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FLUID HEATING HEATER

Abstract

A fluid heating heater according to one embodiment of the present invention may include a main body in which a flow path through which a fluid flows in and is heated is formed, an inlet that is disposed on one side of the main body and through which the fluid flows in, an outlet that is disposed on the other side of the main body and through which the fluid flows out, and a plurality of flow path protrusions that are provided inside the main body to protrude and are isotropically disposed between the inlet and the outlet.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to and the benefit of Korean Patent Application No. 10-2024-0019525, filed on Feb. 8, 2024, and Korean Patent Application No. 10-2025-0010553, filed on Jan. 23, 2025, the disclosure of both are incorporated herein by reference in their entirety.

BACKGROUND

Field of the Invention

[0002] The present invention relates to a fluid heating heater, and more specifically, to a fluid heating heater for heating a fluid such as a coolant circulating inside a vehicle.

Discussion of Related Art

[0003] Under the trend of development of environmentally friendly industries and development of energy sources that replace fossil raw materials, areas that have recently attracted the most attention in the automobile industry are electric vehicles, hybrid vehicles, and fuel cell vehicles. However, unlike vehicles that use conventional petroleum-fueled engines as an energy source, in the electric vehicles, hybrid vehicles, and fuel cell vehicles, it is difficult or impossible to apply a heating system using a coolant.

[0004] That is, in the case of vehicles that use a conventional petroleum-based engine as a power source, a lot of heat is generated from the engine, a coolant circulation system for cooling the engine is provided, and the heat absorbed by the coolant from the engine is used to heat the interior. However, since the electric vehicles, hybrid vehicles, and fuel cell vehicles do not generate as much heat as the engine, there are limitations to using these conventional heating methods.

[0005] Accordingly, various studies are being conducted on adding heat pumps to the air conditioning systems of the electric vehicles, hybrid cars, and fuel cell vehicles to be used as a heat source, providing separate heat sources such as electric heaters, and so on. Among these, the electric heater is currently widely used because the electric heater may more easily heat a coolant without significantly affecting the air conditioning system.

[0006] The existing fluid heating heater includes a plurality of parallel fluid flow paths. In this way, when the fluid flow paths are configured as parallel flow paths, the size is determined by the number of channels in the parallel flow paths, so that the degree of design freedom is not high and each parallel flow path has a structure of two or more hairpins, and thus there is a problem that a large differential pressure occurs. In particular, there is a problem that a larger differential pressure occurs in a low flow region with high viscosity.

SUMMARY OF THE INVENTION

[0007] One embodiment of the present invention is directed to providing a fluid heating heater capable of preventing occurrence of differential pressure and increasing the degree of design freedom compared to parallel-disposed flow paths by forming its flow paths on a main plate in series rather than in parallel.

[0008] One embodiment of the present invention is also directed to providing a fluid heating heater capable of interchangeably using an inlet and an outlet without being restricted by a direction of the inlet and the outlet by alternately disposing a plurality of flow path protrusions in each column and row on a main plate to form an isotropic flow path between the inlet and the outlet.

[0009] One embodiment of the present invention is also directed to providing a fluid heating heater capable of making a temperature distribution of a fluid flow path uniform overall by changing the position of a heating element mounted on a main plate and the height of a flow path protrusion to match inlet and outlet sides.

[0010] Problems to be solved by the present invention are not limited to those mentioned above, and other problems not mentioned will be clearly understood by those skilled in the art from the

following description.
[0011] According to an aspect of the present invention, there is provided a fluid heating heater including a main body in which a flow path through which a fluid flows in and is heated is formed, an inlet that is disposed on one side of the main body and through which the fluid flows in, an outlet that is disposed on the other side of the main body and through which the fluid flows out, and a plurality of flow path protrusions that are provided inside the main body to protrude and are isotropically disposed between the inlet and the outlet.
[0012] The main body may include a main plate including the flow path protrusions on a surface thereof and a cover coupled to cover an upper portion of the main plate.
[0013] The inlet and the outlet may be symmetrically disposed on both sides centered on the main plate.
[0014] An upper end of the flow path protrusion may be formed to be spaced apart from the cover.
[0015] The flow path protrusions may be disposed in a plurality of columns and rows on the main plate.
[0016] The flow path protrusions disposed in the same column and row among the flow path protrusions may be disposed at a constant interval.
[0017] The flow path protrusion may be disposed between the flow path protrusions disposed in a next adjacent row or column.
[0018] The flow path protrusion may be formed to have a rhombus-shaped cross-section.
[0019] The flow path protrusion may be disposed so that a rhombus-shaped diagonal line lies in a flow direction of the fluid on the main plate.
[0020] The flow path protrusion may be formed to have an elliptical cross-section.
[0021] The flow path protrusion may be formed so that a height thereof increases toward the outlet from the inlet.
[0022] A height thereof may increase in some sections toward the outlet from the inlet.
[0023] A heating element may be mounted on a lower surface of the main plate to transfer heat to the main plate.
[0024] The heating element may be disposed closer to the inlet than the outlet with respect to the flow direction of the fluid.
[0025] According to another aspect of the present invention, there is provided a fluid heating heater including a main plate in which a flow path through which a fluid flows in and is heated is formed, an inlet that is disposed on one side of the main plate and through which the fluid flows in, an outlet that is disposed on the other side of the main plate and through which the fluid flows out, and a flow path protrusion that is provided inside the main plate to protrude and is disposed between the inlet and the outlet so that a surface area thereof increases toward the outlet from the inlet. The flow path protrusion may be formed so that a size thereof decreases toward the outlet from the inlet. The flow path protrusions may be disposed so that the number thereof increases toward the outlet from the inlet. The flow path protrusions may be disposed so that an interval therebetween becomes narrower toward the outlet from the inlet. The flow path protrusion may include a first flow path protrusion disposed between the inlet and a central portion of the inlet and the outlet and a second flow path protrusion disposed between the central portion and the outlet, and the first flow path protrusion may be formed to have a larger size than the second flow path protrusion. The first flow path protrusions may be disposed to have a narrower interval than the second flow path protrusions.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0026] The above and other objects, features and advantages of the present invention will become

more apparent to those of ordinary skill in the art by describing exemplary embodiments thereof in detail with reference to the accompanying drawings, in which:
[0027] FIG. **1** is a perspective view illustrating a fluid heating heater according to one embodiment of the present invention;
[0028] FIG. **2** is a plan view illustrating the fluid heating heater according to one embodiment of the present invention;
[0029] FIG. **3** is a cross-sectional view illustrating the fluid heating heater according to one embodiment of the present invention;
[0030] FIG. **4** is a cross-sectional view illustrating a flow path of the fluid heating heater according to one embodiment of the present invention;
[0031] FIG. **5** is a perspective view illustrating a bottom surface of the fluid heating heater according to one embodiment of the present invention;
[0032] FIG. **6** is a bottom view illustrating an existing fluid heating heater;
[0033] FIG. **7** is a view illustrating that a temperature deviation occurs in a heating element illustrated in FIG. **6**;
[0034] FIG. **8** is a bottom view illustrating a fluid heating heater according to one embodiment of the present invention;
[0035] FIG. **9** is a cross-sectional view illustrating a fluid heating heater according to another embodiment of the present invention; and
[0036] FIG. **10** is a plan view illustrating a fluid heating heater according to still another embodiment of the present invention.
DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS
[0037] Since the present invention may be variously modified and embodied, particular embodiments thereof will be illustrated in the drawings and described in detail. However, this is not intended to limit the present invention to the specific embodiments, and it should be understood to include all modifications, equivalents, and substitutes included in the spirit and scope of the present invention. In describing the present invention, when it is determined that the detailed description of the related known technology may obscure the subject matter of the present invention, the detailed description thereof will be omitted.
[0038] Terms “first,” “second,” etc., may be used herein to describe various elements, but the elements should not be limited by the terms. These terms are only used to distinguish one element from another element.
[0039] The terms used in the present application are merely provided to describe specific embodiments, and are not intended to limit the present invention. The singular forms are intended to include the plural forms as well, unless the context clearly indicates otherwise. In the present application, it will be understood that terms “include,” “have,” or the like are intended to specify the presence of features, integers, steps, operations, elements, components, and/or combinations thereof stated in the specification, but do not preclude the possibility of the presence or addition of one or more other features, integers, steps, operations, elements, components, or combinations thereof in advance.
[0040] In addition, throughout the specification, when “connected” is used, this does not only mean two or more components are directly connected, but means that two or more components are indirectly connected through another component, that the components are not only physically connected, but also electrically connected, or that the components are integrated although the components are referred to as different names depending on a location or a function.
[0041] Hereinafter, one embodiment of a fluid heating heater according to the present invention will be described in detail with reference to the accompanying drawings, and in giving description with reference to the accompanying drawings, identical or corresponding components will be assigned the same numbers and overlapping descriptions thereof will be omitted.
[0042] FIG. **1** is a perspective view illustrating a fluid heating heater according to one embodiment

of the present invention, FIG. **2** is a plan view illustrating the fluid heating heater according to one embodiment of the present invention, FIG. **3** is a cross-sectional view illustrating the fluid heating heater according to one embodiment of the present invention, FIG. **4** is a cross-sectional view illustrating a flow path of the fluid heating heater according to one embodiment of the present invention, and FIG. **5** is a perspective view illustrating a bottom surface of the fluid heating heater according to one embodiment of the present invention.

[0043] According to the above drawings, the fluid heating heater according to one embodiment of the present invention may include a main body **1** in which a flow path through which a fluid flows in and is heated is formed, an inlet **12** that is disposed on one side of the main body **1** and through which the fluid flows in, an outlet **14** that is disposed on the other side of the main body **1** and through which the fluid flows out, and a plurality of flow path protrusions **30** that are provided inside the main body **1** to protrude and are isotropically disposed between the inlet **12** and the outlet **14**.

[0044] The main body **1** forms an overall appearance of the fluid heating heater, and the main body **1** may be made in a roughly flat rectangular shape. The main body **1** may include a main plate **10** including the flow path protrusions **30** on a surface thereof, and a cover **20** coupled to cover an upper portion of the main plate **10**.

[0045] The inlet **12** through which fluid flows in and the outlet **14** through which fluid flows out may be formed on both sides of the main plate **10**. The inlet **12** and the outlet **14** are made in a pipe shape so that a fluid may flow therein. In the present embodiment, the inlet **12** and the outlet **14** may extend parallel to each other along both side surfaces of the main plate **10**. In addition, portions where the inlet **12** and the outlet **14** come into contact with both side surfaces of the main plate **10** communicate with each other, so that the fluid may flow in and out through the inlet **12** and the outlet **14**.

[0046] Meanwhile, the fluid flowing into the fluid heating heater may be a coolant as one example. Of course, the fluid is not limited to the coolant and other types of fluids may be used.

[0047] The main plate **10** is a portion where heating actually takes place while the fluid flows. The main plate **10** may be made in a roughly flat hexahedral shape. In one embodiment, the main plate **10** may be formed so that both side surfaces thereof are parallel to each other, and may be formed so that its width becomes narrower as it is further away from portions adjacent to the inlet **12** and the outlet **14**.

[0048] In the present embodiment, the inlet **12** and the outlet **14** may be symmetrically disposed on both sides centered on the main plate **10**. In addition, as described above, since the inlet **12** and the outlet **14** are disposed to be parallel to each other, the fluid flowing therebetween may flow in a direction perpendicular to the inlet **12** and the outlet **14**. In addition, in FIG. **2**, the inlet **12** is shown as being disposed on the right side of the main plate **10** and the outlet **14** is shown as being disposed on the left side of the main plate **10**, but this is only one example and the inlet **12** may be disposed on the left side of the main plate **10** and the outlet **14** may be disposed on the right side of the main plate **10**.

[0049] A plurality of flow path protrusions **30** may be provided to protrude on the surface of the main plate **10**. As one example, the flow path protrusions **30** may be disposed to have isotropy on the surface of the main plate **10**. Here, isotropy means that the flow path protrusions **30** allow the fluid to flow in any direction between the inlet **12** and the outlet **14** regardless of the direction of the inlet **12** and the outlet **14**. For example, in FIG. **2**, the fluid flowing into the inlet **12** may be converted into a vertical direction and flow between the flow path protrusions **30** and flow out through the outlet **14**, and when the outlet **14** acts as a fluid inflow point, the fluid may flow into the outlet **14** and flow out through the inlet **12**.

[0050] In addition, in the present embodiment, since the fluid flow paths are formed in series rather than in parallel on the main plate **10**, there is an advantage in that no differential pressure occurs and the degree of design freedom is increased compared to flow paths disposed in parallel.

[0051] The flow path protrusions **30** may be disposed in a plurality of columns and rows on the surface of the main plate **10**. In addition, the fluid flow path may be formed substantially along a line flowing between the flow path protrusions **30**. As described above, the flow path protrusions **30** are disposed in the plurality of columns and rows, and among the flow path protrusions **30**, the flow path protrusions **30** disposed in the same column and row may be disposed to have a constant interval. When the flow path protrusions **30** are disposed in this way, the fluid flow path formed between the inlet **12** and the outlet **14** may have isotropy.
[0052] In addition, the flow path protrusion **30** may be disposed between flow path protrusions **30** disposed in a next adjacent row or column. For example, when the flow path protrusions **30** disposed in a first row are disposed at a constant interval, the flow path protrusions **30** disposed in a second row may not be disposed at the same position as in the first row, but may be disposed between the flow path protrusions **30** disposed in the first row. As one embodiment, each of the flow path protrusions **30** disposed in the second row may be disposed in a center between the flow path protrusions **30** disposed in the first row.
[0053] As one embodiment, the flow path protrusions **30** disposed in a third row may be disposed in a position parallel to the flow path protrusions **30** disposed in the first row in a column direction. That is, since the flow path protrusions **30** disposed in the third row are disposed in the centers between the flow path protrusions **30** disposed in the second row, the flow path protrusions **30** disposed in the third row may be disposed in the position parallel to the first row in the column direction. In this way, the flow path protrusions **30** may be alternately disposed in each row.
[0054] The above description is given using the example of the flow path protrusions **30** disposed along the rows, and may be equally applied to the flow path protrusions **30** disposed along the columns. As one embodiment, the flow path protrusions **30** may be alternately disposed in each column. Ultimately, when the flow path protrusions **30** are disposed in this way, since isotropic flow paths may be formed between the inlet **12** and the outlet **14**, the inlet **12** and the outlet **14** may be interchangeably used without being restricted by the direction of the inlet **12** and the outlet **14**.
[0055] As one embodiment, the flow path protrusion **30** may be formed to have a rhombus-shaped cross-section. Of course, in the present embodiment, the reason why the flow path protrusions **30** have a rhombus-shaped cross-section is to allow the fluid flowing between the flow path protrusions **30** to move more smoothly along the flow path. To this end, the flow path protrusion **30** may be disposed so that a diagonal line in the rhombus shape lies along a fluid flow on the main plate **10**. That is, referring to FIG. **2**, the flow path protrusion **30** may be disposed so that a longer diagonal line of the two diagonal lines lies along a flow direction of the fluid. When the flow path protrusion **30** is disposed in this way, since the fluid moves along an inclined side surface of the flow path protrusion **30** as the fluid moves to the left or right on the drawing, the flow may be smooth.
[0056] Of course, in the above, the formation of the shape of the flow path protrusion **30** in the rhombus cross-section shape is only one example, and the flow path protrusion **30** may employ any cross-section when the cross-section may allow the fluid to smoothly move. For example, the flow path protrusion **30** may be formed to have an elliptical cross-section to allow the fluid to smoothly move.
[0057] Referring to FIGS. **3** and **4**, the fluid may flow into the inlet **12**, change its direction into a vertical direction, and then flow toward the main plate **10**. In addition, the fluid may be heated while flowing between the flow path protrusions **30** protruding on the main plate **10**, and then flow into the outlet **14** to be discharged to the outside.
[0058] The flow path protrusion **30** may be formed so that its upper end is spaced apart from the cover **20**. The flow path protrusion **30** protrudes upward from the surface of the main plate **10**, and is formed so that the upper end does not come into contact with a ceiling surface and has a predetermined gap. In this case, the gap may be, for example, 4 mm or less, but is not limited thereto. In this way, when the upper end of the flow path protrusion **30** forms a gap with the cover

20, the fluid flow cross-sectional area becomes smaller, so that the fluid speed in a corresponding section may increase.

[0059] Referring to FIG. **5**, a heating element **50** is disposed on one surface, that is, a lower surface, of the main plate **10**. The heating element **50** is mounted on a portion of one surface of the main plate **10** in which the fluid flow path is formed to serves to heat the fluid by applying heat toward the flow path. As one embodiment, the heating element **50** may be in the form of a film to be mounted on one surface of the main plate **10**. In addition, an insulating layer **40** is disposed between the heating element **50** and the main plate **10**.

[0060] FIG. **6** is a bottom view illustrating an existing fluid heating heater, and FIG. **7** is a view illustrating that a temperature deviation occurs in a heating element illustrated in FIG. **6**.

[0061] FIG. **6** illustrates the existing fluid heating heater in which a heating element **50** is mounted at the center of a lower surface of a main plate **10**. When a fluid is heated with the heating element **50** positioned in the center in this way, a temperature deviation occurs as illustrated in FIG. **7**. That is, a phenomenon in which the temperature is low near an inlet **12** through which the fluid flows in and the temperature increases toward the outlet **14** occurs.

[0062] FIG. **8** is a bottom view illustrating a fluid heating heater according to one embodiment of the present invention.

[0063] Referring to FIG. **8**, in the present embodiment, in order to solve the problem examined in FIGS. **6** and **7**, a heating element **50** is disposed close to an inlet **12**. That is, by moving and disposing the heating element **50** toward a side of the inlet **12** from a side of an outlet **14** as a whole, the fluid temperature at the side of the inlet **12** may be further increased. In this way, when the heating element **50** is eccentrically disposed, since the fluid may be further heated through the heating element **50** at the side of the existing inlet **12**, the fluid temperature at the side of the inlet **12** relatively increases. Then, as a result, the overall temperature distribution of the fluid flow path may be uniform.

[0064] FIG. **9** is a cross-sectional view illustrating a fluid heating heater according to another embodiment of the present invention.

[0065] Referring to FIG. **9**, as one example, a flow path protrusion **30** may be formed so that its height increases toward an outlet **14** from an inlet **12**. That is, the flow path protrusion **30** disposed at a side of the outlet **14** has the highest height and the height decreases in a step-like shape toward the inlet **12**, so that the flow path protrusion **30** disposed at a side of the inlet **12** may have the lowest height. For reference, in the present embodiment, the heating element **50** may be disposed as in FIG. **8** or may be disposed in the center as in FIG. **6**.

[0066] As seen in FIGS. **6** and **7**, since the temperature at the side of the inlet **12** is higher than the temperature at the side of the outlet **14** in the existing flow heating heater, so to make it uniform, in order to make the temperature difference uniform, the flow path protrusions **30** are made to have different heights in a step form as described above. In this way, when the height of the flow path protrusion **30** increases toward the outlet **14**, since the heat dissipation area at the side of the outlet **14** increases, it is possible to improve the heat dissipation performance and make the overall temperature distribution of the fluid flow path uniform.

[0067] Meanwhile, in the present embodiment, the height of the flow path protrusion **30** has been described as increasing toward the side of the outlet **14** from the side of the inlet **12** as a whole, but the present embodiment is not limited thereto. For example, the flow path protrusion **30** may be formed so that its height is different only in some sections. That is, the height of the flow path protrusion **30** may increase only in some sections centered on the side of the inlet **12**, or the height may decrease only in some sections centered on the side of the outlet **14**.

[0068] FIG. **10** is a plan view illustrating a fluid heating heater according to still another embodiment of the present invention.

[0069] With reference to FIG. **10**, a fluid heating heater according to the still another embodiment of the present invention may include a main body **1** in which a flow path through which a fluid flows in and is heated is formed, an inlet **12** that is disposed on one side of the main body **1** and through which the fluid flows in, an outlet **14** that is disposed on the other side of the main body **1** and through which the fluid flows out, and flow path protrusions **30** that are provided inside the main body **1** to protrude and are disposed between the inlet **12** and the outlet **14** so that a surface area thereof increases toward the outlet **14** from the inlet **12**.

[0070] The flow path protrusions **30** may be disposed in a plurality of columns and rows on the surface of a main plate **10**. In addition, the fluid flow path may be formed substantially along a line flowing between the flow path protrusions **30**. In this case, unlike the above-described embodiments, the flow path protrusions **30** may be disposed so that a surface area increases toward the outlet **14** from the inlet **12**, and this may be implemented by various embodiments.

[0071] As one embodiment, the flow path protrusions **30** may be disposed so that the number thereof increases toward the outlet **14** from the inlet **12**. Since as the number of flow path protrusions **30** increases in this way, the total surface area of the flow path protrusions **30** increases, the fluid comes into contact with surfaces of the flow path protrusions **30** more as the fluid flows downstream. Since the fluid temperature at the inlet **12** is higher than the fluid temperature at the outlet **14**, the temperature of the heating element **50** (see FIG. **5**) may be uniformized and the differential pressure may be reduced. Meanwhile, the flow path protrusions **30** may have the same size or may have different sizes.

[0072] As one embodiment, the flow path protrusions **30** may be disposed so that the size thereof decreases toward the outlet **14** from the inlet **12**. When the sizes of the flow path protrusions **30** decrease in this way, since the total surface area of the flow path protrusions **30** increases, the fluid may come into contact with the surface of the flow path protrusions **30** more as the fluid flows downstream.

[0073] As one embodiment, the flow path protrusions **30** may be disposed so that an interval between the flow path protrusions **30** becomes narrower toward the outlet **14** from the inlet **12**. When the interval of the flow path protrusions **30** becomes narrower in this way, since the total surface area of the flow path protrusions **30** increases, the fluid may come into contact with the surface of the flow path protrusions **30** more as the fluid flows downstream.

[0074] As one embodiment, the flow path protrusion **30** may include a first flow path protrusion **32** disposed between the inlet **12** and a central portion centered on the central portion of the inlet **12** and the outlet **14** and a second flow path protrusion **34** disposed between the central portion and the outlet **14**, and the first flow path protrusion **32** may be formed to have a larger size than the second flow path protrusion **34**.

[0075] As one embodiment, the first flow path protrusion **32** may be disposed to have a narrower interval than the second flow path protrusion **34**.

[0076] Meanwhile, in the present embodiment, the flow path protrusions **30** are described as being disposed with the first flow path protrusion **32** and the second flow path protrusion **34**, but the present embodiment is not limited thereto, and the flow path protrusions **30** may be disposed with three or more different sizes, shapes, and numbers between the inlet **12** and the outlet **14**.

[0077] According to one embodiment of the present invention, since fluid flow paths are formed on a main plate in series rather than in parallel, it is possible to prevent occurrence of differential pressure and increase the degree of design freedom compared to flow paths disposed in parallel.

[0078] In addition, according to one embodiment of the present invention, since a plurality of flow path protrusions are alternately disposed in each column and row on a main plate, by forming an isotropic flow path between an inlet and an outlet, it is possible to interchangeably use the inlet and the outlet without being restricted by a direction of the inlet and the outlet.

[0079] In addition, according to one embodiment of the present invention, by changing the position of a heating element mounted on a main plate and the height of a flow path protrusion to match inlet and outlet sides, it is possible to make a temperature distribution of a fluid flow path uniform overall.

[0080] Although the specific embodiments of the present invention have been described above, it is understood that one ordinary skilled in the art can make various changes and modifications to the present invention without departing from the spirit and scope of the present invention as hereinafter claimed.

Claims

1. A fluid heating heater comprising: a main body in which a flow path through which a fluid flows in and is heated is formed; an inlet that is disposed on one side of the main body and through which the fluid flows in; an outlet that is disposed on the other side of the main body and through which the fluid flows out; and a plurality of flow path protrusions that are provided inside the main body to protrude and are isotropically disposed between the inlet and the outlet.
2. The fluid heating heater of claim 1, wherein the main body includes: a main plate including the flow path protrusions on a surface thereof; and a cover coupled to cover an upper portion of the main plate.
3. The fluid heating heater of claim 2, wherein the inlet and the outlet are symmetrically disposed on both sides centered on the main plate.
4. The fluid heating heater of claim 2, wherein an upper end of the flow path protrusion is formed to be spaced apart from the cover.
5. The fluid heating heater of claim 2, wherein the flow path protrusions are disposed in a plurality of columns and rows on the main plate.
6. The fluid heating heater of claim 5, wherein the flow path protrusions disposed in the same column and row among the flow path protrusions are disposed at a constant interval.
7. The fluid heating heater of claim 5, wherein the flow path protrusion is disposed between the flow path protrusions disposed in a next adjacent row or column.
8. The fluid heating heater of claim 2, wherein the flow path protrusion is formed to have a rhombus-shaped cross-section.
9. The fluid heating heater of claim 8, wherein the flow path protrusion is disposed so that a rhombus-shaped diagonal line lies in a flow direction of the fluid on the main plate.
10. The fluid heating heater of claim 2, wherein the flow path protrusion is formed to have an elliptical cross-section.
11. The fluid heating heater of claim 2, wherein the flow path protrusion is formed so that a height thereof increases toward the outlet from the inlet.
12. The fluid heating heater of claim 2, wherein a height thereof increases in some sections toward the outlet from the inlet.
13. The fluid heating heater of claim 2, wherein a heating element is mounted on a lower surface of the main plate to transfer heat to the main plate.
14. The fluid heating heater of claim 13, wherein the heating element is disposed closer to the inlet than the outlet with respect to a flow direction of the fluid.
15. A fluid heating heater comprising: a main plate in which a flow path through which a fluid flows in and is heated is formed; an inlet that is disposed on one side of the main plate and through which the fluid flows in; an outlet that is disposed on the other side of the main plate and through which the fluid flows out; and a flow path protrusion that is provided inside the main plate to protrude and is disposed between the inlet and the outlet so that a surface area thereof increases toward the outlet from the inlet.
16. The fluid heating heater of claim 15, wherein the flow path protrusion is formed so that a size thereof decreases toward the outlet from the inlet.
17. The fluid heating heater of claim 15, wherein the flow path protrusions are disposed so that the number thereof increases toward the outlet from the inlet.
18. The fluid heating heater of claim 15, wherein the flow path protrusions are disposed so that an

interval therebetween becomes narrower toward the outlet from the inlet.

19. The fluid heating heater of claim 15, wherein the flow path protrusion includes: a first flow path protrusion disposed between the inlet and a central portion of the inlet and the outlet; and a second flow path protrusion disposed between the central portion and the outlet, and the first flow path protrusion is formed to have a larger size than the second flow path protrusion.

20. The fluid heating heater of claim 19, wherein the first flow path protrusions are disposed to have a narrower interval than the second flow path protrusions.