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(54) **AIR HEAT PUMP TYPE HOT WATER STOVE**

(57) The invention discloses a heat pump type water heater employing energy in the hot air, including a compressor, a condenser unit, a throttle valve and an evaporator unit connected to each other, in which said condenser unit is composed of a plurality of condensers, each condenser is composed of a water tank and a heat radiator within the water tank, and each water tank is provided with an inlet and an outlet in a water piping system and a hot water outlet. According to the invention, the water heater produced hot water by absorbing the heat energy in the environment using heat pump principle

so that the heat pollution to the environment is reduced and the energy is saved because of supplying hot water while providing refrigerating capacity. By connecting a plurality of condensers in series, hot water with different temperatures from 45° C-100°C can be dispensed from the water outlets of the condensers, the two evaporators can provide refrigerating capacity directly and indirectly respectively and the condenser unit having its own housing can be connected to the existing air-conditioners to supply hot water.

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a heat pump type water heater employing energy in the hot air, which is used for dispensing hot water in such places as plants, shops, barber's, families and other places provided with central air-conditioners.

BACKGROUND ART

[0002] With the great developments and progresses of the society and the science and technology, the conventional water heaters, which supply hot water using fuel and electricity, not only consume a huge amount of energy, but also cause severe heat pollution to the environment and thus can not meet the need of modernization. On the other hand, a large amount of heat energy discharged by a great number of refrigerators is wasted.

BRIEF DESCRIPTION OF THE INVENTION

[0003] An object of the invention is to provide a heat pump type water heater employing energy in the hot air, which can solve the above problems and save energy because of being usable in combination with refrigerators.

[0004] The object is achieved by providing a heat pump type water heater employing energy in the hot air, including a compressor, a condenser unit, a throttle valve and an evaporator unit connected to each other, characterized in that said condenser unit is composed of a plurality of condensers, each condenser is composed of a water tank and a heat radiator within the water tank, and each water tank is provided with an inlet and an outlet in a water piping system and a hot water outlet.

[0005] Said evaporator unit includes an evaporator for providing refrigerating capacity directly and an evaporator for providing refrigerating capacity indirectly, the evaporator for providing refrigerating capacity directly is provided with a housing having cold water inlet and outlet on it and the evaporator for providing refrigerating capacity indirectly is provided with a fan.

[0006] The water tanks of the plurality of the condenser are connected to each other in series in the water piping system.

[0007] Said compressor, condenser unit, throttle valve and evaporator unit are provided within a case.

[0008] Said condenser unit is provided within its own housing, on which are provided with refrigerating fluid inlet and outlet and water inlet and outlet.

[0009] According to the invention, the water heater produces hot water by absorbing the heat energy in the environment using heat pump principle so that the heat pollution to the environment is reduced and the energy is saved because of supplying hot water while providing refrigerating capacity. By connecting a plurality of con-

densers in series, hot water with different temperatures from 45C-100°C can be dispensed from the water outlets of the condensers, the two evaporators can provide refrigerating capacity directly and indirectly respectively and the condenser unit having its own housing can be connected to the existing air-conditioners to supply hot water.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig.1 schematically shows the arrangement of a heat pump type water heater employing energy in the hot air according to an embodiment of the invention;

Fig.2 is a schematic perspective view of the water heater according the embodiment of the invention; and

Fig.3 schematically shows the construction of a condenser unit.

BEST MODES OF CARRYING OUT THE INVENTION

[0011] Referring to Fig. 1 and 2, a heat pump type water heater employing energy in the hot air according to an embodiment of the invention includes a compressor 1, a plurality of condensers 2, a throttle valve 3 and an evaporator unit 4 connected to each other, in which each condenser 2 is composed of a water tank 21 and a heat radiator 22 within the water tank, these heat radiators 22 of the plurality of condensers 2 are connected to each other in series in refrigerating fluid piping system 5; each water tank 21 is provided with an inlet and an outlet 6 in the water piping system and a hot water outlet 7; and the water tank 21 of the first condenser is provided with a water inlet 10 connected to a water source. The hot water with different temperatures can be dispensed from the water outlets 7 of these water tanks 21.

[0012] Said evaporator unit 4 includes an evaporator 41 for providing refrigerating capacity indirectly and an evaporator 42 for providing refrigerating capacity directly, the evaporator 41 for providing refrigerating capacity indirectly is provided with a housing having cold water inlet 44 and outlet 45 on it and the evaporator 42 for providing refrigerating capacity directly is provided with a fan 46.

[0013] Said compressor 1, condenser unit 2, throttle valve 3 and evaporator unit 4 are provided within a case 8.

[0014] Referring to Fig. 3, said condenser unit 2 is provided within its own housing 9, on which are provided with refrigerating fluid inlet 11 and outlet 12 and water inlet 10 and outlets 7. Number 13 designates a lead wire for temperature sensors on the condensers for temperature detection and control.

Claims

1. A heat pump type water heater employing energy in the hot air , including a compressor, a condenser unit , a throttle valve and an evaporator unit connected to each other, **characterized in that** said condenser unit is composed of a plurality of condensers , each condenser is composed of a water tank and a heat radiator within the water tank ,and each water tank is provided with an inlet and an outlet in a water piping system and a hot water outlet. 5
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2. A heat pump type water heater employing energy in the hot air according to claim 1 , **characterized in that** said evaporator unit includes an evaporator for providing refrigerating capacity indirectly and an evaporator for providing refrigerating capacity directly , in which the evaporator for providing refrigerating capacity indirectly is provided with a housing having cold water inlet and outlet on it and the evaporator for providing refrigerating capacity directly is provided with a fan. 15
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3. A heat pump type water heater employing energy in the hot air according to claim 1 , **characterized in that** the water tanks of the plurality of condenser are connected to each other in series in a water piping system . 25

4. A heat pump type water heater employing energy in the hot air according to claim 1 , 2 or 3 , **characterized in that** said compressor, condenser unit, throttle valve and evaporator unit are provided within a case . 30
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5. A heat pump type water heater employing energy in the hot air according to claim 1 , **characterized in that** said condenser unit is provided within its own housing , on which are provided with refrigerating fluid inlet and outlet and water inlet and outlet. 40

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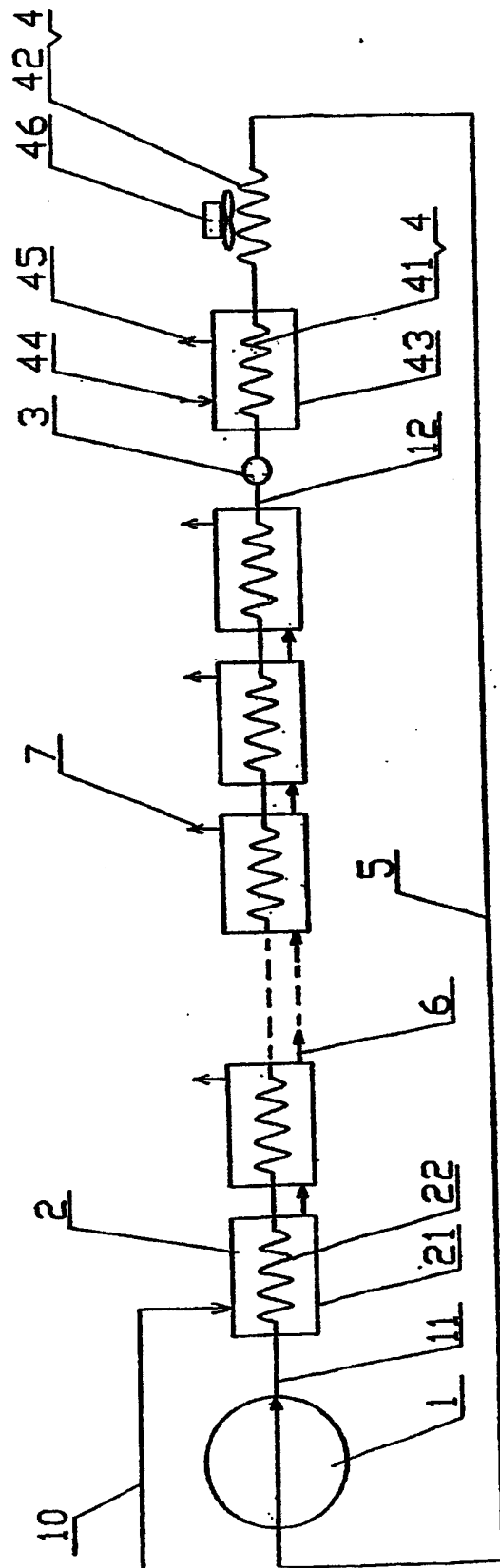


Fig 1

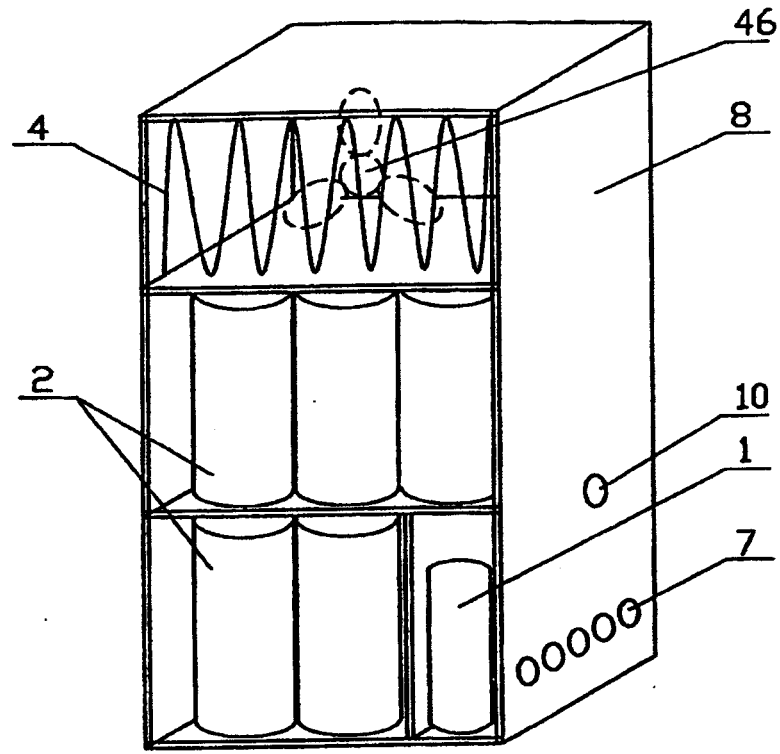


Fig 2

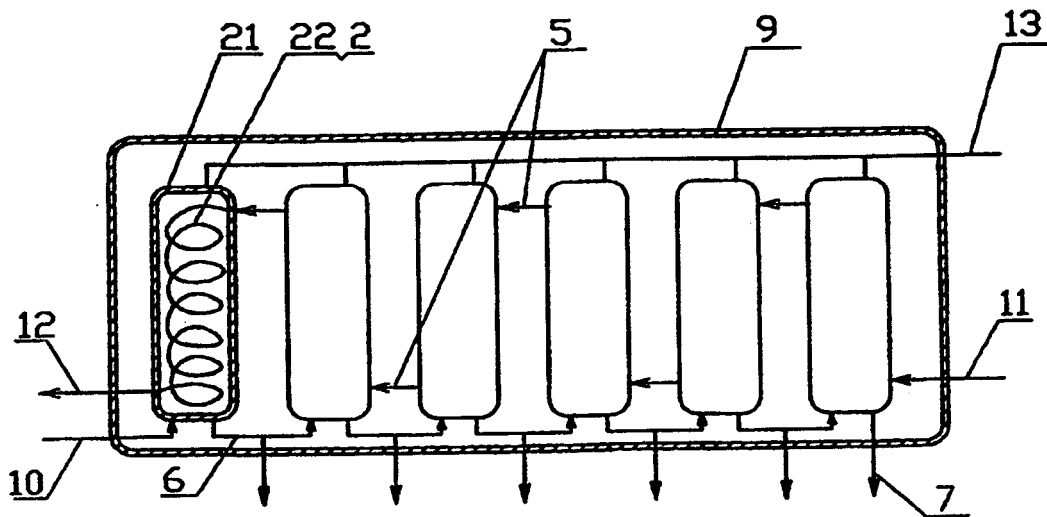


Fig 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2004/000717

A. CLASSIFICATION OF SUBJECT MATTER		
IPC ⁷ F25B 29/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC ⁷ F25B 29/00, 30/00, 30/02, 30/04, F24H 4/02, 4/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Chinese Patent Document		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
EPOQUE, WPI, PAJ, CNPAT		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN,Y, 2332966 (Guo Guimin) 11.Aug. 1999 (11.08.99) whole document	1-5
Y	CN,Y, 2526753 (Jiangsu shuangliang Air-conditioner LTD.) 18. Dec. 2002 (18.12.02) whole document	1,3,5
Y	CN,Y, 2392128 (Liu Xianfa) 16.Aug. 2000 (16.08.00) whole document	4
Y	CN,Y,2260976 (Chen Hui) 27. Aug. 1997 (27.08.97) whole document	2
Y	CN,Y,2526752 (China Academy of Sciences Guangzhou Energy Sources Institute) 18. Dec. 2002 (18.12.02) whole document	1,3,4
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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