

REPLACED SHEETS SG

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PURIFYING AND ENERGY-SAVING WATER FOUNTAIN CAPABLE OF SUPPLYING ICY, WARM AND HOT DISTILLED WATER

BACKGROUND OF TECHNOLOGY

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In this civilized society, economic prosperity have
 resulted in harmful pollution to the environment in
 general, especially the pollution in the quality of
 water which has been getting worse and worse day after
 10 day to the extent of seriously threatening the sources
 of water needed by human beings and substantially
 affecting the health of human beings. Although a
 variety of types of water filters and water fountains
 are available on the markets, they are different in
 15 functions, and none of them can satisfy all the
 requirements in differently polluted environments. In
 addition, due to the consumers' lack of common knowledge
 of maintenance, such devices would, in most times,
 eventually become the hot-bed of bacteria and useless.
 20 In view of these discrepancies, the design of this
 purifying and energy-saving water fountain capable of
 supplying icy, warm and hot distilled water (hereinafter
 referred to as "Purified and Distilled Water Fountain")
 is created to meet actual requirements.

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Presently, "distilled water" is the purest water
 generally recognized by the peoples around the world.
 The drinking water to be supplied by the "Purified and
 Distilled Water Fountain" of this invention is the very
 30 distilled water needed by human beings and free from
 pollutants. Therefore, the purpose of this invention is
 to develop a novel distilled water fountain to overcome
 the above-mentioned shortcomings.

SUMMARY OF INVENTION

According to this invention, the softened water or running water from the intake pipe will first flow
5 though a pre-heating exchanger wherein the water temperature will increase to about 30°C; and secondly flow through a condensing-and-heating exchanger wherein the water temperature will increase to the level above 90°C. The water in the steam generator will be vaporized
10 into steam having a temperature over 100°C. The steam will be sent back to the condensing-and-heating exchanger and condensed into distilled water having a temperature of about 30°C. The distilled water will flow into a water tank for storage before use. Since the
15 temperature of the softened water has increased to a level above 90°C after the water comes out from the condensing-and-heating exchanger, therefore, it requires not too much heating energy to vaporize the water in the steam generator, and thus a considerable amount of
20 energy can be saved.

The water in the water tank is the ordinary warm water which is available for drinking as it is, and can be reheated by the steam generator to the temperature
25 above 95°C for use in making tea, coffee or hot milk, or can be chilled by the electronic chilling device to the temperature between 7°C and 12°C for drinking by users. The heat energy absorbed from the hot water undergoing chilling process in the chilling device can be used to
30 pre-heat the softened water in the first heat exchanger.

From the above description, it may be appreciable

that this invention is indeed a perfect water fountain created for use in modern living.

BRIEF DESCRIPTION OF THE DRAWINGS

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Figure 1 is a schematic diagram of the pipeline layout of this invention;

Figure 2 is the schematic diagram of pipeline layout of an alternative embodiment of this invention; and

Figure 3 shows the structure of the electronic chilling device of this invention.

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DETAILED DESCRIPTION OF THE INVENTION

A more complete understanding of the objective, features and advantages of this invention will be obtained by making reference to the following descriptions and the Figures.

Referring to Figure 1, in which the softened running water flows into the pre-heating exchanger 10 through water pipe 1. The water is heated in the pre-heating exchanger 10 to a temperature about 30°C before flowing, through pipe 2, into the condensing-and-heating exchanger 20 in which the water is heated to a temperature over 90°C. The water will then flow, through pipe 3, into the steam generator 30 in which the water is further heated and vaporized into steam having a temperature over 100°C. The steam will then be piped

back, through pipe 4, into the condensing-and-heating exchanger 20 in which a heat-exchange process will be effected between the steam and the softened water flowing in through pipe 2. The steam will be condensed
5 into distilled water at a temperature about 30°C and then flow, through pipe 5, into the distilled water storage tank 40 ready for use.

The warm water in the distilled water storage
10 tank 40 may be let out through pipe 6 and then flow out through the warm water pipe 12 for direct drinking by users. The warm water let out through pipe 6 may also flow, through pipe 8, into steam generator 30 undergoing heat exchange process and reheating to raise its
15 temperature to 95°C and then flow out through pipe 13 for the user to make tea, coffee or hot milk. The heat exchanging pipeline from pipe 8 installed in the steam generator 30 is submerged in the water inside the steam generator 30, i.e., the submerged pipe heating method is
20 adapted in the invention; therefore, the water being heated in the pipeline will not vaporize, thus will not cause any threat of danger.

In addition, the distilled water in the distilled
25 water storage tank 40 may, after being let out through pipe 6, also flow, through pipe 7, into the electronic chilling device 50 in which the water is chilled to a low temperature between 7°C and 12°C and then flow out through the icy water outlet pipe 11 for drinking by
30 users.

Figure 2 shows a schematic diagram of another embodiment of this invention which provides a water pump

60 between the water storage tank 40 and the three water outlet pipes. In case the outlet pipes is located at a level higher than the water storage tank 40, the pump 60 can pump the water in the water storage tank 40 into the outlets for use by the users.

Figure 3 shows the electronic chilling device used in this invention which consists a radiating fin 21, a cooling pipe 22, an electronic chilling semi-conductor 23, a condensing fin 24, a coil pipe 25 and eutectic melting salt 26. After applying electric power, the electronic chilling semi-conductor 23 is actuated and causes the condensing fin 24 to drop the temperature of the water, and the radiator fin 21 to radiate heat. The temperature of the liquid phase eutectic melting salt 26 contained in the electronic chilling device 50 will drop gradually to a physical state change temperature (preferably 8°C) whereby the liquid phase eutectic melting salt 26 will be condensed into solid phase which can store a large amount of cold energy. Since the coil pipe 25 is submerged in the eutectic melting salt 26 in device 50, when the distilled water stored in the distilled water storage tank 40 flows through pipe 7 into coil pipe 25, it will absorb the cold energy being stored in the eutectic melting salt 26 and become icy water at a temperature between 7°C to 12°C which can be let out through the icy water pipe 11 for use by the users. According to the design of this invention, the eutectic melting salt 26 will turn into either solid phase or solid and liquid co-existence phase during the operation of the water fountain, therefore, the change of the physical state of the eutectic melting salt 26 will enable the salt to store in it a large amount of

cold energy whereby the temperature of the icy distilled water can be maintained between 7°C to 12°C.

5 In order to save energy by making use of the heat energy radiated by the electronic chilling semiconductor 23, the softened water in the pre-heating exchanger 10 can be routed through the cooling pipe 22 in the radiation fin 21 so that it will perform the dual functions of cooling the electronic chilling semiconductor 23 and pre-heating the softened water.

15 It is appreciable from the above description that the design of the electronic chilling and cold energy storage device in this invention can recover the heat energy for re-use whereby providing a better energy-saving function than conventional drinking water fountains.

20 It is further appreciable from the above description that the novel technology disclosed in this invention is capable not only to effectively solve the problems inhering in the conventional drinking water fountains, but also to provide an energy-saving, quiet operating, purifying and highly efficient distilled water fountain. It is apparent that although the invention has been described in connection with preferred embodiments, those skilled in the art may make changes to certain features of the preferred embodiments without departing from the spirit and scope of the invention as defined in the appended claims.

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WHAT IS CLAIMED IS:

1. A distilled water fountain comprising:

5 a first heat exchanger for heating water to a temperature above 25°C;

a second heat exchanger for re-heating the water flowing out from the said first exchanger to a temperature about 90°C;

10 a steam generator for re-heating the water flowing out from said second exchanger to become vaporized steam, said vaporized steam then flowing back to the second exchanger in which said vaporized steam transfers heat to the water from the first exchanger so as to cause the vaporized
15 steam to be condensed into distilled water;

a distilled water storage tank for storing the distilled water;

20 an electronic chilling device having an electronic chilling semi-conductor and eutectic melting salt, said electronic chilling semi-conductor dropping the temperature of the eutectic melting salt to a level at which the physical state of the eutectic melting salt turns into solid phase or solid and liquid co-existence phase so that the
25 distilled water flowing through a coil pipe submerged in the eutectic melting salt may be cooled into icy water;

a first outlet pipe being connected to the distilled water storage tank;

30 a second outlet pipe being connected to the electronic chilling device; and

a third outlet pipe being connected to the distilled water storage tank with a portion thereof



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submerged in the steam generator.

2. The distilled water fountain according to Claim 1,
wherein the electronic chilling semi-conductor
includes radiating fins extending into said first
heat exchanger and condensing fins extending into
said eutectic melting salt.

