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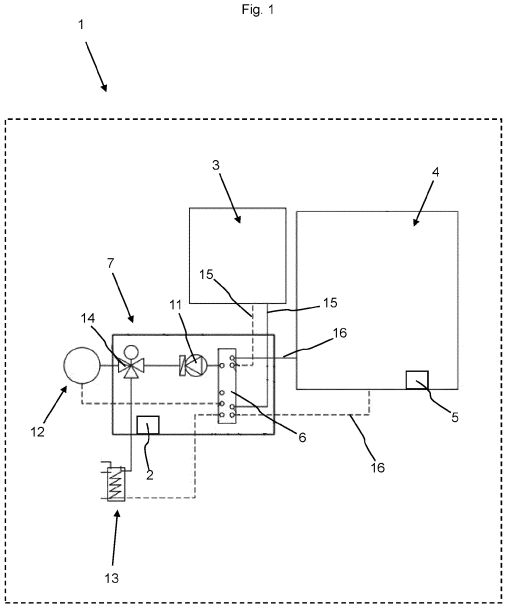
(54) **METHOD FOR SWITCHING A HYBRID SYSTEM TO A CHIMNEY SWEEPER MODE**

(57) The invention relates to a method for switching a hybrid system to a chimney sweeper mode, wherein the hybrid system comprises
a master control unit configured to control a first type of heat generator, in particular a heat pump,
a second type of heat generator, in particular a combustion appliance, and
a slave control unit configured to control the second type of heat generator,
a pump for pumping liquid within at least one load circuit of the hybrid system wherein
the method comprises the steps that
the master control unit receives an operation mode change signal for changing the operation mode of the hybrid system to the chimney sweeper mode and that the master control unit transmits a control signal to the pump resulting in a liquid flow within the at least one load circuit.

Fig. 1



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Description

[0001] The invention relates to method for switching a hybrid system to a chimney sweeper mode. Additionally, the invention relates to a control device for carrying out said method and a hybrid system comprising such a control device. The invention also relates to a computer program product, a non-transitory computer readable medium and data carrier signal.

[0002] Heat pumps become more and more popular for heating or cooling of houses, also in addition to a combustion appliance like a boiler. Using a heat pump alongside a combustion appliance is referred to as a 'hybrid system'. Typically, the term hybrid system describes fitting a heat pump alongside a natural gas, LPG or oil boiler. Such hybrid systems comprise a heat pump and a combustion appliance unit that comprises a combustion appliance device for heating a liquid like water.

[0003] In some countries, like Germany, there exists an obligation to inspect the combustion appliance. Specifically, the exhaust gas is inspected to determine whether the combustion appliance works well. The inspection is performed using predetermined parameters of the combustion appliance. In Germany said inspection is performed by a chimney sweeper so that the operation mode in which the combustion appliance comprises the predetermined parameters to inspect the combustion appliance is called chimney sweeper mode.

[0004] It can happen that the combustion appliance inspection is done in summer during which the hybrid system, in particular the heat pump and the combustion appliance, do not work apart from at most the production of domestic hot water. Thus, the hybrid system has to be activated by the chimney sweeper via inputting orders in e.g. a human machine interface. Additionally, it has to be ensured that the heat pump does not generate heat during the chimney sweeper mode. Thereto, the chimney sweeper has to temporarily reprogram the hybrid system as in the normal operation it is usually preferred that the heat pump generates the heat and that the combustion appliance is only activated when necessary, such as at peak times. Said tasks are time consuming and in case they have to be performed on the heat pump and on the combustion appliance separately and/or sequentially can be error prone.

[0005] The object of the invention is therefore to provide a method for switching a hybrid system to a chimney sweeper mode in which the switch and performing of the chimney sweeper mode can be done fast and with reduced risk of errors.

[0006] The object is solved by a method for switching a hybrid system to a chimney sweeper mode, wherein the hybrid system comprises

a master control unit configured to control a first type of heat generator, in particular a heat pump,
a second type of heat generator, in particular a combustion appliance, and
a slave control unit configured to control the second type of heat generator,
a pump for pumping liquid within at least one load circuit of the hybrid system wherein
the method comprises the steps that
the master control unit receives an operation mode change signal for changing the operation mode of the hybrid system to the chimney sweeper mode and that the master control unit transmits a control signal to the pump resulting in a liquid flow within at least one load circuit.

[0007] An operation mode within the meaning of this application comprises heat generation or standby of the hybrid system. The standby mode is an energy saving mode wherein the hybrid system is connected to a mains power source but is idle. In otherwords, the hybrid system is connected to the mains power source, the hybrid system depends on energy input from the mains power source to work as intended and provides the following functions, which may persist for an indefinite time until at least a heat demand is received: reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or information or status display.

[0008] It was realized that the hybrid system can be easily, and with reduced error risk, switched to the chimney sweeping mode when the master control unit receives the operation mode change signal. The master control unit controls the components of the hybrid system and is responsible for the heat distribution to the load circuits and for controlling which of the heat generators generates the heat. Specifically, the master control unit sends a control signal to the pump so that it is ensured that liquid flows within at least one load circuit. The at least one load circuit can preferably be a domestic hot water circuit which can comprise a tank or a central heating circuit.

[0009] The control signal can be an activation signal for the pump. This is the case when no heat is requested from the heat generators which for example is the case in summer. Alternatively, the control signal can result in a change of the pump speed. This is the case when the pump is running as the heat generators generate heat. This change request results in that the pump runs at a predetermined speed resulting in a predetermined liquid flow that is needed for performing the chimney sweeping mode.

[0010] The hybrid system can be switched to the chimney sweeping mode after the hybrid system is commissioned. Alternatively, the hybrid system can be switched to the chimney sweeping mode during an operation mode of the hybrid system or power off mode of the hybrid system.

[0011] In the commission phase the control master unit determines the heat generators of the hybrid system and commissions them so that the hybrid system can be operated in an operation mode. In the operation mode the heat generators provide heat according to a heat

request that is received from the master control unit. In the power off mode the heat generators do not generate any heat.

[0012] The first type of heat generator differs from the second type of heat generator. Specifically, the first type of heat generator can be a heat pump and the second type of heat generator can be a combustion appliance.

[0013] According to the understanding of the invention a "combustion appliance device" is any device that is capable to combust fuel. The fuel can be oil, natural gas, propane, hydrogen or a mixture of hydrogen and another fuel, such as natural gas or propane. However, it is also possible that the fuel is in solid state. In said case the fuel can be coal, pellets or the same. The device can be a boiler and/or comprise a burner, a burner chamber and the heat exchanger. Additionally, the device, in particular boiler, can comprise valves, at least one control unit and a control panel.

[0014] The heat pump unit can be a ground source heat pump or an air source heat pump. Additionally or alternatively, the heat pump can be a split unit or a monobloc unit. The heat pump can be configured to heat or cool the fluid medium. Thereto, the heat pump comprises a heat pump heat exchanger in which the heat exchange between the fluid medium and the refrigerant of the heat pump occurs.

[0015] The hybrid system can comprise merely one first type heat generator and merely one second type of heat generator. Such a hybrid system has a simple structure. With "heat generator" an appliance is meant which is configured such that generated heat is transferred to a liquid that flows in a circuit of the heat generator. The hybrid system can optionally not comprise a first heat generator, in particular a heat pump, e.g. at the time of commissioning.

[0016] The master control unit and/or the slave control unit can comprise one or more processors or be a processor. Alternatively, the master control unit can and/or slave control unit can be a control board circuit or can be part of a control board circuit. Any or all sensors, pumps, actuators, room units of the first type of heat generator can be connected to the master control unit, wirelessly or via electric lines. Likewise, any or all sensors, pumps, actuators, room units of the first type of heat generator can be connected to the slave control unit, wirelessly or via electric lines.

[0017] In case the control unit for the heat pump is configured as the master control unit of the hybrid system, the hybrid system can optionally not comprise the first heat generator. That means, said master control unit is locally separated from the first heat generator and is used to commission the second heat generator, in particular combustion appliance. The hybrid system and/or master control unit is configured such that the second type of heat generator can be commissioned independent of whether the hybrid system comprises the first type of heat generator or not. Additionally, said master control unit is used to control the operation of the hybrid system, i.e. the operation of the first heat generator and the second heat generator during the operation of the hybrid system.

[0018] According to an embodiment the slave control unit can receive the mode change signal. The slave control unit can receive the mode change signal from an input means. The input means can be a human machine interface of the second type of heat generator. A particular advantageous embodiment is when the input means is a button that the chimney sweeper has to press to switch the hybrid system to the chimney sweeper mode. Said button can be a hardware button arranged on the second type of heat generator. However, the button can be a button provided in an application executed on an electrical device, in particular mobile phone. Additionally or alternatively the input means can be an electrical interface via which data is transmitted to the master control unit. For example, the chimney sweeper can enter in an application that is executed on the electrical device, in particular a mobile phone, that the hybrid system shall switch to the chimney sweeping mode by pressing the corresponding button. The electrical device transmits said information to the slave control unit. The data connection between the electrical device and the slave control unit and/or master control unit can be wireless and/or via an electrical line. The slave control unit transmits a signal to the master control unit by means of which the master control unit is informed that the hybrid system is operated in the chimney sweep mode. Thus, the master control ensures that no heat is provided by the first type of heat generator during the chimney sweep mode. The slave control unit controls the heat output by the second type of heat generator during the chimney sweep mode.

[0019] According to an embodiment the master control unit receives the operation mode change signal from an input means. The input means can be the same as discussed above. After receiving the operation mode change signal, the master control unit transmits said signal to the second type of heat generator and ensures that the first type of heat generator does not output any heat.

[0020] It is possible that the installer selects to which control unit, i.e. to the master control unit or the slave control unit, the operation mode change signal shall be transmitted. Alternatively, it is possible that the control unit to which the operation mode signal is transmitted is automatically selected.

[0021] The chimney sweeper mode of the hybrid system can be operated dependent on at least one predetermined operating parameter. Specifically, the predetermined operating parameters are assigned to the chimney mode of the hybrid system. An operating parameter can be the heat amount to be generated by the second type of heat generator and/or the pump speed of the hybrid system. The master control unit ensures by controlling components of the hybrid system that the predetermined operating parameters are realized. The method accord-

ing to the invention is thus as simple and error reduced as "pressing a button" on the second type of heat generator.

[0022] According to an embodiment the master control unit can control the first type of heat generator in the chimney sweeper mode such that the first type of heat generator does not generate heat. This means that the heat pump is allowed at most to produce sufficient heat for a frost-free operation of the heat pump itself. In other words, the heat pump only generates enough heat that the heat pump itself remains functional in case outside temperatures are below freezing temperature. As the master control unit is assigned to control the first type of heat generator this can be realized very easily. Thus, it can be achieved in an easy manner that in the chimney sweeper mode, merely the second type of heat generator generates heat.

[0023] The hybrid system can be switched to an operation mode after the chimney sweeping mode is performed. The master control unit controls the components of the hybrid system such that the hybrid system is switched to an operation mode in which selectively none of the heat generators, which corresponds to the standby mode, or one of the two heat generators or both heat generators generate heat. Thus, it is easily possible to switch the hybrid system to the mode that is needed after the chimney sweeping mode is finalized.

[0024] According to an aspect of the invention a control unit is provided wherein the control device comprises means for carrying out an inventive method. The control unit can be the master control unit.

[0025] According to a further aspect of the invention a hybrid system is provided. The hybrid system can comprise a first type of heat generator, a master control unit configured to control the first type of heat generator, a second type of heat generator and a slave control unit configured to control the second type of heat generator and a pump for pumping liquid within at least one load circuit of the hybrid system, wherein the master control unit comprises means for carrying an inventive method.

[0026] The hybrid system can comprise a support unit. The support unit can comprise an inner space in which the master control unit is arranged. Additionally or alternatively, the support unit can comprise a distributor by means of which the first type of heat generator and the second type heat generator are fluidically connected to each other.

[0027] The fluid distributor is used to collect and distribute the fluid that flows between the different components of the hybrid system. In particular, the fluid distributor is a hydronic or hydraulic distributor by means of which the fluid, in particular water, as an energy carrier, is distributed between the heat pump unit, the combustion appliance device and at least one load, in particular several loads. The terms hydraulic and hydronic are used synonymously. The distributor is fluidly connected with the first type of heat generator and the second type of heat generator to receive fluid medium from the first type of heat generator and the second type of heat generator that is to be distributed to the one or more load circuits of the hybrid system. The load circuit can be a central heating circuit. Additionally or alternatively the load circuit can be domestic hot water circle. The fluid distributor has a cavity for receiving the fluid and several inlets and outlets that are fluidically connected to the components of the hybrid. The distributor in one embodiment can be a decoupling tank.

[0028] A "fluidic connection" between two or more components means that the components are connected in such a manner that a fluid, in particular a liquid, can flow from one component to the other component. A "fluid path" is the path that the fluid medium flows within the heating or cooling system. As is discussed below more in detail the heating or cooling system comprises several circuits. Said circuits define the fluid path of the fluid medium.

[0029] The support unit can comprise a housing that supports the second type of heat generator. Said housing can be attached to a wall, in particular to a house wall. The housing can be formed by one or more side panels. The side panels can comprise at least one of steel, aluminium, a polymeric, in particular a thermoplastic material, and a composite material or can be made of steel, aluminium, a polymeric, in particular a thermoplastic material, and a composite material. Steel provides the side panels with strength. The aluminium, the polymeric, in particular the thermoplastic material, and the composite material may be used to reduce the noise generated by the hybrid system and reduce the weight of the respective unit.

[0030] The pump can be arranged downstream of the distributor along a liquid flow direction. Additionally, the pump can be arranged upstream of a valve by means which the liquid flow through at least two load circuits is controlled. Thus, the hybrid system has the advantage that the same pump is used to pump liquid through the at least two load circuits. The hybrid system can comprise further pumps. Specifically, a further pump can be provided in the heat pump circuit and another pump can be provided in the combustion appliance circuit.

[0031] According to an aspect of the invention a computer program product is provided. The computer program product comprises instructions which, when the program is executed by a computer, in particular a control unit, cause the computer, in particular the control unit, to carry out an inventive method. Additionally a non-transitory computer readable medium is provided wherein the non-transitory computer readable medium has stored thereon the inventive computer program product. Further, a data carrier signal carrying the inventive computer program product is provided.

[0032] In the figures, the subject-matter of the invention is schematically shown, wherein identical or similarly acting elements are usually provided with the same reference signs.

Figure 1 shows a hybrid system according to the invention.

Figure 2 shows a flow chart regarding to switching the hybrid system shown in figure 1 to a chimney sweeper mode.

Figure 3 shows a support device of the hybrid system from a front view.

Figure 4 shows the support device of the hybrid system from a rear view.

Figure 5 shows a support device and a second type of heat generator in an assembled state.

[0033] A hybrid system 1 as shown in figure 1 comprises a first type of heat generator 3, a master control unit 2 configured to control the first type of heat generator 3, a second type of heat generator 4 and a slave control unit 5 configured to control the second type of heat generator 4. The master control unit 2 and the slave control unit 5 are electrically connected to each other such that a data exchange between the two control units is possible. In this embodiment the first type of heat generator 3 is a heat pump and the second type of heat generator 4 is a combustion appliance, in particular a gas boiler.

[0034] As is explained in figure 2 more in detail, the master control unit 2 receives commissioning data relating to the hybrid system 1 and transmits said received commissioning data to the slave control unit 5 for commissioning the second type of heat generator 4 independent of whether the hybrid system 1 comprises the first type of heat generator 3 or not.

[0035] The hybrid system 1 also comprises a support device 7 that is shown in figures 3 to 5 more in detail. Said support device 7 is used to support the second type of heat generator 4 and can be attached to a wall.

[0036] A distributor 6 of the hybrid system 1 is arranged in an inner space of the support device 7. The distributor 6 has a plurality of inlet and outlet connections by means of which a non-shown cavity of the distributor 6 is fluidically connected to the other components of the hybrid system 1. The distributor 6 is fluidically connected to the first type of heat generator 3 and to the second type of heat generator 4. Additionally, the distributor 6 is fluidically connected to a first load circuit 12 and to a second load circuit 13. The first load circuit 12 can be a domestic hot water circuit and the second load circuit 13 can be a central heating circuit. The distributor 6 is used to fluidically connect the first type of heat generator 3, the second type of heat generator 4, the first load circuit 12 and the second load circuit 13 to each other.

[0037] The hybrid system 1 comprises a pump 11. The pump 11 is used to pump liquid within the first and/or second load circuit 12, 13. Referring to the liquid flow direction, the pump 11 is arranged downstream the distributor 6. The pump 11 is also arranged within the inner space of the support device 7.

[0038] The hybrid system 1 comprises a valve 14. The valve 14 is arranged within the inner space of the support device 7 and arranged downstream the pump 11. The flow rate flowing within the first load circuit 12 or within the second load circuit 13 depends on a valve position. The master control unit 2 is connected with the valve 14 and controls the valve position.

[0039] The first type of heat generator 3, which in this embodiment is a heat pump, is only schematically shown. Specifically, the components of the heat pump like compressor, condenser, evaporator and expansion valve are not shown. Additionally, only the part of a heat pump circuit 15 is shown that is fluidically connected with the distributor 6. However, a further pump that is arranged in the heat pump circuit 15 to ensure circulation of the liquid within the heat pump circuit 15 is not shown.

[0040] The second type of heat generator 4, which in this embodiment is a combustion appliance, in particular a gas boiler, is only schematically shown. In particular, a burner, valves and the heat exchanger of the combustion appliance are not shown. A part of the combustion appliance circuit 16 that is fluidically connected to distributor 6 is shown. Additionally, another pump is not shown wherein the other pump is used for circulating the liquid within the combustion appliance circuit 16.

[0041] Figure 2 shows a flow chart regarding to switching the hybrid system 1 shown in figure 1 to a chimney sweeper mode. In a first step S1 the slave control unit 5 receives operation mode change signal. The slave control unit 5 can receive the signal from a human machine interface 18 as shown in fig. 5. Said signal is generated after the chimney sweeper presses a button of the second type of heat generator 4 or enters an order in the human machine interface of the second type of heat generator 4. In a non-shown embodiment the slave control unit 5 can receive the operation mode change signal from an electrical device which executes an application by means of which the chimney sweeper mode can be activated and/or into which the installer can input instruction orders.

[0042] The slave control unit 5 sends a signal to the master control unit 2 informing that the hybrid system shall be operated in the chimney sweeper mode. The master control unit 2 ensures that the first type of heat generator does not provide heat during the chimney sweeping mode.

[0043] In a second step S2 the chimney sweeper ensures that the heat loads arranged in the load circuits 12, 13 have a heat demand. Specifically, the chimney sweeper opens a load valve so that heat is consumed by the heat loads. This is necessary if the environment temperature is high so that there is no need for any heat consumption by the heat loads. Alternatively, it is possible that the load valves are opened automatically as a result of a control signal issued by the slave control unit 5 and/or the master control unit. The second step S2 is not necessary for example in winter in which there is a continuous heat demand by the loads so that the valve loads are in an open position.

[0044] In a third step S3 the master control unit 2 sends

a control sign to the pump 11. The control signal results in that that the pump 11 is either activated or is ensures that a predetermined liquid flow is provided. Said pumped liquid flows through the first and/or second load circuit 12, 13.

[0045] In a fourth step S4, the slave control unit 2 determines whether the chimney sweeping mode is finalized. If the chimney sweeping mode is finalized, the slave control unit 5 informs the master control unit 2 accordingly. The master control uni 2 ensures that the hybrid system 1 is switched to an operation mode in a fifth step S5. Said mode can be an operation mode in which one of the two heat generators or both heat generators generate heat or a standby mode in which no heat generator generates heat.

[0046] Figure 3 shows a support device 7 of the hybrid system 1 from a front view and Figure 4 shows the support device 7 of the hybrid system 1 from a rear view. In contrary to figure 3, figure 4 shows the master control unit 2 that is arranged in an inner space of the support device 7.

[0047] The support device 7 comprises a housing 10 that is formed by several panels, namely a top panel, a bottom panel and two side panels. The panels delimit the inner space of the support device 7 in which the pump 11, the distributor 6 and the valve 14 are arranged. The distributor 6 is arranged on the bottom panel. As is evident from figure 5, the housing 10 is attached to a wall.

[0048] Figure 5 shows the support device 7 and a second type of heat generator 4 in an assembled state. The support device 7, in particular the housing 10, is attached to a wall 17. Additionally, the support device 7 supports the second type of heat generator 4. Specifically, a housing 19 of the second type of heat generator 4 is mechanically connected to the housing 10 of the support device 7. Thus, an end of the housing 10 is connected to the wall 17 and another end of the housing 10 is connected to the housing 19 of the second type of heat generator 4. The second type of heat generator 4 comprises a human machine interface 18 via which the installer can input information.

Reference Signs

[0049]

1 Hybrid system
2 Master control unit
3 First type of heat generator
4 Second type of heat generator
5 Slave control unit
6 Distributor
7 Appliance unit
8 First load circuit
9 Second load circuit
10 Housing
11 Pump
12 First load circuit
13 Second load circuit
14 Valve
15 Heat pump circuit
16 Combustion appliance circuit
17 Wall
18 Human machine interface
19 Housing of second type of heat generator

Claims

1. Method for switching a hybrid system (1) to a chimney sweeper mode, wherein the hybrid system (1) comprises

   a master control unit (2) configured to control a first type of heat generator (3), in particular a heat pump,
   a second type of heat generator (4), in particular a combustion appliance, and
   a slave control unit (5) configured to control the second type of heat generator (4),
   a pump (11) for pumping liquid within at least one load circuit (12, 13) of the hybrid system (1) wherein
   the method comprises the steps that
   the master control unit (2) receives an operation mode change signal for changing the operation mode of the hybrid system (1) to the chimney sweeper mode and that the master control unit (2) transmits a control signal to the pump (11) resulting in a liquid flow within the at least one load circuit (12, 13).

2. Method according to claim 1, **characterized in that** the master control unit (2) receives the mode change signal from the slave control unit (5).

3. Method according to claim 1 or 2, **characterized in that** the slave control unit (5) receives the mode change signal from an input means of the second type of heat generator (5).

4. Method according to at least one of the claims 1 to 3, **characterized in that** in the chimney sweeper mode the second type of heat generator (4) is operated dependent on at least one predetermined operating parameter.

5. Method according to at least one of the claims 1 to 4, **characterized in that** the master control unit (2) controls the first type of heat generator (3) in the chimney sweeper mode such that the first type of heat generator (3) does not generate heat.

6. Method according to at least one of the claims 1 to 5, **characterized in that** the hybrid system (1) is switched to a mode after the chimney sweeping mode is performed, wherein the hybrid system (1)

is switched to a mode in which selectively none of the heat generators or one of the two heat generators or both heat generators generate heat.

7. Control device comprising means for carrying out the method of at least one of the claims 1 to 6.

8. Hybrid System (1) comprising a first type of heat generator (3), a master control unit (2) configured to control the first type of heat generator (3), a second type of heat generator (4), a slave control unit (5) configured to control the second type of heat generator (4) and a pump (11) for pumping liquid within at least one load circuit (12, 13) of the hybrid system (1), wherein the master control unit (2) comprises means for carrying out the method of at least one of the claims 1 to 9.

9. Hybrid system (1) according to claim 8, **characterized in that** the hybrid system (1) unit comprises a distributor (6) by means of which the first type heat of generator (3) and the second type heat generator (4) are fluidically connected

10. Hybrid system (1) according to claim 8 or 9, **characterized in that** the hybrid system (1) comprises a support unit (7) that supports the second type of heat generator (4).

11. Hybrid system according to claim 10, **characterized in that**

a. the support unit (7) comprises an inner space in which the master control unit (2) and/or slave control unit (5) and/or distributor (6) and/or pump (11) is arranged and/or wherein
b. the support unit (7) comprises a housing (10) that supports the second type of heat generator (4).

12. Hybrid system (1) according to claim 9 or 10, **characterized in that** the pump (11) is arranged downstream of the distributor (6).

13. Computer program product comprising instructions which, when the program is executed by a computer, in particular a control unit, cause the computer, in particular the control unit, to carry out the method of at least one of the claims 1 to 9.

14. Non transitory computer readable medium having stored thereon the computer program product according to claim 13.

15. Data carrier signal carrying the computer program product of claim 13.

Fig. 1

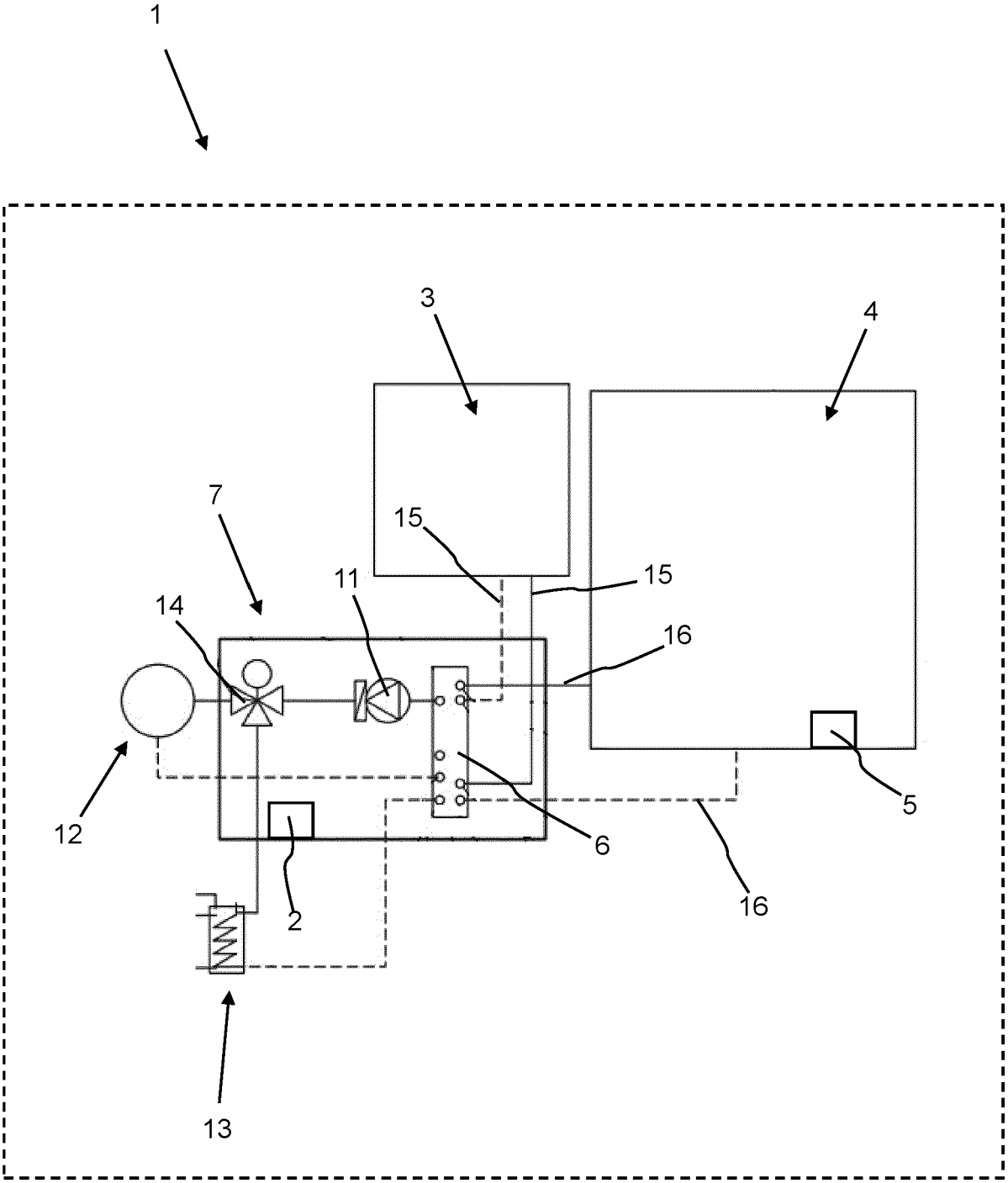


Fig. 2

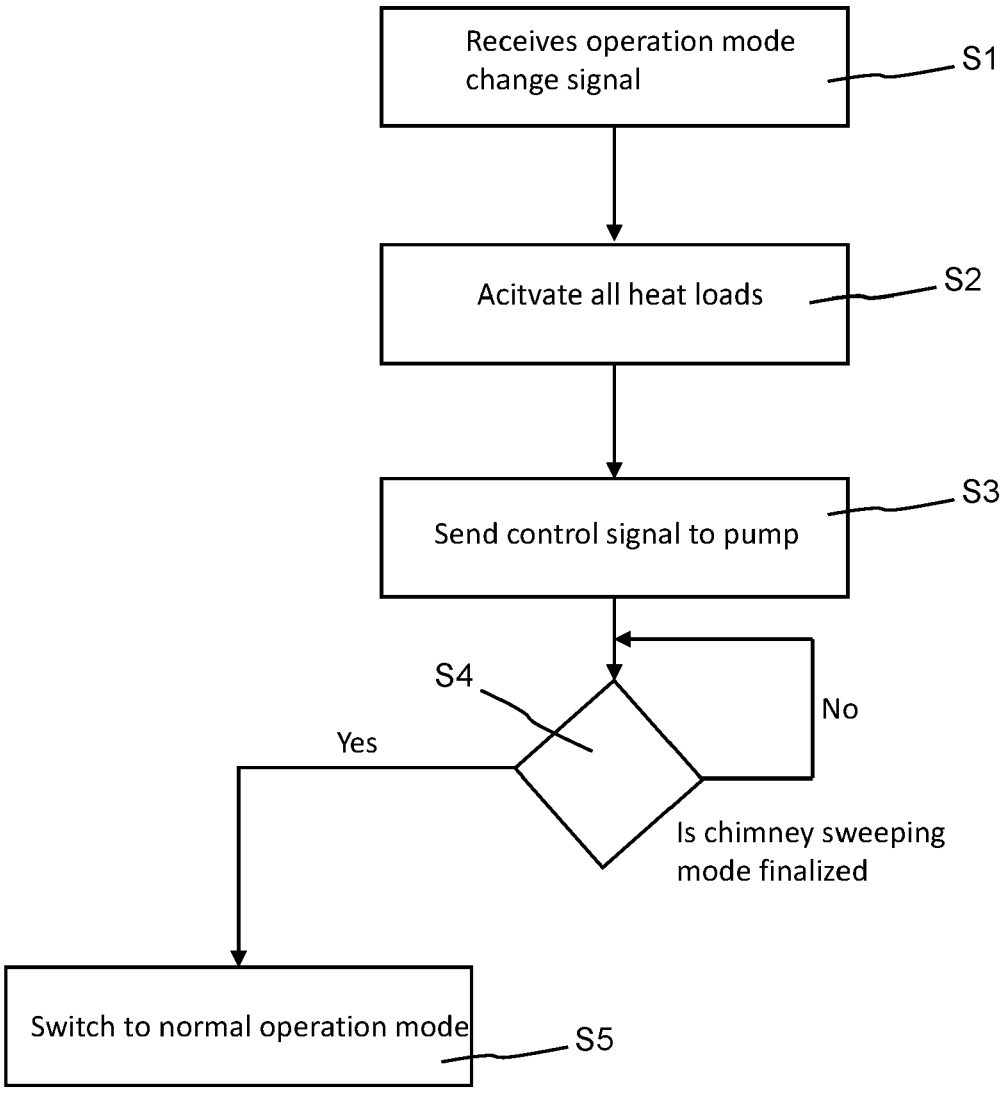

Receives operation mode change signal
S1
Acitvate all heat loads
S2
Send control signal to pump
S3
S4
No
Yes
Is chimney sweeping mode finalized
Switch to normal operation mode
S5

Fig. 3

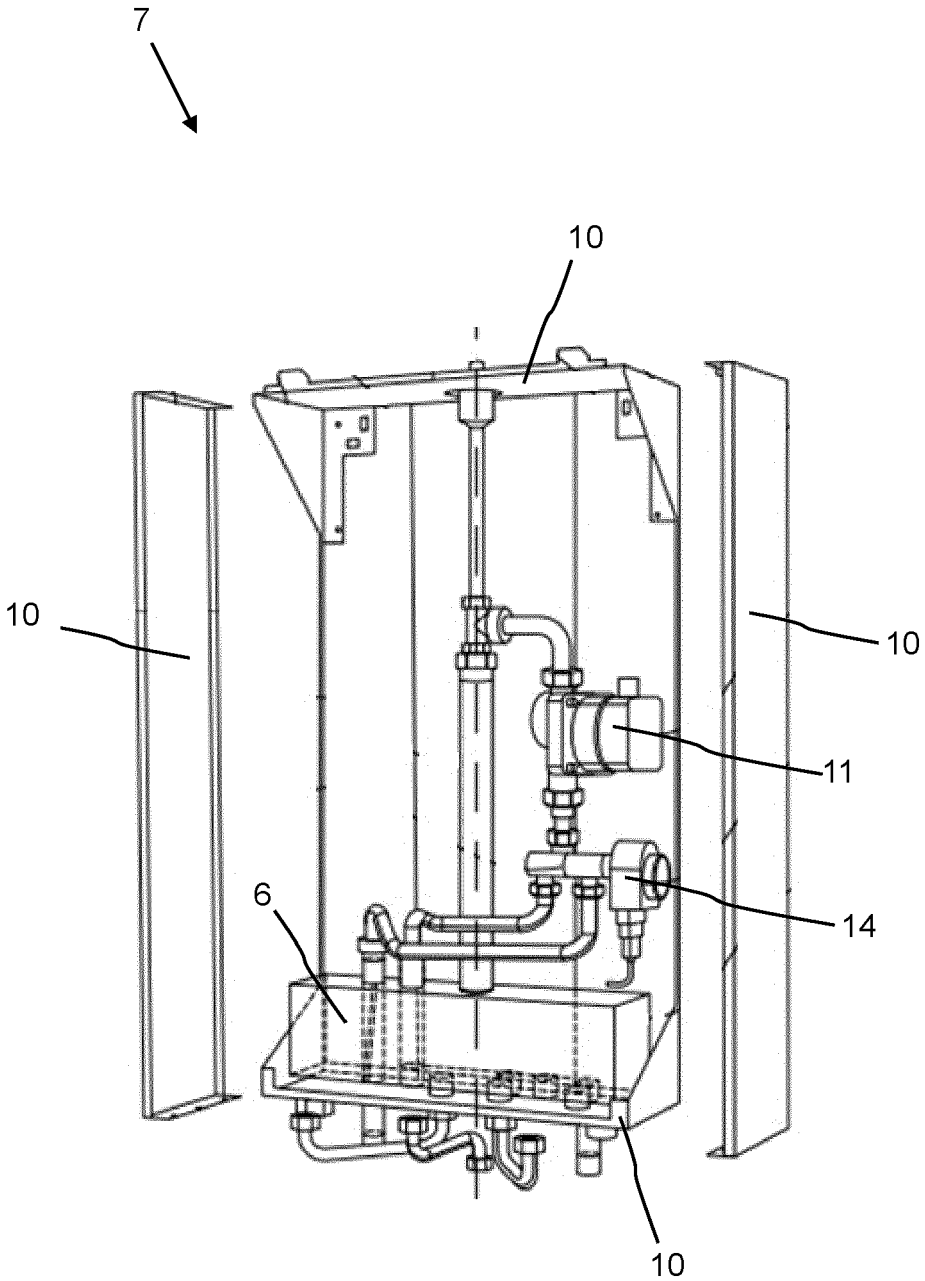


Fig. 4

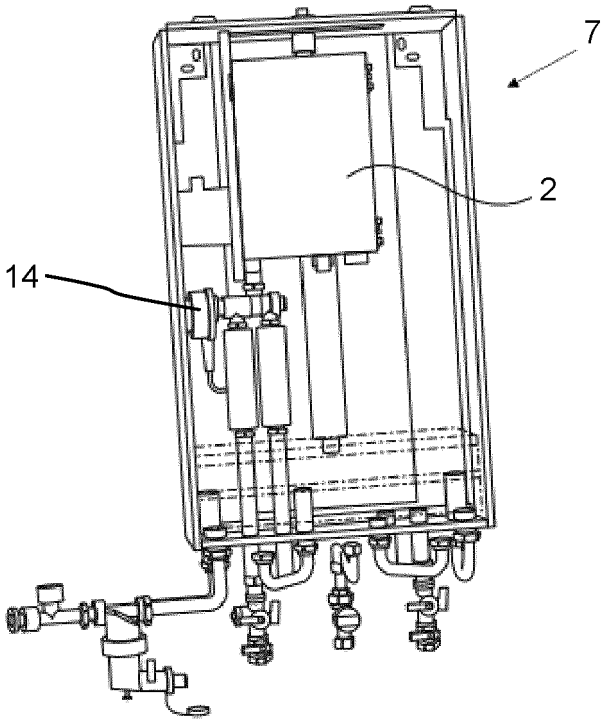
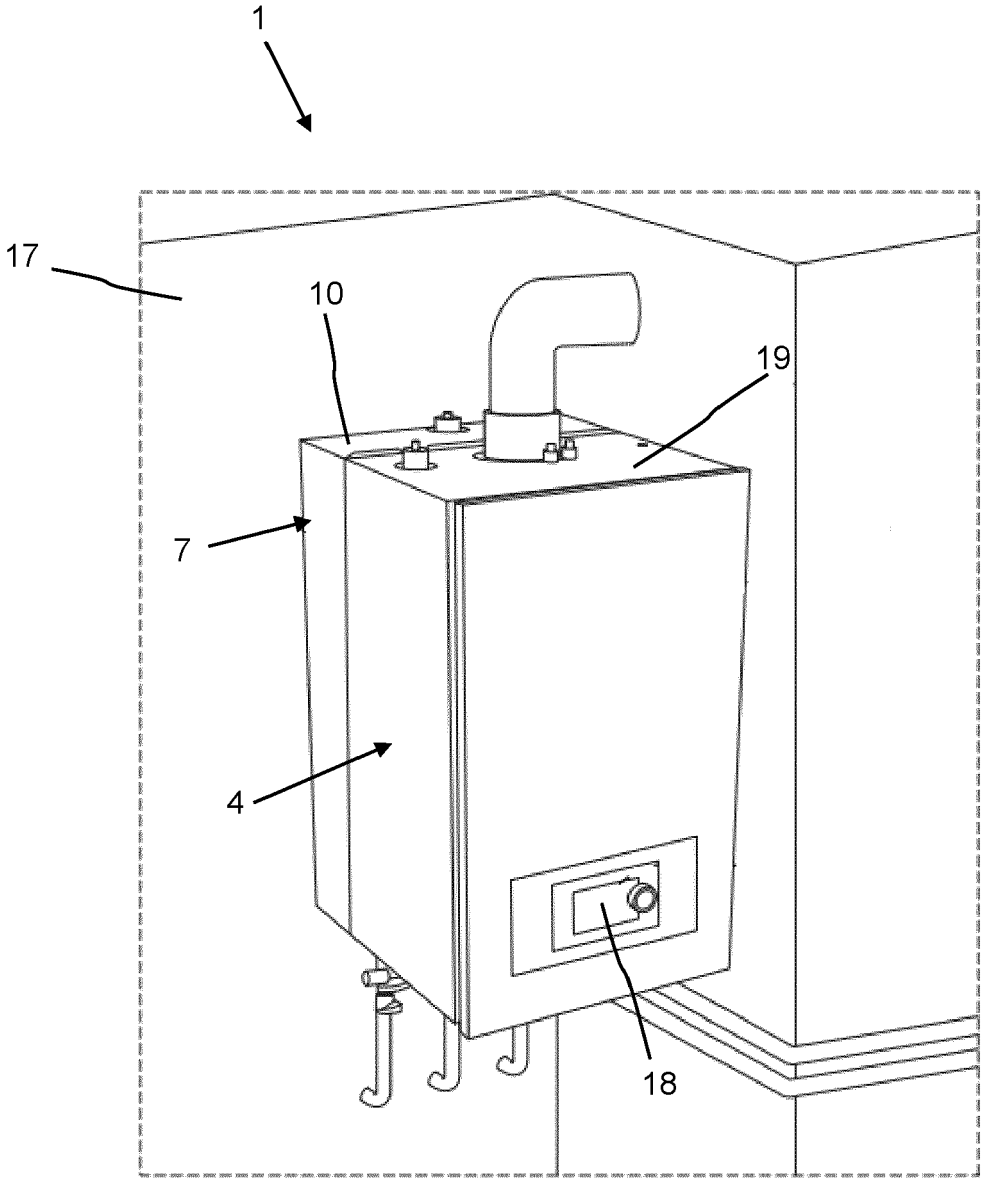


Fig. 5



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European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 20 6378

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	"DIGITAL, MULTI-FUNCTIONAL HEATING AND HOT WATER CONTROL SYSTEM", SIGMAGYR RVP DIGITAL. LANDIS & GYR, ZUG, CH, 1 April 1990 (1990-04-01), pages 1-38, XP000431566, * the whole document *	1-15	INV. F24D12/02 F24D19/10 F24H9/20 F24H15/104 F24H15/414 F24H15/429 F24H15/443
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F24D
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G05B
F23N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 March 2024	García Moncayo, O

CATEGORY OF CITED DOCUMENTS

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L : document cited for other reasons

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 20 6378

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