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(54) Title: HEAT INTERFACE UNIT

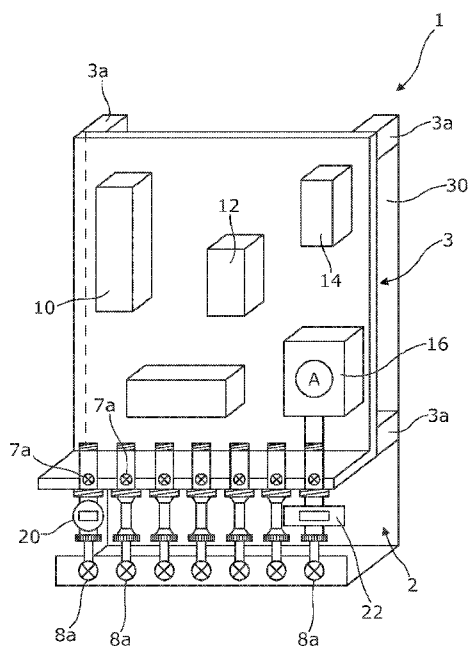


Figure 1

(57) Abstract: A heat interface unit (1) for connection to a centralised boiler, which comprise two modules, a first module (2) which is arranged to be fixed in position and be connected to the centralised boiler to receive heated water therefrom, and a second module (3) which is arranged to be removably connected onto the first module, and the first module comprises a meter for measuring usage of energy which has been supplied from the centralised boiler.

## HEAT INTERFACE UNIT

### Technical Field

The present invention relates to Heat Interface Units

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### Background

Heat interface units (HIU) are typically installed in large apartment or multi-storey complexes with multiple dwellings. Rather than each dwelling being fitted with a boiler, a central boiler provides heating and domestic hot water energy to the entire complex. Heat interface units (HIU) act as a bridge between the central boiler and the heating and hot water systems of the individual apartments. The implementation of a HIU may be considered as a centralised plant scheme serving multiple dwellings.

A HIU typically comprises a heat exchanger which receives heated water from the centralised plant boiler, and which heat is then transferred by the heat exchanger to water in the local hot water and/or central heating circuits in the property.

Advantages of HIU's include:

no individual boilers in dwellings, reducing risks associated with a gas pipework, saving on installation costs and reducing the need for individual flue terminals (with associated plumbing);  
annual gas safety inspection can be restricted to the plant room in which the centralised boiler is located;  
if installed facing into landlord areas, HIUs reduce maintenance access issues;  
gas consumption may be reduced through central plant efficiencies.

We have devised an improved HIU.

### Summary

According to a first aspect of the invention there is provided a heat interface unit for connection to a centralised boiler, which comprise two modules, a first module which is arranged to be fixed in position and be connected to the centralised boiler to receive heated water therefrom, and a second module which is arranged to be removably connected onto the first module, and the first module comprises a meter for measuring usage of energy which has been supplied from the centralised boiler.

The second module may be arranged to be separable from the first module.

A HIU may be considered as a delivery point for heating water for a dwelling or property.

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The first module may be termed a manifold.

The first module may be arranged to be secured to a wall, or be mounted on a floor.

10    

The first module may be termed a (wall) jig.

The first module may comprise a number of fluid connectors, which are arranged to be connected to counterpart fluid connectors of the second module.

15    

Each of the fluid connectors may comprise a respective isolator valve, for controllably allowing fluid to flow through the connector.

20    

The HIU may comprise a union for each of the connectors, which allows the connections of the first module to be fluidically connected to the connectors of the second module. The unions may be retained by one or other of a respective pair of connectors. The unions may comprise threaded component, which can connect one connection to another. The unions preferably allow the connector (pairs) to be selectively coupled or de-coupled. This may be achieved manually by using a tool, such as a spanner.

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The connections of the first module and the connections of the second module may arranged be such that they are aligned or in register when the first module is in an in situ position.

30    

The fluid connections may be provided at a forward or foremost region or front of the HIU.

The HIU may comprise one or more of the following:

an energy usage or heat meter;

35    

a volumetric water usage meter (for example to measure cold water usage);

- a heat exchanger (such as a plate heat exchanger for example);
- (insulated) pipework;
- a pressure gauge;
- (motorised or driven) valves;
- 5 a pump;
- expansion tank for hot water storage;
- differential valve- DPCV;
- primary circuit bypass;
- primary circuit strainer;
- 10 secondary circuit pump;
- manual air vents for primary and secondary circuits;
- thermostatic valve for primary circuitt2-way valve primary circuit for secondary heating circuit;
- user controls (for example such as a programmer and roomstat);
- 15 fill and flush valve.

A water meter may be provided as part of the first module.

- 20 The majority of operative or working parts/sub-assemblies of the HIU, save the energy meter, may be contained within or be fixed or connected or integrated with the second module.

- 25 The first module may comprise a base part and a rear part. The rear part may be arranged to be secured to a wall, so as to maintain the second module in position.

- 25 The first module may comprise a support surface or structure, suitable for supporting the first module in situ. This may be provided by a plate, or a number of support surface portions.

- 30 The support structure may be slidably mounted, such that it can be slid to an outward or extended condition (including when the second module is on the support surface). In this way, removal and attachment of the second module to the first module is facilitated.

The second module may comprise features which allow the second module to be detachably connected to the first module, such as fasteners or fixings.

The second module may be arranged to be removably connectable to the first module.

- 5 Usage data may be collected by a reader device, routed to a data network or transmitted via a node to the GSM telephone network. This then conveniently allows either local or remote meter reading with real time energy use, aggregate kWh consumption over pre-determined time periods and, in some instances, fault status or error notification.

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The invention may comprise one or more features disclosed in the description and/or as shown in the drawings, either individually or in combination.

#### **Brief description of the drawings**

- 15 Various embodiments of the invention will now be described, by way of example only, with reference to the following drawings in which:

**Figure 1** is a schematic front perspective view of a HIU,

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**Figure 2** is a side view of the HIU of Figure 1,

**Figure 3** is a schematic front perspective view of a wall-mounted manifold module of the HIU of Figure 1,

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**Figure 4** is a side view of the module shown in Figure 3,

**Figure 5** is a front perspective view of the removable module of the HIU of Figure 1 (without outer casing removed),

30

**Figure 6** is a side view of the removable module shown in Figure 5, and

**Figure 7** is a perspective view the casing of the HIU.

**Detailed Description**

There is now described a novel Heat Interface Unit (HIU) 1. As will be described in more detail below, the HIU 1 comprises two major components, or units/modules, a wall-mounted manifold or jig 2, and a removable unit 3. As will be described in more detail below, the HIU 1 advantageously allows the removal and replacement of the removable unit 3, without having to drain the unit down first.

The removable module 3 comprises various functional/working components and sub-assemblies required for the HIU to function. These are contained within an internal space of the module 3. The HIU comprises a heat exchanger 10, a three-port valve 12, a thermostatic valve 14, and a pump 16. The pipework connections between the various components is omitted for ease of representation. The circulating pump 16 in operation overcomes the resistance of the dwelling pipe system.

More generally, both the heat meter and the water meter 20 are usage measuring devices which are registered to the particular dwelling or property where the HIU is installed. The manifold module may comprise non-mechanical parts affixed thereto, such as a strainer, a filter, etc.

The removable module 3 further comprises a series of connectors 7, which are located at the front region of the module. The connectors 7 are spaced apart and aligned. These provide fluid communication with counterpart connections of the first manifold module 2. The allow fluid to flow to and from the centralised boiler, allow cold water to enter and be heated by the heat exchanger 10, and allow heated water to flow to a hot water pipework, such as for a domestic hot water pipework, and may also allow connection to a central heating system. Each connection comprises a threaded portion 7b and an isolation valve 7a. Each threaded portion allows a connector to be connected to a counterpart connector by way of a union, such as a threaded ring.

Turning to the manifold module 2, this comprises a base portion 2a and a rearward portion (comprising a wall or a panel) 2b. The manifold module 2 also comprises a series of connectors 8, which each comprise a threaded portion 8a and an isolation valve 8b. One of the connectors is provided with a water meter 20, and another of the connectors is provided with a heat meter 22. The heat meter 22 in use is arranged to measure the amount of heat (such as in kWh) which is used. The heat meter is

attached the connection through which heated water from the centralised boiler is received by the HIU 1. The water meter 20 measures the volume water which is supplied to the HIU to supply the on-demand hot water supply.

- 5 The manifold module 2 is provided in the rearward panel 2b with a number of fastener apertures. These allow the manifold module to be securely attached to a wall. The back panel 2a further comprises features of lugs 2d which serve in use to assist in correctly locating the removable module 3 in situ on the manifold module. In the embodiment shown in the drawings, the manifold module may more accurately be described as a frame, with a central space. In some embodiments, the rear part of the manifold module may be arranged to enclose or house the removable unit, in situ.

The removable module 2 comprises four fixing brackets 3a, which are arranged to allow them to be secured through respective fixing apertures with a fastener, through the apertures 2c to the rear section 2b of the of the manifold module. The configuration of the brackets ensures that there is a space or gap 30 behind the removable module 3. This space conveniently allows pipework to extend through that space, in any orientation. Alternatively, the pipework may extend through the wall to which the rear section 2b is secured.

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The HIU 1 is provided with a removable cover or casing 5, as shown in Figure 7, which comprises a number of panels, three side panels and a front panel. The front panel is provided with two apertures or windows 5a and 5b. These provide visibility to the displayed readings of each of the water meter and the heat meter. The cover conceals both modules for aesthetics, and also from a safety perspective.

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**CLAIMS**

1. A heat interface unit for connection to a centralised boiler, which comprise two modules, a first module which is arranged to be fixed in position and be connected to the centralised boiler to receive heated water therefrom, and a second module which is arranged to be removably connected onto the first module, and the first module comprises a meter for measuring usage of energy which has been supplied from the centralised boiler.
2. A unit as claimed in claim 1 in which the second module is arranged to be separable from the first module.
3. A unit as claimed in claim 1 or claim 2 in which is a delivery point for heating water for a dwelling or property.
4. A unit as claimed in any preceding claim in which the first module comprises a manifold.
5. A unit as claimed in any preceding claim in which the first module is arranged to be secured to a wall, or to be mounted on a floor.
6. A unit as claimed in any preceding claim in which the first module comprises a number of fluid connectors, which are arranged to be connected to counterpart fluid connectors of the second module.
7. A unit as claimed in claim 6 in which each of the fluid connectors comprises a respective isolator valve, for controllably allowing fluid to flow through the connector.
8. A unit as claimed in claim 7 which comprises a union for each of the connectors, which allows the connections of the first module to be fluidically connected to the connectors of the second module.

9. A unit as claimed in claim 8 in which the connectors of the first module and the connectors of the second module are arranged be such that they are aligned or in register when the first module is in an in situ position.

5 10. A unit as claimed in the fluid connectors are provided at a forward or foremost region or front of the unit.

11. A unit as claimed in any preceding claim which comprises one or more of the following:

- 10 an energy usage or heat meter;  
a volumetric water usage meter (for example to measure cold water usage);  
a heat exchanger (such as a plate heat exchanger for example);  
(insulated) pipework;  
a pressure gauge;
- 15 (motorised or driven) valves;  
a pump;  
expansion tank for hot water storage;  
differential valve- DPCV;  
primary circuit bypass;
- 20 primary circuit strainer;  
secondary circuit pump;  
manual air vents for primary and secondary circuits;  
thermostatic valve for primary circuitt2-way valve primary circuit for secondary heating circuit;
- 25 user controls (for example such as a programmer and roomstat);  
fill and flush valve.

12. A unit as claimed in any preceding claimed in any preceding claim in which a water meter is provided as part of the first module.

30

13. A unit as claimed in any preceding claim in which the majority, or major proportion, of operative or working parts/sub-assemblies of the unit, save the energy meter, are contained within or be fixed or connected or integrated with the second module.

35

14. A unit as claimed in any preceding claim in which the first module comprises a base part and a rear part.

15. A unit as claimed in claim 14 in which the rear part is arranged to be secured to a wall, so as to maintain the second module in position.

16. A unit as claimed in any preceding claim in which the first module comprises a support surface or structure, suitable for supporting the first module in situ.

10 17. A unit as claimed in claim 16 in which the support structure is slidably mounted, such that it can be slid to an outward or extended condition (including when the second module is on the support surface).

15 18. A unit as claimed in any preceding claim in which the second module comprises features which allow the second module to be detachably connected to the first module, such as fasteners or fixings.

19. A unit as claimed in any preceding claim in which the second module is arranged to be removably connectable to the first module.

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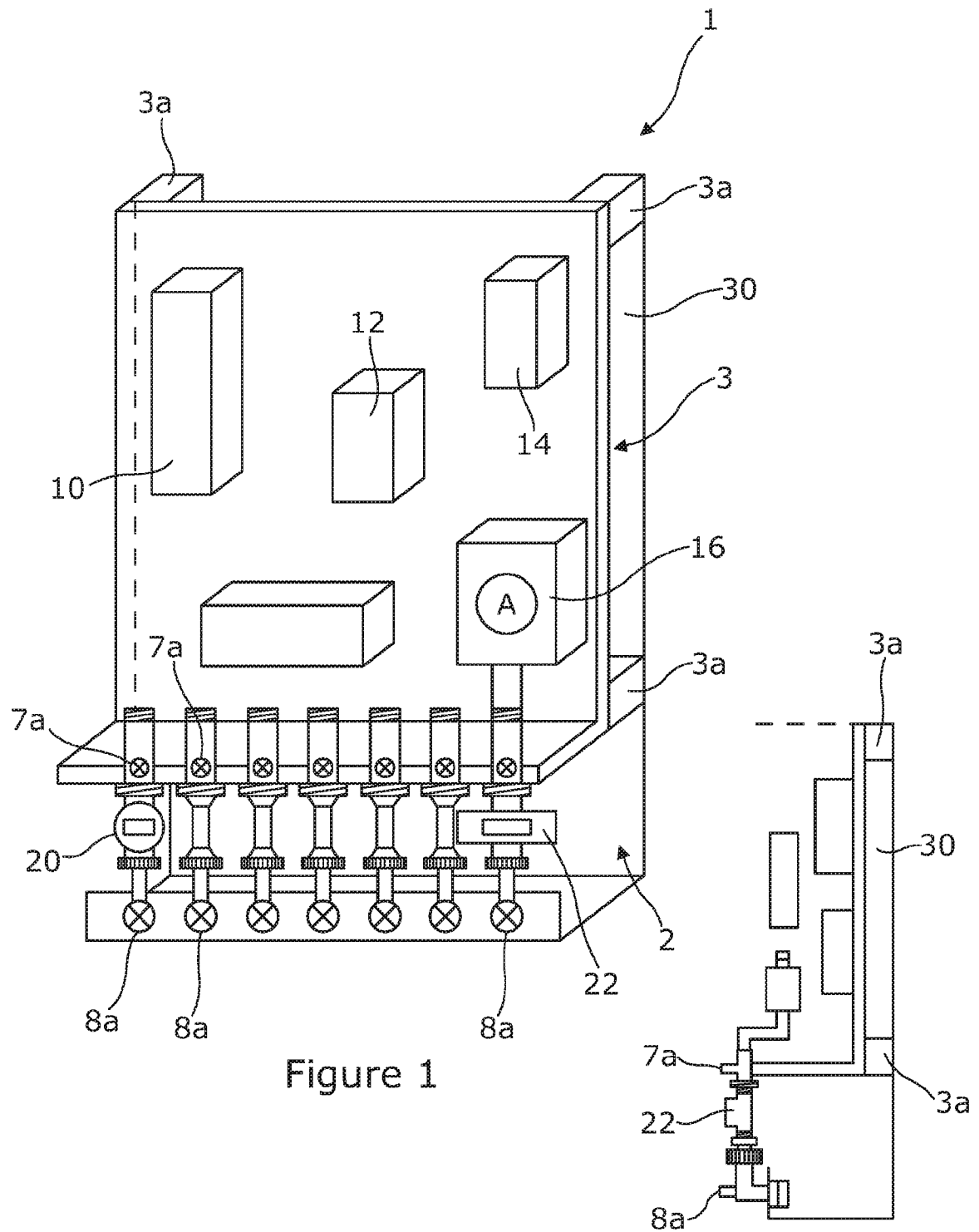


Figure 1

Figure 2

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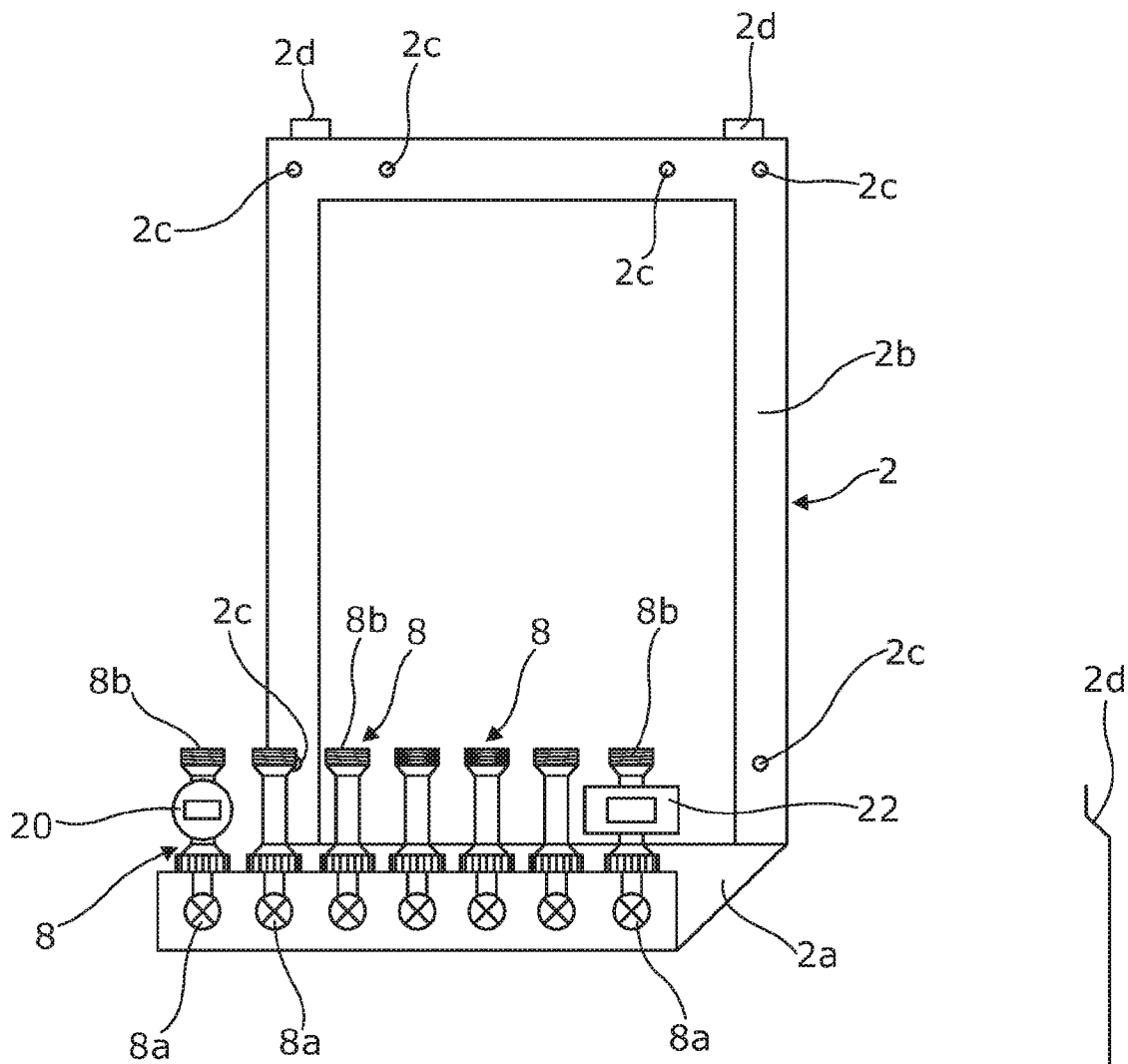


Figure 3

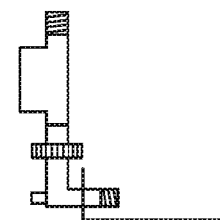


Figure 4

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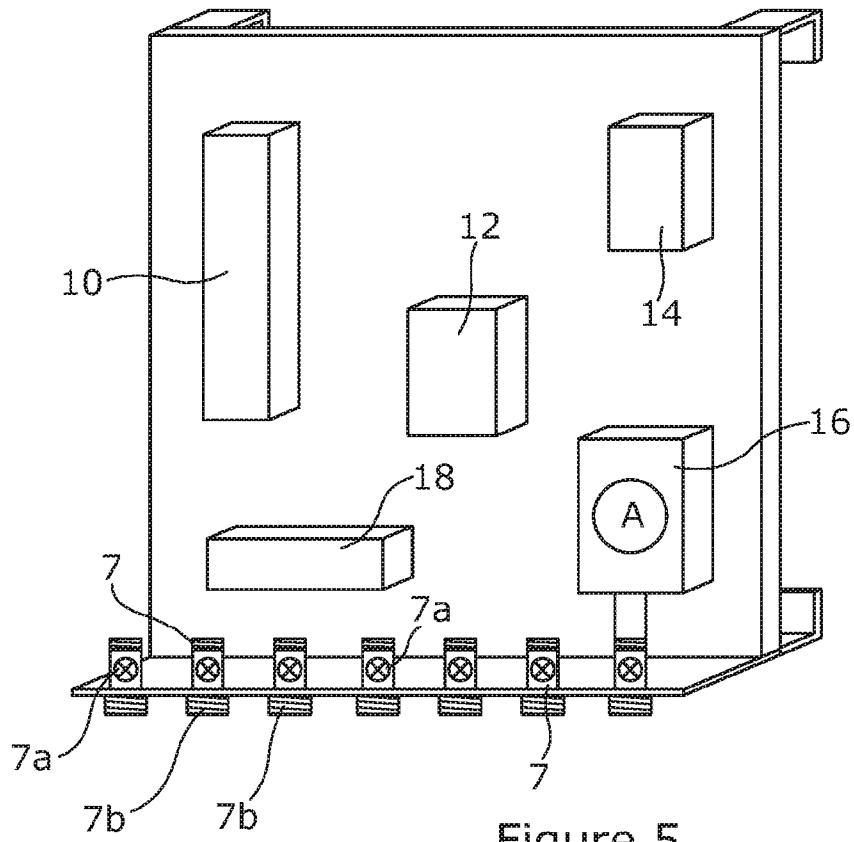


Figure 5

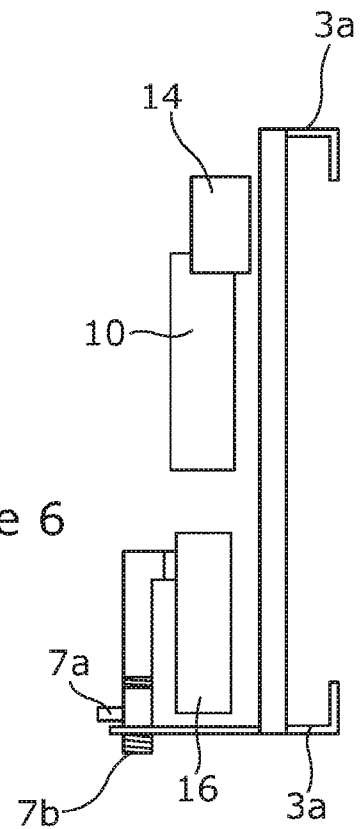


Figure 6

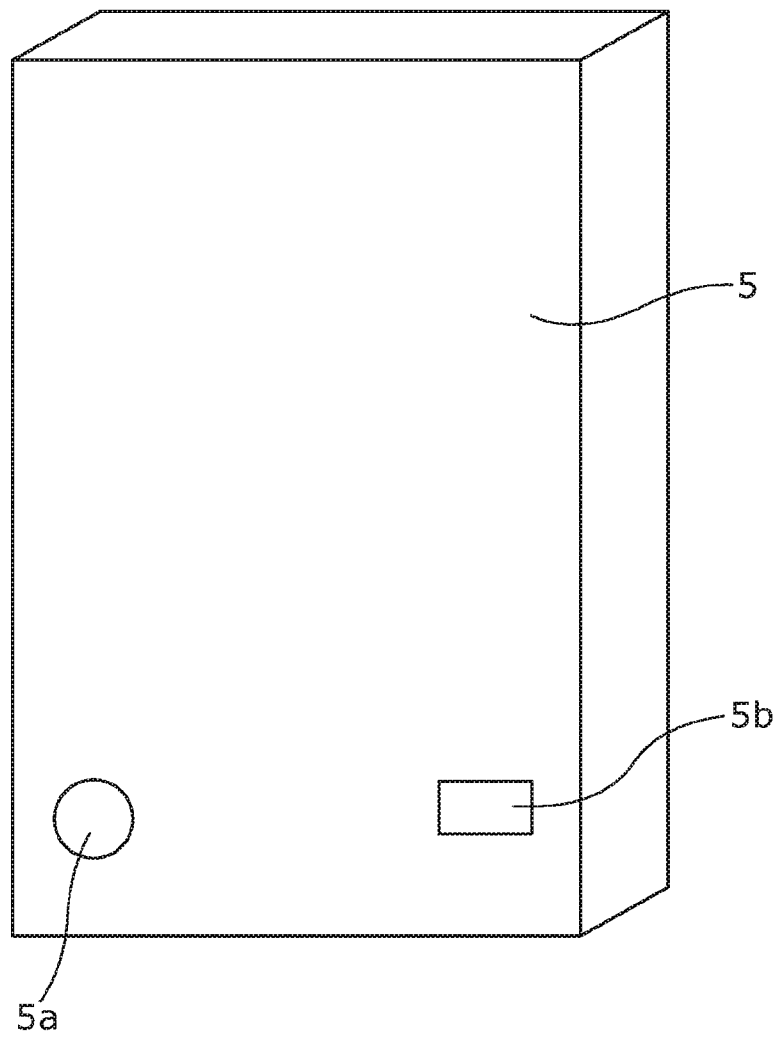


Figure 7

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2019/050350

## A. CLASSIFICATION OF SUBJECT MATTER

INV. F24D3/10 F24D10/00 F24D19/10  
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
F24D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                              | Relevant to claim No. |
|-----------|-----------------------------------------------------------------------------------------------------------------|-----------------------|
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| X         | EP 1 944 554 A2 (FERRERO RICCARDO [IT])<br>16 July 2008 (2008-07-16)<br>columns 5-14; figures 1-3, 5-7<br>----- | 1-19                  |
| A         | DE 20 2014 104134 U1 (ULLAND GMBH [DE])<br>17 November 2014 (2014-11-17)<br>the whole document<br>-----         | 1-19                  |
| A         | WO 88/09904 A1 (STEAG FERNWAERME [DE])<br>15 December 1988 (1988-12-15)<br>the whole document<br>-----          | 1-19                  |



Further documents are listed in the continuation of Box C.



See patent family annex.

## \* Special categories of cited documents :

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Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2019/050350

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date      |
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