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(54) **AIR-CONDITIONING INSTALLATION**

(57) The invention relates to an air-conditioning installation for heating or cooling several rooms independently, wherein the installation comprises an aerothermal pump (2), heat/cold emitters (3) connected to the aerothermal pump (2), temperature controllers (4) located in each room to set temperatures independently, and a central unit (5) electronically linked to the heat/cold emitters (3), to the temperature controllers (4) and to the aero-

thermal pump (2) by means of emitter receivers (17), controller receivers (6) and aerothermal receivers (7), respectively, said central unit (5) being configured to send orders to vary the temperature of the drive water to the aerothermal pump (2) by the temperature controllers (4), varying the operating mode of the aerothermal pump (2) remotely.

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Description

OBJECT OF THE INVENTION

[0001] The object of the present invention falls within the technological field of air-conditioning installations.

[0002] The present invention relates to an air-conditioning installation for areas of rooms that has an aerothermal pump and a set of heat/cold emitters, such as underfloor heating units and/or fan coil devices, located in independent areas of said room.

[0003] Said aerothermal pump is electronically controlled by a central unit that turns said aerothermal pump on or off remotely, electronically modifies its operating mode to heating or cooling mode, and varies the temperature of the areas of the room independently, with the temperature of said areas being different from others.

BACKGROUND OF THE INVENTION

[0004] Air-conditioning installations for rooms that use aerothermal energy as an air-conditioning system are known in the state of the art, a system that allows, through heat exchange, energy to be obtained from the air, with the aim of converting it into heating energy, cooling energy or to obtain hot water through the use of a single piece of equipment, instead of using a boiler that consumes more energy.

[0005] Aerothermal energy encompasses all the systems that allow energy to be extracted from the air. The most widely used system consists of an aerothermal, air-water, heat pump, which increases or decreases the temperature of the water circulating in a room, increasing or decreasing the temperature of the areas habitable by a user of said room.

[0006] Aerothermal energy uses the heat pump to heat the water due to heat exchange with the outside. This makes it possible to generate heating in winter, cooling in summer and domestic hot water (DHW) throughout the year.

[0007] A refrigerant flows through the aerothermal pump via a circuit made up of an evaporator, a compressor, a condenser and an expansion valve.

[0008] However, several problems associated with these systems arise, among them the operating mode of the aerothermal pump; in other words, it operates by heating or cooling of the areas of the room, but its operating mode cannot be modified. This means that there is no communication between generating elements, such as the aerothermal pump, and heat/cold emitting elements, such as underfloor heating units or fan coil devices; in other words, there is no communication between what is required by a user and the emission of heat/cold by the emitters.

[0009] The most significant problem can be found in the installation itself; in other words, existing air-conditioning installations known in the state of the art have an aerothermal pump associated with a global temperature

controller, a general thermostat, through which a user can set the heating or cooling temperature of the room.

[0010] Given its global use, the electrical consumption of the aerothermal pump is higher because it will only stop its operation when it detects that all the areas of the room are at the temperature set by the user. This entails long waiting times in some areas of the room with respect to others and a decrease in the period of useful life of the elements that make up the installation, increasing the cost of repair and maintenance of the same.

DESCRIPTION OF THE INVENTION

[0011] The present invention aims to solve the problems that can be found in the air-conditioning installations for rooms in the state of the art, the invention relating to an air-conditioning installation for rooms that modifies the temperature of one or more areas of said room independently, that is, being able to simultaneously select a different temperature in said areas or choosing which area of the room should be heated or cooled depending on the ambient conditions.

[0012] Specifically, the air-conditioning installation comprises a DHW (Domestic Hot Water) accumulator, element responsible for collecting a determined volume of water from the network and providing hot water to taps and showers in a room by means of heat exchange with its interior, with the water from an aerothermal pump to which it is connected by installation lines.

[0013] The aerothermal pump varies the temperature of the water that it receives through a refrigerant circuit, circulating a refrigerant liquid through it that absorbs a certain amount of energy from the air, outside the installation.

[0014] Depending on the demand for air-conditioning in the room, the aerothermal pump will increase or decrease the temperature of the domestic hot water received from the DHW accumulator and which will be subsequently driven towards said accumulator again or towards a set of heat/cold emitters, such as underfloor heating units and/or fan coil devices to heat or cool different areas of the house where they are located.

[0015] The installation object of the invention additionally comprises a central unit that connects to the aerothermal pump and to the heat/cold emitters, through electrical connections, such as electrical wiring, said central unit being equipped with an on/off actuator, specifically a switch, that starts or stops the operation of the aerothermal pump remotely and electronically; and a mode change switch, which transmits orders to the aerothermal pump about the operating mode, such as heating or cooling, then capturing more or less energy from the air to increase or decrease the temperature of the water.

[0016] The central unit also incorporates temperature controllers, specifically thermostats, located in one or more areas of the room and which are linked to the aerothermal pump, sending information to said pump about the temperature to which it should heat or cool the water

that will be subsequently sent to the set of heat/cold emitters, which heat or cool the areas of the room independently of each other. It is possible that two areas are heated at different temperatures, increasing the performance of the installation by directly selecting where the water should directly circulate, instead of using a global thermostat that sets the same temperature in all areas of the room.

[0017] In this way, the temperature of the areas can be adapted to the needs of the user or users who are inhabiting the room, consuming less energy by directing the heated or cooled water directly to a specific place.

[0018] Furthermore, the central unit can incorporate climate sensors, preferably moisture sensors or other types of sensors that can measure the climatic conditions of the areas of the room where they are located. The central unit incorporates moisture sensors of this type to determine the relative humidity of each area in order to adjust the temperature selected on the thermostat by user action and to avoid condensation problems due to temperature changes between room temperature and the heat or cold emitted by the set of emitters, be it solely the underfloor heating unit or in collaboration with the fan coil devices.

[0019] In the case of an air-conditioning installation with installation lines that are long, the installation incorporates an auxiliary group located between the heat/cold emitters and the aerothermal pump, formed by a buffer tank where hot water or cold water from the aerothermal pump accumulates, and a drive pump that drives said water to air-condition an area with the aforementioned emitters.

[0020] The functionality of the buffer tank is to accumulate hot water until heat is demanded, avoiding operation stoppages and constant start-ups of the aerothermal pump, which can reduce its useful life and require more maintenance time and costs.

[0021] Likewise, the buffer tank can be connected to a drive pump that sends the water from said tank to the underfloor heating ducts and/or to the fan coil devices.

[0022] In order to divide the flow of water that circulates through the installation, said installation preferably incorporates a three-way valve that allows circulation to the buffer tank and heat/cold emitters or to the DHW accumulator, exchanging heat therein with the domestic hot water collected from the network by means of a coil, by convection, to divert it to the taps in the room.

DESCRIPTION OF THE DRAWINGS

[0023] As a complement to the description provided herein, and for the purpose of helping to make the features of the invention more readily understandable, in accordance with a preferred practical exemplary embodiment thereof, said description is accompanied by a set of drawings constituting an integral part of the same, wherein by way of illustration and not limitation, the following has been represented:

Figure 1 shows a diagram of the air-conditioning installation for areas of rooms.

Figure 2 shows a diagram of the central unit of the air-conditioning installation for areas of rooms.

PREFERRED EMBODIMENT OF THE INVENTION

[0024] A preferred exemplary embodiment of the air-conditioning installation for independent areas of a room is described with the aid of figures 1 and 2.

[0025] Figure 1 shows a diagram of the air-conditioning installation object of the invention, for heating or cooling one or more areas of a room independently, which comprises a DHW (Domestic Hot Water) accumulator (1) that can be linked to the domestic hot water network through a water inlet line and which is intended to capture water from said network, an aerothermal pump (2) that connects to the DHW accumulator (1) through supply and return water lines, which receives domestic hot water from said DHW accumulator (1) and drives it, modifying its temperature to high or low temperature; and a set of heat/cold emitters (3) that connect to the aerothermal pump (2) through supply and return water lines, which are located in one or more independent areas of the room and which increase or decrease the temperature of said areas independently, depending on the temperature of the water from the aerothermal pump (2).

[0026] Likewise, the invention incorporates temperature controllers (4) distributed in each of the areas of the room and configured to set heating or cooling temperatures in said areas independently of each other, and a central unit (5) that is electronically linked to the set of heat/cold emitters (3), to the temperature controllers (4) and to the aerothermal pump (2) by means of emitter receivers (17), controller receivers (6) and aerothermal receivers (7), respectively, said central unit (5) being configured to send orders to vary the temperature of the drive water to the aerothermal pump (2) by the temperature controllers (4), vary the heating or cooling operating mode of the aerothermal pump (2) remotely, and/or turn said aerothermal pump (2) on or off.

[0027] If the connection lines are considerably long, the installation may additionally comprise at least one auxiliary group (10) that connects to the central unit (5) by means of an auxiliary group connector (11), which is located between the aerothermal pump (2) and the set of heat/cold emitters (3).

[0028] The auxiliary group (10) is equipped with: a buffer tank (12) that accumulates water from the aerothermal pump (2), avoiding continuous stops and starts of said aerothermal pump (1), and a drive pump (13) that connects via supply and return water lines to the buffer tank (12) and to the set of heat/cold emitters (3) and drives the determined received water towards the set of heat/cold emitters (3).

[0029] Additionally, the set of heat/cold emitters (4) preferably incorporates an underfloor heating unit that

increases or decreases the temperature of one or more areas of the room independently, depending on the number of areas or compartments in the room, equating that amount to the number of underfloor heating units.

[0030] In a complementary manner, a set of heat/cold emitters (4) may additionally incorporate one or more fan coil devices that support the increase or decrease of the temperature in one or more areas of the room by action of the underfloor heating unit.

[0031] Furthermore, with the aid of figure 2, it can be seen how the central unit (5) is equipped with at least one on/off switch (8) that turns the aerothermal pump (2) on or off electronically and remotely, and at least one mode change switch (9) that modifies the operating mode of the aerothermal pump (1) to a heating or cooling mode.

[0032] Finally, the installation may comprise moisture sensors (14) located in independent areas of the room, linked to the central unit (5) by means of sensor receivers (15), acting in coordination with the temperature controllers (4), avoiding condensation in the areas due to temperature changes.

Claims

1. An air-conditioning installation for independent areas of rooms for heating or cooling one or more areas of rooms independently, comprising:

- a DHW (Domestic Hot Water) accumulator (1) that can be linked to the domestic hot water network through a water inlet line and which is intended to capture water from said network,
- an aerothermal pump (2) that connects to the DHW accumulator (1) through supply and return water lines, which receives domestic hot water from said DHW accumulator (1) and drives it, modifying its temperature to high or low temperature,
- a set of heat/cold emitters (3) that connect to the aerothermal pump (2) through supply and return water lines, which are located in one or more independent areas of the room and which increase or decrease the temperature of said areas independently, depending on the temperature of the water from the aerothermal pump (2);

characterised in that it additionally comprises:

- temperature controllers (4) distributed in each of the areas of the room and configured to set heating or cooling temperatures in said areas independently of each other, and
- a central unit (5) that is electronically linked to the set of heat/cold emitters (3), to the temperature controllers (4) and to the aerothermal pump (2) by means of emitter receivers (17),

controller receivers (6) and aerothermal receivers (7), respectively, said central unit (5) being configured to send orders to vary the temperature of the drive water to the aerothermal pump (2) by the temperature controllers (4), vary the heating or cooling operating mode of the aerothermal pump (2) remotely, and/or turn said aerothermal pump (2) on or off.

2. The air-conditioning installation for independent areas of rooms according to claim 1, wherein the central unit (5) is equipped with:

- at least one on/off switch (8) that turns the aerothermal pump (2) on or off electronically and remotely, and
- at least one mode change switch (9) that modifies the operating mode of the aerothermal pump (1) to a heating or cooling mode.

3. The air-conditioning installation for independent areas of rooms according to claim 1, additionally comprising at least one auxiliary group (10) that connects to the central unit (5) by means of an auxiliary group connector (11), which is located between the aerothermal pump (2) and the set of heat/cold emitters (3) and which is equipped with:

- a buffer tank (12) that accumulates water from the aerothermal pump (2), avoiding continuous stops and starts of said aerothermal pump (1), and
- a drive pump (13) that connects via supply and return water lines to the buffer tank (12) and to the set of heat/cold emitters (3) and drives the determined received water towards the set of heat/cold emitters (3).

4. The air-conditioning installation for independent areas of rooms according to claim 1, additionally comprising moisture sensors (14) located in independent areas of the room, linked to the central unit (5) by means of sensor receivers (15), acting in coordination with the temperature controllers (4), avoiding condensation in the areas due to temperature changes.

5. The air-conditioning installation for independent areas of rooms according to claim 1, wherein the set of heat/cold emitters (3) are made up of underfloor heating units located in independent areas of the room.

6. The air-conditioning installation for independent areas of rooms according to claim 5, wherein the set of heat/cold emitters (3) are additionally made up of one or more fan coil devices that support the operation of the underfloor heating units.

7. The air-conditioning installation for independent areas of rooms according to claim 1, wherein the temperature controllers (4) are thermostats in which the heating or cooling temperature of each independent area of the room is set.

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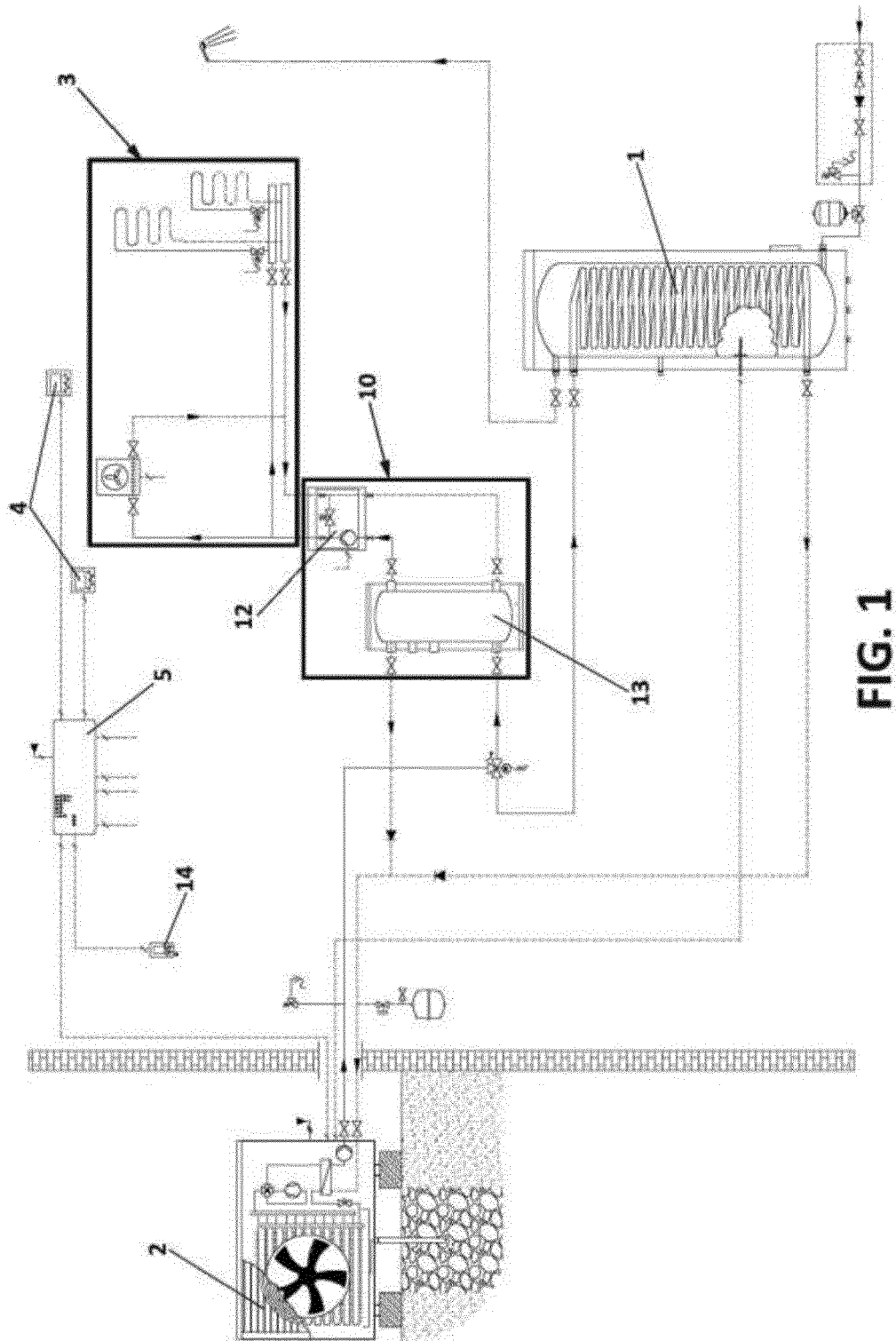


FIG. 1

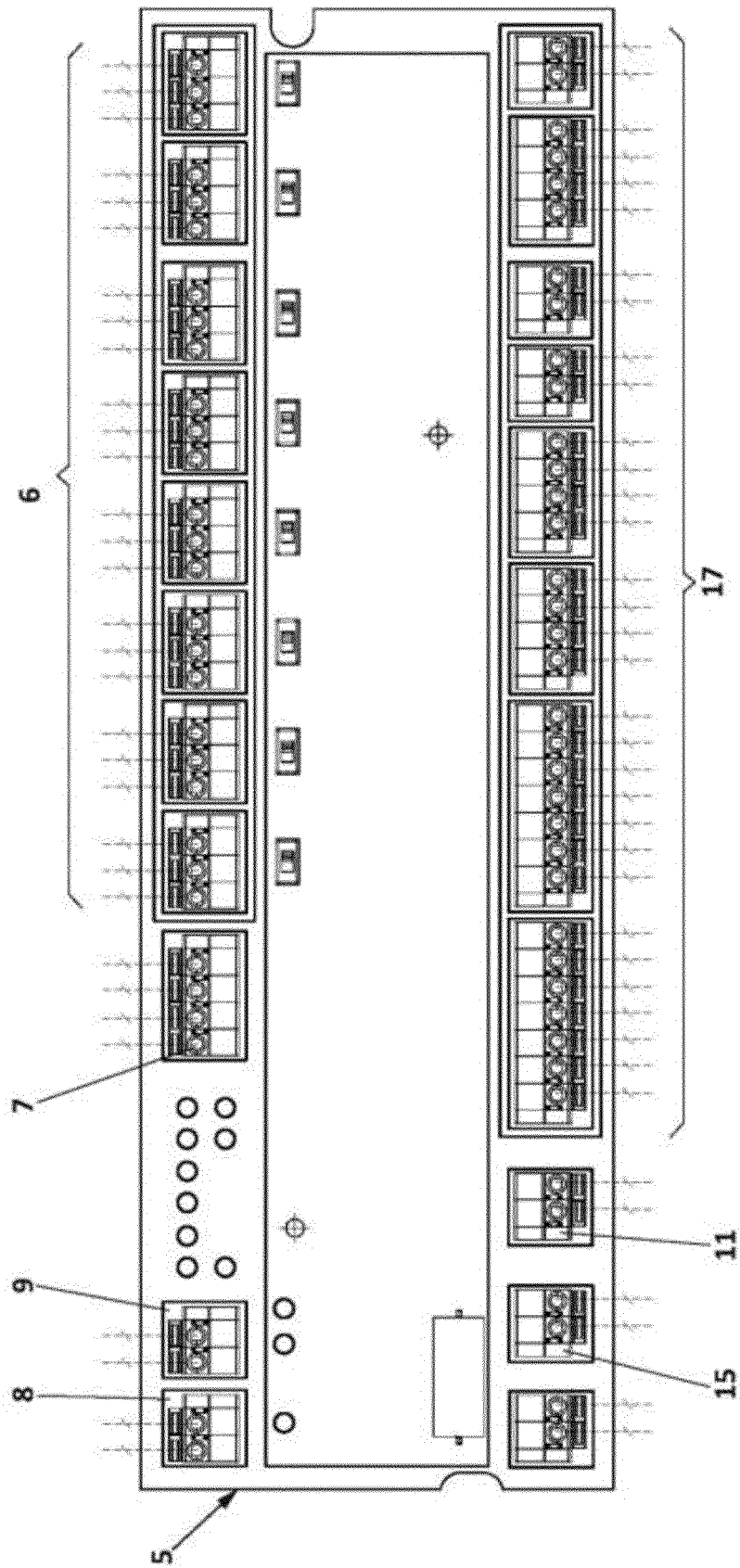


FIG. 2



EUROPEAN SEARCH REPORT

Application Number

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The present search report has been drawn up for all claims			

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EPO FORM 1503 03.82 (P04C01)

Place of search

Munich

Date of completion of the search

27 October 2023

Examiner

Hoffmann, Stéphanie

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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