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**CHEN**

(54) **BASE PLATE FIXING STRUCTURE FOR A HEAT DISSIPATING MODULE**

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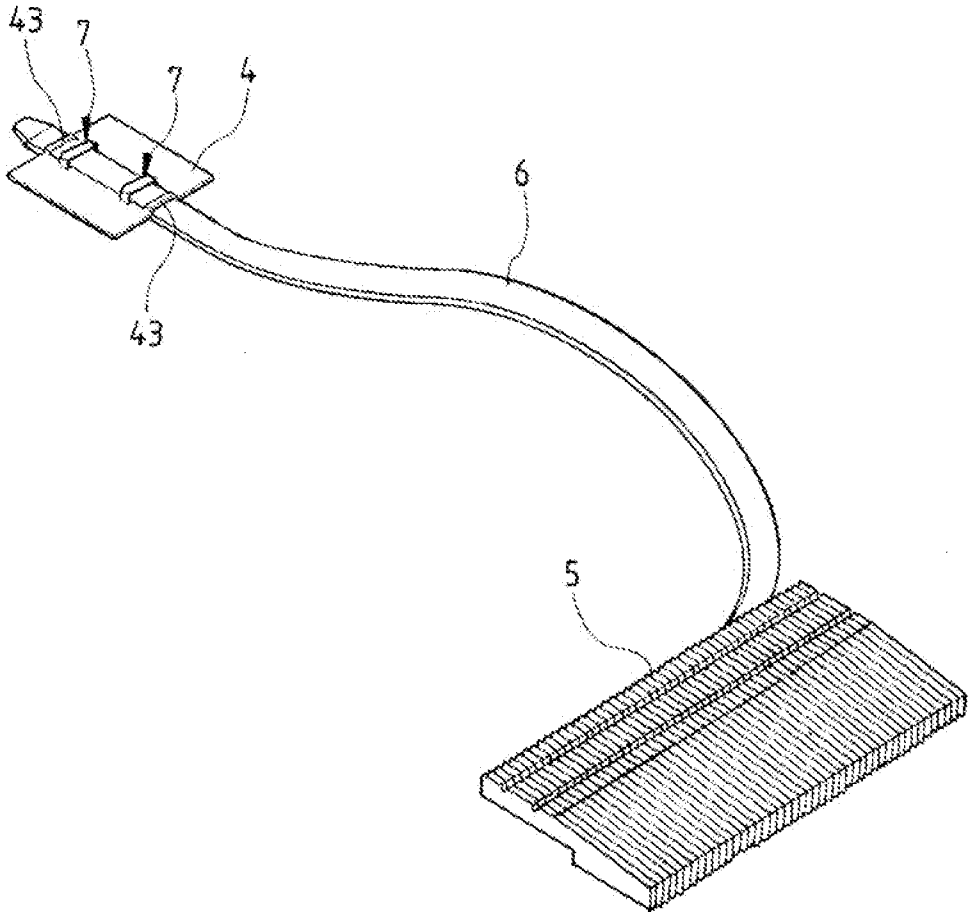
(57) **ABSTRACT**

A base plate fixing structure for a heat dissipating module includes a base plate and a plurality of fixing components. At a center of the base plate is disposed a through groove. At a bottom edge of the through groove is disposed a holding and engaging part extending and protruding inwards. On two sides of the through groove are respectively disposed two or more than two corresponding fixing holes. On two ends of the through groove are respectively disposed a containing rod arching upwards. The plurality of fixing components each includes a horizontal section and vertical sections extending downwards from two ends of the horizontal section. During assembly, one end of the heat pipe is run through the through groove of the base plate with the containing rod and the holding and engaging part limiting its position. The fixing components are joined to the fixing holes through their vertical sections. The horizontal sections are used to press the heat pipe so that the heat pipe is tightly fixed to the base plate. The fore-going combination facilitates the assembly of a heat dissipating module at a reduced assembly cost.



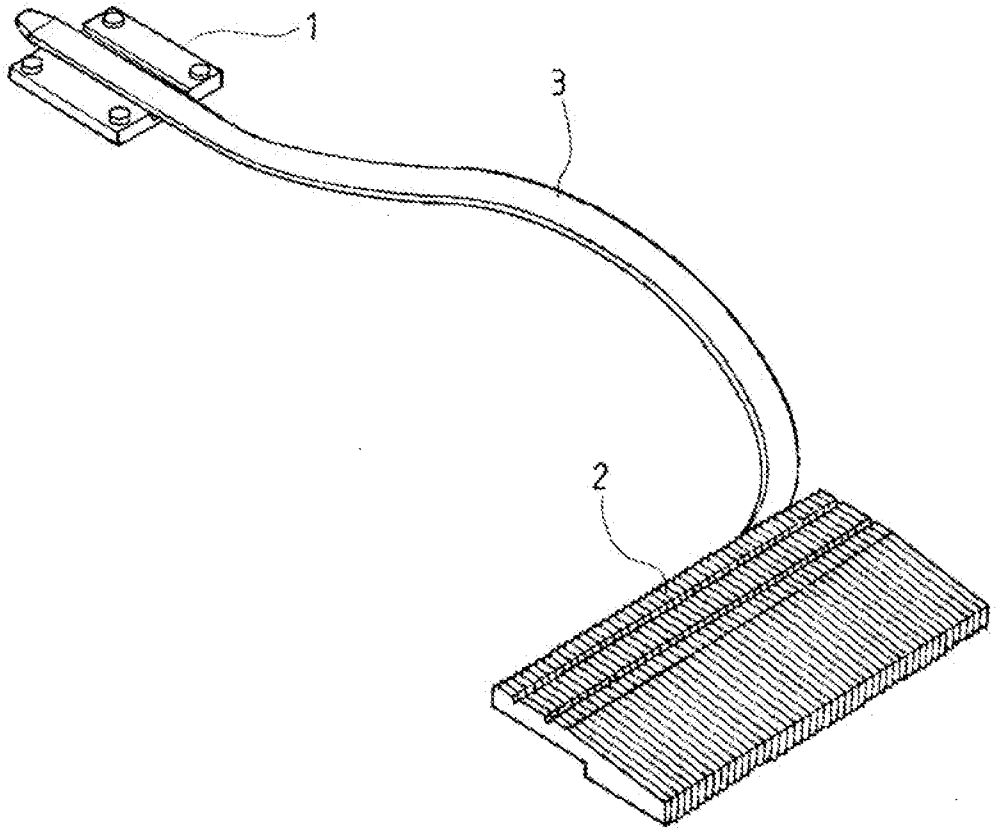



Fig. 1
(Prior Art)

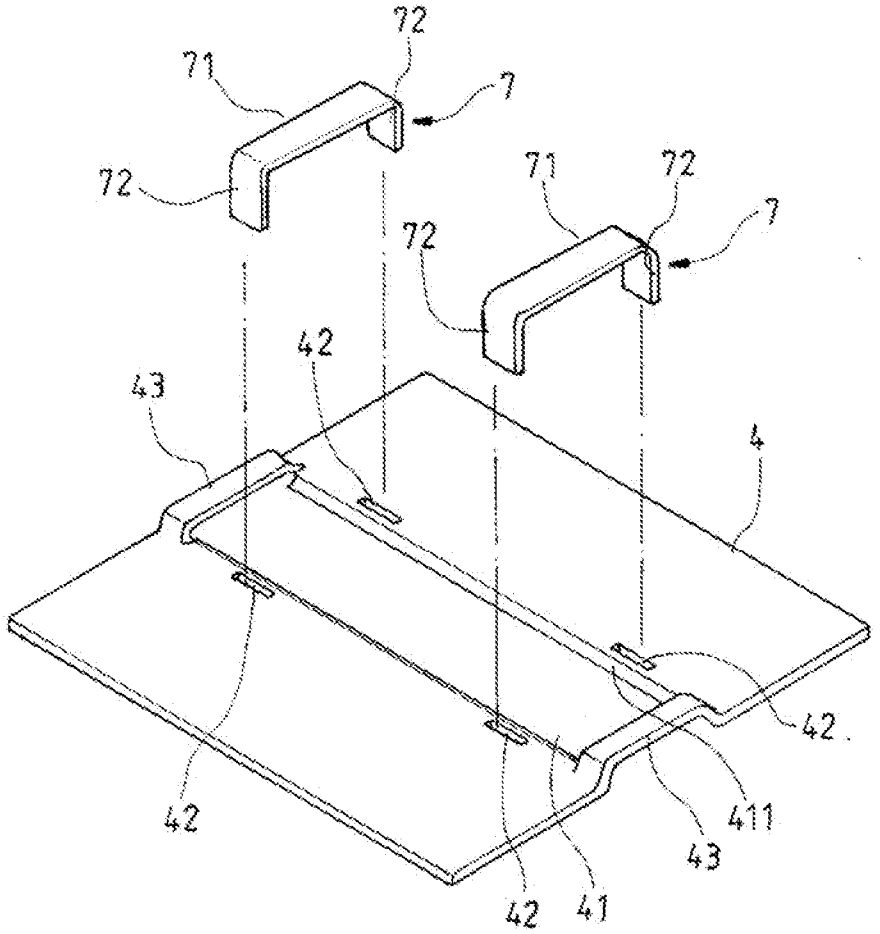



Fig. 2

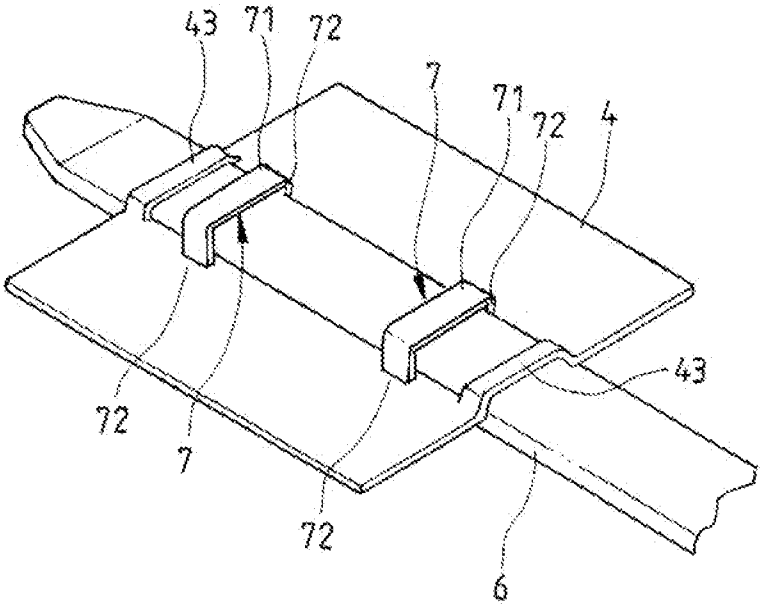



Fig. 3

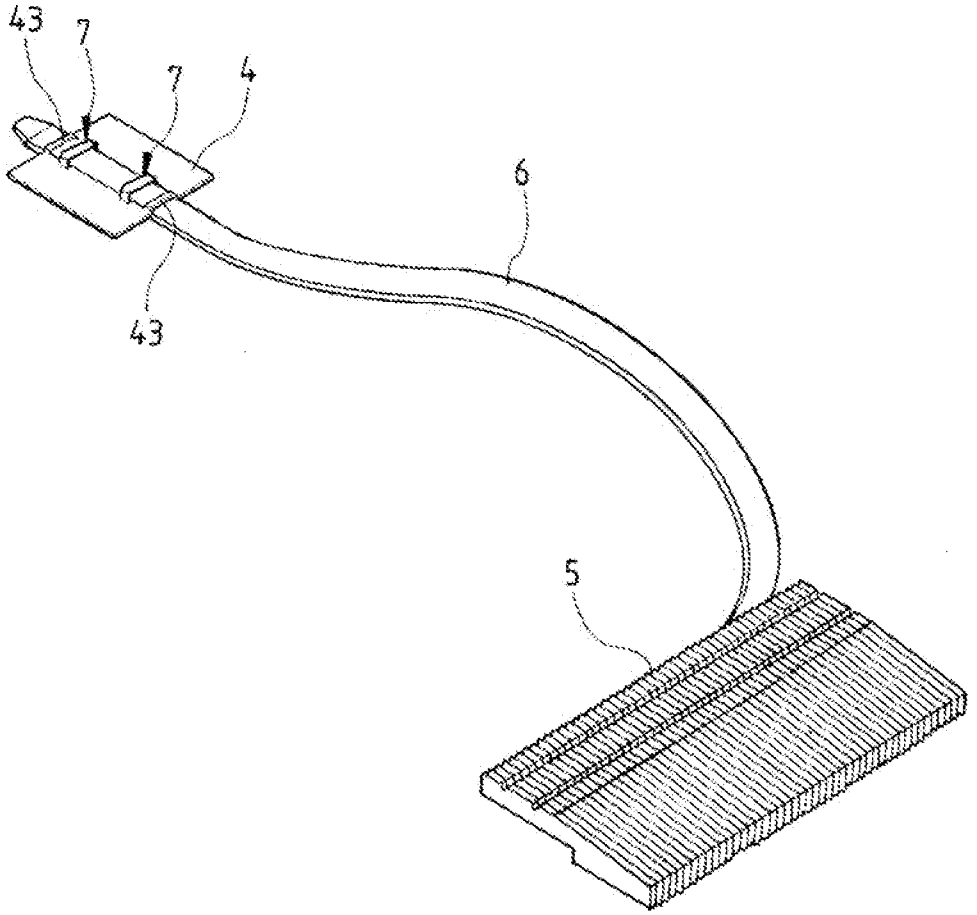



Fig. 4

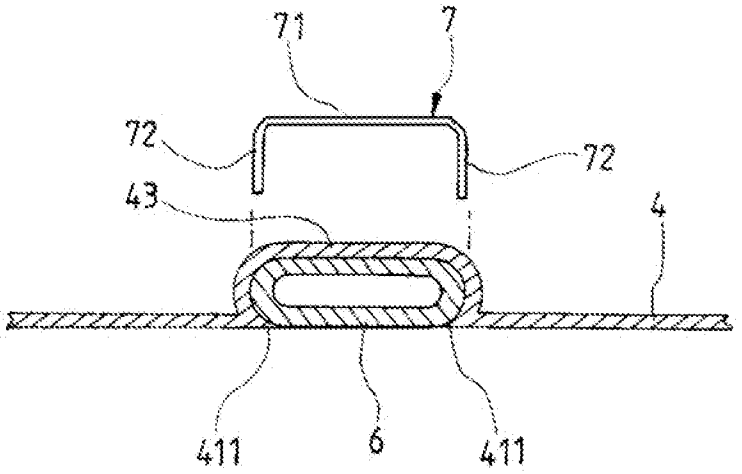



Fig. 5

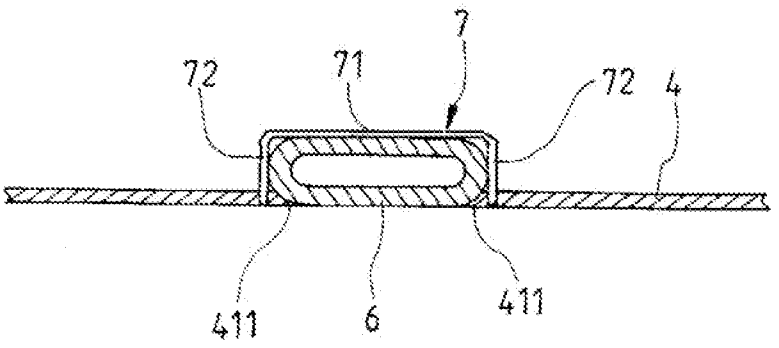



Fig.6

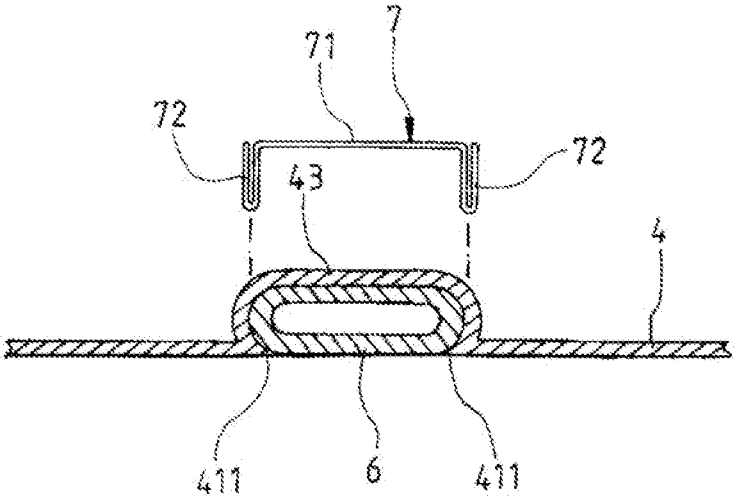



Fig. 7

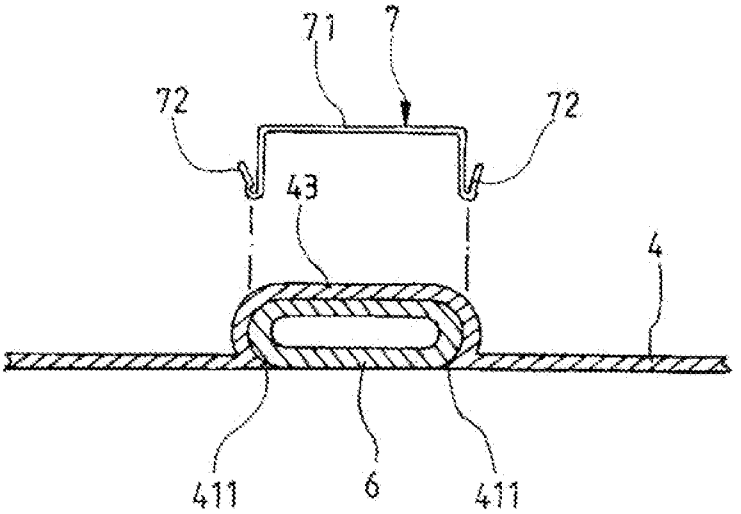



Fig.8

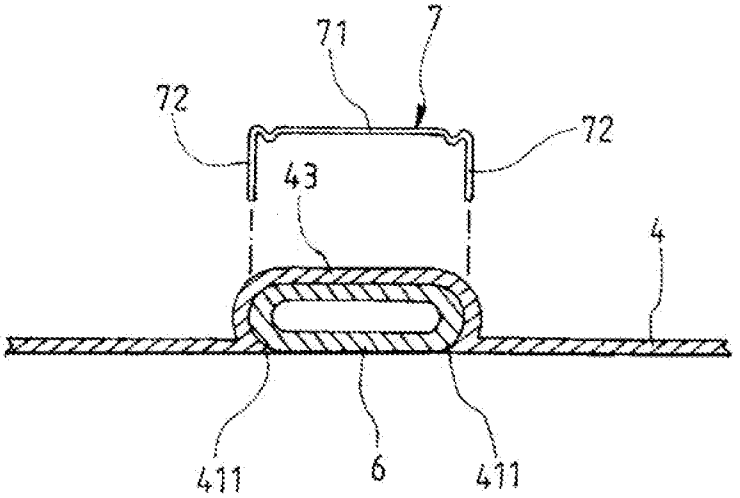



Fig. 9

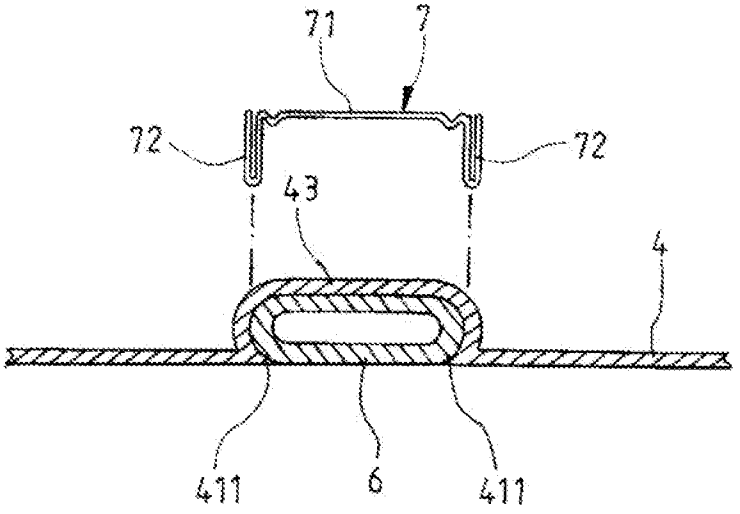



Fig.10

# BASE PLATE FIXING STRUCTURE FOR A HEAT DISSIPATING MODULE

## BACKGROUND OF THE INVENTION

**[0001]** 1. Field of the Invention

**[0002]** The present invention relates to a base plate fixing structure for a heat dissipating module, particularly to a base plate fixing structure for a heat dissipating module which facilitates the assembly of a base plate and a heat pipe for a heat dissipating module at a reduced assembly cost.

**[0003]** 2. Description of Related Art

**[0004]** Existing CPUs in laptops usually generate a huge amount of heat energy in working states, which causes the temperature of electronic components to rise. Without adequate heat dissipation, those electronic components will overheat, which may destabilize their operation and may even cause the entire electronic device to stop working or crash. As the working speed of all kinds of electronic components is constantly improved, the amount of heat energy generated in working states also increases greatly and may burn down the CPU completely. Therefore, heat dissipating devices for all kinds of chips have become a major issue nowadays.

**[0005]** Current heat dissipating devices and heat dissipating modules generally comprise varying combinations of a plurality of identical or diverse heat dissipating components. These heat dissipating components may be heat pipes, heat sinks, heat dissipating base plates, and so on. They are generally assembled and fixed by soldering. But when soldering aluminum heat dissipating components, some preliminary procedures are required before carrying out a special soldering process. Not only is the manufacturing process complicated and the manufacturing cost increased, but harmful substances are also produced and pollute the environment.

**[0006]** As FIG. **1** shows, a heat pipe is connected to a heat dissipating plate and heat dissipating fins. A CPU is fixed to a bottom edge of the heat dissipating plate. The heat energy generated by the CPU is conducted by the heat pipe and dissipated through the heat dissipating fins. In a conventional process of manufacturing a heat dissipating module, the heat pipe is assembled using tin soldering. In the process, the material is first plated with nickel and then soldered with tin solder when being assembled. But this conventional process of assembly has the following drawbacks:

**[0007]** 1. The material cost of nickel-plating and tin soldering is high. They will also generate harmful substances and pollute the environment.

**[0008]** 2. It is less effective in conducting heat.

**[0009]** In view of this, after laborious research and experiments, the applicant has devised a fixing structure for a heat dissipating module which facilitates the assembly of a heat dissipating module at a reduced assembly cost.

## SUMMARY OF THE INVENTION

**[0010]** It is an object of the present invention to provide a base plate fixing structure for a heat dissipating module which facilitates the assembly of a heat dissipating module by doing without the process of soldering and reduces the assembly cost.

**[0011]** It is another object of the present invention to provide a base plate fixing structure for a heat dissipating module which comprises a base plate and a plurality of fixing components. At a center of the base plate is disposed a through groove. At a bottom edge of the through groove is disposed a holding and engaging part extending and protruding inwards. On two sides of the through groove are respectively disposed two or more than two corresponding fixing holes. On two ends of the through groove are respectively disposed a containing rod arching upwards. The plurality of fixing components includes a horizontal section and vertical sections extending downwards from two ends of the horizontal section. During assembly, one end of the heat pipe is run through the through groove of the base plate with the containing rod and the holding and engaging part limiting its position. The fixing components are joined to the fixing holes through their vertical sections. The horizontal sections are used to press the heat pipe so that the heat pipe is tightly fixed to the base plate. The fore-going combination facilitates the assembly of a heat dissipating module at a reduced assembly cost.

**[0012]** Further, the holding and engaging part disposed at a bottom edge of the through groove of the base plate is an arc extending inwards. Further, the vertical sections of the fixing components are slightly bigger than the hole size of the fixing holes on the base plate, so that when pressed into the fixing holes the vertical sections are tightly snapped fit to the fixing holes. Further, the vertical sections of the fixing components may also be configured as bending upwards to form a V shape from bottom ends to produce appropriate flexibility, so that after passing through the fixing holes the vertical sections are tightly snapped fit to the fixing holes. Further, the horizontal section of the fixing components may be configured as containing arcs bending downwards near the vertical sections to produce appropriate flexibility and facilitate pressing down of the heat pipe for fixing.

**[0013]** The fixing structure for a heat dissipating module of the present invention facilitates assembly of a heat dissipating module at a reduced cost. It also reduces the thickness and weight of a heat dissipating module with improved quality.

## BRIEF DESCRIPTION OF THE INVENTION

**[0014]** FIG. **1** is a pictorial drawing of a conventional heat dissipating module;

**[0015]** FIG. **2** is a pictorial break-down drawing of a base plate and a heat pipe of the present invention;

**[0016]** FIG. **3** is a pictorial drawing of a base plate and a heat pipe of the present invention;

**[0017]** FIG. **4** is a pictorial drawing of a heat dissipating module of the present invention;

**[0018]** FIG. **5** is a view of the present invention during assembly;

**[0019]** FIG. **6** is a cross-sectional view of the present invention after assembly.

**[0020]** FIG. **7** is a view of a second preferred embodiment of the present invention during assembly.

**[0021]** FIG. **8** is a view of a third preferred embodiment of the present invention during assembly.

**[0022]** FIG. **9** is a view of a fourth preferred embodiment of the present invention during assembly.

**[0023]** FIG. **10** is a view of a fifth preferred embodiment of the present invention during assembly.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0024]** Please refer to FIGS. **2** and **3**, along with FIGS. **4**, **5**, and **6**, showing respectively a pictorial break-down drawing of a base plate and a heat pipe of the present invention, a pictorial drawing of a base plate and a heat pipe of the present

invention, a pictorial drawing of a heat dissipating module of the present invention, a view of the present invention during assembly, and a cross-sectional view of the present invention after assembly. As the figures show, the present invention includes a base plate **4**, heat dissipating fins **5**, a heat pipe **6** connected to the base plate **4** and the heat dissipating fins **5**, and fixing components **7** for fixing the heat pipe **6**. At a center of the base plate **4** is disposed a through groove **41**. At a bottom edge of the through groove **41** is disposed a holding and engaging part **411** extending and protruding inwards. On two sides of the through groove **41** are respectively disposed two or more than two corresponding fixing holes **42** (two fixing holes **42** are respectively disposed on two sides of the through groove **41** in this preferred embodiment). On two ends of the through groove **41** are respectively disposed a containing rod **43** arching upwards. The plurality of fixing components **7** each includes a horizontal section **71** and vertical sections **72** extending downwards from two ends of the horizontal section **71**. The vertical sections **72** of the fixing components **7** are slightly bigger than the hole size of the fixing holes **42** of the base plate **4** for having the vertical sections **72** tightly snapped fit to the fixing holes **42**.

**[0025]** During assembly, one end of the heat pipe **6** is run through the through groove **41** of the base plate **4** with the containing rod **43** above and the holding and engaging part **411** below limiting its position. The fixing components **7** are joined to the fixing holes **42** through their vertical sections **72**. The horizontal sections **71** of the fixing components **7** are used to press the heat pipe **6** so that the heat pipe **6** is tightly fixed to the base plate **4**. The fore-going combination facilitates the assembly of a base plate **4** for a heat dissipating module at a reduced assembly cost.

**[0026]** Please refer to FIGS. **5** and **6**, along with FIG. **3**. As the figures show, during assembly, the heat pipe **6** is run through the through groove **41** of the base plate **4**. On a bottom edge of the through groove **41** is disposed a holding and engaging part **411** configured as an arc extending and protruding inwards. When the heat pipe **6** is run through the through groove **41**, the holding and engaging part **411** holds a bottom edge of one end of the heat pipe **6**, and the position of the upper edge of the heat pipe **6** is limited by the containing rod **43** to prevent the heat pipe **6** from coming off. Further, the vertical sections **72** of the fixing components **7** are snapped fit to the fixing holes **42** on the base plate **4**. The horizontal sections **71** of the fixing components **7** are pressed to tightly snap fit the heat pipe **6** to the base plate **4**.

**[0027]** Please refer to FIGS. **7** and **8**, showing views of a second and a third embodiment of the present invention during assembly. As the figures show, the vertical sections **72** of the fixing components **7** of the present invention may also be configured as bending upwards to form a V shape from bottom ends to produce appropriate flexibility, so that after passing through the fixing holes **42** the vertical sections **72** are tightly snapped fit to the fixing holes **42**.

**[0028]** Please refer to FIGS. **9** and **10**, showing views of a fourth and a fifth embodiment of the present invention during assembly. As the figures show, the horizontal sections **71** of the fixing components **7** may be configured as containing arcs bending downwards near the vertical sections **72** to produce appropriate flexibility, so that after passing through the fixing holes **42** the vertical sections **72** are tightly snapped fit to the fixing holes **42** and press the heat pipe **6** down by means of the downward bending arcs.

**[0029]** Compared with the assembly of a conventional heat dissipating module, the present invention has at least the following advantages:

**[0030]** 1. No nickel-plating and tin soldering are needed to assemble the present invention, which reduces its material cost and is eco-friendly.

**[0031]** 2. It is more efficient in conducting heat.

**[0032]** 3. Its production cost is reduced.

**[0033]** The fore-going preferred embodiments of the present invention are illustrated of the present invention rather than limiting of the present invention. It is intended to cover various modifications and changes included within the spirit and scope of the appended claims, the scope of which should be accorded the broadest interpretation so as to encompass all such modifications and similar structures.

**[0034]** In view of the foregoing considerations, the present invention relates to a fixing structure for a heat dissipating module comprising a base plate with a through groove and fixing holes, and fixing components for fixing. It facilitates the assembly of a base plate and a heat pipe of a heat dissipating module at a reduced assembly cost and is also eco-friendly.

What is claimed is:

**1**. A fixing structure for a heat dissipating module, comprising:

a base plate, at a center of the base plate is disposed a through groove, at a bottom edge of the through groove is disposed a holding and engaging part extending and protruding inwards, on two sides of the through groove are respectively disposed two or more than two corresponding fixing holes, and on two ends of the through groove are respectively disposed a containing rod arching upwards;

a plurality of fixing components, each comprising a horizontal section and vertical sections extending downwards from two ends of the horizontal section;

a heat pipe, one end of the heat pipe is disposed inside the through groove;

wherein during assembly, one end of the heat pipe is run through the through groove of the base plate with the containing rod above and the holding and engaging part below limiting its position, the fixing components are joined to the fixing holes through their vertical sections, the horizontal sections are used to press the heat pipe, and the heat pipe is tightly fixed to the base plate through the fixing components.

**2**. The base plate fixing structure for a heat dissipating module of claim **1**, wherein the holding and engaging part disposed at a bottom edge of the through groove of the base plate is configured as an arc extending and protruding inwards.

**3**. The base plate fixing structure for a heat dissipating module of claim **1**, wherein the vertical sections of the fixing component are slightly bigger than the hole size of the fixing holes of the base plate, so that when pressed into the fixing holes the vertical sections are tightly snapped fit to the fixing holes.

**4**. The base plate fixing structure for a heat dissipating module of claim **1**, wherein the vertical sections of the fixing component may also be configured as bending upwards to form a V shape from bottom ends to produce appropriate flexibility.

* * * * *