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(54) **HEATSINK DEVICE**

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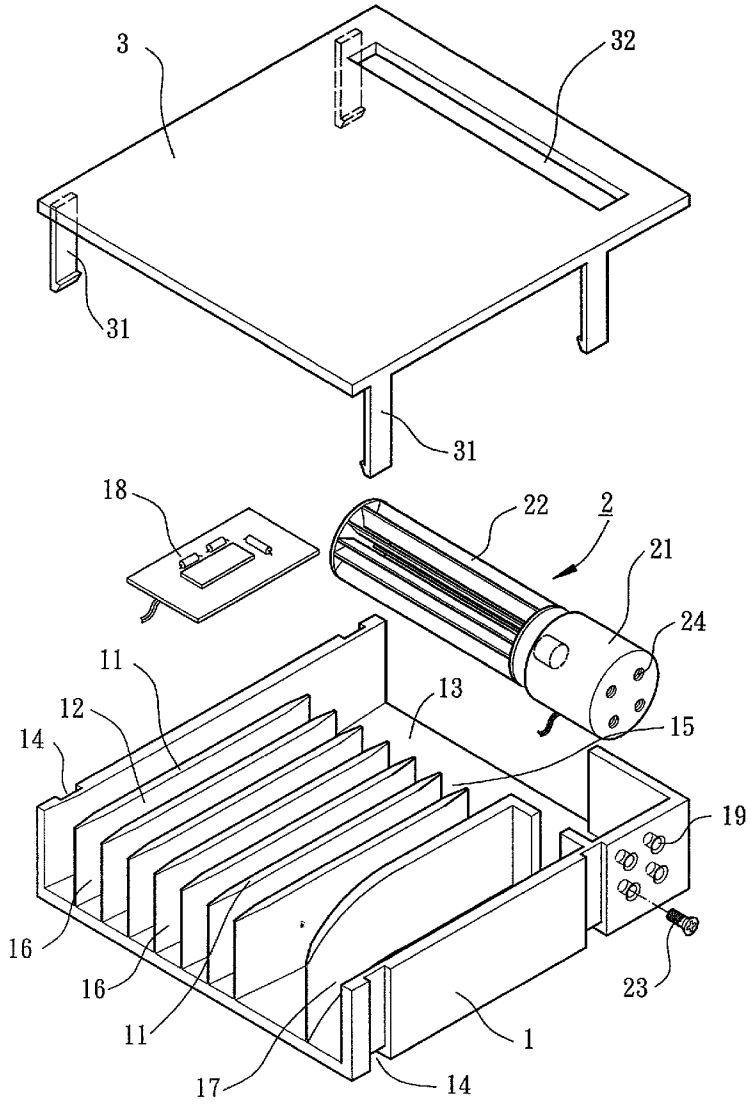
(57) **ABSTRACT**

A heatsink device includes a base board provided with multiple fins and multiple channels formed between any two adjacent fins. Each of the channels has a first end formed with an air inlet and a second end formed with an air outlet. The base board is provided with a mounting portion. An impeller is combined on the mounting portion of the base board, and a cover plate is combined on a top of the base board. The impeller includes a power member to drive a blast type vane to rotate. The vane is aligned with the channels formed between the multiple fins, to drive an air flow from the air inlet at one side of the base board to the air outlet at the other side of the base board.



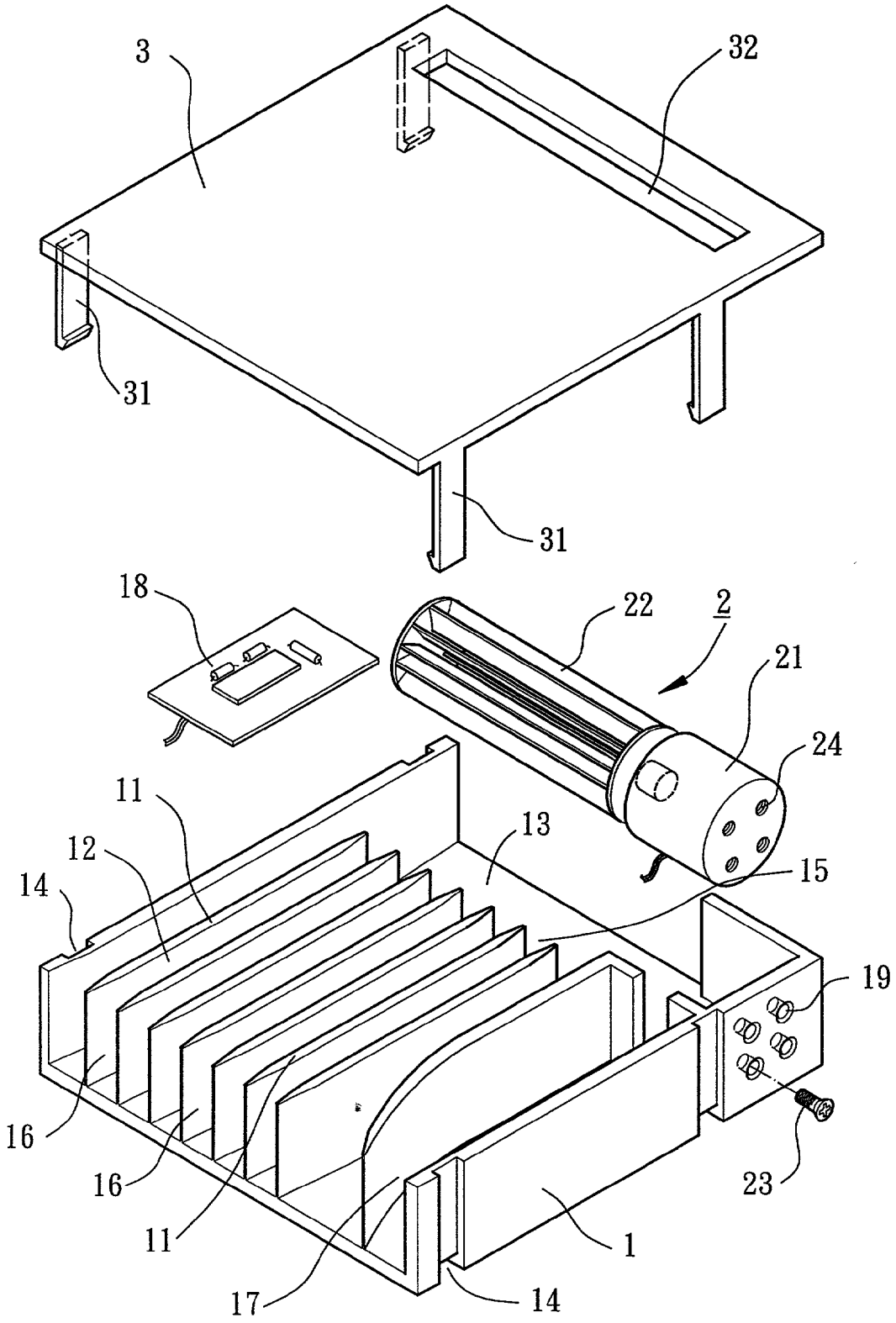


FIG. 1

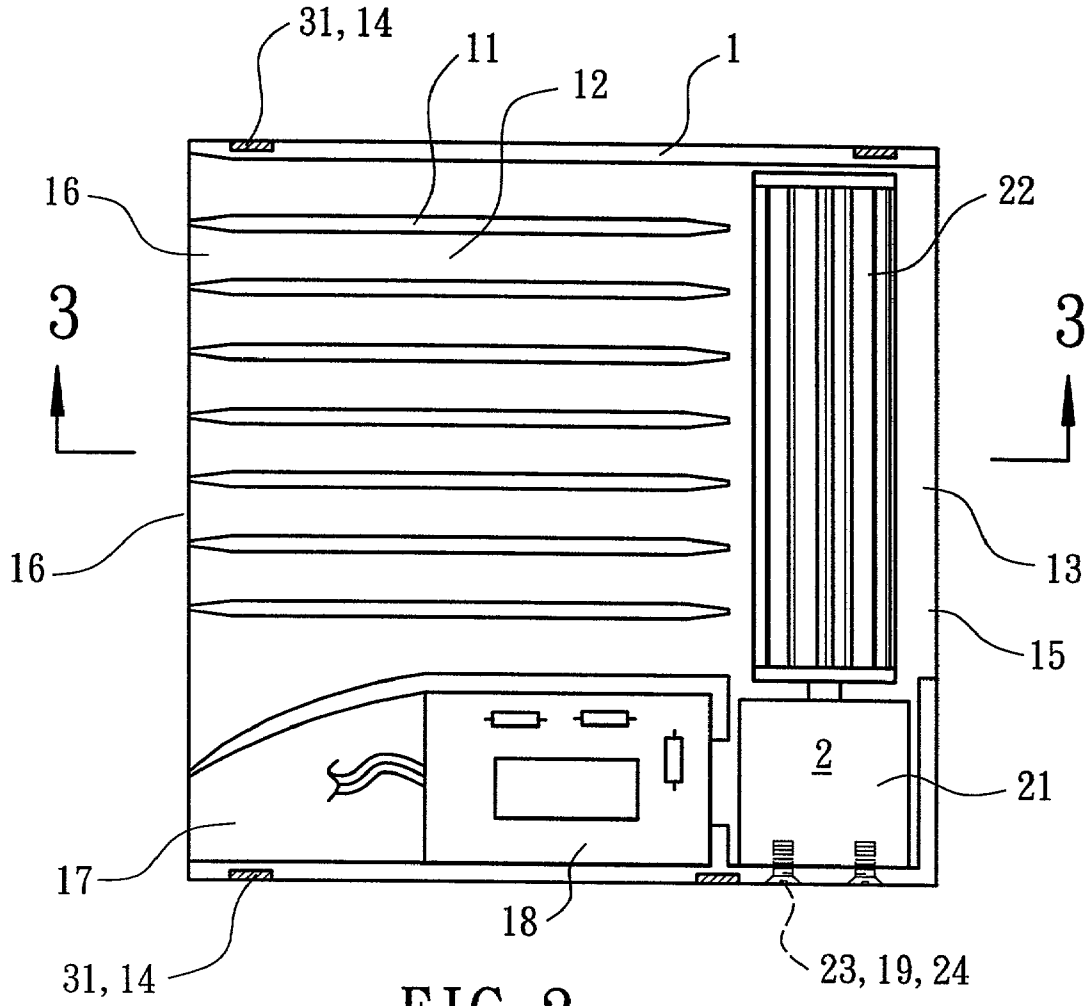

31, 14
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FIG. 2

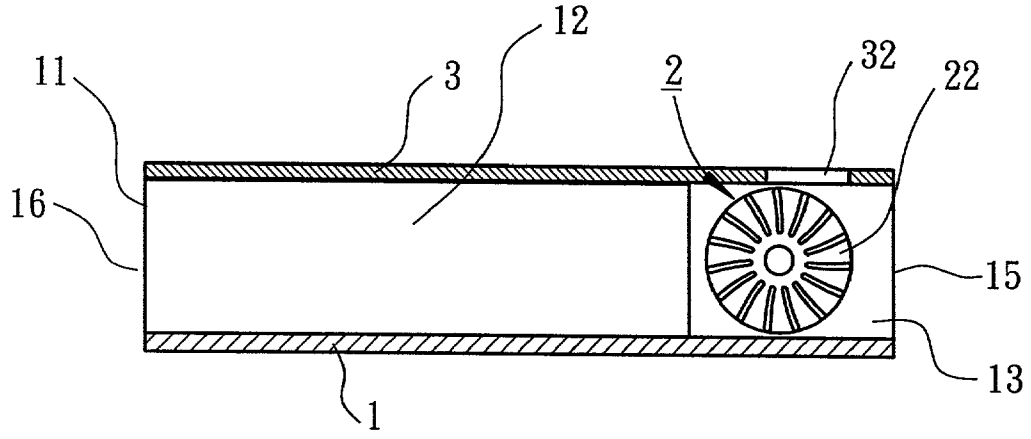
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FIG. 3

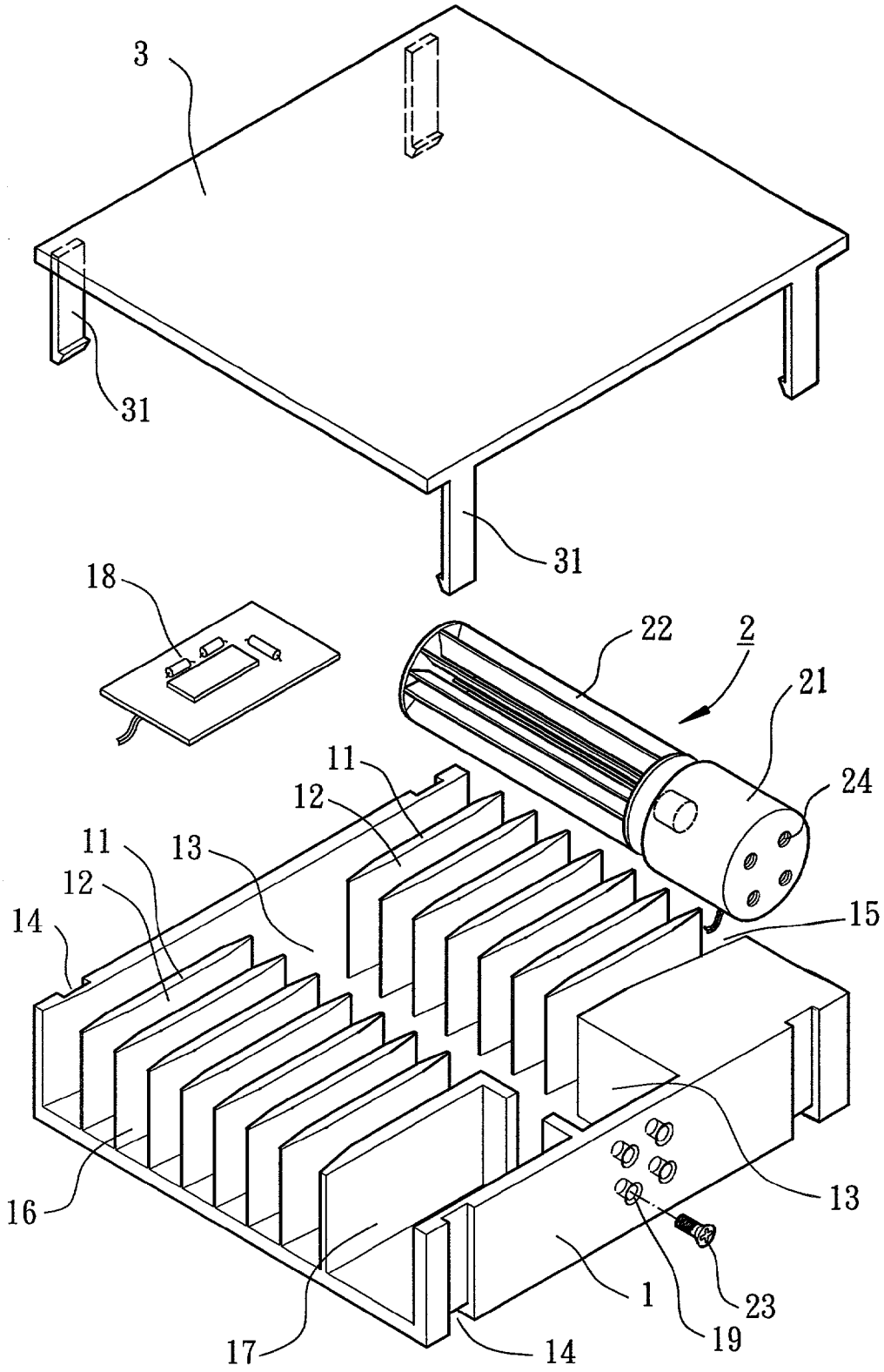

FIG. 4

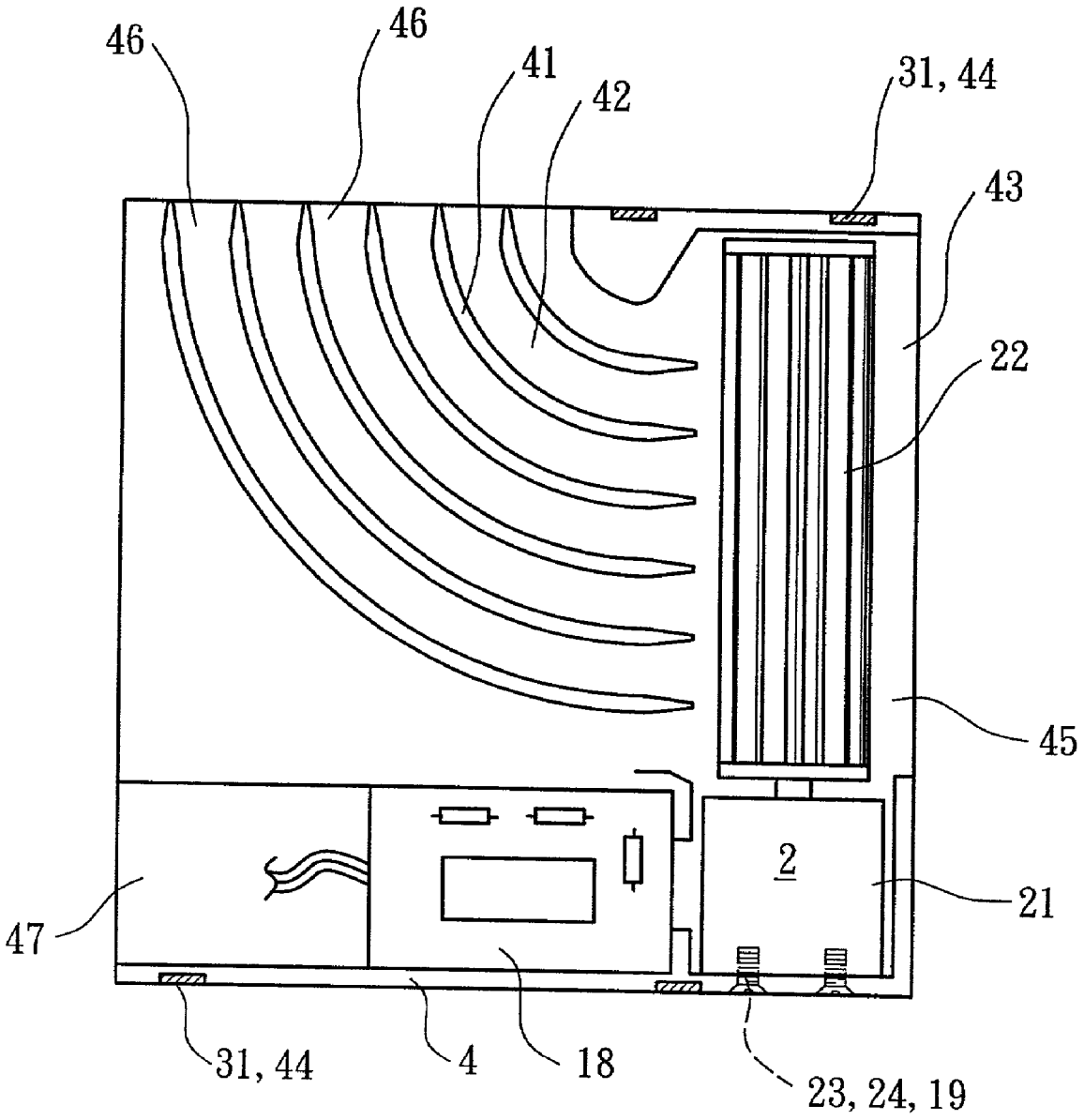

FIG. 5

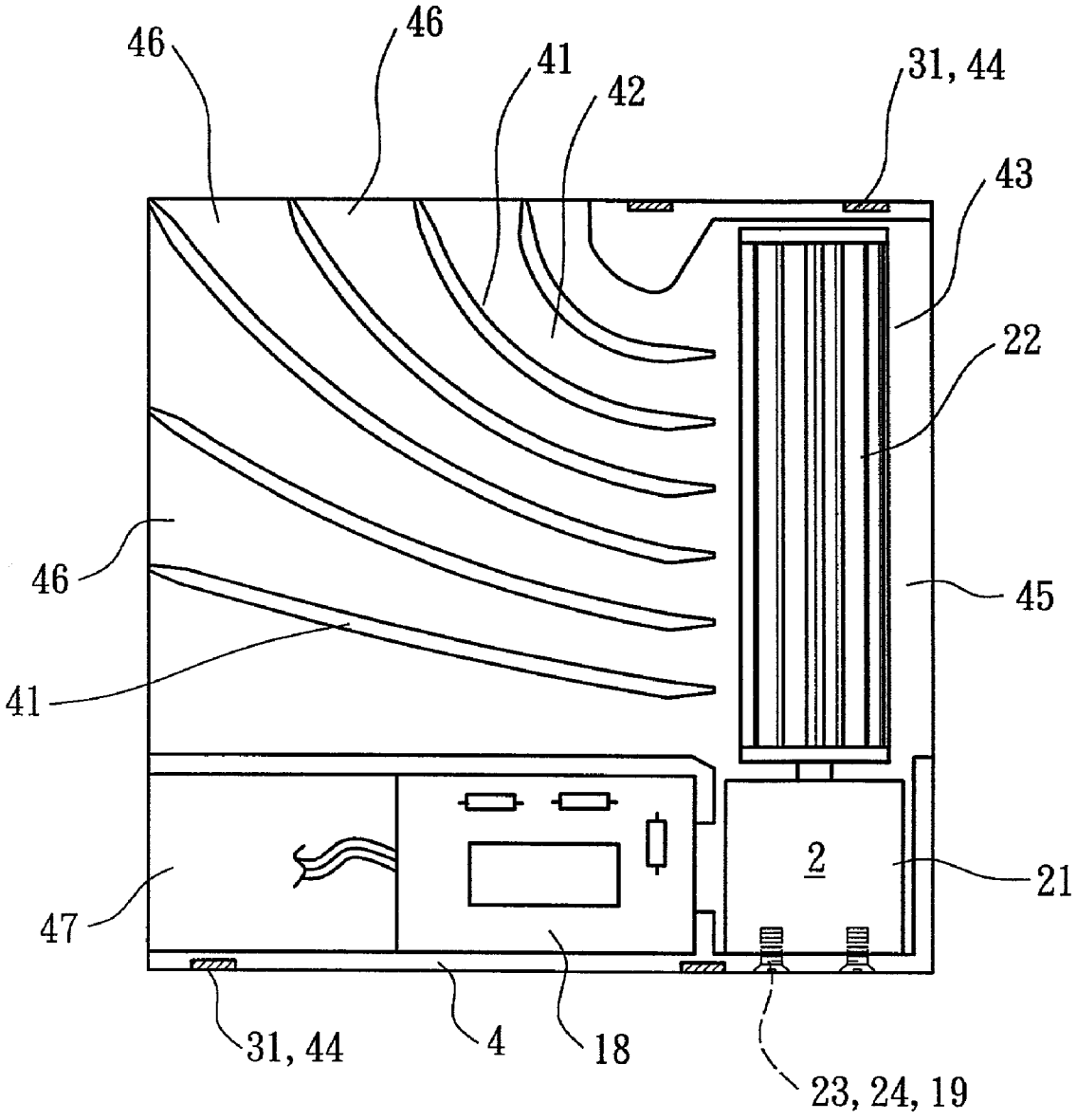

FIG. 6

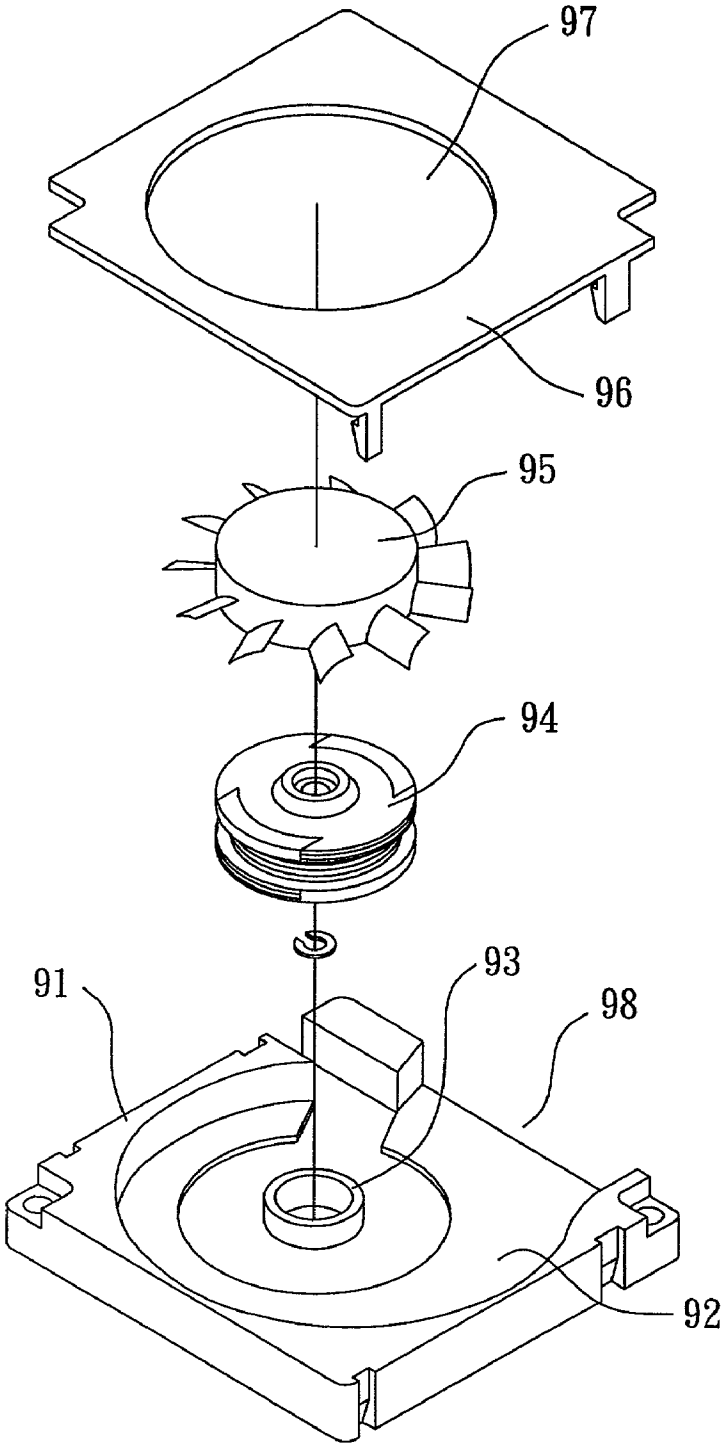

FIG. 7
PRIOR ART

HEATSINK DEVICE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a heatsink device, and more particularly to a heatsink device that may drive a larger amount of air flow, and the heatsink air flow may be sucked from one side of the base board and may be carried outward from the other side of the base board.

[0003] 2. Description of the Related Art

[0004] A conventional super thin type fan structure in accordance with the prior art shown in **FIG. 7** comprises a base **91** provided with a helical receiving space **92** which is provided with a shaft seat **93** on which a coil seat **94** is mounted. An impeller **95** has a rotation shaft rotatably mounted on the coil seat **94**. A cover plate **96** is mounted on the base **91**, and has an air inlet **97**. The base **91** is provided with an air outlet **98**. The impeller **95** may be rotated to suck the air flow through the air inlet **97**, and the air flow may be blown from the air outlet **98** toward a place needing a heat dissipation. Thus, the impeller **95** may be rotated to suck the air flow through the air inlet **97** of the cover plate **96**, and the air flow may be blown outward from the air outlet **98** at one side of the base **91**. However, the air flow has to turn through 90 degrees from the air inlet **97** to the air outlet **98**, so that the air flow turning through 90 degrees will produce a turbulence. In addition, if the air inlet side above the air inlet **97** does not have an enough space, the air flow rate will be reduced, thereby decreasing the heatsink effect.

SUMMARY OF THE INVENTION

[0005] The primary objective of the present invention is to provide a heatsink device that may drive a larger amount of air flow, wherein the heatsink air flow may be sucked from one side of the base board and may be carried outward from the other side of the base board, and the heatsink air flow may be conveyed toward larger angles and ranges, so that the heat emitting source combined on the base board **1** may have the optimum heatsink effect.

[0006] A secondary objective of the present invention is to provide a heatsink device that may drive a larger amount of air flow, without being limited by the top space of the heatsink device, and the driven air flow needs not to turn, so that the heatsink device of the present invention may have a better heatsink effect.

[0007] In accordance with the present invention, there is provided a heatsink device, comprising a base board provided with multiple fins and multiple channels formed between any two adjacent fins. Each of the channels has a first end formed with an air inlet and a second end formed with an air outlet. The base board is provided with a mounting portion. An impeller is combined on the mounting portion of the base board, and a cover plate is combined on a top of the base board. The impeller includes a power member to drive a blast type vane to rotate. The vane is aligned with the channels formed between the multiple fins, to drive an air flow from the air inlet at one side of the base board to the air outlet at the other side of the base board.

[0008] Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] **FIG. 1** is an exploded perspective view of a heatsiink device in accordance with a first embodiment of the present invention;

[0010] **FIG. 2** is a top plan assembly view of the heatsink device as shown in **FIG. 1**, with the cover plate being removed;

[0011] **FIG. 3** is a plan cross-sectional view of the heatsink device taken along line **3-3** as shown in **FIG. 2**;

[0012] **FIG. 4** is an exploded perspective view of a heatsink device in accordance with a second embodiment of the present invention;

[0013] **FIG. 5** is a top plan assembly view of the heatsink device in accordance with a third embodiment of the present invention, with the cover plate being removed;

[0014] **FIG. 6** is a top plan assembly view of the heatsink device in accordance with a fourth embodiment of the present invention, with the cover plate being removed; and

[0015] **FIG. 7** is an exploded perspective cross-sectional assembly view of a conventional super thin type fan structure in accordance with the prior art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] Referring to the drawings and initially to **FIG. 1, a** heatsink device in accordance with a first embodiment of the present invention comprises a base board **1**, an impeller **2**, and a cover plate **3**.

[0017] The base board **1** is made of a metallic material having a better heat conduction feature. The base board **1** has a bottom plate provided with multiple fins **11**, and multiple channels **12** formed between any two adjacent fins **11**. Each of the channels **12** has a first end formed with an air inlet **15** and a second end formed with an air outlet **16**. The base board **1** is provided with a mounting portion **13** for mounting and fixing the impeller **2**. The mounting portion **13** may be located at the air inlet **15** of the base board **1**. In addition, the base board **1** is provided with multiple positioning portions **14**, so that the cover plate **3** may be combined on the base board **1** easily. The positioning portion **14** may be a positioning hole or a groove as shown in the figure, so that the positioning member **31** of the cover plate **3** may be snapped on the positioning portion **14** of the base board **1**. Further, the base board **1** may be provided with a receiving chamber **17** which aligns with the position of the power member **21** of the impeller **2**, without disturbing the air flow. In addition, the receiving chamber **17** may be used to receive a circuit board **18** that is used to control operation of the power member **21** of the impeller **2**.

[0018] The impeller **2** includes a power member **21**, such as a motor, to drive a vane **22** to rotate. The vane **22** is a blast type vane that has elongated blades. The impeller **2** may be combined on the mounting portion **13** of the base board **1** in a conventional fixing manner as shown in the figure. The base board **1** is provided with multiple positioning holes **19** for passage of positioning members **23**, such as bolts, which may be screwed into screw bores **24** formed in the power member **21** of the impeller **2**, thereby fixing the impeller **2**. The length of the vane **22** of the impeller **2** is substantially

equal to the total width of the multiple fins **11** provided at the air inlet **15** of the base board **1**. Thus, when the vane **22** is driven to rotate, a large quantity of air flow may be sucked into the air inlet **15** of the base board **1**. The air flow may be driven to pass through each of the channels **12** of the base board **1**, and may be carried outward from the air outlet **16** of the base board **1**, so as to provide a heatsink effect to the base board **1** or the heat emitting member located at the air outlet **16** of the base board **1**.

[**0019**] The cover plate **3** is combined on the top of the channels **12** of the base board **1** by the multiple positioning members **31**, thereby ensuring that the air flow may enter the base board I from the air inlet **15** of the base board **1**, and may be carried outward from the air outlet **16** of the base board **1**. The cover plate **3** may be combined with the base board **1** by a conventional combination method, such as by screwing of bolts, or as shown in the figure, the cover plate **3** is provided with multiple positioning members **31** each provided with a barb, so that the barb of each of the multiple positioning members **31** may be snapped on each of the multiple positioning portions **14** of the base board **1**. In addition, for increasing the air inlet rate when the cover plate **3** is combined with the base board **1**, the cover plate **3** may be provided with an air inlet **32** aligning with the vane **22** of the impeller **2**, thereby increasing the driving rate of the air flow when the vane **22** of the impeller **2** is rotated.

[**0020**] Referring to **FIGS. 2 and 3**, the heatsink device in accordance with a first embodiment of the present invention is assembled. The impeller **2** is combined on the mounting portion **13** of the base board **1**, and the cover plate **3** is combined on the top of the channels **12** of the base board **1**. In addition, the vane **22** of the impeller **2** is aligned with the air inlet **15** of the base board **1** and aligned with the air inlet **32** of the cover plate **3**. Thus, when the power member **21** of the impeller **2** drives the vane **22** to rotate, the vane **22** may drive a larger amount of air flow that may flow in the channels **12** between the fins **11**, and may be carried outward from the air outlet **16** of the base board **1**. In addition, the length of the vane **22** of the impeller **2** is substantially equal to the total width of the multiple fins **11** provided at the air inlet **15** of the base board **1**. Thus, the heatsink device in accordance with the present invention may obtain the maximum amount of driven air flow, and may have the optimum heatsink effect.

[**0021**] Referring to **FIG. 4, a** heatsink device in accordance with a second embodiment of the present invention is shown. The mounting portion **13** may be provided at the mediate position of each of the channels **12** located between the air inlet **15** and the air outlet **16**. Thus, when the vane **22** of the impeller **2** is rotated, the air flow may be introduced into the base board **1** from the air inlet **15** of the base board **1**, and may be carried outward from the air outlet **16** of the base board **1**. Thus, the heatsink device in accordance with the present invention may obtain the maximum amount of driven air flow, and the heat emitting source located under the base board **1** may have the optimum heatsink effect.

[**0022**] Referring to **FIG. 5, a** heatsink device in accordance with a third embodiment of the present invention comprises a base board **4**, an impeller **2**, and a cover plate **3**.

[**0023**] In third embodiment of the present invention, the base board **4** is also provided with multiple fins **41**, and multiple channels **42** formed between any two adjacent fins **41**. Each of the fins **41** has an arcuate shape. The impeller **2** is provided at one end of each of the channels **42**, and is provided at the side of the air inlet **45**. The other end of each of the channels **42** is the air outlet **46** which may be located at one side of the base board **1**. The base board **4** is also provided with a mounting portion **43** for mounting the impeller **2**. The mounting portion **43** may be located between the air inlet **45** and the air outlet **46**, or located at the air inlet **45**. In addition, the base board **4** is also provided with multiple positioning portions **44**, so that the cover plate **3** may be combined on the base board **4** easily. Further, the base board **4** may also be provided with a receiving chamber **47** to receive the circuit board **18**.

[**0024**] Referring to **FIG. 6, a** heatsink device in accordance with a fourth embodiment of the present invention is shown. In third embodiment of the present invention, the base board **4** is also provided with multiple fins **41** respectively formed with different arcuate shapes, or formed with locally arcuate shapes and locally oblique plates. The base board **4** is also provided with multiple channels **42** formed between any two adjacent fins **41**. One end of each of the channels **42** is provided with a mounting portion **43** for mounting the impeller **2** which is provided at the side of the air inlet **45**. The other end of each of the channels **42** is the air outlet **46** which may be located at two sides of the base board **1**. The base board **4** is also provided with a mounting portion **43** for mounting the impeller **2**. The mounting portion **43** may be located between the air inlet **45** and the air outlet **46**, or located at the air inlet **45**. In addition, the base board **4** is also provided with multiple positioning portions **44**, so that the cover plate **3** may be combined on the base board **4** easily. Further, the base board **4** may also be provided with a receiving chamber **47** to receive the circuit board **18**. Thus, the larger amount of air flow driven by the heatsink device in accordance with the present invention may be conveyed toward larger angles and ranges, so that the heat emitting source combined on the base board **1** may have the optimum heatsink effect.

[**0025**] Accordingly, in the heatsink device in accordance with the present invention, the vane of the blast type impeller is aligned with the multiple channels of the base board, and the length of the vane of the impeller is substantially equal to the total width of the multiple fins provided at the air inlet of the base board. Thus, when the vane is driven to rotate, the vane may drive a larger quantity of air flow which may carry the heat source from the air inlet at one side of the base board to the air outlet at the other side of the base board and the heat source may be carried outward from the air outlet of the base board, so that the heatsink device may have the optimum heatsink effect.

[**0026**] Although the invention has been explained in relation to its preferred embodiment as mentioned above, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the present invention. It is, therefore, contemplated that the appended claim or claims will cover such modifications and variations that fall within the true scope of the invention.

What is claimed is:

1. A heatsink device, comprising:

a base board, provided with multiple fins, and multiple channels formed between any two adjacent fins, each of

the channels having a first end formed with an air inlet and a second end formed with an air outlet, the base board being provided with at least one mounting portion;

an impeller, combined on the mounting portion of the base board, the impeller including a power member to drive a blast type vane to rotate, the vane being aligned with the channels formed between the multiple fins, to drive an air flow from the air inlet at one side of the base board to the air outlet at the other side of the base board; and

a cover plate, combined on a top of the base board.

2. The heatsink device as claimed in claim 1, wherein the channels are arranged in a linear manner.

3. The heatsink device as claimed in claim 1, wherein the channels are arranged in an arcuate manner.

4. The heatsink device as claimed in claim 1, wherein the channels are partially arranged in a linear manner and partially arranged in an arcuate manner, so that the air outlet of the channel is located at two sides of the base board.

5. The heatsink device as claimed in claim 1, wherein the mounting portion is located at a position of the air inlet of the base board.

6. The heatsink device as claimed in claim 1, wherein the mounting portion is located between the air inlet and the air outlet of the base board.

7. The heatsink device as claimed in claim 1, wherein the base board is provided with multiple positioning holes for passage of positioning members which may be screwed into screw bores formed in the impeller, thereby fixing the impeller.

8. The heatsink device as claimed in claim 1, wherein the base board is provided with at least one positioning portion, and the cover plate is provided with at least one positioning member which may be combined on the at least one positioning portion.

9. The heatsink device as claimed in claim 1, wherein the vane of the impeller has a length substantially equal to a total width of the multiple fins.

10. The heatsink device as claimed in claim 1, wherein the cover plate is provided with an air inlet aligning with the vane of the impeller.

11. The heatsink device as claimed in claim 1, wherein the base board is provided with a receiving chamber to receive a circuit board.

* * * * *