

ROOM SOLAR ENERGY HEATING AND REFRIGERATION AIR CONDITIONER OF SPLIT TYPE

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to a solar energy usage field, and in particular to a room solar energy heating and refrigeration air conditioner of split type.

2. The Prior Arts

[0002] A conventional air conditioner generally uses mechanical energy converted by electric energy to operate a compressor. The refrigeration or heating can be operated through the operation of the compressor making the medium flow in the recycle system, which will consume lots of electric energy. Pat. No. 200410042645.8 discloses an air conditioner using solar energy, with its disadvantages of one-way recycle, unobvious refrigeration effect and short operating lifespan.

SUMMARY OF THE INVENTION

[0003] A primary objective of the present invention is to provide a room solar energy heating and refrigeration air-conditioner of split type, which has advantages of good refrigeration and heating effect, low power consumption and long operating life, which solves the drawback of the conventional design.

[0004] The objective of the present invention is achieved by a room solar energy heating and refrigeration air conditioner of split type, which mainly comprises an indoor machine and an outdoor machine. The indoor machine is mainly composed of an evaporator, a circuit control panel and an air blower. The outdoor machine is

equipped with a solar energy storage assembly comprising a energy storage tank and vacuum heat collectors communicated with the energy storage tank and having energy storage material filled therein. The energy storage tank has an exchanger mounted therein, both ends of which are extended out from the energy storage tank, the pipeline of one end is connected with the evaporator through a condensation device and the pipeline of the other end is connected with the evaporator of the indoor machine through a power driving device. The power driving device is connected in series with the pipeline through an electromagnetic change valve. The exchanger, the condensation device and the evaporator form or compose a closed recycle passage in which low-boiling point recycle medium is filled. A filter, a throttle, a capillary tube and a high-pressure valve are disposed in order between the condensation device and the evaporator. A low-pressure valve is mounted between the evaporator and the power-driven device.

[0005] The objective of the present invention can be obtained by adding a photoelectric conversion adjuster mounted within the energy storage tank.

[0006] The solution of the present invention also can be further realized by taking the power driving device as an overflowing pump or a low-power compressor.

[0007] Compared with the conventional air conditioner, the air conditioner in accordance with the present invention mainly uses the solar energy storage assembly mounted at the outdoor machine to vaporize the recycle medium and takes the low-power compressor or the overflowing pump disposed at the pipeline as the subsidiary driving device, so that the air conditioner has advantages of good refrigeration and heating effect, low power consumption and low operation noise. Experiments show that a traditional air conditioner of 1.5HP has a refrigeration power of around 1200W and a heating power of around 1800W; while a solar energy heating

and refrigeration air conditioner of the present invention with equal refrigeration and heating amount only has a refrigeration power of around 750W and a heating power of around 1100W. A traditional air conditioner of 2HP has a refrigeration power of around 2000W and a heating power of around 3500 W; while a solar energy heating and refrigeration air conditioner of the present invention with equal refrigeration amount only has a refrigeration power of around 950W and a heating power of around 1950W. In conclusion, the solar energy heating and refrigeration air conditioner in accordance with the present invention will save electricity by more than 46% than the average one.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present invention will be apparent to those skilled in the art by reading the following detailed description of a preferred embodiment thereof, with reference to the attached drawings, in which:

[0009] Figure 1 is a diagram showing the configuration of an air conditioner in accordance with the present invention.

- [0010]
1. vacuum heat collector
 2. energy storage tank
 3. photoelectric conversion adjuster
 4. electromagnetic change valve
 5. overflowing pump or low-power compressor
 6. condensation device
 7. outdoor machine
 8. filter
 9. throttle

- 10. capillary tube
- 11. high-pressure valve
- 12. low-pressure valve
- 13. exchanger
- 14. evaporator
- 15. circuit control panel
- 16. air blower
- 17. indoor machine

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] A room solar energy heating and refrigeration air conditioner of split type comprises an indoor machine 17 and an outdoor machine 7. The indoor machine 17 is mainly composed of an evaporator 14, a circuit control panel 15 and an air blower 16. The outdoor machine 7 is mainly composed of a solar energy storage assembly, an exchanger 13, a condensation device 6, a filter 8, a throttle 9, a capillary tube 10, a high-pressure valve 11, an overflowing pump or a low-power compressor 5, and an electromagnetic change valve 4. The solar energy storage assembly comprises an energy storage tank 2 and vacuum heat collectors 1 communicated with the energy storage tank 2 and having energy storage material filled therein. A photoelectric conversion adjuster 3 is mounted within the energy storage tank 2. When the sunshine is not sufficient enough or it is cloudy continuously, the photoelectric conversion adjuster 3 will be activated to compensate through electric heating. Both ends of the exchanger 13 are extended out from the energy storage tank 2, the pipeline of one end is connected with the evaporator 14 of the indoor machine through the condensation device 6, and the pipeline of the other end is connected with the

evaporator 14 of the indoor machine through the overflowing pump or the low-power compressor 5. The overflowing pump or the low-power compressor 5 is connected in series with the pipeline through the electromagnetic change valve 4. The exchanger 13, the condensation device 6 and the evaporator 14 of the indoor machine form or compose a closed recycle passage in which low-boiling point recycle medium is filled. A low-pressure valve 12 is disposed between the evaporator 14 and the overflowing pump or the low-power compressor 5.

WHAT IS CLAIMED IS:

1. A room solar energy heating and refrigeration air conditioner of split type, comprising an indoor machine mainly composed of an evaporator, a circuit control panel and an air blower and an outdoor machine, characterized in that: said outdoor machine is provided with a solar energy storage assembly comprising an energy storage tank and vacuum heat collectors communicated with the energy storage tank and having energy storage material filled therein, an exchanger is mounted within the energy storage tank, both ends of which are extended out from the energy storage tank, the pipeline of one end is connected with the evaporator of the indoor machine through a condensation device, and the pipeline of the other end is connected with the evaporator of the indoor machine through a power driving device which is connected in serial with the pipeline through an electromagnetic change valve; the exchanger, the condensation device and the evaporator of the indoor machine compose a closed recycle passage in which low-boiling point recycle medium is filled; a filter, a throttle, a capillary tube and a high-pressure valve are disposed in order between the condensation device and the evaporator, and a low-pressure valve is disposed between the evaporator and the power driving device.
2. The air conditioner as claimed in Claim 1, wherein the energy storage tank of the solar energy storage assembly has a photoelectric conversion adjuster mounted therein.
3. The air conditioner as claimed in Claim 1, wherein the power driving device is an overflowing pump or a low-power compressor.