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(54) THERMAL DEVICE FOR HEAT GENERATING SOURCE

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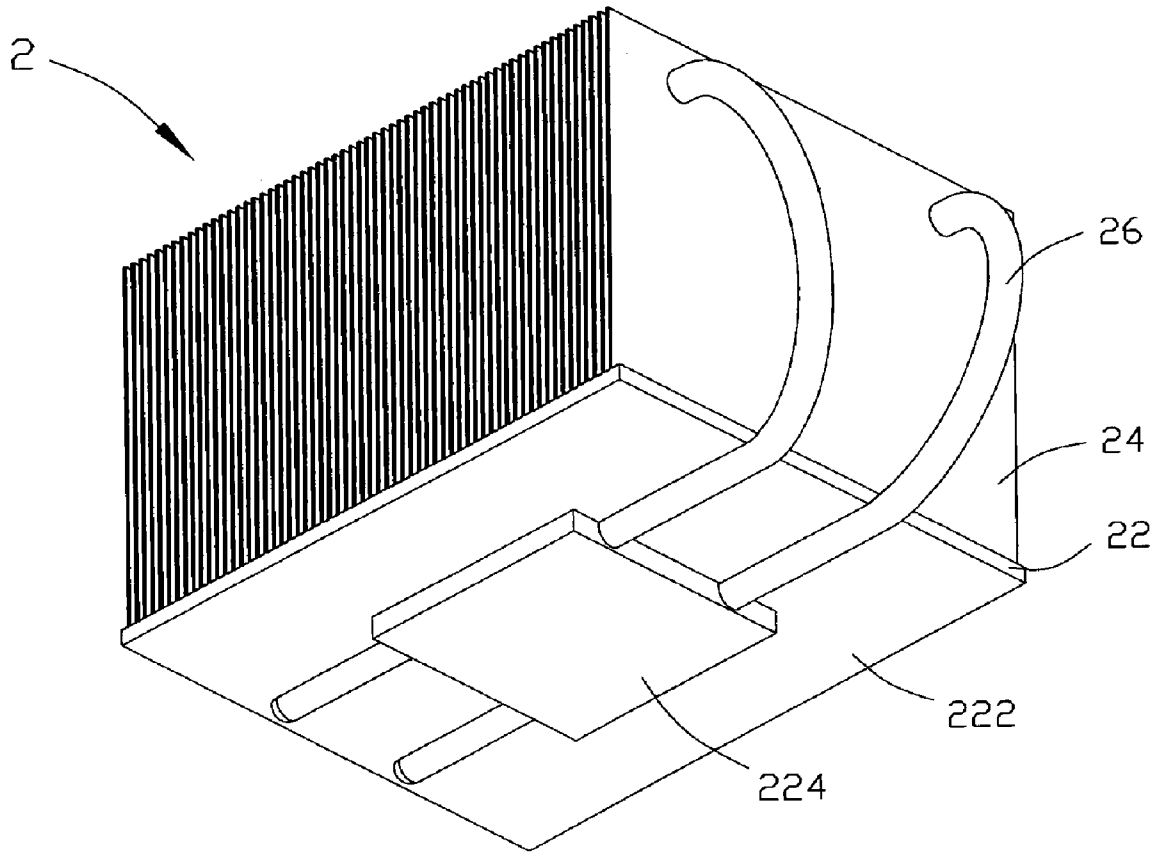
(57) **ABSTRACT**

A thermal device for cooling a heat generating source is provided, including a first portion and a second portion which is formed from the first portion, the area of the bottom of the second portion is smaller than the area of the bottom of the first portion, and the area of the bottom of the second portion accords with a contact surface area of the heat generating source.



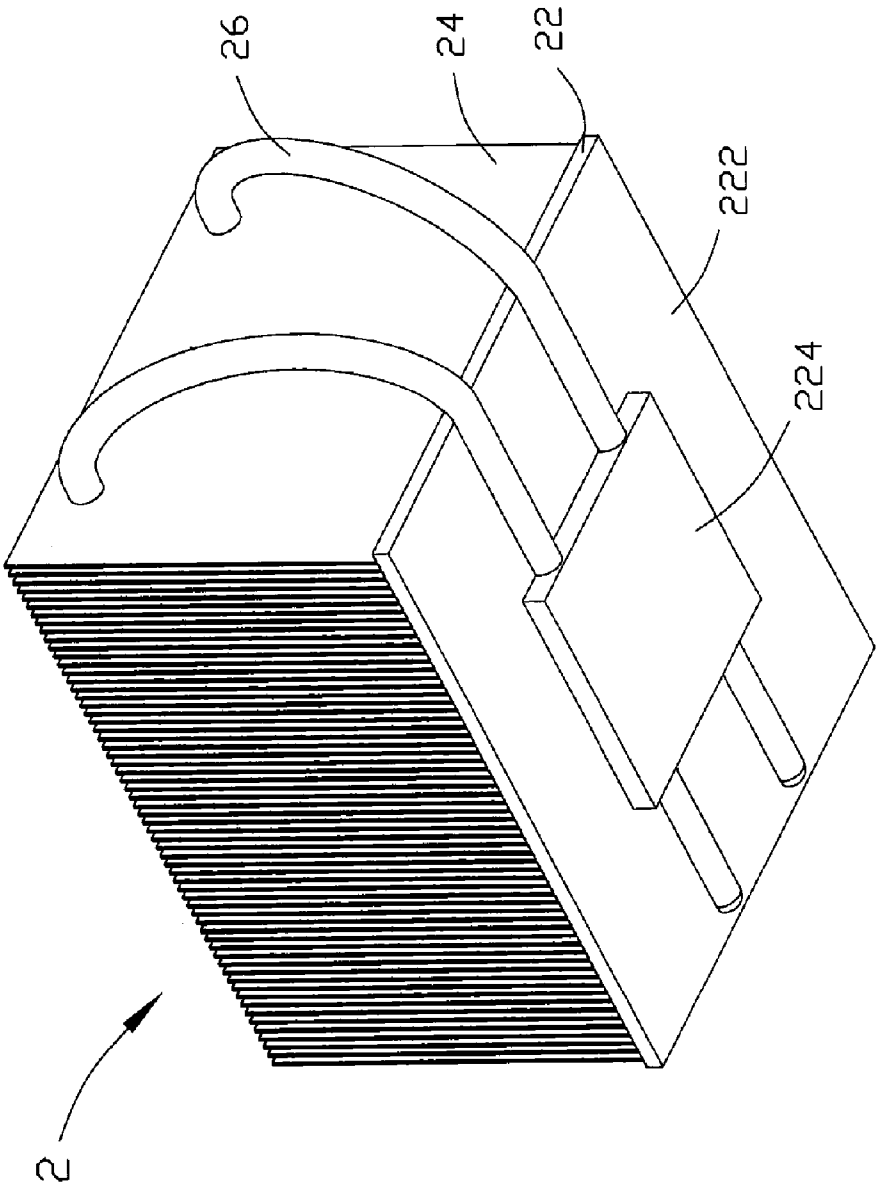


FIG. 1

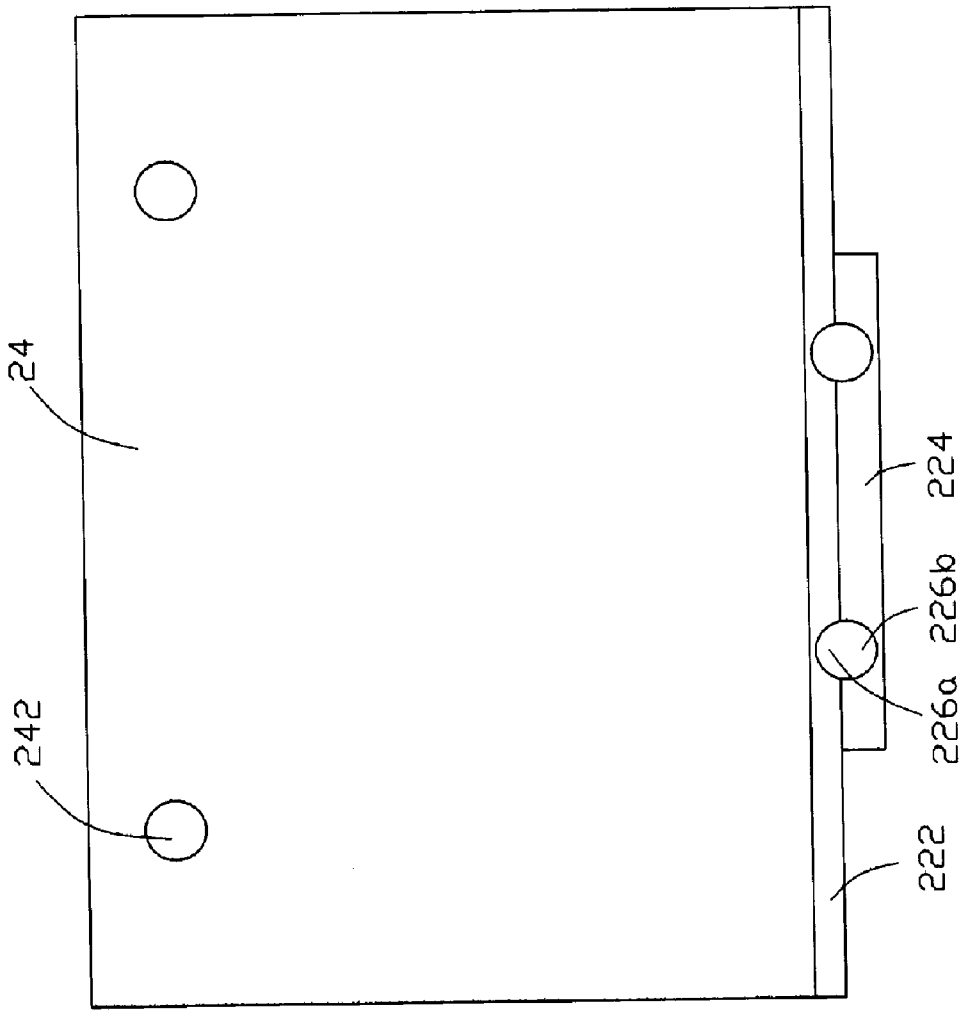


FIG. 2

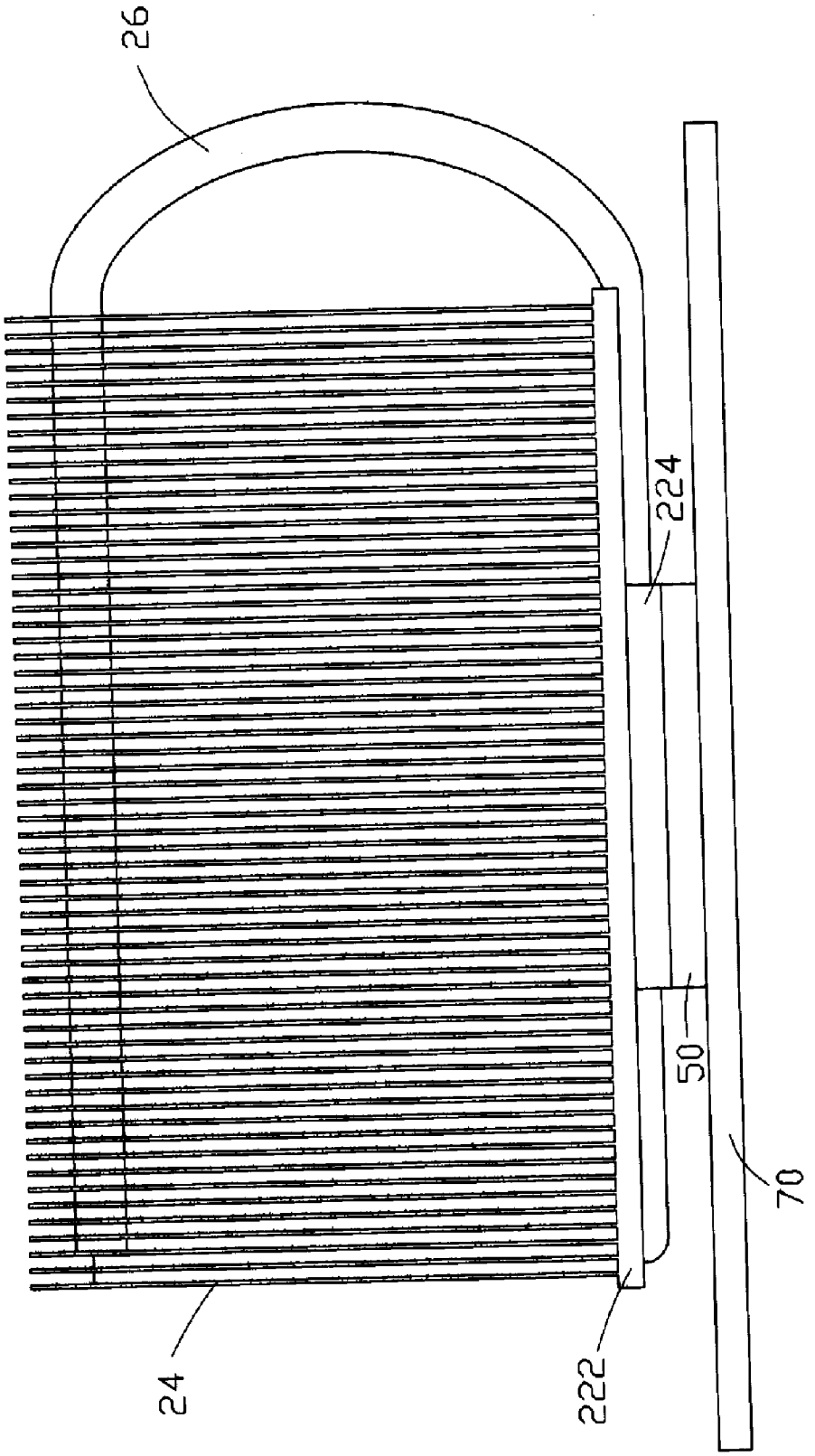


FIG. 3

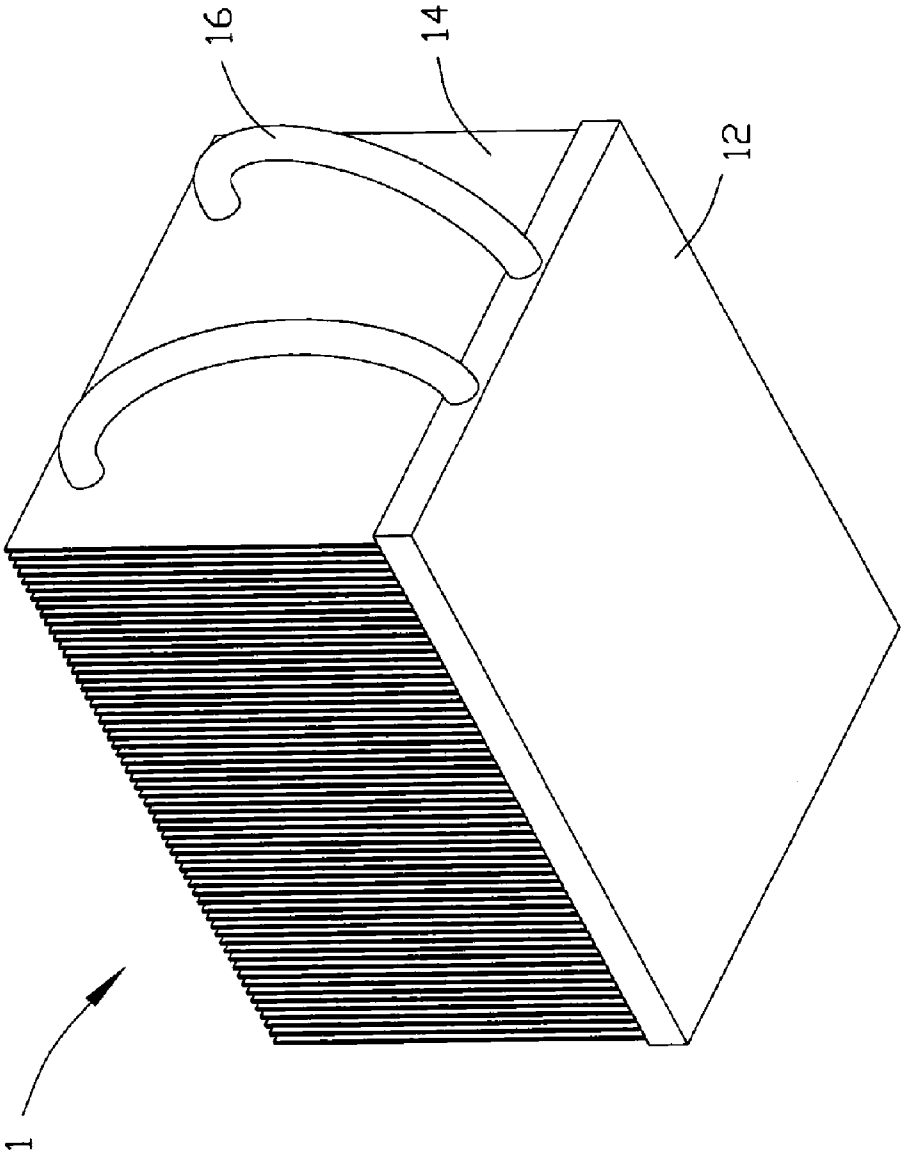


FIG. 4<PRIOR ART>

THERMAL DEVICE FOR HEAT GENERATING SOURCE

FIELD OF THE INVENTION

[0001] The present invention relates to thermal devices, and particularly to a thermal device for dissipating heat from or cooling off a heat generating source.

DESCRIPTION OF RELATED ART

[0002] Computers may not work properly when the temperature of their central processing units (CPUs) rises above 64° C. To prevent overheating of a CPU a thermal device is often attached to the CPU for heat dissipation.

[0003] FIG. **4** shows one of a currently used thermal device **1**, including a base **12**, a plurality of parallel fins **14**, and two heat pipes **16**. The base **12** is a slab-shaped metal block with a rectangular bottom. Two holes are defined in the base **12**. The fins **14** extend up from the base **12**. Two pairs of holes are respectively defined in the base **12** and the fins **14** for receiving the heat pipes **16** therein. The base **12** is coupled to a CPU. The area of the base **12** is larger than that of the CPU. However, manufacturing the thermal device **1** requires comparatively more metal raw material, which adds greatly to the cost of manufacture.

[0004] What is needed, therefore, is a lower cost thermal device which still provides good heat sink performance.

SUMMARY OF THE INVENTION

[0005] A thermal device for dissipating heat from a heat generating source is provided. The thermal device includes a first portion, and a second portion formed on the bottom of the first portion. An area of a bottom of the second portion is smaller than an area of a bottom of the first portion, and the area of the bottom of the second portion accords with an area of a contacting surface of the heat generating source.

[0006] Other advantages and novel features will be drawn from the following detailed description of a preferred embodiment with attached drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. **1** is an isometric view of a thermal device, in accordance with a preferred embodiment of the present invention;

[0008] FIG. **2** is a front view of FIG. **1** without the heat pipes;

[0009] FIG. **3** is a side view of FIG. **1** with a motherboard thereunder; and

[0010] FIG. **4** is an isometric view of a conventional thermal device.

DETAILED DESCRIPTION OF THE INVENTION

[0011] Referring to FIG. **1**, a thermal device **2** in accordance with a preferred embodiment of the present invention, including a base **22**, a plurality of parallel fins **24**, and two heat pipes **26** is shown.

[0012] As shown in FIG. **1** and FIG. **2**, the base **22** includes a first portion **222** and a second portion **224**. The first portion **222** is generally rectangular-shaped. The second portion **224** is generally square shaped, and protrudes from a middle of a bottom of the first portion **222**. The dimensions of the second portion **224** are less than that of the first portion **222**. Therefore, the base **22** has a cross section that is wide at the top and narrow at the bottom. An area of the bottom of the second portion **224** is the same as a top contacting surface area of a heat generating source, such as a CPU used as an example in the preferred embodiment. Two parallel, arc shaped holes **226***a* are defined in the first portion **222** from one end of the first portion **222** to near another end of the base **22**. And two arc-shaped parallel holes **226***b* are defined in the second portion **224** aligned with the holes **226***a*. The holes **226***a*, **226***b* cooperate to receive ends of the heat pipes **26**.

[0013] As shown in FIG. **2** and FIG. **3**, the fins **24** extend up from a top surface of the first portion **222** perpendicular to the base **22**. Each fin **24** is a slim rectangular-shaped metal piece with two circular holes **242** symmetrically defined near a top edge thereof. The two holes **242** are for receiving other ends of the two heat pipes **26**.

[0014] Referring to FIG. **1**, the generally U-shaped heat pipes **26** are inserted into the holes **226** of the base **22** and the holes **242** of the fins **24**. Heat in the base **22** will be conducted to the fins **24** by the heat pipes **26** to accelerate the process of dissipating heat from the chip.

[0015] As shown in FIG. **3**, in use, the thermal device **2** is fixed on a chip **50** of a motherboard **70**. The second portion **224** of the base **22** contacts the chip **50**. Heat produced by the chip **50** is conducted to the second portion **224**, and then to the first portion **222**. Thereafter, the heat is conducted to the fins **24** through the heat pipes **26**, so that the chip **50** can be kept at acceptable working temperatures.

[0016] In comparing the conventional thermal device **1** of FIG. **4** with the thermal device **2** in accordance with the preferred embodiment of the present invention of FIG. **1**, it can be seen that a volume of the material used for manufacturing the base **22** of the thermal device **2** is less than the volume of material used for the conventional thermal device **1**. Thereby there is a reduction in cost of manufacture.

[0017] In comparing the conventional thermal device **1** with the thermal device **2** of the preferred embodiment under same testing conditions, (ambient temperature of 35° C., rotation speed of a cooling fan 3800 round/min, BTX style layout) we have the results:

Testing component	Thermal device 1 temperature (° C.)	Thermal device 2 temperature (° C.)	Temperature required (° C.)
CPU	63.26	63.61	<64.1
Sound card	43.32	43.69	<100
Video card	67.52	67.3	<85
Clock chips	54.81	56.87	<85

[0018] It is evident that the cooling performance of the thermal device **2** of the preferred embodiment is comparable to the thermal device **1**.

[0019] It is to be understood, however, that even though numerous characteristics and advantages have been set forth in the foregoing description of a preferred embodiments, together with details of the structure and function of the

preferred embodiments, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A thermal device for a heat generating package, comprising:

a plurality of fins; and

a base having a first portion and a second portion, the first portion supporting the plurality of fins, and the second portion formed from a bottom of the first portion, the area of a contacting surface of the second portion being less than that of the bottom of the first portion, and according with that of a contacting surface of the heat generating package.

2. The thermal device as claimed in claim 1, further comprising at least a heat pipe extending from the base to the fins.

3. The thermal device as claimed in claim 2, wherein a portion of the heat pipe is exposed where the second portion does not cover the bottom of the first portion.

4. The thermal device as claimed in claim 2, wherein a hole is defined in the base for receiving the heat pipe, a top longitudinal portion of the hole is defined in the first portion, and a bottom longitudinal portion of the hole is defined in the second portion.

5. The thermal device as claimed in claim 1, wherein both the first portion and the second portion are slab-shaped metal blocks.

6. The thermal device as claimed in claim 1, wherein the second portion protrudes from the first portion.

7. The thermal device as claimed in claim 2, wherein the heat pipe is U-shaped.

8. A thermal device for cooling a heat generating source comprising:

a base with a cross section having a top dimension wider than a bottom dimension, the area of a contacting surface of the base according with a contacting surface of the heat generating source;

a plurality of fins extending from the base, and

at least a heat pipe extending from the base to the fins.

9. The thermal device as claimed in claim 8, wherein the base includes a slab-shaped first portion and a slab-shaped second portion, the area of bottom of the second portion being smaller than the area of the bottom of the first portion.

10. The thermal device as claimed in claim 12, wherein a hole is defined in the base for receiving the heat pipe, a top longitudinal portion of the hole is defined in the first portion, and a bottom longitudinal portion of the hole is defined in the second portion.

11. The thermal device as claimed in claim 8, wherein the second portion protrudes from the first portion.

12. The thermal device as claimed in claim 8, wherein the heat pipe is U-shaped.

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