Claims

1. A reaction device which is provided with a heat-medium circulation tube in contact with an outer wall of a reaction vessel containing a reaction liquid, and at the same time, is provided with an inlet for the liquid heat medium at the lower end portion of the heat-medium circulation tube, and an outlet for the liquid heat medium or a gas heat medium which is a vaporized liquid heat medium at the upper end portion of the heat-medium circulation tube, respectively, wherein the outlet is a plurality of the orifices which direct diagonally below with respect to the horizontal direction.

2. The reaction device according to claim 1, wherein the heat-medium circulation tube is wound spirally from the bottom side of the reaction vessel to the top side the of reaction vessel.

3. The reaction device according to claim 1 or 2, wherein gaps between the heat-medium circulation tube and the reaction vessel outer wall are filled with a filler.

4. The reaction device according to claim 3, wherein the filler is formed by a material in which a liquid can flow inside the filler, and at the same time, the outlet is formed in a direction such that the liquid heat medium is discharged toward the filler.

5. The reaction device according to any one of claims 1 to 4, wherein a pressing member for pressing the heat-medium circulation tube against the outer wall of the reaction vessel is provided on the outer circumference of the heat-medium circulation tube.

6. The reaction device according to any one of claims 1 to 5, wherein an outer vessel is provided which hermetically covers the outer circumference of the reaction vessel provided with the heat-medium circulation tube.

7. The reaction device according to any one of claims 1 to 6, wherein the heat medium is liquid nitrogen.

8. A reaction device which is provided with a heat-medium circulation tube, via a filler inside which a liquid can flow, on an outer wall of a reaction vessel containing a reaction liquid, and at the same time, is provided with an inlet for the liquid heat medium at the lower end portion of the

heat-medium circulation tube, and an outlet for the liquid heat medium or a gas heat medium which is a vaporized liquid heat medium at the upper end portion of the heat-medium circulation tube, respectively, wherein the outlet is a plurality of the orifices which direct diagonally below with respect to the horizontal direction.