

THERMAL CONDUCTIVE CYLINDER INSTALLED WITH U-TYPE CORE PIPING AND LOOP PIPING

BACKGROUND OF THE INVENTION

5 (a) Field of the Invention

The present invention relates to a thermal conductive cylinder installed with U-type core piping and loop piping for being installed within the thermal storage body (500) composed of natural thermal storage body, such as shallow surface of the earth, or pool, lake, river, ocean, etc, or artificial
10 objects in solid, or gaseous, or liquid state; wherein the thermal conductive cylinder installed with U-type core piping and loop piping is constructed through that the piping segments of fluid inlet terminal and/or outlet terminal of the U-type core piping and loop piping are directly made of thermal insulating material, or thermal insulating structure is installed between the
15 inlet terminal and the outlet terminal; so as to prevent thermal energy loss because of thermal conduction between adjacent piping segments of inlet terminal and outlet terminal on the same side when thermal conductive fluid with temperature difference passing through.

(b) Description of the Prior Art

20 Traditionally, thermal energy loss often occurs in U-type piping device of U-type piping heat exchanger, because of thermal conduction by temperature difference between adjacent piping segments of fluid inlet terminal and fluid outlet terminal installed on the same side when fluid with temperature difference passing through.

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SUMMARY OF THE INVENTION

The present invention provides a device in accordance with the appended claims.

The present invention relates to radial U-type pipelines for passing thermal energy through each other, wherein the piping segments of the
30 U-type fluid piping inlet terminal and/or outlet terminal, which are radial

U-type pipelines for passing thermal energy through each other, are directly made of thermal insulating material, or thermal insulating structure is installed between the inlet terminal and the outlet terminal; and the above piping system is installed within the thermal conductive cylinder made of thermal conductive material; so as to prevent thermal energy loss because of thermal conduction by temperature difference between adjacent piping segments with temperature difference of inlet terminal and outlet terminal installed on the same side when fluid with temperature difference passing through.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows an embodiment of conventional U-type piping (100) installed within the thermal storage body (500);

FIG. 2 shows an embodiment of conventional U-type piping (100) installed within the columnar thermal conductive body (300), wherein the columnar thermal conductive body (300) is placed within the thermal storage body (500);

FIG. 3 is a structural schematic view showing that two or more radially arranged U-type piping sections are installed within thermal conductive cylinder, and the thermal insulating structure is installed at where close to the peripheral of piping group with same flow direction which concentrates toward axial core, according to the present invention;

FIG. 4 is a section view of FIG. 3.

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DESCRIPTION OF MAIN COMPONENT SYMBOLS

100 : U-type piping

101 : First fluid inlet and outlet terminal

102 : Second fluid inlet and outlet terminal

30 111 : Thermal conductive fluid

300 : Columnar thermal conductive body

400 : Thermal insulating device

500 : Thermal storage body

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DETAILED DESCRIPTION OF THE PREFERED EMBODIMENTS

The present invention relates to a thermal conductive cylinder installed with U-type core piping and loop piping for being installed within the thermal storage body (500) composed of natural thermal storage body, such as shallow surface of the earth, or pool, lake, river, ocean, etc, or artificial objects in solid, or gaseous, or liquid state; wherein the thermal conductive cylinder installed with U-type core piping and loop piping is constructed through that the piping segments of fluid inlet terminal and/or outlet terminal of the U-type core piping and a thermal insulating structure is installed between the inlet terminal and the outlet terminal; so as to prevent thermal energy loss because of thermal conduction between adjacent piping segments of inlet terminal and outlet terminal on the same side when thermal conductive fluid with temperature difference passing through.

As for the thermal conductive cylinder installed with U-type core piping and loop piping of the present invention, each of the U-type piping (100) is used for passing through one or more following thermal conductive fluid (111), including for passing through:

- 1) liquid state fluid;
- 2) gaseous state fluid;
- 3) liquid to gaseous state fluid; and
- 4) gaseous to liquid state fluid.

Traditionally, thermal energy loss often occurs in U-type piping device of U-type piping heat exchanger, because of thermal conduction by

temperature difference between adjacent piping segments of fluid inlet terminal and fluid outlet terminal installed on the same side when fluid with temperature difference passing through, which is illustrated by examples as followings:

5 FIG. 1 shows an embodiment of conventional U-type piping (100) installed within the thermal storage body (500). When the thermal conductive fluid (111) passing through the piping segment of the first fluid inlet and outlet terminal (101) and the adjacent piping segment of the second fluid inlet and outlet terminal (102) respectively installed on the same side of the U-type piping (100) are in temperature difference, the two piping segments will produce thermal conduction and therefore result in thermal energy loss.

FIG. 2 shows an embodiment of conventional U-type piping (100) installed within the columnar thermal conductive body (300), wherein the columnar thermal conductive body (300) is placed within the thermal storage body (500).

When the columnar thermal conductive body (300) is installed at the thermal conductive cylinder installed with U-type core piping and loop piping of the thermal storage body (500) composed of natural thermal storage body, such as shallow surface of the earth, or pool, lake, river, ocean, etc, or artificial objects in solid, or gaseous, or liquid state, and the thermal conductive fluid (111) with temperature difference passes through the first fluid inlet and outlet terminal (101) and the second fluid inlet and outlet terminal (102) of the U-type piping, there will be thermal energy loss, because of thermal conduction between adjacent piping segments of the first fluid inlet and outlet terminal (101) and the second fluid inlet and outlet terminal (102) installed on the same side.

The present invention relates to a thermal conductive cylinder installed with U-type core piping and loop piping for being installed within the thermal storage body (500) composed of natural thermal

storage body, such as shallow surface of the earth, or pool, lake, river, ocean, etc, or artificial objects in solid, or gaseous, or liquid state; wherein the thermal conductive cylinder installed with U-type core piping and loop piping is constructed through that the piping segments of the U-type fluid piping inlet terminal and/or outlet terminal, which are radial U-type pipelines for passing thermal energy through each other, a thermal insulating structure is installed between the inlet terminal and the outlet terminal; so as to prevent thermal energy loss because of thermal conduction between adjacent piping segments of inlet terminal and outlet terminal on the same side when thermal conductive fluid with temperature difference passing through.

FIG. 3 is a structural schematic view showing that two or more radially arranged U-type piping sections are installed within thermal conductive cylinder, and the thermal insulating structure is installed at where close to the peripheral of piping group with same flow direction which concentrates toward axial core, according to the present invention.

FIG. 4 is a section view of FIG. 3.

As shown in FIG. 3 and FIG. 4, the main components are as followings:

---U-type piping (100): made of U-type tubular body for the thermal conductive fluid (111) passing through, wherein the U-type piping (100) is used for being installed within the columnar thermal conductive body (300) composed of solid state or colloidal object; each of the U-type piping (100) has the first fluid inlet and outlet terminal (101) and the second fluid inlet and outlet terminal (102), the piping segments near the first fluid inlet and outlet terminal (101) are concentrated adjacent installed at the core of the columnar thermal conductive body (300), and the piping segments near the second fluid inlet and outlet terminal (102) are radially arranged along the axial direction and near the edge of the columnar thermal conductive body (300);

---Columnar thermal conductive body (300): made of thermal conductive material; and

---Thermal insulating device (400): related to thermal insulating structure constituted by the followings with thermal insulating effects,
5 such as solid, flexible body, or foam, or enveloped colloid, gas, or liquid, or vacuum structure, for being placed between the piping segments near the first fluid inlet and outlet terminal (101) of each of the U-type piping (100), which are concentrated adjacent installed at the axial core of the columnar thermal conductive body (300), and the piping segments near
10 the second fluid inlet and outlet terminal (102) of each of the U-type piping are enveloped by thermal insulating material; by way of the above thermal insulating structure, for substantially reducing thermal energy loss caused by thermal conduction between adjacent piping segments of the first fluid inlet and outlet terminal (101) and the second fluid inlet and
15 outlet terminal (102) on the same side of the U-type piping (100).

CLAIM:**1. A thermal conductive cylinder comprising:**

U-type piping (100): made of two or more U-type tubular bodies (100) for a thermal conductive fluid (111) to pass through, wherein the U-type tubular bodies are radially arranged within a columnar thermal conductive body (300) which is composed of solid state or colloidal object made of thermal conductive material; each of the U-type tubular bodies has a first fluid inlet and outlet terminal (101) and a second fluid inlet and outlet terminal (102), the segments of piping near the first fluid inlet and outlet terminal (101) are concentrated adjacent to the core of the columnar thermal conductive body (300), and the piping segments near the second fluid inlet and outlet terminal (102) are radially arranged along the axial direction of the columnar thermal conductive body (300) and near the edge of the columnar thermal conductive body (300); and

a thermal insulating device (400): placed between the piping segments of the U-type tubular bodies near the first fluid inlet and outlet terminal (101) of each of the U-type tubular bodies and the piping segments near the second fluid inlet and outlet terminal (102) of each of the U-type tubular bodies, the piping segments near the first fluid inlet and outlet terminal (101) being enveloped by the thermal insulating material; the thermal insulating device is installed around the U-type piping section which is concentrated towards the axial core of the thermally conductive cylinder; the thermal insulating device substantially reduces the thermal energy loss caused by thermal conduction between adjacent piping segments of the first fluid inlet and outlet terminal (101) and the second fluid inlet and outlet terminal (102) on the same side of the U-type piping (100).