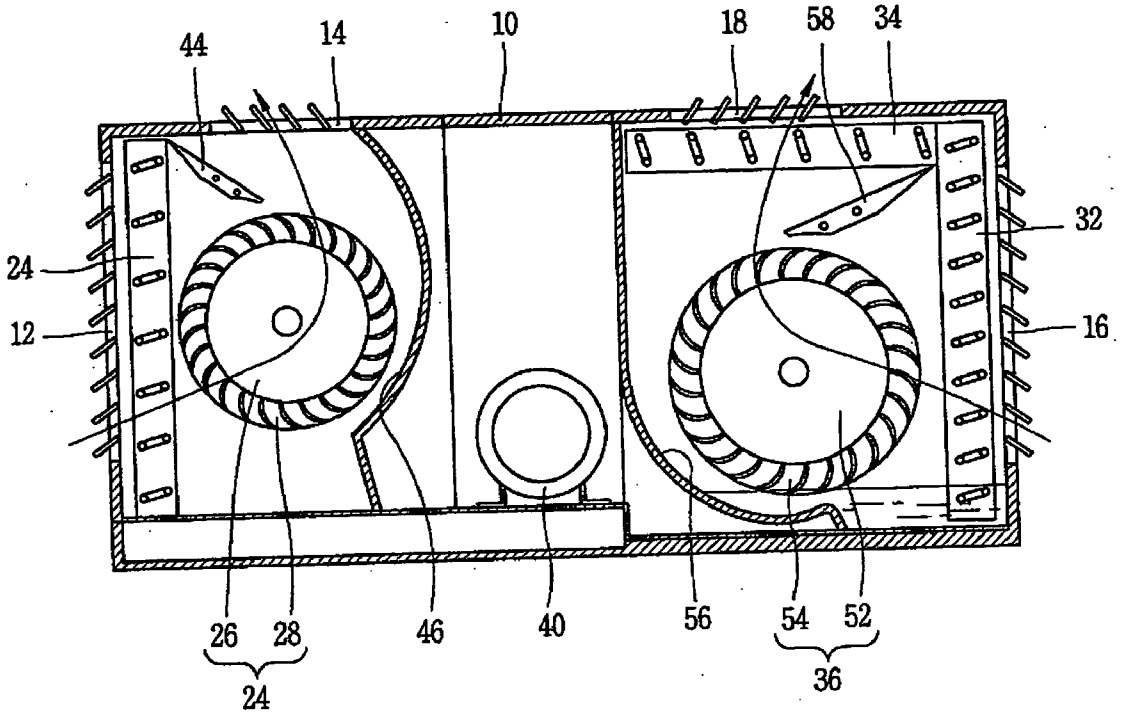
[Fig. 2]


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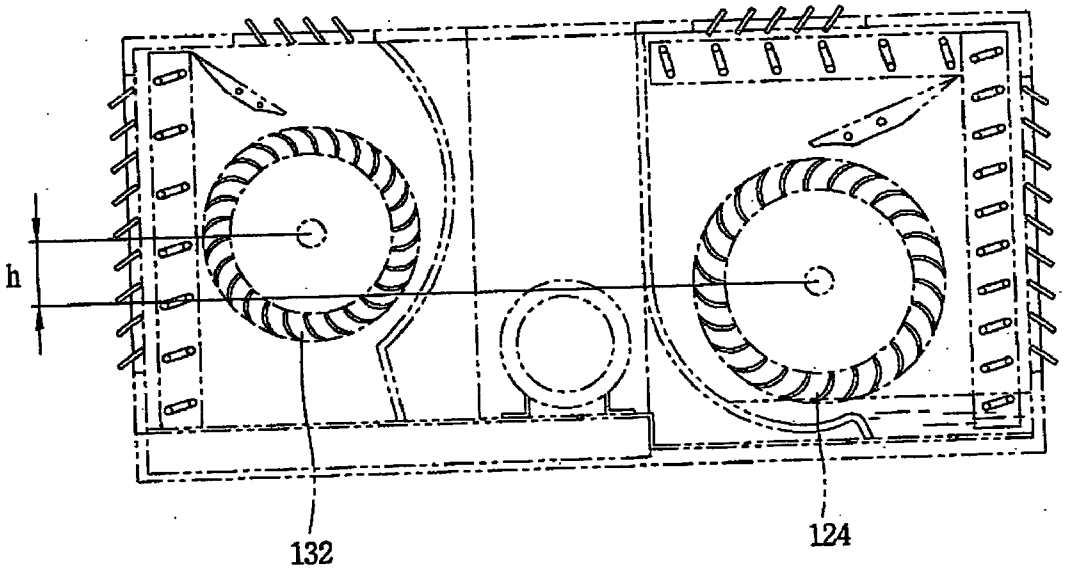
[Fig. 3]



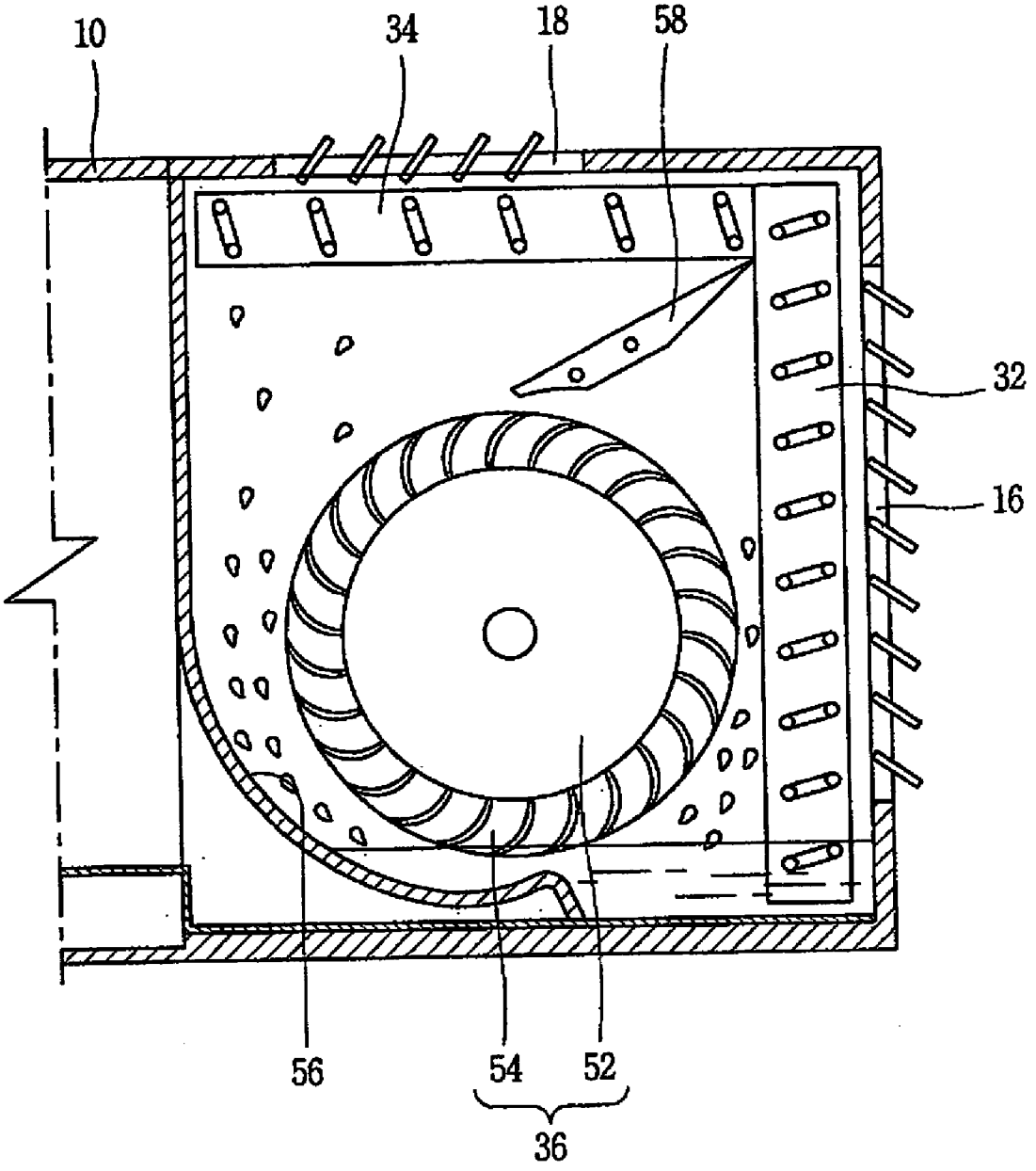
[Fig. 4]



[Fig. 5]



[Fig. 6]



WINDOW TYPE AIR CONDITIONER

TECHNICAL FIELD

[0001] The present invention relates to a window type air conditioner, and more particularly, to a window type air conditioner capable of reducing noise and enhancing the air volume by respectively installing a cross flow fan at an outdoor unit and an indoor unit.

BACKGROUND ART

[0002] In general, an air conditioner is provided with a refrigerating cycle constituted with a compressor, a condenser, a capillary tube, a heat exchanger, etc., and properly supplies cool air generated from an evaporator and warm air generated from the condenser indoors according to the indoor condition, thereby maintaining the indoor circumstance comfortably.

[0003] The air conditioner is divided into a window type air conditioner and a separated type air conditioner according to an installation method. The window type air conditioner is installed at the window, etc. under the state that an outdoor unit and an indoor unit are integrally assembled to each other in one case, and the separate type air conditioner is respectively installed at the outdoor and the indoor under the state that the outdoor unit and the indoor unit are separated from each other.

[0004] FIG. **1** is a disassembled perspective view showing a window type air conditioner in accordance with the conventional art, and FIG. **2** is an engagement sectional view showing the window type air conditioner in accordance with the conventional art.

[0005] The conventional window type air conditioner comprises: a case **100** of which one side is positioned at the outdoor side and another side is positioned at the indoor side; an outdoor unit **110** installed at the outdoor side of the case **100** and heat-exchanged with the outdoor air; an indoor unit **120** installed at the indoor side of the case **100** and heat-exchanged with the indoor air; and a compressor **130** for compressing a refrigerant.

[0006] The case **100** is installed at the wall that divides the outdoors and the indoors, and one side of the case **100** is positioned at the outdoor side and another side thereof is positioned at the indoor side. An outdoor air suction port **102** for sucking the outdoor air is formed at both lateral surfaces of the case **100** positioned at the outdoor side. Also, an outdoor air discharge port **104** for discharging the air that has been heat-exchanged while passing through the outdoor unit **110** to the outdoor is formed at the rear surface of the case **100**. At the front surface of the case **100** positioned at the indoor side, an indoor air suction port **106** for sucking the indoor air and an indoor air discharge port **108** for discharging the air that has been heat-exchanged while passing through the indoor unit **120** to the indoor are respectively formed.

[0007] The outdoor unit **110** is composed of: an outdoor heat exchanger **112** installed inside the case **100** positioned at the outdoor side and connected to the compressor **130** by a refrigerant pipe thus to be heat-exchanged with the outdoor air; and an axial fan **114** opposite to the outdoor heat exchanger **112** for generating a blowing force to suck the outdoor air and thus to discharge it to the outdoor heat exchanger **112**.

[0008] The outdoor heat exchanger **112** and the axial fan **114** are mounted in a shroud **116**. The shroud **116** is provided with an orifice **118** for guiding the air to the axial fan **112** for a smooth suction.

[0009] The indoor unit **120** is composed of: an indoor heat exchanger **122** installed inside the case **100** positioned at the indoor side for heat-exchanging the indoor air; and a centrifugal fan **124** opposite to the indoor heat exchanger **122** for generating a blowing force so that the indoor air can pass through the indoor heat exchanger **122**.

[0010] An orifice **134** for guiding the indoor air that has passed through the indoor heat exchanger **122** to the centrifugal fan **124** is formed between the indoor heat exchanger **122** and the centrifugal fan **124**. An air guide **128** for guiding the air that has passed through the centrifugal fan **124** to the indoor air discharge port **108** is installed at the upper side of the centrifugal fan **124**.

[0011] A division plate **140** for dividing the outdoor unit **110** and the indoor unit **120** is installed inside the case **100**, and a driving motor **142** for driving the centrifugal fan **124** and the axial fan **114** is mounted at the division plate **140**.

[0012] Operation of the window type air conditioner in accordance with the conventional art will be explained in more detail. When a power source is applied to the air conditioner, the compressor **130** and the driving motor **142** are driven thus to heat-exchange the outdoor air by the outdoor unit **110** and heat-exchange the indoor air by the indoor unit **120**.

[0013] More specifically, when the axial fan **114** is driven, the outdoor air is sucked into the case **100** through the outdoor air suction port **102**. The outdoor air passes through the outdoor heat exchanger **112** thus to condense a refrigerant passing through the inside of the outdoor heat exchanger **112**. Then, the outdoor air is discharged to the outdoor through the outdoor air discharge port **104**.

[0014] When the centrifugal fan **124** is driven, the indoor air is sucked through the indoor air suction port **106** thus to be cooled while passing through the indoor heat exchanger **122**. Then, the indoor air is discharged to the indoor through the indoor air discharge port **108**.

[0015] However, in the conventional window type air conditioner, the axial fan **114** is installed at the outdoor unit **110** thus to increase noise. Also, the axial fan **114** is susceptible to a channel resistance thus to decrease the air volume. In order to lower the channel resistance, a suction space **150** to which the outdoor air is sucked has to be increased. However, in that case, the entire size of the air conditioner is increased.

[0016] Additionally, since the outdoor heat exchanger **112** of the outdoor unit **110** is installed only at an exit side of the axial fan **114**, a heat exchange area becomes small and thereby a cooling function of the air conditioner is degraded.

DISCLOSURE

[0017] Therefore, it is an object of the present invention to provide a window type air conditioner capable of reducing noise, preventing the air volume from being lowered due to a channel resistance, and minimizing the entire size thereof by applying a cross flow fan at an outdoor unit.

[0018] It is another object of the present invention to provide a window type air conditioner capable of enhancing a heat exchanging function of an outdoor heat exchanger.

[0019] To achieve these objects, there is provided a window type air conditioner comprising: a case of which one side is positioned at an indoor side and another side is positioned at an outdoor side; an indoor heat exchanger mounted inside the case positioned at the indoor side thus to be heat-exchanged with the indoor air; an indoor cross flow fan for generating a blowing force so that the indoor air can pass through the indoor heat exchanger and for sucking the indoor air in a circumferential direction thereof and thereby discharging the indoor air in the circumferential direction thereof; an outdoor heat exchanger mounted inside the case positioned at the outdoor side thus to be heat-exchanged with the outdoor air; and an outdoor cross flow fan for generating a blowing force so that the outdoor air can pass through the outdoor heat exchanger and for sucking the outdoor air in a circumferential direction thereof and thereby discharging the outdoor air in the circumferential direction thereof.

[0020] A compressor for compressing a refrigerant into a high temperature and a high pressure is installed at one side of the outdoor heat exchanger. As the compressor, a horizontal type compressor that a driving unit and a refrigerant compression unit are horizontally arranged is applied.

[0021] The indoor cross flow fan is composed of: a hub arranged in a longitudinal direction of the indoor heat exchanger and connected to the driving motor; and a plurality of blades formed at the outer circumferential surface of the hub with a certain interval and arranged in a longitudinal direction of the indoor heat exchanger.

[0022] The outdoor heat exchanger is composed of: a first outdoor heat exchanger installed at the inner side surface of the outdoor air suction port thus to be heat-exchanged with the outdoor air sucked through the outdoor air suction port; and a second outdoor heat exchanger installed at the inner side of the outdoor air discharge port thus to be heat-exchanged with the outdoor air discharged to the outdoor air discharge port.

[0023] A window type air conditioner according to the present invention comprises: a case of which one side is positioned at an indoor side and another side is positioned at an outdoor side; an indoor heat exchanger mounted inside the case positioned at the indoor side thus to be heat-exchanged with the indoor air; a centrifugal fan for generating a blowing force so that the indoor air can pass through the indoor heat exchanger; an outdoor heat exchanger mounted inside the case positioned at the outdoor side thus to be heat-exchanged with the outdoor air; and a cross flow fan for generating a blowing force so that the outdoor air can pass through the outdoor heat exchanger and for sucking the outdoor air in a circumferential direction thereof and thereby discharging the outdoor air in the circumferential direction thereof.

DESCRIPTION OF DRAWINGS

[0024] FIG. **1** is a disassembled perspective view showing a window type air conditioner in accordance with the conventional art;

[0025] FIG. **2** is a sectional view showing the window type air conditioner in accordance with the conventional art;

[0026] FIG. **3** is a disassembled perspective view showing a window type air conditioner according to one embodiment of the present invention;

[0027] FIG. **4** is a sectional view showing the window type air conditioner according to one embodiment of the present invention;

[0028] FIG. **5** is a sectional view showing a mounting position of an outdoor cross flow fan and an indoor cross flow fan according to one embodiment of the present invention; and

[0029] FIG. **6** is a sectional view showing a structure of an outdoor unit according to one embodiment of the present invention.

BEST MODE

[0030] Hereinafter, preferred embodiments of a window type air conditioner according to the present invention will be explained with reference to the attached drawings.

[0031] Even if a plurality of preferred embodiments may exist in the present invention, the most preferred embodiment will be explained hereinafter.

[0032] FIG. **3** is a disassembled perspective view showing a window type air conditioner according to one embodiment of the present invention, and FIG. **4** is a sectional view showing the window type air conditioner according to one embodiment of the present invention.

[0033] The window type air conditioner according to the present invention comprises: a case **10** arranged at a wall that divides an indoor side and an outdoor side and of which one side is positioned at an indoor side and another side is positioned at an outdoor side; an indoor unit **20** arranged at the indoor side of the case **10** thus to be heat-exchanged with the indoor air; an outdoor unit **30** arranged at the outdoor side of the case **10** thus to be heat-exchanged with the outdoor air; a compressor **40** for compressing a refrigerant into a gaseous refrigerant of a high temperature and a high pressure; and etc.

[0034] As the compressor, a horizontal type compressor that a driving unit and a refrigerant compression unit are horizontally arranged is applied.

[0035] An indoor air suction port **12** for sucking the indoor air is formed at the front surface of the case **10** positioned at the indoor side, and an indoor air discharge port **14** for discharging the air that has been heat-exchanged while passing through the indoor unit **20** to the indoor is formed at the upper surface of the case **10** positioned at the indoor side.

[0036] An outdoor air suction port **16** for sucking the outdoor air is formed at the rear surface of the case **10** positioned at the outdoor side, and an outdoor air discharge port **18** for discharging the air that has passed through the outdoor unit **30** to the outdoor is formed at the upper surface of the case **10** positioned at the outdoor side.

[0037] The indoor unit **20** is composed of: an indoor heat exchanger **22** for passing the indoor air and cooling; and an indoor cross flow fan **24** arranged at the inner side of the indoor heat exchanger **22** for generating a blowing force so that the indoor air sucked into the indoor air suction port **12** can pass through the indoor heat exchanger **22**.

[0038] The indoor heat exchanger **22** is formed as a rectangular parallelepiped shape arranged at the inner side of the indoor air suction port **12**. Since the indoor air suction port **12** is formed to almost occupy the front surface of the case **10**, the indoor air suction port **12** is formed to have the same area as the indoor heat exchanger **22** in order to increase a heat exchanging area.

[0039] The indoor cross flow fan **24** is a fan for sucking the indoor air in the circumferential direction thereof and discharging the indoor air in the circumferential direction thereof. The indoor cross flow fan **24** sucks the indoor air in the lateral direction thereof through the indoor air suction port **12**, and then discharges the indoor air in the upper direction thereof through the indoor air discharge port **14** arranged to be perpendicular to the indoor air suction port **12**.

[0040] Herein, the centrifugal fan explained in the conventional art can be applied instead of the indoor cross flow fan **24**.

[0041] The indoor cross flow fan **24** is composed of: a hub **26** arranged in a longitudinal direction of the indoor heat exchanger **22** and connected to the driving motor **42**; and a plurality of blades **28** formed at the outer circumferential surface of the hub **26** with a certain interval and arranged in a longitudinal direction of the indoor heat exchanger **22**.

[0042] In order to divide a suction side and a discharge side of the indoor cross flow fan **24**, a stabilizer **44** having approximately 45° is installed between the indoor air suction port **12** and the indoor air discharge port **14**.

[0043] The indoor cross flow fan **24** is mounted in the case **10** positioned at the indoor side, and a guide panel **46** for guiding the indoor air sucked into the indoor air suction port **12** to the indoor air discharge port **14** is provided at the case **10** positioned at the indoor side.

[0044] The outdoor unit **30** is composed of: a first outdoor heat exchanger **32** heat-ex changed with the outdoor air sucked through the outdoor air suction port **16** positioned at the indoor side; a second outdoor heat exchanger **34** heat-exchanged with the outdoor air discharged through the outdoor air discharge port **18**; and an outdoor cross flow fan **36** for generating a blowing force so that the outdoor air can be sucked and thereby to pass through the first and second outdoor heat exchangers **32** and **34**.

[0045] The first outdoor heat exchanger **32** is vertically formed to occupy up the rear surface of the case **10** thereby to be heat-exchanged with the outdoor air sucked through the outdoor air suction port **16** formed at the rear surface of the case. Also, the second outdoor heat exchanger **34** is horizontally arranged at the upper surface of the case **10** positioned at the outdoor side thereby to be heat-exchanged with the outdoor air discharged through the outdoor air discharge port **18** formed at the upper surface of the case **10**.

[0046] The outdoor cross flow fan **36** sucks the air in the circumferential direction thereof and then discharges the air in the circumferential direction thereof. The outdoor cross flow fan **36** is installed in a longitudinal direction of the first and second outdoor heat exchangers **16** and **18**, thereby sucking the outdoor air in the lateral direction thereof and then discharging the outdoor air in the upper direction thereof.

[0047] The outdoor cross flow fan **36** is composed of: a hub **52** connected to a driving motor **50** at one side thereof for receiving a rotational force; and blades **54** arranged at the outer circumferential surface of the hub **52** with a certain interval and long arranged along the longitudinal direction of the hub **52**.

[0048] A guide panel **56** for guiding the outdoor air sucked in the lateral direction to be discharged to the upper direction is installed at a lateral surface of the outdoor cross flow fan **36**. Also, a stabilizer **58** for dividing a suction side and a discharge side of the outdoor cross flow fan **36** is installed between the first outdoor heat exchanger **32** and the second outdoor heat exchanger **34**. The stabilizer **58** is preferably installed with approximately 45°.

[0049] As shown in FIGS. **5** and **6**, the rotation center of the outdoor cross flow fan **36** is positioned at a lower side than the indoor cross flow fan **24** with a certain distance h, so that the edge of the blade **54** is in contact with condensing water collected at the lower portion of the case **10** positioned at the outdoor side thus to spray the condensing water.

[0050] That is, when the outdoor cross flow fan **36** is rotated, the blade **54** contacting the condensing water lifts up the condensing water. According to this, the condensing water is sprayed to the first and second outdoor heat exchangers **32** and **34** thus to lower the temperature of the first and second outdoor heat exchangers **32** and **34**.

[0051] Operation of the window type air conditioner will be explained as follows.

[0052] When a power source is applied to the air conditioner, the compressor **40** is driven thus to cool the refrigerant, the indoor cross flow fan **24** is driven thus to heat-exchange the indoor air by the indoor heat exchanger **22**, and the outdoor cross flow fan **36** is driven thus to heat-exchange the outdoor heat exchangers **32** and **34** with the outdoor air.

[0053] At this time, the indoor unit **20** is operated as follows. When the indoor cross flow fan **24** is driven as the power source is applied to the driving motor **42**, the indoor air is sucked into the case **10** through the indoor air suction port **12** formed at the front side of the case **10** thus to be cooled while passing through the indoor heat exchanger **22**. The cooled air is guided by the air guide **46** thus to be discharged to the indoor side through the indoor air discharge port **14** formed at the upper side of the front side of the case **10**.

[0054] Also, the outdoor unit **30** is operated as follows. When the outdoor cross flow fan **36** is driven as the power source is applied to the driving motor **50**, the outdoor air is sucked into the case **10** through the outdoor air suction port **16** formed at the rear surface of the case **10**. The outdoor air is heat-exchanged while passing through the first outdoor heat exchanger **32**. Then, the outdoor air that has passed through the first outdoor heat exchanger **32** is moved to the upper side of the case **10** along the air guide **56**, and passes through the second outdoor heat exchanger **34** thus to be secondarily heat-exchanged. Then, the outdoor air is discharged to the outdoor side through the outdoor air discharge port **18** formed at the upper side of the case **10**.

[0055] At this time, the blade **54** of the outdoor cross flow fan **36** is in contact with condensing water stored at the lower portion of the case **10** thus to lift up the condensing

water when the outdoor cross flow fan **36** is rotated and thereby to spray the condensing water to the first outdoor heat exchanger **32** and the second outdoor heat exchanger **34**. According to this, the temperature of the first and second outdoor heat exchangers is lowered.

[**0056**] In the window type air conditioner according to the present invention, noise of the air condition is reduced and the air volume is increased even if the channel resistance is increased by applying the outdoor cross flow fan at the outdoor unit, thereby enhancing the function of the air conditioner.

[**0057**] Also, since the outdoor cross flow fan can have a diameter smaller than that of an axial fan and the horizontal type compressor is applied, the entire size of the air conditioner is minimized and the height of the air conditioner is lowered.

[**0058**] Additionally, the first and second outdoor heat exchangers are applied to the outdoor unit thus to increase the heat exchanging area and thereby to enhance the function of the air conditioner.

[**0059**] In addition, since the outdoor cross flow fan sprays condensing water by lifting up the condensing water, an additional component for spraying condensing water is not necessary. Also, the temperature of the first and second heat exchangers is lowered thus to enhance the function of the heat exchanger.

[**0060**] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

1. A window type air conditioner comprising:

a case of which one side is positioned at an indoor side and another side is positioned at an outdoor side;

an indoor heat exchanger mounted inside the case positioned at the indoor side thus to be heat-exchanged with the indoor air;

an indoor cross flow fan for generating a blowing force so that the indoor air can pass through the indoor heat exchanger and for sucking the indoor air in a circumferential direction thereof and thereby discharging the indoor air in the circumferential direction thereof;

an outdoor heat exchanger mounted inside the case positioned at the outdoor side thus to be heat-exchanged with the outdoor air; and

an outdoor cross flow fan for generating a blowing force so that the outdoor air can pass through the outdoor heat exchanger and for sucking the outdoor air in a circumferential direction thereof and thereby discharging the outdoor air in the circumferential direction thereof.

2. The window type air conditioner of claim 1, wherein a compressor for compressing a refrigerant into a high temperature and a high pressure is installed at one side of the outdoor heat exchanger, and a horizontal type compressor that a driving unit and a refrigerant compression unit are horizontally arranged is applied as the compressor.

3. The window type air conditioner of claim 1, wherein an indoor air suction port for sucking the indoor air is formed at the front side of the case positioned at the indoor side, and an indoor air discharge port for discharging the indoor air is formed at the upper surface of the case positioned at the indoor side.

4. The window type air conditioner of claim 3, wherein the indoor air suction port has a size that occupies up the front surface of the case.

5. The window type air conditioner of claim 4, wherein the indoor heat exchanger is vertically arranged inside the indoor air suction port.

6. The window type air conditioner of claim 1, wherein the indoor cross flow fan is composed of:

a hub arranged in a longitudinal direction of the indoor heat exchanger and connected to the driving motor; and

a plurality of blades formed at the outer circumferential surface of the hub with a certain interval and arranged in a longitudinal direction of the indoor heat exchanger.

7. The window type air conditioner of claim 6, wherein a guide panel for guiding the indoor air sucked in the indoor air suction port to an indoor air discharge port is installed at one side of the indoor cross flow fan, and a stabilizer for dividing a suction side and a discharge side of the indoor cross flow fan is installed at one side of the case.

8. The window type air conditioner of claim 1, wherein an outdoor air suction port for sucking the outdoor air is formed at the rear surface of the case positioned at the outdoor side, and an outdoor air discharge port for discharging the outdoor air is formed at the upper surface of the case positioned at the outdoor side.

9. The window type air conditioner of claim 8, wherein the outdoor air suction port has a size that occupies up the rear surface of the case.

10. The window type air conditioner of claim 8, wherein the outdoor heat exchanger is composed of:

a first outdoor heat exchanger installed inside the outdoor air suction port thus to be heat-exchanged with the outdoor air sucked through the outdoor air suction port; and

a second outdoor heat exchanger installed inside the outdoor air discharge port thus to be heat-exchanged with the outdoor air discharged to the outdoor air discharge port.

11. The window type air conditioner of claim 10, wherein the first outdoor heat exchanger is vertically arranged inside the outdoor air suction port, and the second outdoor heat exchanger is horizontally arranged inside the outdoor air discharge port.

12. The window type air conditioner of claim 1, wherein the outdoor cross flow fan is composed of:

a hub arranged in a longitudinal direction of the outdoor heat exchanger and connected to the driving motor; and

a plurality of blades formed at the outer circumferential surface of the hub with a certain interval and having a certain length.

13. The window type air conditioner of claim 6, wherein a stabilizer for dividing a suction side and a discharge side of the outdoor cross flow fan is installed between the first outdoor heat exchanger and the second outdoor heat exchanger, and a guide panel for guiding the indoor air

sucked in the outdoor air suction port to the outdoor air discharge port is installed at one side of the outdoor cross flow fan.

14. The window type air conditioner of claim 12, wherein the blade of the outdoor cross flow fan is in contact with condensing water stored at the lower surface of the case positioned at the outdoor side thereby to spray the condensing water when the outdoor cross flow fan is rotated.

15. A window type air conditioner comprising:

a case of which one side is positioned at an indoor side and another side is positioned at an outdoor side;

an indoor heat exchanger mounted inside the case positioned at the indoor side thus to be heat-exchanged with the indoor air;

a centrifugal fan for generating a blowing force so that the indoor air can pass through the indoor heat exchanger;

an outdoor heat exchanger mounted inside the case positioned at the outdoor side thus to be heat-exchanged with the outdoor air; and

a cross flow fan for generating a blowing force so that the outdoor air can pass through the outdoor heat exchanger and for sucking the outdoor air in a circumferential direction thereof and thereby discharging the outdoor air in the circumferential direction thereof.

16. The window type air conditioner of claim 15, wherein an outdoor air suction port for sucking the outdoor air is formed at the rear surface of the case positioned at the outdoor side, and an outdoor air discharge port for discharging the outdoor air is formed at the upper surface of the case positioned at the outdoor side.

17. The window type air conditioner of claim 16, wherein the outdoor heat exchanger is composed of:

a first outdoor heat exchanger installed inside the outdoor air suction port thus to be heat-exchanged with the outdoor air sucked through the outdoor air suction port; and

a second outdoor heat exchanger installed inside the outdoor air discharge port thus to be heat-exchanged with the outdoor air discharged to the outdoor air discharge port.

18. The window type air conditioner of claim 15, wherein the outdoor cross flow fan is composed of:

a hub arranged in a longitudinal direction of the outdoor heat exchanger and connected to the driving motor; and

a plurality of blades formed at the outer circumferential surface of the hub with a certain interval and having a certain length.

19. The window type air conditioner of claim 18, wherein the blade of the outdoor cross flow fan is in contact with condensing water stored at the lower surface of the case positioned at the outdoor side thereby to spray the condensing water when the outdoor cross flow fan is rotated.

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