[0057] Claims

1. A cleaning device having a heat recovery unit, comprising:

   a water inlet unit for inputting water of a first temperature;

   a heater unit for connecting with the water inlet unit and heating or adjusting the water from the water inlet unit to hot water of a third temperature;

   a water outlet unit for connecting with the heater unit and outputting the hot water of the third temperature for cleaning operation; and

   a heat recovery unit in fluid communication with the hot water from the water outlet unit and/or steam generated therefrom for receiving, storing, transferring, and/or regulating heat or waste heat from the hot water and/or the steam;

   wherein the water inlet unit connects at least partly with the heat recovery unit to receive heat or waste heat from the heat recovery unit and/or the hot water and/or the steam, by which heat or waste heat the water in the water inlet unit is regulated to be of a second temperature before heated by the heater unit;

   wherein the water inlet unit comprises a meandering portion extending back and forth along the width and/or height of at least a portion of the heat recovery unit to maximise the contact area between the water inlet unit and the heat recovery unit.

2. The cleaning device according to Claim 1, further comprising a waste water treatment unit in fluid communication with the water outlet unit and adapted for processing waste water used for cleaning operation and output from the water outlet unit.

3. The cleaning device according to claim 2, wherein the heat recovery unit and/or the water inlet unit are further connected to the waste water treatment unit to receive the waste heat from the waste water so that the water in the water inlet unit is preheated or adjusted to the second temperature before being heated by the heater unit.

4. The cleaning device according to anyone of the preceding claims, further comprising a condensate treatment unit adapted for being in fluid communication with the steam generated by the water outlet unit for treating

condensed water from the steam.

5. The cleaning device according to claim 4, wherein the heat recovery unit and/or the water inlet unit are further connected to the condensate treatment unit to receive the condensed water and/or the heat from the condensed water, so that the water in the water inlet unit is preheated or adjusted to the second temperature before being heated by the heater unit.

6. The cleaning device according to claim 4, wherein longitudinal axes of the water inlet unit, the water outlet unit, the heat recovery unit, the condensate treatment unit and/or the waste water treatment unit are aligned with each other.

7. The cleaning device according to claim 4, wherein at least a portion of the water inlet unit and/or the waste water treatment unit and/or the condensate treatment unit is arranged in a manner of surrounding a longitudinal axis of the heat recovery unit, comprising a manner of surrounding concentrically a longitudinal axis of the heat recovery unit.

8. The cleaning device according to anyone of the preceding claims, wherein the first temperature comprises 25 °C, 45-57 °C or 5-57 °C; and/or the second temperature comprises 45-57 °C or 35-65 °C; and/or the third temperature comprises 70-85 °C or 70-95 °C.

9. A cleaning apparatus for cleaning tableware comprising at least one cleaning device as claimed in claim 4, and further comprising:

an automatic conveying mechanism including a belt conveyor mechanism extended through an input end and an output end of the cleaning apparatus so that the tableware, comprising a bowl, a dish, a disk, and/or a cup, can be conveyed therebetween;

wherein at least one cleaning device is arranged between the input end and the output end to clean the tableware passing therethrough and conveyed therebetween;

wherein in a configuration of the cleaning apparatus comprising a plurality of cleaning devices, the cleaning devices are arranged in series or in cascade between the input end and the output end to sequentially clean the tableware conveyed therebetween; and the water inlet unit, the heat recovery unit, the

condensate treatment unit, and/or the waste water treatment unit of one of the plurality of cleaning devices are respectively connected with the water inlet unit, the heat recovery unit, the condensate treatment unit, and/or the waste water treatment unit of other one or more of the cleaning devices, so as to facilitate the water in one or more of the water inlet unit to be preheated or adjusted to the second temperature before being heated by respective heater units.

10. The cleaning apparatus as claimed in claim 9, wherein in the configuration of the cleaning apparatus comprising the plurality of cleaning devices, one of the plurality of cleaning devices and the other one or more of the plurality of the cleaning devices are configured to share one or more of the heat recovery units; and/or the condensate treatment unit and/or the waste water treatment unit of one of the plurality of cleaning devices are respectively in connection with the water inlet unit, the heat recovery unit, the condensate treatment unit, and/or the waste water treatment unit of other one or more of the cleaning devices; and/or the condensate treatment unit of one of the plurality of cleaning devices are respectively in fluid communication with the water inlet unit, the heat recovery unit, and/or the condensate treatment unit of other one or more of the cleaning devices; wherein the connection and/or the fluid communication facilitate the water in one or more of the water inlet unit to be preheated or adjusted to the second temperature before being heated by respective heater units.