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(54) **CLIMATE CONTROL INSTALLATION**

KLIMAREGELUNGSANLAGE

INSTALLATION DE CONDITIONNEMENT D'AIR

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Description

FIELD OF THE INVENTION AND PRIOR ART

[0001] The present invention is related to a climate control installation according to the preamble of the appended independent claims.

[0002] For heating premises and buildings and tap hot water climate control installations comprising a heating boiler operating with fossil fuels have been used for a long time. It is also known to include in climate control installations a heat pump complementary to the heating boiler in order to decrease the use of fossil fuels. In the latter type of heat installations mainly the heat pump is utilized during the summer for meeting the present heating demand, whereas the heating boiler meets a major part of the heating demand during the winter, the heat pump contributing to the heating to a less extent than during the summer.

[0003] An example of this kind of systems is disclosed in BE- 836906.

[0004] To include a heat pump with members belonging to the pump for transferring heat energy between different media in a climate control installation is rather costly, and that is why it is of large economic importance to utilize a heat pump included in a climate control installation and equipment associated therewith as effectively as possible.

SUMMARY OF THE INVENTION

[0005] The object of the present invention is to provide a climate control installation of the initially defined kind, which in comparison with prior art utilizes the components of the climate control installation more effectively for achieving better operating economy and a better utilization of the energy sources used.

[0006] This object is achieved according to a first aspect of the invention by providing a climate control installation with the features according to claim 1.

[0007] Thanks to the second connection between the first circuit and the second circuit for transferring heat energy between the second circuit and the third medium via the first heat energy transferring member, a more effective utilization of the first heat energy transferring member is enabled.

[0008] According to a preferred embodiment of the invention the second connection is adapted to enable removal of a heat energy excess of the second circuit via the first heat energy transferring member by transferring the heat energy excess to the third medium.

[0009] In addition to use for transferring heat energy from the third medium to the first medium it is, accordingly, possible to via the first heat energy transferring member transfer a heat energy excess of the second circuit to the third medium. At the same time as the first heat energy transferring member is utilized more effectively, there is no need for installation of any member for

transferring heat energy in the second circuit for enabling a removal of a heat energy excess present therein to any other medium than the third medium.

[0010] According to another preferred embodiment of the invention the second connection is adapted to enable transfer of heat energy from the third medium via the first heat energy transferring member and the first circuit directly to the second circuit without using the heat pump.

[0011] Thus, in this way heat energy from the third medium may be absorbed directly by the second circuit for heating purposes without having to use the heat pump. This contributes to a decreased use of the heat pump, which is advantageous for the operating economy of the installation.

[0012] According to a preferred embodiment of the invention the third medium has heat emitting as well as heat storing properties. In this way it is possible to store, in the third medium, a heat energy excess transferred from the second circuit via the first heat energy transferring member. This stored heat energy may then be utilized in different ways. For instance, when there due to changed operating conditions arises a need for use of the heat pump for heating purposes, the stored energy may be transferred via the first heat energy transferring member to the first medium and be reused by the heat pump for heating purposes. This results in that the heat pump needs to add less work for achieving heating compared with the case when no heat energy from the second circuit has been stored previously in the third medium.

The heat energy stored in the third medium may, if desired, also be utilized for heating purposes directly without using the heat pump. This is achieved by transferring the heat energy stored in the third medium via the first heat energy transferring member and the first circuit through the second connection to the second circuit.

[0013] Thanks to the provision of the second heat energy transferring member in the first circuit transfer of further heat energy to the first medium in addition to the energy being transferred via the first heat energy transferring member is enabled, which improves the efficiency of the heat pump. Furthermore, existing energy sources are utilized advantageously in that cooling indoor air may contribute in heating, for instance, tap hot water.

[0014] According to a preferred embodiment of the invention the second heat energy transferring member is arranged in the first circuit in series with the first heat energy transferring member and after, in the flow direction, the first heat energy transferring member.

[0015] In this way cooling indoor air is possible by means of the third medium, as this is colder than the indoor air. Under advantageous circumstances, for instance during summertime, the need for operation of the heat pump for cooling the indoor air is thereby eliminated.

[0016] Further advantages and advantageous features of the invention will be apparent from the following description and the other dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Below follows a detailed description of preferred embodiments of the invention with reference to appended drawings, on which

- Fig 1 is a schematic view illustrating a climate control installation according to a first embodiment of the invention,
- Fig 2 is a schematic view illustrating a climate control installation not according to the present invention.
- Fig 3 is a schematic view illustrating a climate control installation according to a second embodiment of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

[0018] In Fig 1 is very schematically shown a climate control installation according to a first embodiment of the invention. The installation includes a heat pump 1, the input side of which being connected to a first circuit 11 containing a first medium. Furthermore, the heat pump 1 is connected, on its output side, to a second circuit 12 containing a second medium. For instance, the circuit 12 contains water and the circuit 11 contains a glycol/water mixture. This is of course only one possible combination and optional other media suitable for the purpose, which are circulatable in the circuits, are useful as well. A conventional circulation pump 13 is arranged in the circuit 12 and a conventional circulation pump 14 is arranged in the circuit 11 for circulating the media in the respective circuits.

[0019] The heat pump is adapted to, during circulation of the first medium in the first circuit 11 and the second medium in the second circuit 12, absorb heat energy from the first medium on its input side and emit heat energy to the second medium on its output side.

[0020] In addition to the heat pump 1 normally also some other heat production unit 2, for instance a heating boiler operating with fossil fuels, such as for instance oil or gas, is included in the installation. The unit 2 is connected to a system for heating premises and tap hot water via the circuit 12. The system, schematically illustrated by the block 3, comprises for instance radiators and hot water tap locations.

[0021] Accordingly, the heat pump 1 as well as the heat production unit 2 contributes in transferring heat energy to the second medium in the second circuit 12 and by that they also contributes in heating premises and tap hot water via the system 3.

[0022] The heat pump 1 comprises an evaporator 15, a condenser 16 and a compressor 17 and works in the conventional way as follows. By heat exchange with the medium in the first circuit 11 a medium of the heat pump

absorbs heat energy via the evaporator 15. Work is added via the compressor 17, whereby the pressure and the temperature of the medium of the heat pump is increased. In the condenser 16 heat energy is then emitted to the second medium in the second circuit 12 by heat exchange and then the medium of the heat pump is returned to the evaporator 15 during pressure and temperature decrease.

[0023] However, in order for the heat pump 1 to work energy has to be transferred to the medium in the circuit 11. For this purpose there is arranged in the circuit 11 a first member 21 for transferring heat energy between the first medium and a third medium. Different conceivable, but not in any way limiting for the invention, examples of the third medium include outdoor air, air from ventilation, rock and ground water. For instance, the heat energy transferring member 21 is provided in the form of a heat exchanger, which is adjusted to heat exchange between the first medium and the third medium. The adjustment depends on a plurality of factors, the aggregate state of the respective media being of substantial importance.

[0024] As already mentioned initially, a heat pump with equipment belonging thereto is a rather costly investment. Therefore, it is desirable to utilize the heat pump and the equipment belonging thereto as effectively as possible.

[0025] During operation of the installation different operating conditions arise due to temperature variations in the environment surrounding the installation. For instance, during summertime usually a heat energy excess arises in the circuit 12, which has to be removed. This is for instance possible to achieve by arranging in the circuit 12 a member for transferring energy between the second medium and some other further medium. However, according to the embodiment of the invention illustrated in Fig 1 the installation comprises a connection 30 between the first circuit 11 and the second circuit 12 for transferring heat energy between the second circuit and the third medium via the first heat energy transferring member. This connection 30, preferably comprising a heat exchanger, is in this example adapted to enable removal of the heat energy excess in the second circuit 12 via the first heat energy transferring member 21 by transferring the heat energy excess to the third medium. In this embodiment the connection 30 comprises a heat exchanger 38, which via two conduits 33 and 34 is connected to the circuit 11. The conduit 33 is joined to the circuit 11 upstream in relation to the first heat energy transferring member 21 and the conduit 34 is joined thereto downstream in relation to the first heat energy transferring member 21. Furthermore, two other conduits 35 and 36 connect the heat exchanger 38 to the circuit 12. Preferably, it is also provided means for controlling circulation of the first medium and the second medium to and from the connection 30. For instance, according to this embodiment, there is provided a conventional circulation pump 31 in the conduit 33 and a valve member 32 in the conduit 34. When heat energy is to be transferred between the second circuit

12 and the first circuit 11, the valve member 32 is suitably opened and the pump 31 is suitably started. In an operation condition, when no heat energy is to be transferred between the circuits 11, 12, the valve member 32 is closed and the pump 31 is adapted not to circulate the first medium. Preferably, the pump 31 is turned off in this operating condition. Furthermore, preferably a valve member 37 is provided in the circuit 12. The valve member 37 is suitably controlled so that it allows circulation of the second medium to the connection 30, in this embodiment via conduits 36 and 35 to the heat exchanger 38, when transferring heat energy between the circuits 11, 12 and so that it does not allow any circulation of the second medium to the connection 30, when no heat energy is to be transferred between the circuits 11, 12.

[0026] According to a preferred embodiment of the invention the third medium has heat emitting as well as heat storing properties, which is very advantageous, since hereby it is possible to store the heat energy excess transferred from the second circuit 12 in the third medium. The stored energy may then be reused, for instance by the heat pump 1, for heating purposes, when the operating conditions change, that is when the heat pump is started for heating purposes. In that case the compressor 17, accordingly, will have to add less work for heating than in the case, when no such previous energy storing has taken place. According to a preferred embodiment of the invention the third medium is ground, preferably rock, which has said properties. In some occasions, for instance during the autumn, the heat energy stored in the third medium may be sufficiently large for meeting the heating demand present in the system 3. According to a preferred embodiment of the invention the connection 30 is adapted to enable transfer of heat energy from the third medium via the first heat energy transferring member 21 and the first circuit 11 directly to the second circuit. Hereby, if so desired, the heat energy stored in the third medium may be transferred to the second circuit 12, for heating purposes, directly via the connection 30 without using the heat pump 1.

[0027] In Fig 2 is schematically illustrated a climate control installation not according to the invention. This installation is much similar to the embodiment illustrated in Fig 1, as regards design and function, but has no connection 30 and the possibilities afforded by that. Identical components are indicated with identical reference numerals and they will therefor not be described more in detail.

[0028] According to this installation the first circuit comprises at least one second member 22, for instance in the form of a suitably adapted heat exchanger, for transferring heat energy between the first medium and indoor air. The second heat energy transferring member 22 is adapted to transfer heat energy from the indoor air to the first medium. Hereby, the heat pump 1 may also be used for cooling indoor air and thus not only for heating indoor air and tap hot water via the system 3. When there is a heating demand present in the system 3 and the heat

pump 1 is operated for that reason, consequently, it is possible to at the same time meet a need for cooling indoor air by transferring, via the heat energy transferring member 22, heat energy from indoor air to the first medium in the circuit 11. For instance, during summertime tap hot water is provided by means of cooling the indoor air.

[0029] The second heat energy transferring member 22 can be arranged in the first circuit 11 in series with the first heat energy transferring member 21 and after, in the flow direction, the first heat energy transferring member 21. In this way it may be sufficient, during advantageous temperature conditions, for instance during summertime, with circulation of the first medium in the circuit 11 for cooling the indoor air, since the third medium is colder than the indoor air. Thus, the heat pump does not have to be operated for cooling the indoor air, which is energy saving, and it is sufficient to operate the pump 14 for circulation of the first medium in the circuit 11. The third medium can be ground, preferably rock, which during summertime has a temperature being substantially lower than the temperature of the indoor air. Preferably, it is also provided means for controlling the flow of the second medium via the second heat energy transferring member. In the installation illustrated in Fig 2 this control means is a valve member 25, which suitably allows circulation of the first medium via the heat energy transferring member 22, when indoor air is to be cooled and not allows such circulation otherwise.

[0030] In Fig 3 is illustrated a second embodiment of an inventional climate control installation, which has the features of the first embodiment as well as the features of the installation disclosed in Fig.2.

[0031] Hereby, a combination of the advantages associated with the respective embodiment is achieved.

[0032] Furthermore, this embodiment is advantageous, for instance when the need for cooling indoor air is greater than the need for heating present in the system 3. If the heat pump 1 in that case is operated for cooling purposes, a heat excess may arise in the circuit 12, which has to be removed. This is, for instance, possible to achieve by providing in the circuit 12 a member (not shown) for transferring energy between the second medium and some other further medium. However, according to the invention the installation comprises a connection 30 between the first circuit 11 and the second circuit 12 for transferring heat energy between the second circuit 12 and the third medium via the first heat energy transferring member 21, such as already described above with reference to Fig 1. This connection 30, preferably comprising a heat exchanger, is in this example adapted to enable removal of the heat energy excess in the second circuit 12 via the first heat energy transferring member 21 by transferring the heat energy excess to the third medium.

[0033] Also as described above, according to a preferred embodiment of the invention the third medium has heat emitting as well as heat storing properties. This is

very advantageous in that hereby it is possible to store in the third medium the heat excess arising in the second circuit as a result of cooling the indoor air by means of the heat pump. The stored energy may then be reused directly or by means of the heat pump for heating purposes, when the operating conditions change as described above.

[0034] The installation illustrated in Fig 3 enables a very effective use of the components included in the installation. The operation of the installation is, according to what has been described above, adjustable depending on present need for heating and/or cooling so that the energy sources used are utilized effectively.

[0035] In summary, accordingly, a very advantageous use of the heat pump included in the installation for cooling as well as heating purposes is achieved. Furthermore, the connection 30 between the two circuits 11 and 12 provides the possibility to alternately remove a heat energy excess on the condenser side of the heat pump 1 in the installation and absorb heat energy from a third medium on the evaporator side of the heat pump 1 in the installation via one and the same heat energy transferring member 21. By arranging the third medium heat storing a heat energy excess removed from the second circuit may be reused directly or by the heat pump 1 for heating purposes.

[0036] The invention is of course not in any way restricted to the embodiments described above, but many possibilities to modifications thereof will be possible for a man with ordinary skill in the art, without departing from the basic idea of the invention as defined in the claims.

[0037] For instance, it is possible to provide more heat energy transferring members in parallel with the second heat energy transferring member 22, such as illustrated in Fig 3 by the member 42. Preferably, in that case it is also provided a valve member 26 for controlling the circulation of the first medium to and from the member 42. The valve member 26 is, for example, controlled in the same way as the valve member 25.

[0038] Furthermore, it is also possible to provide a plurality of heat energy transferring members in parallel with the first heat energy transferring member 21, such as illustrated in Fig 3 by the member 39. It is also possible to utilize the flue gases from the heating boiler 2 for heating the first medium in the first circuit 11. This is indicated in Fig 1-3 by the conduit 24, which is connected to a heat energy transferring member 23 connected to the first circuit 11. Suitably, in that case it is arranged a valve member 28 in the circuit 11 for controlling circulation of the first medium to the member 23, when the flue gases are to be utilized for heating the first medium and preventing such circulation otherwise.

[0039] In those cases, when a plurality of heat energy transferring members are arranged in the first circuit, preferably, a valve member 27 is arranged in the first circuit 11 for controlling the circulation of the first medium. The valve member 27, preferably, controls the circulation so that it allows circulation via the first heat energy trans-

ferring member 21 (and possible further heat energy transferring members in parallel with this member 21) when energy is to be absorbed to the first medium via said member 21 and prevents such circulation when no heat energy is to be transferred between the first medium and the third medium via the member 21.

Claims

1. Climate control installation, comprising a first circuit (11) containing a first medium, a second circuit (12) containing a second medium and a first connection between the first circuit (11) and the second circuit (12) in the form of a heat pump (1), the input side of which being connected to the first circuit so as to allow heat exchange between the first medium in the first circuit (11) and the evaporator (15) of the heat pump (1) and the output side of which being connected to the second circuit so as to allow heat exchange between the second medium in the second circuit (12) and the condenser (16) of the heat pump (1), the heat pump (1) being adapted to, during circulation of the first medium and the second medium in their respective circuits (11, 12), absorb heat energy from the first medium on its input side by heat exchange between the first medium and the evaporator (15) and emit heat energy to the second medium on its output side by heat exchange between the second medium and the condenser (16), the first circuit comprising at least one first heat energy transferring member (21) for transferring heat energy between the first medium and a third medium, **characterized in that** the installation comprises a second connection (30) between the first circuit (11) and the second circuit (12) for transferring heat energy between the second circuit (12) and the third medium via the first heat energy transferring member (21), the second connection (30) comprising a heat exchanger (38) connected to the first circuit (11) and to the second circuit (12).
2. Climate control installation according to claim 1, **characterized in that** the heat exchanger (38) via a first conduit (33) is joined to the first circuit (11) upstream of the first heat energy transferring member (21) and via a second conduit (34) is joined to the first circuit (11) downstream of the first heat energy transferring member (21).
3. Climate control installation according to claim 1 or 2, **characterized in that** the second connection (30) is adapted to enable removal of a heat energy excess of the second circuit (12) via the first heat energy transferring member (21) by transferring the heat energy excess to the third medium.
4. Climate control installation according to any of claims

- 1-3, **characterized in that** the second connection (30) is adapted to enable transfer of heat energy from the third medium via the first heat energy transferring member (21) and the first circuit (11) directly to the second circuit (12) without using the heat pump (1). 5
5. Climate control installation according to any of claims 1-4, **characterized in that** the third medium has heat emitting as well as heat storing properties. 10
6. Climate control installation according to claim 5, **characterized in that** the third medium is ground, preferably rock. 10
7. Climate control installation according to any of the preceding claims, **characterized in that** the first circuit (11) comprises at least one second heat energy transferring member (22) for transferring heat energy between the first medium and indoor air and that the second heat energy transferring member (22) is adapted to transfer heat energy from indoor air to the first medium for cooling the indoor air. 20
8. Climate control installation according to claim 7, **characterized in that** the second heat energy transferring member (22) is arranged in the first circuit (11) in series with the first heat energy transferring member (21) and after, in the flow direction, the first heat energy transferring member (21). 25

Patentansprüche

1. Klimaregelungsanlage, die Folgendes umfasst: einen ersten Kreis (11), der ein erstes Medium enthält, einen zweiten Kreis (12), der ein zweites Medium enthält, und eine erste Verbindung zwischen dem ersten Kreis (11) und dem zweiten Kreis (12) in Form einer Wärmepumpe (1), wobei deren Eingangsseite derart mit dem ersten Kreis verbunden ist, dass Wärmeaustausch zwischen dem ersten Medium im ersten Kreis (11) und dem Verdampfer (15) der Wärmepumpe (1) erlaubt wird, und wobei deren Ausgangsseite derart mit dem zweiten Kreis verbunden ist, dass Wärmeaustausch zwischen dem zweiten Medium im zweiten Kreis (12) und dem Kondensator (16) der Wärmepumpe (1) erlaubt wird, wobei die Wärmepumpe (1) dazu geeignet ist, um während der Bewegung des ersten Mediums und des zweiten Mediums in ihren jeweiligen Kreisen (11, 12) Wärmeenergie vom ersten Medium an dessen Eingangsseite durch Wärmeaustausch zwischen dem ersten Medium und dem Verdampfer (15) zu absorbieren und Wärmeenergie zum zweiten Medium an dessen Ausgangsseite durch Wärmeaustausch zwischen dem zweiten Medium und dem Kondensator (16) auszugeben, wobei der erste Kreis zumindest ein erstes Wärmeenergieübertragungselement (21) 35 40 45 50 55

zum Übertragen von Wärmeenergie zwischen dem ersten Medium und einem dritten Medium umfasst, **dadurch gekennzeichnet, dass** die Anlage eine zweite Verbindung (30) zwischen dem ersten Kreis (11) und dem zweiten Kreis (12) umfasst, um Wärmeenergie zwischen dem zweiten Kreis (12) und dem dritten Medium über das erste Wärmeenergieübertragungselement (21) zu übertragen, wobei die zweite Verbindung (30) einen Wärmeaustauscher (38) umfasst, der mit dem ersten Kreis (11) und dem zweiten Kreis (12) verbunden ist.

2. Klimaregelungsanlage nach Anspruch 1, **dadurch gekennzeichnet, dass** der Wärmeaustauscher (38) über eine erste Rohrleitung (33) mit dem ersten Kreis (11) stromaufwärts zum ersten Wärmeenergieübertragungselement (21) verbunden ist und über eine zweite Rohrleitung (34) mit dem ersten Kreis (11) stromabwärts zum ersten Wärmeenergieübertragungselement (21) verbunden ist.
3. Klimaregelungsanlage nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die zweite Verbindung (30) dazu geeignet ist, die Beseitigung eines Wärmeenergieüberschusses vom zweiten Kreis (12) über das erste Wärmeenergieübertragungselement (21) zu ermöglichen, indem der Wärmeenergieüberschuss zum dritten Medium übertragen wird.
4. Klimaregelungsanlage nach Ansprüchen 1 bis 3, **dadurch gekennzeichnet, dass** die zweite Verbindung (30) dazu geeignet ist, die Übertragung von Wärmeenergie vom dritten Medium über das erste Wärmeenergieübertragungselement (21) und dem ersten Kreis (11) direkt zum zweiten Kreis (12) zu ermöglichen, ohne die Wärmepumpe (1) zu verwenden. 30 35
5. Klimaregelungsanlage nach Ansprüchen 1 bis 4, **dadurch gekennzeichnet, dass** das dritte Medium sowohl wärmeabgebende als auch wärmespeichernde Merkmale aufweist. 40
6. Klimaregelungsanlage nach Anspruch 5, **dadurch gekennzeichnet, dass** das dritte Medium Erde ist, vorzugsweise Gestein. 45
7. Klimaregelungsanlage nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der erste Kreis (11) zumindest ein zweites Wärmeenergieübertragungselement (22) umfasst, um Wärmeenergie zwischen dem ersten Medium und Innenluft zu übertragen und dass das zweite Wärmeenergieübertragungselement (22) dazu geeignet ist, Wärmeenergie von Innenluft zum ersten Medium zu übertragen, um die Innenluft zu kühlen. 50 55
8. Klimaregelungsanlage nach Anspruch 7, **dadurch**

gekennzeichnet, dass das zweite Wärmeenergieübertragungselement (22) im ersten Kreis (11) in Serie mit dem ersten Wärmeenergieübertragungselement (21) und in der Durchflussrichtung nach dem ersten Wärmeenergieübertragungselement (21) angeordnet ist.

Revendications

1. Installation de contrôle de climat, comprenant un premier circuit (11) contenant un premier milieu, un second circuit (12) contenant un deuxième milieu et une première liaison entre le premier circuit (11) et le second circuit (12) sous la forme d'une pompe à chaleur (1), dont le côté d'entrée est relié au premier circuit de façon à permettre l'échange thermique entre le premier milieu dans le premier circuit (11) et l'évaporateur (15) de la pompe à chaleur (1), et dont le côté de sortie est relié au second circuit de façon à permettre l'échange thermique entre le deuxième milieu dans le second circuit (12) et le condenseur (16) de la pompe à chaleur (1), la pompe à chaleur (1) étant conçue pour absorber, pendant la circulation du premier milieu et du deuxième milieu dans leurs circuits respectifs (11, 12), l'énergie thermique provenant du premier milieu sur son côté d'entrée par échange thermique entre le premier milieu et l'évaporateur (15) et émettre de l'énergie thermique vers le deuxième milieu sur son côté de sortie par échange thermique entre le deuxième milieu et le condenseur (16), le premier circuit comprenant au moins un premier élément de transfert d'énergie thermique (21) pour transférer l'énergie thermique entre le premier milieu et un troisième milieu, **caractérisée en ce que** l'installation comprend une seconde liaison (30) entre le premier circuit (11) et le second circuit (12) pour transférer de l'énergie thermique entre le second circuit (12) et le troisième milieu via le premier élément de transfert d'énergie thermique (21), la seconde liaison (30) comprenant un échangeur de chaleur (38) relié au premier circuit (11) et au second circuit (12).
2. Installation de contrôle de climat selon la revendication 1, **caractérisée en ce que** l'échangeur de chaleur (38) via un premier conduit (33) est raccordé au premier circuit (11) en amont du premier élément de transfert d'énergie thermique (21) et, via un second conduit (34), est raccordé au premier circuit (11) en aval du premier élément de transfert d'énergie thermique (21).
3. Installation de contrôle de climat selon la revendication 1 ou 2, **caractérisée en ce que** la seconde liaison (30) est conçue pour permettre l'élimination d'un excès

d'énergie thermique du second circuit (12) via le premier élément de transfert d'énergie thermique (21) en transférant l'excès d'énergie thermique vers le troisième milieu.

4. Installation de contrôle de climat selon une quelconque des revendications 1-3, **caractérisée en ce que** la seconde liaison (30) est conçue pour permettre le transfert d'énergie thermique provenant du troisième milieu via le premier élément de transfert d'énergie thermique (21) et le premier circuit (11) directement au second circuit (12) sans utiliser la pompe à chaleur (1).
5. Installation de contrôle de climat selon une quelconque des revendications 1-4, **caractérisée en ce que** le troisième milieu a une propriété d'émission de chaleur ainsi que des propriétés de stockage de chaleur.
6. Installation de contrôle de climat selon la revendication 5, **caractérisée en ce que** le troisième milieu est le sol, de préférence de la roche.
7. Installation de contrôle de climat selon une quelconque des revendications précédentes, **caractérisée en ce que** le premier circuit (11) comprend au moins un second élément de transfert d'énergie thermique (22) pour transférer de l'énergie thermique entre le premier milieu et l'air intérieur et **en ce que** le second élément de transfert d'énergie thermique (22) est conçu pour transférer de l'énergie thermique de l'air intérieur vers le premier milieu pour refroidir l'air intérieur.
8. Installation de contrôle de climat selon la revendication 7, **caractérisée en ce que** le second élément de transfert d'énergie thermique (22) est agencé dans le premier circuit (11) en série avec le premier élément de transfert d'énergie thermique (21) et après, dans la direction d'écoulement, le premier élément de transfert d'énergie thermique (21).



