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Cooling device of electronic equipment

Abstract

A first air blowing unit rotates to blow air and includes a first discharge surface for discharging the air. A second air blowing unit rotates to blow the air and includes a second discharge surface for discharging the air. A heat sink includes a plurality of fins. Edges on an upstream side in an air blowing direction of the fins are opposed to the first discharge surface or the second discharge surface. The edges of the fins located on a downstream side of a boundary between the first discharge surface and the second discharge surface are located closer to the first discharge surface and the second discharge surface than the other edges. A duct covers the heat sink, the first air blowing unit, and the second air blowing unit and includes a suction port on the upstream side and an exhaust port on the downstream side.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION
(1) This application is based upon and claims the benefit of priority from Japanese Patent Application No. 2022-202904, filed on Dec. 20, 2022, the entire contents of which are incorporated herein by reference.
FIELD
(2) Embodiments described herein relate generally to a cooling device of electronic equipment.
BACKGROUND
(3) Electronic equipment such as a PC (Personal Computer) includes a component heated to high temperature such as a CPU (Central Processing Unit). In general, a heat sink is attached to such a component in order to radiate heat. Air sucked by a fan installed on an upstream side flows to the heat sink and is discharged to a downstream side of the heat sink, whereby the heat radiation is performed.
(4) Recently, there are increasing demands for a reduction in the size of electronic equipment. A reduction in the size of a cooling fan that blows air to a heat sink is demanded. However, if the cooling fan is reduced in size, since a discharge volume of cooling air decreases, cooling performance of the heat sink is undesirably deteriorated.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
(1) FIG. **1** is a perspective view illustrating an example of an exterior of a cooling device in an embodiment;
(2) FIG. **2** is a perspective view schematically illustrating an example of the structure of electronic equipment to which the cooling device is attached;
(3) FIG. **3** is a perspective view illustrating an example of vent holes provided in the electronic equipment;
(4) FIG. **4** is a perspective view illustrating an example of a shape of a duct;
(5) FIG. **5** is a schematic plan view of the cooling device for explaining a relation between a direction of discharge surfaces of fans and a shape of edges of fins;
(6) FIG. **6** is a schematic plan view of the cooling device for explaining the relation between the direction of discharge surfaces of the fans and the shape of the edges of the fins; and
(7) FIG. **7** is a schematic plan view of the cooling device for explaining the relation between the direction of discharge surfaces of the fans and the shape of the edges of the fins.
DETAILED DESCRIPTION
(8) An aspect of embodiments is to provide a cooling device of electronic equipment capable of realizing a reduction in the size of a cooling fan without reducing a discharge volume of cooling air.
(9) A cooling device of electronic equipment according to an embodiment includes a first air blowing unit, a second air blowing unit, a heat sink, and a duct. The first air blowing unit forms a

flow of air by rotating to blow the air and includes a first discharge surface for discharging the air. The second air blowing unit forms a flow of the air by rotating to blow the air, includes a second discharge surface for discharging the air, and is installed adjacent to the first air blowing unit. The heat sink has width smaller than a sum of a diameter of the first discharge surface and a diameter of the second discharge surface, a plurality of fins being erected side by side in a thickness direction in a base section of the heat sink to which heat of an electronic component conducts. Edges on an upstream side in an air blowing direction of the fins are opposed to the first discharge surface or the second discharge surface. The edges of the fins located on a downstream side of a boundary between the first discharge surface and the second discharge surface are located closer to the first discharge surface and the second discharge surface than the other edges. The duct covers the heat sink, the first air blowing unit, and the second air blowing unit and includes a suction port on the upstream side and an exhaust port on the downstream side in the air blowing direction by the first air blowing unit and the second air blowing unit.
(10) An embodiment is explained with reference to the drawings. FIG. **1** is a perspective view illustrating an example of an exterior of a cooling device **200** in a first embodiment. FIG. **2** is a perspective view schematically illustrating an example of the structure of electronic equipment **100** to which the cooling device **200** is attached. For convenience of explanation, a three-dimensional coordinate system is also illustrated in the drawings. In the three-dimensional coordinate system, a width direction (a left-right direction) of the cooling device **200** and the electronic equipment **100** is represented as an X-axis direction, a depth direction (a front-rear direction) thereof is represented as a Y-axis direction, and a height direction (an up-down direction) thereof is represented as a Z-axis direction. Note that a Y-axis positive direction is a direction from the rear side to the front side of the electronic equipment **100**. The Y-axis positive direction is referred as “front”. A Z-axis positive direction is a down-to-up direction.
(11) First, as illustrated in FIG. **1**, the cooling device **200** includes a duct **1**, a heat sink **2**, and fans **3** and **4**. The duct **1** has a substantially box-like shape and covers the heat sink **2** and the fans **3** and **4** that blow air to the heat sink **2**. A suction port **11** is provided in a position on an upstream side in an air blowing direction of the fans **3** and **4** in the duct **1**. An exhaust port **12** is provided in a position on a downstream side in the air blowing direction. The duct **1** discharges, from the exhaust port **12**, air sucked from the suction port **11** by the fans **3** and **4**. A flowing direction of the air blown by the fans **3** and **4** is directed to a Y-axis negative direction (the rear) by the duct **1**.
(12) In the following explanation, the simple description of the upstream side intends to indicate an upstream side (a windward side) based on a flowing direction of the air in the duct **1** (the Y-axis negative direction). Similarly, the simple description of the downstream side intends to indicate a downstream side (a downwind side) based on the flowing direction of the air in the duct **1**.
(13) The heat sink **2** is generally formed of a metal material having high thermal conductivity such as aluminum or copper and is attached to an electronic component (a heat source) that generates heat. The heat source is, for example, a CPU (Central Processing Unit). Heat generated by the CPU conducts to the heat sink **2**. Heat of the heat sink **2** is dispersed to the air around the heat sink **2**. Consequently, malfunction and the like due to overheat of the CPU are prevented.
(14) The heat sink **2** includes a base section **21** and a plurality of fins **22**. The base section **21** receives conduction of heat emitted by the electronic component. The plurality of fins **22** are provided to be erected side by side in the thickness direction on the base section **21**. The plurality of fins **22** are adjacent to one another at predetermined intervals from one another. The base section **21** is in contact with the CPU and receives the conduction of the heat of the CPU. The fins **22** emit (radiate), to the air, the heat conducting from the base section **21** that is continuous to the fins **22**. The air flowing in the duct **1** passes among the fins **22** of the heat sink **2**, whereby the heat radiation is accelerated.
(15) The heat sink **2** is fixed, by helical springs **84** and screws **85**, on frames **81** and **82** formed in layers at a predetermined interval. A motherboard **101** (see FIG. **2**) is sandwiched between the

frame **81** and the frame **82**.
(16) The fan **3** is an example of the first air blowing unit in the present disclosure. The fan **4** is an example of the second air blowing unit in the present disclosure. The fan **3** includes a first discharge surface **32** for discharging the air sucked from the outside toward the heat sink **2**. The fan **4** includes a second discharge surface **42** for discharging the air sucked from the outside toward the heat sink **2**.
(17) The fan **3** and the fan **4** in this embodiment have the same size, pass the center position in the width direction of the heat sink **2** along an X axis and are disposed symmetrically with respect to a surface parallel to the fins **22** (a surface parallel to a YZ plane) at an included angle of 90 degrees or more.
(18) The fans **3** and **4** are axial fans and continuously blow the air by driving to rotate, for example, with conduction motors, propellers including one or more blades around rotating shafts. The air blown by the fans **3** and **4** forms a flow of the air among the fins **22**. The air blown by the fans **3** and **4** carries the heat emitted by the fins **22** and the base section **21** to the downstream side and accelerates the heat radiation. In this way, the fans **3** and **4** cool the heat sink **2**.
(19) In this embodiment, the suction port **11**, the fan **3** or the fan **4**, the heat sink **2**, the exhaust port **12** are disposed in this order from the upstream side toward the downstream side in the air flowing direction in the duct **1**. The air sucked from the suction port **11** and blown by the fans **3** and **4** mainly flows around the fins **22** of the heat sink **2** to take away heat of the fins **22** and is discharged from the exhaust port **12**.
(20) The duct **1** causes the air blow by the fan **3** to efficiently act on the heat radiation of the heat sink **2** and improves a heat radiation effect. Specifically, the duct **1** surrounds the heat sink **2** and delimits a range in which the air blown by the fan **3** for cooling the heat sink **2** flows. Gas in the duct **1** is replaced with gas sucked from the suction port **11** by rotation of the fan **3** and is pushed out from the discharge port **12**. Consequently, gas around the heat sink **2** is quickly replaced.
(21) In order to sufficiently exert the effects of the cooling device **200** explained above, a component (an obstacle) that hinders exhaust is desirably absent on the downwind side of the exhaust port **12**. However, an obstacle is sometimes disposed on the downstream side of the exhaust port **12** depending on the size of the electronic equipment **100** including the cooling device **200**, disposition of an object built in the cooling device **200**, and the like.
(22) As illustrated in FIG. **2**, the electronic equipment **100** includes a motherboard **101**, a CPU **102**, memories **103**, SSDs (Solid State Drives) **104**, a riser card **105**, an I/O board **106**, and a housing **110**. The housing **110** houses the units described above (the motherboard **101**, the CPU **102**, the memories **103**, the SSDs **104**, the riser card **105**, and the I/O board **106**).
(23) The motherboard **101** is an example of a substrate on which the electronic component (in this embodiment, the CPU **102**), the heat of which is radiated by the heat sink **2**, is mounted. Since the memories **103** and the SSDs **104** also generate heat according to operation, the memories **103** and the SSDs **104** can be heat sources. The heat generated by the heat sources is also emitted by the flow of the gas in the housing **110** formed by the air blow of the fans **3** and **4**.
(24) The I/O board **106** is connected to the motherboard **101** via an insertion port (a slot) included in the riser card **105**. Since the I/O board **106** is disposed in parallel to the mother board **101** by being connected to the insertion port included in the riser card **105**, it is possible to suppress a height dimension of the housing **110**.
(25) However, if the I/O board **106** is located further on the downstream side than the exhaust port **12** because of the disposition explained above, the I/O board **106** hinders the exhaust. This embodiment is configured such that the exhaust from the duct **1** avoids the I/O board **106**.
(26) FIG. **3** is a perspective view illustrating an example of vent holes **161** to **167** provided in the electronic equipment **100**. The perspective view is a view of the electronic equipment **100** viewed from the rear side.
(27) The duct **1** is housed on the inside of the housing **110** of the electronic equipment **100**. In the

housing **110**, the vent holes **161**, **162**, and **163** for taking in the air sucked into the inside of the duct **1** and the vent holes **164**, **165**, and **167** for discharging the air passed through the duct **1** are provided.
(28) The vent holes **161**, **162**, and **163** are provided in a front cover **111** configuring the front surface of the housing **110**. The vent holes **164** are provided in a rear cover **112** configuring the rear surface of the housing **110**. The vent holes **165** and **167** are provided in an I/O panel **113** configuring a part of the rear surface of the housing **110**. The I/O panel **113** includes connection terminals for connecting various kinds of peripheral equipment to the electronic equipment **100**.
(29) In the electronic equipment **100** in this embodiment, the I/O board **106** is disposed behind the CPU **102**. Therefore, the exhaust port **12** of the duct **1** is divided into, such that the exhaust avoids the I/O board **106**, an upper exhaust port **121** opened upward and a lower exhaust port **122** opened downward (see FIG. **1**). Specifically, the exhaust port **12** is divided into the upper exhaust port **121** and the lower exhaust port **122** by a branch wall **13**.
(30) FIG. **4** is a perspective view illustrating an example of a shape of the duct **1**. The duct **1** has a shape formed by opening a side on which the fan **3** and the fan **4** are attached and the side of the exhaust port **12**.
(31) The duct **1** includes a top plate **10** and sidewalls **15** to **18**. The top plate **10** configures a Z-axis direction upper part of the duct **1** and is opposed to the distal end portions of the fins **22**. The sidewalls **17** and **18** are opposed to both side portions of the heat sink **2**. The sidewalls **15** and **16** connect the sidewalls **17** and **18** and side portions of the fans **3** and **4** and surround a space between the fans **3** and **4** and the heat sink **2**.
(32) With the duct **1** explained above, the air blown by the fans **3** and **4** reaches the heat sink **2** without leaking from the duct **1**. The sidewalls **15** and **16** are examples of a first wall section in the present disclosure.
(33) The branch wall **13** is provided on the downstream side (the Y-axis negative side) of the duct **1**. The branch wall **13** includes an upper wall section **131** and a lower wall section **132**. The upper wall section **131** and the lower wall section **132** are connected on a side extending along the X axis on the upstream side in the air blowing direction. The upper wall section **131** and the lower wall section **132** are inclined with respect to the air blowing direction such that the distance between the upper wall section **131** and the lower wall section **132** is larger further on the downstream side in the air blowing direction.
(34) The air passed among the fins **22** of the heat sink **2** reaches the branch wall **13**. The upper wall section **131** guides, obliquely upward, a part of the air passed among the fins **22** of the heat sink **2** and discharges the part of the air from the upper exhaust port **121**. The lower wall section **132** guides, obliquely downward, the remaining air passed among the fins **22** of the heat sink **2** and discharges the remaining air from the lower exhaust port **122**. In this way, the branch wall **13** guides the exhaust air to avoid a part of a range on the downstream side of the branch wall **13** and causes the exhaust air to branch. Therefore, even if peripheral equipment such as the I/O board **106** (see FIG. **3**) is disposed in a position on the downstream side of the branch wall **13**, cooling performance of the heat sink **2** is not hindered.
(35) FIGS. **5**, **6**, and **7** are schematic plan views of the cooling device **200** for explaining a relation between the directions of the discharge surfaces **32** and **42** of the fans **3** and **4** and the shape of the edges of the fins **22**. FIGS. **5** to **7** illustrate examples different from one another.
(36) First, the fans **3** and **4** common to the examples are explained. The fan **3** includes a plurality of blades that rotate around the rotating shaft. The fan **3** discharges, from the first discharge surface **32**, the air sucked from the suction port **11**. The first discharge surface **32** is a circular region. Similarly, the fan **4** includes a plurality of blades that rotate around the rotating shaft. The fan **4** discharges, from the second discharge surface **42**, the air sucked from the suction port **11**. The second discharge surface **42** is a circular region.
(37) The fan **3** and the fan **4** have the same size. The size of the fan **3** and the fan **4** is set such that

the sum of the diameter of the first discharge surface **32** and the diameter of the second discharge surface **42** is larger than the width of the heat sink **2**.
(38) The first discharge surface **32** from which the fan **3** discharges the air and the second discharge surface **42** from which the fan **4** discharges the air are symmetrically disposed across a fin **221** in the center in the width direction of the heat sink **2** (the X-axis direction) on the upstream side of the heat sink **2**.
(39) Further, a housing of the fan **3** and a housing of the fan **4** are adjacent to each other without a gap. Therefore, the housing of the fan **3**, the housing of the fan **4**, the sidewalls **15** and **16**, and the top plate **10** (see FIG. **4**) surround a space on the upstream side of the heat sink **2**. Therefore, the air blown by the fan **3** and the fan **4** reaches the heat sink **2** without leaking to the outside of the duct **1**.
(40) The sidewalls **15** and **16** of the duct **1** are provided to gradually reduce the interval between the sidewalls **15** and **16** in a part from the suction port **11** to the heat sink **2**. Therefore, the air blown by the fan **3** is directed to the center in the width direction along the sidewall **15** and the air blown by the fan **4** is directed to the center in the width direction along the sidewall **16**.
(41) Subsequently, the example illustrated in FIG. **5** is explained. In the heat sink **2** in this example, edges on a side opposed to the first discharge surface **32** or the second discharge surface **42** (edges of the fins **22** on the upstream side in the air blowing direction) of the fins **22** are located along a ridge-shaped imaginary line projecting in the center in an arranging direction of the fins **22** (the X-axis direction). In other words, the edges on the side opposed to the first discharge surface **32** or the second discharge surface **42** of the fins **22** are located to draw a ridge shape projecting most in the fin **221** in the center.
(42) An edge of the fin **221** in the center is located on the downstream side of a boundary between the first discharge surface **32** and the second discharge surface **42** (a position where the housing of the fan **3** and the housing of the fan **4** are in contact). The edge of the fin **221** in the center is located closest to the fans **3** and **4** and intervals between the edges of the other fins **22** and the fans **3** and **4** are wider than an interval between the fin **221** in the center and the fans **3** and **4**. The edges of the fins **22** in other than the center farther away from the center are located farther from the first discharge surface **32** or the second discharge surface **42**.
(43) In this example, the fans **3** and **4** are disposed such that an angle formed by the first discharge surface **32** and the fin **221** in the center and an angle formed by the second discharge surface **42** and the fin **221** in the center are equal and an included angle between the first discharge surface **32** and the second discharge surface **42** is 90° or more. That is, the fans **3** and **4** are disposed such that an angle formed by the fin **221** in the center and the first discharge surface **32** or the second discharge surface **42** is 45° or more.
(44) If the angles are set smaller, that is, if the included angle between the fan **3** and the fan **4** is set smaller than 90°, since an angle formed by a traveling direction of the air discharged by the fans **3** and **4** and the fins **22** increases and resistance in the air changing the air flowing direction along the fins **22** increases, the flow of the air tends to be disturbed. Accordingly, the included angle between the fan **3** and the fan **4** is desirably 90° or more.
(45) The fin **221** in the center functions as a wall extending in the height direction (the Z-axis direction) between the position between the fan **3** and the fan **4** and the center position in the width direction of the heat sink **2** (the X-axis direction). The air blown by the fan **3** and the air blown by the fan **4** are separated by the fin **221** in the center. An inconvenience of flows of the air blown by the fan **3** and the air blown by the fan **4** interfering with each other is avoided. With such structure, the air blown by the fan **3** and the air blown by the fan **4** are guided to the heat sink **2** without being mixed.
(46) The edges opposed to the first discharge surface **32** or the second discharge surface **42** of the fins **22** in this example respectively include end faces substantially parallel to the thickness direction (the X-axis direction). The air blowing direction of the fans **3** and **4** in this example is not parallel to a Y axis but is inclined with respect to the Y axis. Therefore, the end faces of the edges

of the fins **22** explained above are inclined with respect to an air discharging direction from the first discharge surface **32** or the second discharge surface **42** and are not orthogonal to the air discharging direction. Accordingly, the air blown by the fan **3** and the air blown by the fan **4** do not collide with the end faces of the fins **22** to be blocked.
(47) If the edges of the fins **22** did not project in the ridge shape, since the air blown by the fan **3** and the air blown by the fan **4** collide with each other in the center in the width direction, the flow would be disturbed. In this case, flow velocity is likely to inconveniently decrease.
(48) However, in this example, since the edges of the fins **22** are projected in the ridge shape, the air blown by the fan **3** and the air blown by the fan **4** are prevented from being mixed and, at the same time, the edges of the fins **22** do not have orthogonal surfaces opposed to the first discharge surface **32** or the second discharge surface **42**. Therefore, it is possible to improve stability of the flow of the air in the duct **1**.
(49) Subsequently, the example illustrated in FIG. **6** is explained. In the explanation of this example, explanation of portions common to the example illustrated in FIG. **5** is omitted and different portions are explained.
(50) In this example, the included angle between the first discharge surface **32** and the second discharge surface **42** is 180°. That is, the angle formed by the fin **221** in the center and the first discharge surface **32** or the second discharge surface **42** is 90°.
(51) In a heat sink **201** in this example, the edges opposed to the first discharge surface **32** or the second discharge surface **42** of the fins **22** respectively include the end faces inclined with respect to the thickness direction (the X-axis direction). The air blowing direction of the fans **3** and **4** in this example is parallel to the Y-axis direction. Therefore, the end faces of the edges of the fins **22** explained above are inclined with respect to the air discharging direction from the first discharge surface **32** or the second discharge surface **42** and is not orthogonal to the air discharging direction. Accordingly, the air blown by the fan **3** and the air blown by the fan **4** do not collide with the end faces of the fins **22** to be blocked.
(52) The example explained above does not deny that the fan **3** and the fan **4** are installed in a state in which the included angle exceeds 180°. That is, the included angle between the fan **3** and the fan **4** may be set larger than 180° (up to, for example, approximately 200°).
(53) Subsequently, the example illustrated in FIG. **7** is explained. In the explanation of this example, explanation of portions common to the example illustrated in FIG. **6** is omitted and different portions are explained.
(54) In a heat sink **202** in this example, the edges on the side opposed to the first discharge surface **32** and the second discharge surface **42** of the fins **22** are located along a W-shaped imaginary line projecting in the center and both the ends in the arranging direction of the fins **22** (the X-axis direction). In other words, the edges on the side opposed to the first discharge surface **32** and the second discharge surface **42** of the fins **22** are located to draw a W shape formed by projecting the fins **22** in the center and at both the ends.
(55) With the heat sink **202** in this example, the sum of the surface areas of the fins **22** can be set larger than that of the heat sink **201** in the example illustrated in FIG. **6**. Therefore, it is possible to obtain the heat sink **202** having higher heat radiation power.
(56) In the examples explained above, the fans **3** and **4** are disposed symmetrically with respect to the heat sink **2**. However, in implementation, the disposition of the fans **3** and **4** is not limited to this. The fans **3** and **4** may not be symmetrically disposed with respect to the heat sink **2**.
(57) Since the fans **3** and **4** suck, from the suction port **11**, the air to be blown against the heat sink **2**, an air current occurs in a position facing the suction port **11**. Heat generated by components located near the suction port **11** is carried and taken away by the air current. That is, a flow of the air formed by the fans **3** and **4** is considered to facilitate heat radiation of not only the heat source that is in contact with the base section **21** of the heat sink **2** but also the components near the suction port **11**.

(58) Accordingly, the fans **3** and **4** may be disposed with intention to facilitate heat radiation of components around the fans **3** and **4**.
(59) As explained above, the cooling device **200** in the embodiment includes the fan (the first air blowing unit) **3**, the fan (the second air blowing unit) **4**, the heat sink **2**, and the duct **1**. The fan **3** forms a flow of air by rotating to blow the air and includes the first discharge surface **32** for discharging the air. The fan **4** forms a flow of the air by rotating to blow the air, includes the second discharge surface **42** for discharging the air, and is installed adjacent to the fan **3**. The duct **1** covers the heat sink **2**, the fan **3**, and the fan **4** and includes the suction port **11** on the upstream side in the air blowing direction by the fans **3** and **4** and the exhaust port **12** on the downstream side in the air blowing direction. The heat sink **2** has width smaller than the sum of the diameter of the first discharge surface **32** and the diameter of the second discharge surface **42**, the plurality of fins **22** being erected side by side in the thickness direction in the base section **21** of the heat sink **2** to which the heat of the electronic component such as the CPU **102** conducts. Edges on the upstream side in the air blowing direction of the fins **22** are opposed to the first discharge surface **32** or the second discharge surface **42**. The edge of the fin **221** in the center located on the downstream side of the boundary between the first discharge surface **32** and the second discharge surface **42** is located closer to the first discharge surface **32** and the second discharge surface **42** than the edges of the other fins **22**.
(60) With the structure explained above, the cooling device **200** can perform the air blow to the heat sink **2** with the plurality of fans **3** and **4** and can direct, with the fin **221** in the center further projecting than the other fins **22**, the flows of the air blown from the fan **3** and the air blown from the fan **4** toward the heat sink **2** without causing the flows to interfere with each other. Consequently, in cooling the heat sink **2** with the two fans **3** and **4** in which the sum of the diameters of the discharge surfaces **32** and **42** is larger than the width of the heat sink **2**, it is possible to suppress a loss of energy and efficiently cool the heat sink **2**. Accordingly, even if a large-diameter fan cannot be used because of, for example, the height of the housing **110** of the electronic equipment **100**, by adopting a plurality of fans **3** and **4** that supply an air volume equivalent to that of the large-diameter fan in cooperation with one another, it is possible to realize a reduction in the size of (reduce the height direction dimension of) the cooling fans without reducing a discharge volume of cooling wind.
(61) The fans **3** and **4** in the embodiment explained above have the same size. However, in implementation, the sizes of the plurality of fans **3** and **4** do not always need to be the same. Outputs (wind velocities and air volumes to be obtained) of the fans **3** and **4** may be different.
(62) While several embodiments are explained above, these embodiments are presented as examples and are not intended to limit the scope of invention. These new embodiments can be implemented in other various forms. Various omissions, substitutions, and changes can be made in a range not departing from the gist of the invention. These embodiments and modifications thereof are included in the scope and the gist of the invention and included in the inventions described in the claims and a scope of equivalents of the inventions.

Claims

1. A cooling device of electronic equipment, comprising: a first air blowing component configured to produce a flow of air by rotating to blow the air, the first air blowing component including a first discharge surface for discharging the air; a second air blowing component configured to produce a flow of the air by rotating to blow the air, the second air blowing component including a second discharge surface for discharging the air, and installed adjacent to the first air blowing component; a heat sink configured to include a base section to which heat of an electronic component conducts and a plurality of fins standing side by side in a thickness direction in a base section of the heat sink, the heat sink having a width smaller than a sum of a first diameter of the first discharge

surface and a second diameter of the second discharge surface, edges of the fins on an upstream side in an air blowing direction by the first blower and the second blower being opposed to the first discharge surface or the second discharge surface, and the edges of the fins located on a downstream side in the air blowing direction of a boundary between the first discharge surface and the second discharge surface located closer to the first discharge surface and the second discharge surface than the other edges of the fins; and a duct covering the heat sink, the first air blowing component, and the second air blowing component and including a suction port on the upstream side and an exhaust port on the downstream side in the air blowing direction by the first air blowing component and the second air blowing component.

2. The cooling device according to claim 1, wherein the edges opposed to the first discharge surface or the second discharge surface of the fins are located along a ridge-shaped imaginary line projecting in a center in an arranging direction of the plurality of fins.

3. The cooling device according to claim 1, wherein the edges opposed to the first discharge surface or the second discharge surface of the fins have end faces inclined with respect to a discharging direction of the air from the first discharge surface or the second discharge surface.

4. The cooling device according to claim 1, wherein an included angle between the first discharge surface and the second discharge surface is 90° or more and 200° or less.

5. The cooling device according to claim 1, wherein the heat sink is fixed by helical springs and screws on frames formed in layers at a predetermined interval.

6. The cooling device according to claim 1, wherein the first air blowing component is a first fan and the second air blowing component is a second fan.

7. The cooling device according to claim 1, wherein the heat sink comprises at least one of aluminum and copper.

8. The cooling device according to claim 1, wherein the plurality of fins are positioned with respect to one another in a predetermined interval.

9. The cooling device according to claim 1, wherein the first diameter and the second diameter are substantially equal.

10. The cooling device according to claim 1, wherein the first diameter and the second diameter are different.

11. An electronic apparatus, comprising: an electronic component; and a cooling device comprising: a first air blowing component configured to produce a flow of air by rotating to blow the air, the first air blowing component including a first discharge surface for discharging the air; a second air blowing component configured to produce a flow of the air by rotating to blow the air, the second air blowing component including a second discharge surface for discharging the air, and installed adjacent to the first air blowing component; a heat sink configured to include a base section to which heat of an electronic component conducts and a plurality of fins standing side by side in a thickness direction in a base section of the heat sink, the heat sink having a width smaller than a sum of a first diameter of the first discharge surface and a second diameter of the second discharge surface, edges of the fins on an upstream side in an air blowing direction by the first blower and the second blower being opposed to the first discharge surface or the second discharge surface, and the edges of the fins located on a downstream side in the air blowing direction of a boundary between the first discharge surface and the second discharge surface located closer to the first discharge surface and the second discharge surface than the other edges of the fins; and a duct covering the heat sink, the first air blowing component, and the second air blowing component and including a suction port on the upstream side and an exhaust port on the downstream side in the air blowing direction by the first air blowing component and the second air blowing component.

12. The electronic apparatus according to claim 11, wherein the edges opposed to the first discharge surface or the second discharge surface of the fins are located along a ridge-shaped imaginary line projecting in a center in an arranging direction of the plurality of fins.

13. The electronic apparatus according to claim 11, wherein the edges opposed to the first

discharge surface or the second discharge surface of the fins have end faces inclined with respect to a discharging direction of the air from the first discharge surface or the second discharge surface.

14. The electronic apparatus according to claim 11, wherein an included angle between the first discharge surface and the second discharge surface is 90° or more and 200° or less.

15. The electronic apparatus according to claim 11, wherein the heat sink is fixed by helical springs and screws on frames formed in layers at a predetermined interval.

16. The electronic apparatus according to claim 11, wherein the first air blowing component is a first fan and the second air blowing component is a second fan.

17. The electronic apparatus according to claim 11, wherein the heat sink comprises at least one of aluminum and copper.

18. The electronic apparatus according to claim 11, wherein the plurality of fins are positioned with respect to one another in a predetermined interval.

19. The electronic apparatus according to claim 11, wherein the first diameter and the send diameter are substantially equal.

20. The electronic apparatus according to claim 11, wherein the electronic apparatus is a personal computer and the electronic component is a CPU.
