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(72) Inventor; and
(71) Applicant : **MC ARDLE, Arthur james** [IE/IE]; Leonsgarve, Carrickmacross, Co. Monaghan (IE).

(74) Agent: **GORDON, Naoise**; NP Gordon & Associates, Annyalla, Castleblayney, Co. Monaghan (IE).

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(54) **Title**: A HEATING SYSTEM

(57) **Abstract**: A heating system (1) made up a stove (2), a hot water cylinder (3), an open radiator zone (4) and pipework (5) connecting the stove (2), the hot water cylinder (3) and the radiator zone (4) in which the pipework (5) comprises a conduit in the form of a cylinder injector pipe (16) and manifold (6) which enable efficient and safe pumped flow of heated water from the stove (6) to the cylinder (3) radiator zone (4) for effective heating of the radiator zone (4).

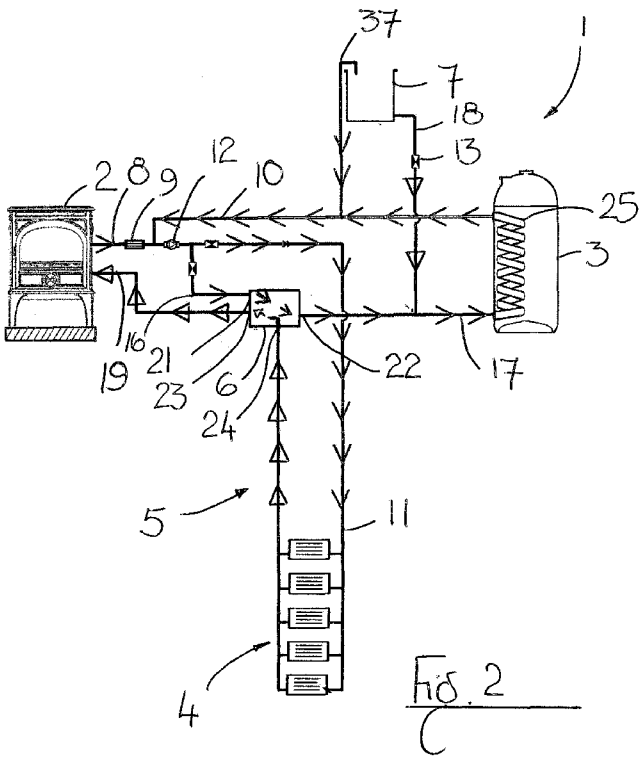


Fig. 2

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A Heating System

Introduction

This invention relates to pipework and a manifold for a central heating system powered by a solid fuel stove and to a method for connecting a stove to a hot water cylinder and a radiator zone in a central heating system.

Background of the Invention

Solid fuel stoves have become increasingly popular as heat sources in domestic and commercial environments due to their high efficiency, cost effectiveness and aesthetic appeal. More recently, stoves are being widely used as boilers in central heating systems – either alone or in combination with other boilers such as oil-fired boilers. Such stoves can be incorporated into central heating systems during installation of the central heating systems or can be retro-fitted to existing central heating systems.

However, the use of stoves as boilers in central heating systems is subject to a number of requirements peculiar to stoves. For example, stoves must always be installed in a gravity fed open vented heating system to allow hot water to circulate away from the boiler and cool down without requiring the use of an electrically powered pump to power flow to the radiators. However, such open systems suffer from a number of disadvantages e.g. water pressure can be lost into the gravity system resulting in poor heating of radiators particularly those remote from the stove.

Summary of the Invention

According to the invention there is provided pipework for connecting a stove to a hot water cylinder and a radiator zone wherein the pipework comprises a conduit between the stove and the hot water cylinder for effecting the pumped flow of heated water into the cylinder from the stove.

Preferably, the conduit comprises a cylinder injector pipe. More preferably, the conduit further comprises a manifold communicable with the cylinder injector pipe. Most preferably, the manifold comprises a cylinder injector pipe fitting, a cylinder return pipe fitting, a stove return pipe fitting and a radiator return pipe fitting.

Suitably, the manifold comprises a four-sided housing having the cylinder injector pipe fitting adjacent the stove return pipe fitting on a first side thereof, the cylinder return pipe fitting on an oppositely disposed second side thereof and the radiator return pipe fitting on a third side thereof.

Preferably, the cylinder return pipe fitting is disposed opposite the stove return pipe fitting and the radiator return pipe fitting is disposed between the cylinder return pipe fitting and the stove return pipe fitting.

In a further embodiment, the pipework further comprises a circulation pump for effecting pumped flow of heated water from the stove to the hot water cylinder and the radiator zone through the conduit.

Preferably, the circulation pump is actuatable in response to the temperature of the output of the stove.

Suitably, the system comprises a thermostat communicable with the circulation pump to actuate the circulation pump.

Preferably, the thermostat is located on the pipework at the output of the stove.

The invention also extends to a heating system comprising:

a heat source in the form of a stove;

a hot water cylinder;

a radiator zone, and

pipework connecting the stove to the hot water cylinder and the radiator zone wherein the pipework comprises a conduit between the stove and the hot water cylinder for effecting the pumped flow of heated water into the cylinder from the stove.

Preferably, the conduit comprises a cylinder injector pipe. More preferably, the conduit further comprises a manifold communicable with the cylinder injector pipe.

Suitably, the manifold comprises a cylinder injector pipe fitting, a cylinder return pipe fitting, a stove return pipe fitting and a radiator return pipe fitting.

Advantageously, the manifold comprises a four-sided housing having the cylinder injector pipe fitting adjacent the stove return pipe fitting on a first side thereof, the

cylinder return pipe fitting on an oppositely disposed second side thereof and the radiator return pipe fitting on a third side thereof.

Suitably, the cylinder return pipe fitting is disposed opposite the stove return pipe fitting and the radiator return pipe fitting is disposed between the cylinder return pipe fitting and the stove return pipe fitting.

In one embodiment, the system further comprises a circulation pump for effecting pumped flow of heated water from the stove to the hot water cylinder and the radiator zone through the conduit.

Preferably, the circulation pump is actuatable in response to the temperature of the output of the stove.

Suitably, the system comprises a thermostat communicable with the circulation pump to actuate the circulation pump.

Preferably, the thermostat is located on the pipework at the output of the stove.

In an alternative embodiment of the invention, the system further comprises a second heat source. Suitably, the second heat source comprises a boiler. Optionally, the boiler comprises an oil boiler.

In a further embodiment, the invention also extends to a manifold for use in a heating system having a heat source in the form of a stove, a hot water cylinder, a radiator

zone and pipework connecting the stove to the hot water cylinder and the radiator zone wherein the manifold comprises a cylinder injector pipe fitting, a cylinder return pipe fitting, a stove return pipe fitting and a radiator return pipe fitting.

Preferably, the manifold comprises a four-sided housing having the cylinder injector pipe fitting adjacent the stove return pipe fitting on a first side thereof, the cylinder return pipe fitting on an oppositely disposed second side thereof and the radiator return pipe fitting on a third side thereof.

More preferably, the cylinder return pipe fitting is disposed opposite the stove return pipe fitting and the radiator return pipe fitting is disposed between the cylinder return pipe fitting and the stove return pipe fitting.

The invention also extends to a method for connecting a stove to a hot water cylinder and a radiator zone wherein the method comprises inserting a conduit in pipework between the stove and the hot water cylinder to effect the pumped flow of heated water into the cylinder from the stove.

Preferably, the conduit comprises a cylinder injector pipe. More preferably, the conduit further comprises a manifold communicable with the cylinder injector pipe.

Suitably, the manifold comprises a cylinder injector pipe fitting, a cylinder return pipe fitting, a stove return pipe fitting and a radiator return pipe fitting. Preferably, the manifold comprises a four-sided housing having the cylinder injector pipe fitting adjacent the stove return pipe fitting.

The invention therefore results in a heating system comprising a heat source in the form of a stove; hot water cylinder; a radiator zone, and pipework connecting the stove to the hot water cylinder and the radiator zone wherein the pipework comprises a circulation pump for effecting pumped flow of heated water from the stove to the hot water cylinder and the radiator zone.

The advantages of the invention are many. A system fitted with the cylinder injector pipe of the invention allows for pumped heat flow to the cylinder and radiators and prevents loss of pressure in gravity systems by permitting the safe and effective use of a circulation pump on a pipework flow as opposed to a return to maximise delivery of heated water from the stove to all radiators – even remote radiators. Due to the use of the cylinder injector pipe with the manifold, the cylinder does not cool.

The cylinder heating system of the invention is extremely safe as the cylinder injector pipe and manifold ensure that fluid can flow at all times – all waterways are open while no moving parts are present – so that heated water is always free to travel from the stove even if the circulation pump fails. The manifold can be fitted at any suitable location in a gravity fed system as no maintenance is required due to the open waterways. The injector pipe and manifold can also be easily retrofitted to existing heating systems are incorporated into new heating systems.

The invention is also suitable for use in dual heat source systems where stoves and oil or other fuel type boilers are employed in combination. The cylinder injector pipe and manifold therefore allow for pumped fluid flow of heated water from the stove to the cylinder and all radiators in such systems in a safe and efficient manner.

In short, heating systems of the invention fitted with cylinder injector pipes, manifolds and circulation pumps optimise the performance of stoves, and in particular, solid fuel appliances.

Brief Description of the Drawings

The invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a schematic representation of a first embodiment of a heating system in accordance with the invention fitted with the cylinder injector pipe and manifold of the invention in which a stove is the sole boiler or heat source and is connected to an open radiator zone via pipework, the temperature of the system is below 50-55°C so that the system is gravity fed only i.e. the circulation pump is switched off and the direction of movement of cold water in the pipework is indicated by closed arrows and the direction of movement of heated water is indicated by open arrows;

Figure 2 is a schematic representation of the heating system of Figure 1 in which the temperature of the system is above 50-55°C and the circulation pump is switched on to reverse flow heated water between the stove and the cylinder via the cylinder injector pipe;

Figure 3 is an enlarged plan view from above of the four-sided rectangular manifold of Figures 1 and 2 with the cylinder injector pipe, the cylinder return pipe,

the boiler return pipe and the heating/radiator return pipe projecting from the manifold and the internal configuration of the cylinder injector pipe and the heating/radiator return pipe indicated by broken lines;

Figure 4 is a schematic representation of the manifold of Figure 3 with the direction of movement of water within the manifold when the heating system is operating on gravity and the pump is off indicated by arrows;

Figure 5 is a schematic representation of the manifold of Figure 3 with the direction of movement of water within the manifold when the temperature is above 50-55°C, and the circulation pump is on indicated by arrows, and

Figure 6 is a schematic representation of a second embodiment of a combined or linked heating system fitted with the pipework and manifold of the invention in which the system has two boilers or heat sources in the form of a stove and an oil fired boiler connected to an open radiator zone and a controlled radiator zone via pipework, the temperature of the system is above 50-55°C, the circulation pump is switched on and the direction of movement of cold water in the pipework is indicated by closed arrows and the direction of movement of heated water is indicated by open arrows.

Detailed Description of the Invention

As shown in Figures 1 to 5 of the drawings, a first embodiment of a heating system of the invention adapted for use with stoves is generally indicated by the reference

numeral 1 and is made up of a single heat source in the form of a stove 2, a hot water cylinder 3, an open radiator zone 4 and pipework 5 connecting the stove 2, the hot water cylinder 3 and the radiator zone 4. For safety reasons, as with most stove powered heating systems, the heating system 1 is an open vented gravity fed system in communication with a tank 7 positioned at least 4 feet from its bottom above the pipework 5 or radiator zone 4 but, as shall be explained more fully below, provided with a manifold 6 and cylinder injector pipe 16 which enable efficient and safe pumping of heated water from the stove 6 to the radiator zone 4 for effective heating of the radiator zone 4.

Much of the necessary pipework 5 will be generally familiar to those skilled in the art. However, in the heating system 1 of the invention, the pipework 5 has a stove outlet pipe 8 fitted with a thermostat 9 in communication with the stove 2. The thermostat 9 is fitted as closely as possible to the stove 2 to accurately monitor the temperature of water exiting the stove 2.

A cylinder pipe 10 branches from adjacent the thermostat 8 to the cylinder 3 while a radiator hot water pipe 11 for conveying hot water to the radiator zone 4 also extends from the stove outlet pipe 8 to the radiator zone 4.

In contradistinction with heating systems of the prior art, a circulation pump 12 is mounted in the pipework 5 on the radiator hot pipe 11 after the cylinder pipe 10 so that, upon activation, hot water can be pumped from the stove 2 to the radiator zone 4 i.e. the circulation pump 12 is fitted to the heating flow of the pipework 5 as opposed to the gravity flow of the pipework 5. As shown in the drawing, the

circulation pump 12 can be mounted in the pipework 5 on the radiator hot pipe 11 immediately after the cylinder pipe 10 if desired. The circulation pump 12 is in electrical communication with the thermostat 9 so that the pump 12 is activated in response to the hot water temperature detected by the thermostat 9. This shall be explained more fully below.

The radiator hot water pipe 11 is also fitted with a balancing gate valve 13.

A radiator return pipe 14 extends between the radiator zone 4 and the manifold 6. Importantly, the heating system of the invention is provided with a cylinder injector pipe 16 (fitted with a balancing gate valve 13) which extends between the manifold 6 and the radiator hot water pipe 11 between the circulation pump 12 and the balancing gate valve 13 on the radiator hot water pipe 11. The cylinder injector pipe 16 facilitates the safe pumping of heated water from the stove 2 to the cylinder 3.

A cylinder return pipe 17 also extends between the cylinder 3 and the manifold 6 while a cold feed pipe 18 also fitted with a balancing gate valve 13 extends between the tank 7 and the cylinder return pipe 17.

As shall be explained more fully below in relation to Figures 2 and 5, the cylinder injector pipe 16 (in combination with the manifold 6) allows for reversal of flow direction in the cylinder return pipe 17 so that, in use, the system 1 of the invention directs heated water from the stove 2 to the hot water cylinder 3 via the cylinder injector pipe 16, the manifold 6 and the cylinder return pipe 17.

A boiler return pipe 19 also extends between the manifold 6 and the stove 2 to return cool water for re-heating to the stove 2.

A vent pipe 37 also extends from the cylinder pipe 10 to the tank 7 while, in the present embodiment, the open radiator zone 4 is made up of five individual radiators although, as will be appreciated by those skilled in the art, the number of radiators can be varied in accordance with the output capacity of the stove 2.

As shown particularly in Figure 3, the manifold 6 is made up of a four sided rectangular housing 20 having a cylinder injector pipe fitting 21 extending from a first side therefrom and into the manifold 6 for attachment to the cylinder injector pipe 16, an outwardly disposed cylinder return pipe fitting 22 for attachment to the cylinder return pipe 17 on an opposing side of the housing 20, an outwardly disposed stove/boiler return pipe fitting 23 adjacent the cylinder injector pipe fitting 21 for attachment to the radiator return pipe 14 and an outwardly disposed radiator return pipe fitting 24 for attachment to the radiator return pipe 19. The return pipe fitting 24 extends into the manifold 6 in an arcuate fashion towards the boiler return pipe fitting 23.

The cylinder 3 is provided with a single coil 25 for heating water.

In use, where the temperature of the system 1 is below 50-55°C as detected by the thermostat 9, the system 1 operates and water flows as shown in Figures 1 and 4. More particularly, the circulation pump 12 is not activated by the thermostat 9 and

the system 1 of the invention is gravity fed only to heat water in the cylinder 3 via the coil 25.

Accordingly, as shown by the open arrows in Figure 1 cold water from the tank 7 is fed under gravity to the cylinder return pipe 17 via the cold feed pipe 18. The cold water then enters the manifold 6 via the cylinder return pipe fitting 22 and exits the manifold via the boiler return pipe fitting 23 to return to the stove 2 via the (radiator) return pipe 19. The water is therefore heated in the stove 2 and exits from the stove 2 via the stove outlet pipe 8 and into the cylinder pipe 10 to heat water in the cylinder 3 via the coil 25. Accordingly, only water in the cylinder 3 is heated by the stove 2 at temperatures below 50-55°C while heated water is not pumped to the radiator zone 4 as the circulation pump 12 is not activated by the thermostat 9.

Following heating of the water in the cylinder 3, the cooled water is returned to the stove 2 via the cylinder return pipe 17.

However, in use, where the temperature of the system 1 is above 50-55°C as detected by the thermostat 9, the system 1 operates as a pumped heated flow system to the radiator zone 4 and water flows as shown in Figures 2 and 5 so that hot water flows from the stove 2 via the cylinder injector pipe 16, the manifold 6 and the cylinder return pipe 17 to the cylinder 3 i.e. flow in the cylinder return pipe 17 between the manifold 6 and the cylinder 3 is reversed so that, firstly, suction is created on the expansion tank 7 to allow for stronger circulation of water to the radiator zone 4 and, secondly, cold feed from the cold feed pipe 18 is mixed with

heated water in the cylinder return pipe 17 prior to entering the cylinder 3 for increased efficiency of heating.

More particularly, upon detection by the thermostat 9 that the temperature of water exiting the stove 2 is in excess of about 50-55°C, the circulation pump 12 is activated to create suction on the expansion tank 7 and simultaneously pump or drive the heated water to the cylinder 3 via the cylinder injector pipe 16 and the manifold 6 and to the radiator zone 4 via the radiator hot pipe 11.

Accordingly, heated water is directed to the radiator zone 4 by the circulation pump 12 and radiator hot pipe 11 and is then returned to the manifold 6 at the radiator return pipe fitting 24 via the radiator return pipe 14. The returned water then passes through the manifold 6 and exits the manifold 6 into the boiler return pipe 19 via the boiler return pipe fitting 23. Similarly, heated water is pumped to the cylinder 3 via the cylinder injector pipe 16, into the manifold 6 at the cylinder injector pipe fitting 21 and from the manifold 6 at the cylinder (return) pipe fitting 22 and the cylinder return pipe 17 into the cylinder 3 i.e. the flow at the cylinder return pipe fitting 22 is reversed when the circulation pump 12 is activated.

As shown in the drawings, the cylinder injector pipe 16, the manifold 6 and circulation pump 12 of the heating system 1 allows the pumped flow of hot water from the stove 2 i.e. pumped heating flow on the stove outlet pipe 8 as opposed to on the return of known heating systems so that heated water can be pumped to the cylinder 3 via the cylinder return pipe 17 and to the open radiator zone 4 whilst

suction is created on the expansion tank 7 in a safe manner allowing improved circulation of water to the radiator zone 4 and domestic hot water.

As a result, both the radiator zone 4 and hot water cylinder 3 can be heated efficiently with the pump without losing water pressure into the gravity fed system. Radiators remote from the stove 2 can be heated with ease. In short, the manifold 6 acts as an injector to prevent water from egressing in the gravity system to maintain effective flow in the heating system 1.

In addition, the manifold 6 and the injector pipe 16 allow for simultaneous effective heating of the hot water cylinder 3 with the radiator zone 4 by reversing the flow of heated water in the coil 25 of the cylinder 3.

Figure 6 shows schematic representation of a second embodiment of a heating system 1 in accordance with the invention fitted with the manifold 6 broadly similar to the heating system of Figures 1 to 5. However, in the present embodiment, the heating system 1 is provided with a second heat source or boiler in the form of an oil boiler 26 connected to a controlled radiator zone 27 made up of a series of radiators via the pipework 5. Figure 6 shows the system 1 of the present embodiment where the temperature of the system 1 is above 50-55°C, the circulation pump 12 is switched on and the direction of movement of cold water in the pipework 5 is indicated by closed arrows and the direction of movement of heated water is indicated by open arrows. Like numerals indicate like parts.

The pipework 5 of the system 1 for the stove 2, open radiator zone 4 and manifold 6 of the present embodiment is broadly similar to the arrangement described in relation to the first embodiment with the modifications discussed further below.

The second heat source in the form of the oil boiler 26 is connected to a second water heating coil 28 in the cylinder 3 via an oil cylinder pipe 29 while the boiler is also connected to the controlled radiator zone 27 via a first oil radiator hot pipe 30 and to the open radiator zone 4 by a second oil radiator hot pipe 31 both connected to the radiator hot pipe 11 previously described.

An oil boiler circulation pump 32, similar to the circulation pump 12 at the stove 2, is provided on the oil cylinder pipe 29 for pumping heated water from the oil boiler 26.

A first radiator return pipe 33 extends between the controlled radiator zone 27 and the oil boiler 26 while a second radiator return pipe 34 extends between the radiator return pipe 14 of the open radiator zone 4 described above and the oil boiler 26.

Accordingly, the oil boiler 26 is fluidly communicable in both flow and return with the open radiator zone 4 and the controlled radiator zone 27. Similarly, the stove 2 is fluidly communicable in both flow and return with the open radiator zone 4 and the controlled radiator zone 27.

As will be appreciated by those skilled in the art, the system 1 of the present embodiment is also provided with motorized valves 35, auto air vents 36 and balancing gate valves 13 and non-return valves 15 as appropriate.

In use, where the output of the stove 2 is below 50-55°C, the thermostat 9 maintains the circulation pump 12 in the off position so that the first coil 25 in the cylinder 3 receives heated water from stove 2 via the cylinder pipe 10 as previously described. Accordingly, only hot water is generated by the stove 2 and the open radiator zone 4 is not heated by the stove 2.

However, where the output of the stove 2 is above about 50-55°C, the thermostat 9 causes actuation of the circulation pump 12 so that both the first coil 25 in the cylinder 3 and the open radiator zone 4 of the heating system 1 are heated by the stove 2 as previously described. However, heated water is also pumped by the circulation pump 12 to the controlled radiator zone 27 via the radiator hot pipe 11 which is connected to the first oil radiator hot pipe 30 to contribute towards heating the controlled radiator zone 27.

Accordingly, in short, the stove 2 of a gravity fed open system 1 can contribute towards heating a controlled radiator zone 27 normally heated by an oil fired boiler 26.

As will be appreciated by those skilled in the art, the manifold 6 provides a convenient, simple and compact conduit for fluid flow between the stove 2, the cylinder 3 and the radiator zone 4 via the cylinder injector pipe 16. However, if desired, in a more complex arrangement, the manifold 6 can be replaced by additional pipework 5 and valves to allow movement of water between the stove 2 and the cylinder 3 and radiator zone 4 via the cylinder injector pipe 16.

Claims

1. Pipework for connecting a stove to a hot water cylinder and a radiator zone wherein the pipework comprises a conduit between the stove and the hot water cylinder for effecting the pumped flow of heated water into the cylinder from the stove.

2. Pipework as claimed in Claim 1 wherein the conduit comprises a cylinder injector pipe.

3. Pipework as claimed in Claim 2 wherein the conduit further comprises a manifold communicable with the cylinder injector pipe.

4. Pipework as claimed in Claim 3 wherein the manifold comprises a cylinder injector pipe fitting, a cylinder return pipe fitting, a stove return pipe fitting and a radiator return pipe fitting.

5. Pipework as claimed in Claim 4 wherein the manifold comprises a four-sided housing having the cylinder injector pipe fitting adjacent the stove return pipe fitting on a first side thereof, the cylinder return pipe fitting on an oppositely disposed second side thereof and the radiator return pipe fitting on a third side thereof.

6. Pipework as claimed in Claim 5 wherein the cylinder return pipe fitting is disposed opposite the stove return pipe fitting and the radiator return pipe fitting is disposed between the cylinder return pipe fitting and the stove return pipe fitting.

7. Pipework as claimed in any of Claims 1 to 6 further comprising a circulation pump for effecting pumped flow of heated water from the stove to the hot water cylinder and the radiator zone through the conduit.

8. Pipework as claimed in Claim 7 wherein the circulation pump is actuatable in response to the temperature of the output of the stove.

9. Pipework as claimed in Claim 8 wherein the system comprises a thermostat communicable with the circulation pump to actuate the circulation pump.

10. Pipework as claimed in Claim 9 wherein the thermostat is located on the pipework at the output of the stove.

11. A heating system comprising:

a heat source in the form of a stove;

a hot water cylinder;

a radiator zone, and

pipework connecting the stove to the hot water cylinder and the radiator zone wherein the pipework comprises a conduit between the stove and the hot water cylinder for effecting the pumped flow of heated water into the cylinder from the stove.

12. A heating system as claimed in Claim 11 wherein the conduit comprises a cylinder injector pipe.

13. A heating system as claimed in Claim 12 wherein the conduit further comprises a manifold communicable with the cylinder injector pipe.

14. A heating system as claimed in Claim 13 wherein the manifold comprises a cylinder injector pipe fitting, a cylinder return pipe fitting, a stove return pipe fitting and a radiator return pipe fitting.

15. A heating system as claimed in Claim 14 wherein the manifold comprises a four-sided housing having the cylinder injector pipe fitting adjacent the stove return pipe fitting on a first side thereof, the cylinder return pipe fitting on an oppositely disposed second side thereof and the radiator return pipe fitting on a third side thereof.

16. A heating system as claimed in Claim 15 wherein the cylinder return pipe fitting is disposed opposite the stove return pipe fitting and the radiator return pipe fitting is disposed between the cylinder return pipe fitting and the stove return pipe fitting.

17. A heating system as claimed in any of Claims 1 to 16 further comprising a circulation pump for effecting pumped flow of heated water from the stove to the hot water cylinder and the radiator zone through the conduit.

18. A heating system as claimed in Claim 17 wherein the circulation pump is actuatable in response to the temperature of the output of the stove.

19. A heating system as claimed in Claim 18 wherein the system comprises a thermostat communicable with the circulation pump to actuate the circulation pump.

20. A heating system as claimed in Claim 19 wherein the thermostat is located on the pipework at the output of the stove.

21. A heating system as claimed in any of Claims 1 to 20 further comprising a second heat source.

22. A heating system as claimed in Claim 21 wherein the second heat source comprises a boiler.

23. A heating system as claimed in Claim 22 wherein the boiler comprises an oil boiler.

24. A manifold for use in a heating system having a heat source in the form of a stove, a hot water cylinder, a radiator zone and pipework connecting the stove to the hot water cylinder and the radiator zone wherein the manifold comprises a cylinder injector pipe fitting, a cylinder return pipe fitting, a stove return pipe fitting and a radiator return pipe fitting.

25. A manifold as claimed in Claim 24 wherein the manifold comprises a four-sided housing having the cylinder injector pipe fitting adjacent the stove return pipe fitting on a first side thereof, the cylinder return pipe fitting on an oppositely disposed second side thereof and the radiator return pipe fitting on a third side thereof.

26. A manifold as claimed in Claim 25 wherein the cylinder return pipe fitting is disposed opposite the stove return pipe fitting and the radiator return pipe fitting is disposed between the cylinder return pipe fitting and the stove return pipe fitting.

27. A method for connecting a stove to a hot water cylinder and a radiator zone wherein the method comprises inserting a conduit in pipework between the stove and the hot water cylinder to effect the pumped flow of heated water into the cylinder from the stove.

28. A method as claimed in Claim 27 wherein the conduit comprises a cylinder injector pipe.

29. A method as claimed in Claim 28 wherein the conduit further comprises a manifold communicable with the cylinder injector pipe.

30. A method as claimed in Claim 29 wherein the manifold comprises a cylinder injector pipe fitting, a cylinder return pipe fitting, a stove return pipe fitting and a radiator return pipe fitting.

31. A method as claimed in Claim 30 wherein the manifold comprises a four-sided housing having the cylinder injector pipe fitting adjacent the stove return pipe fitting. on a first side thereof, the cylinder return pipe fitting on an oppositely disposed second side thereof and the radiator return pipe fitting on a third side thereof.

32. A method as claimed in Claim 31 wherein the cylinder return pipe fitting is disposed opposite the stove return pipe fitting and the radiator return pipe fitting is disposed between the cylinder return pipe fitting and the stove return pipe fitting.

33. A method as claimed in any of Claims 27 to 32 further comprising the step of fitting a circulation pump to the pipework to effect pumped flow of heated water from the stove to the hot water cylinder and the radiator zone through the conduit.

34. A method as claimed in Claim 33 wherein the circulation pump is actuatable in response to the temperature of the output of the stove.

35. A method as claimed in Claim 34 further comprising the step of fitting a thermostat in the pipework communicable with the circulation pump to actuate the circulation pump.

36. A method as claimed in Claim 35 wherein the thermostat is located on the pipework at the output of the stove.

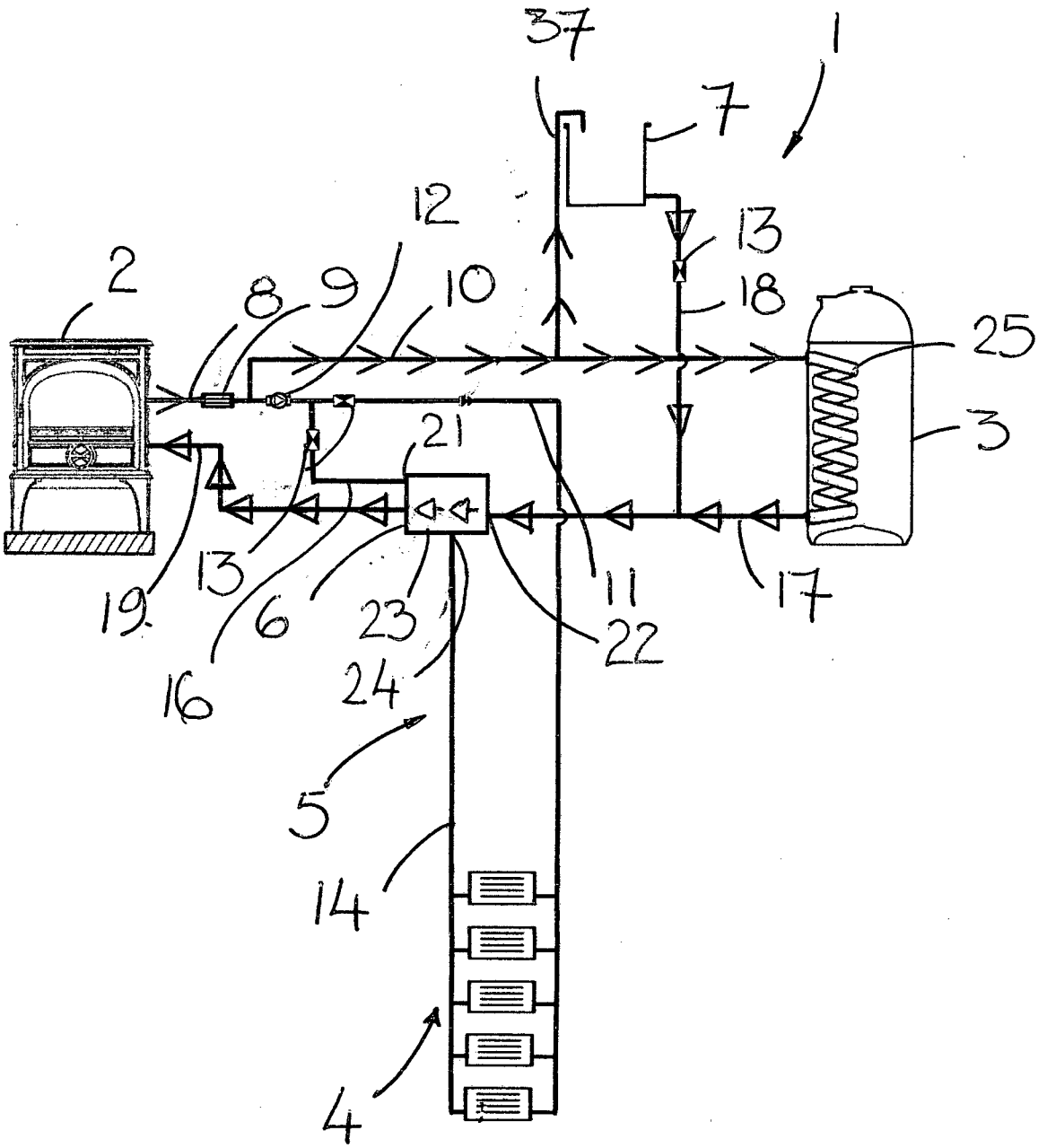


Fig. 1

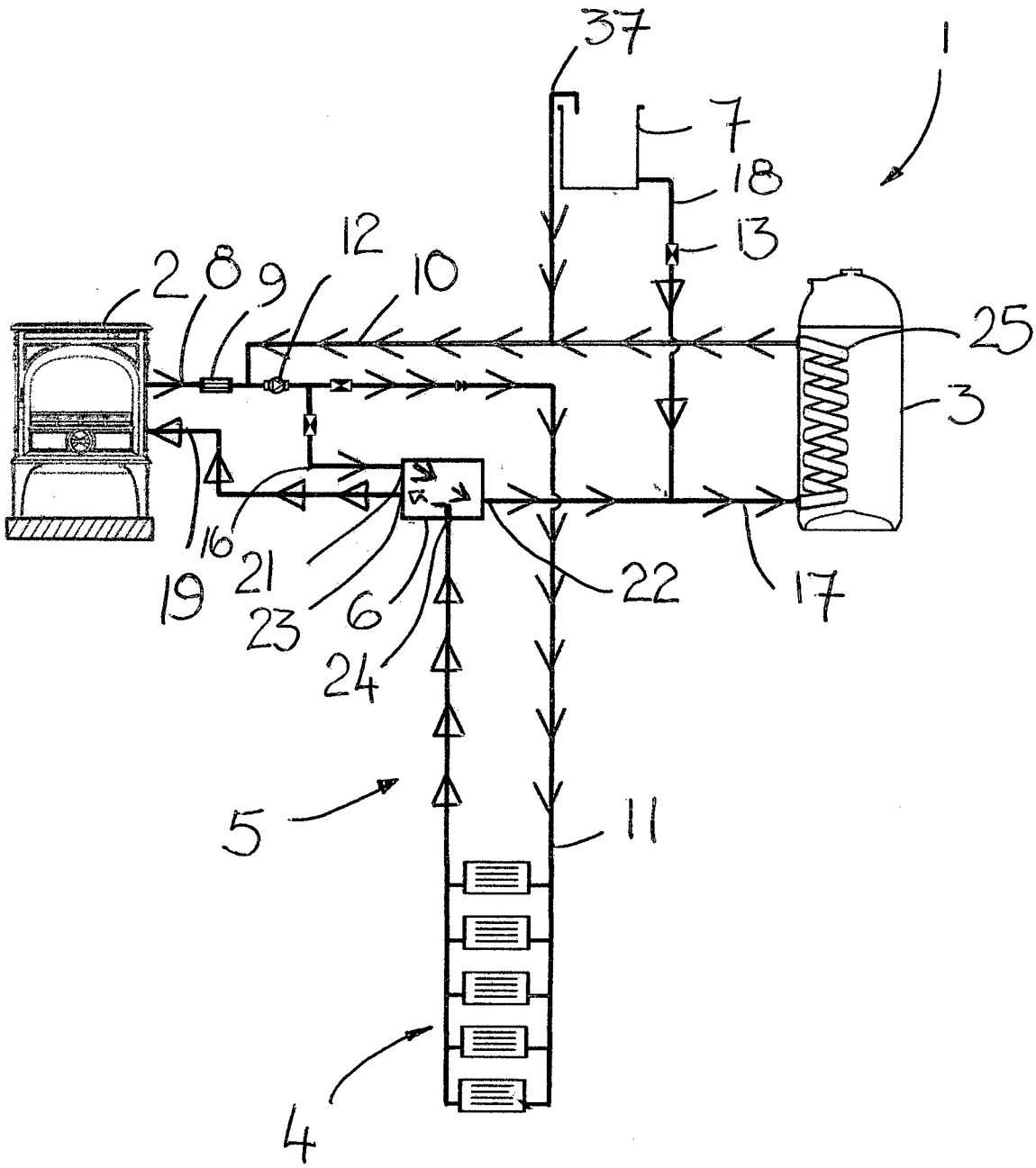


Fig. 2

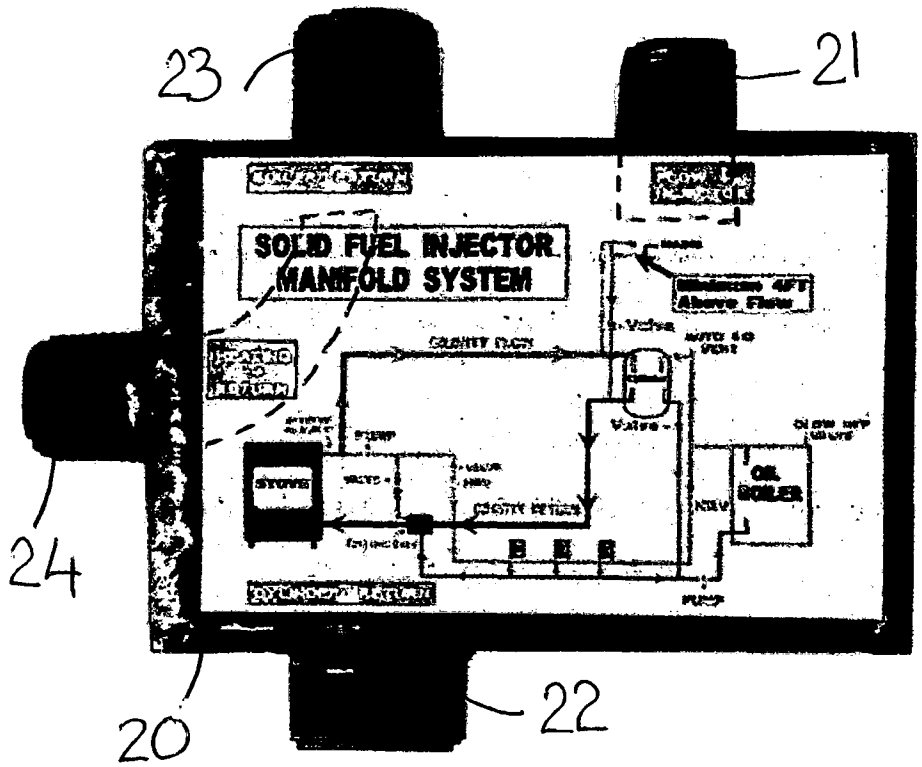


Fig. 3

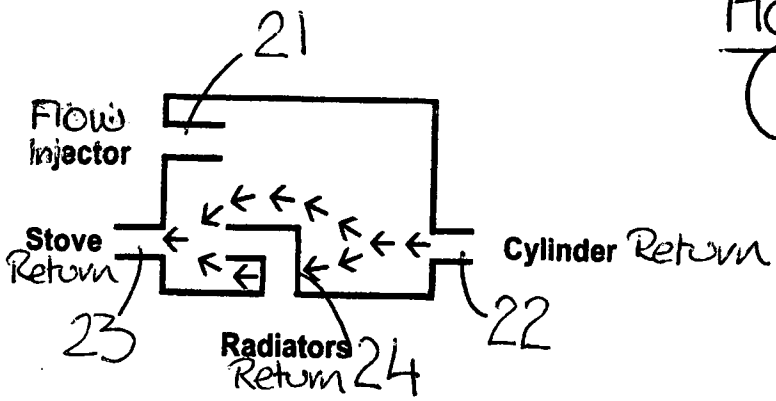


Fig. 4

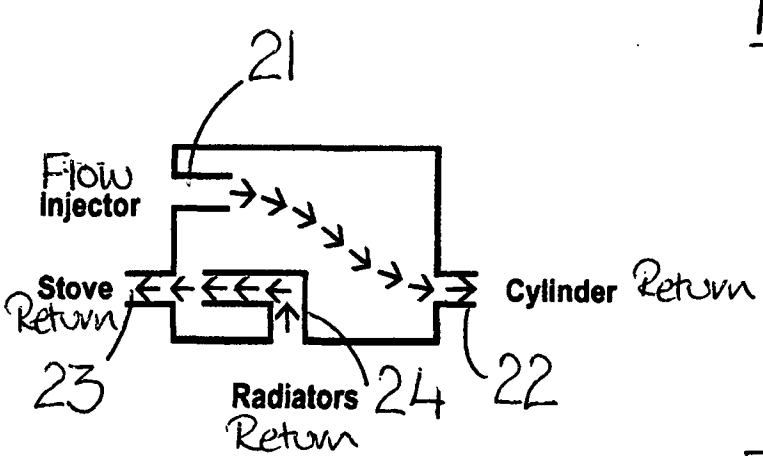


Fig. 5

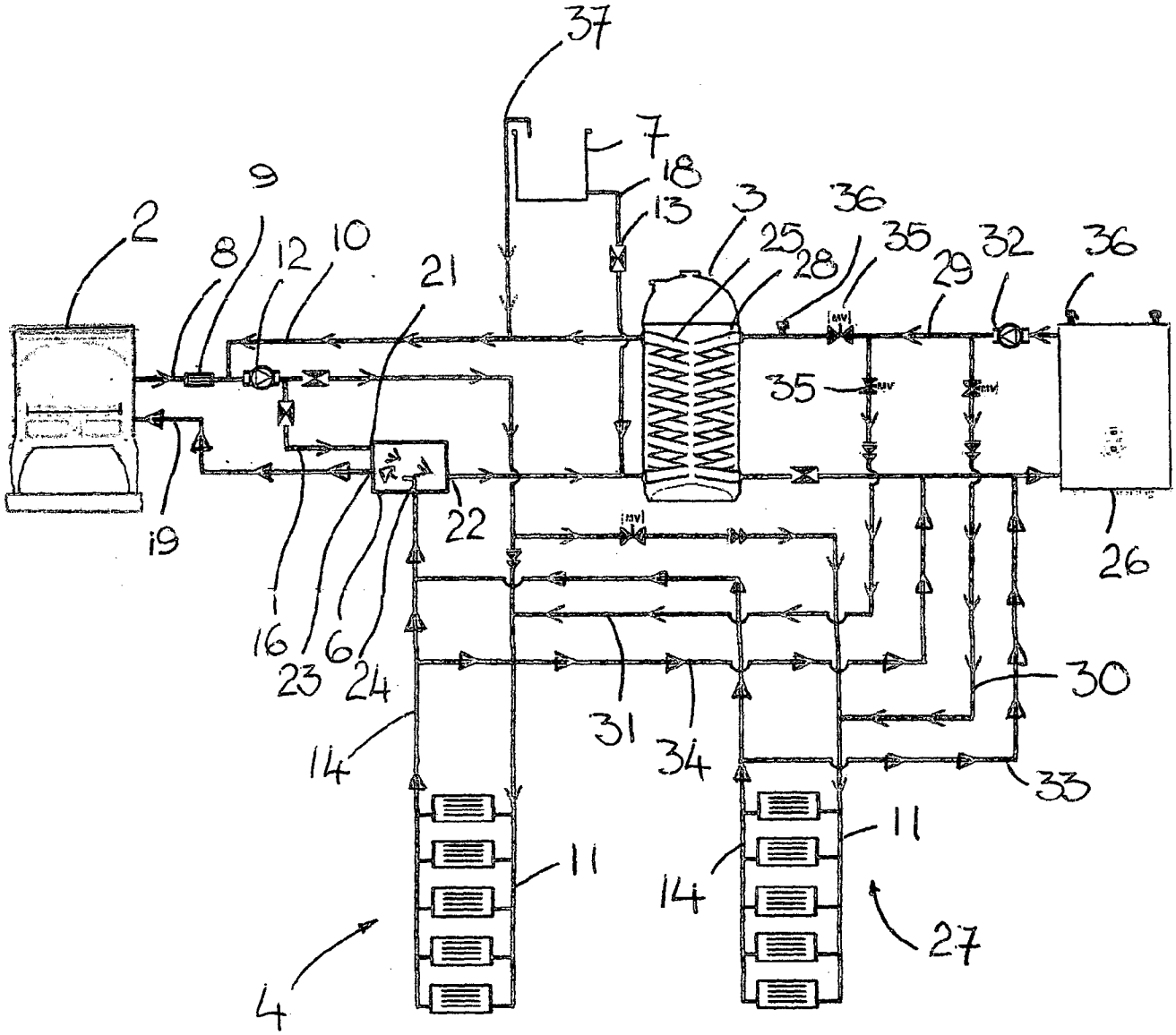

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Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/IE2016/000007

A. CLASSIFICATION OF SUBJECT MATTER
INV. F24D11/00 F24D19/10 F24D3/10
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.
X A	CA 345 112 A (BRODERICK FREDERICK CHARLES) 9 October 1934 (1934-10-09) the whole document	1-20,24, 27-36 21-23, 25,26
X	GB 2 473 684 A (WATERFORD FOUNDRY [IE]) 23 March 2011 (2011-03-23) abstract; figure 7	1,2,7, 11,12, 17, 21-23, 27,28,33
X	GB 2 372 310 A (RAY NEVILLE GEORGE [GB]) 21 August 2002 (2002-08-21) abstract; figure 3	1-3, 11-13, 27-29

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
26 July 2016	02/08/2016

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Ast, Gabor

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IE2016/000007

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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X	GB 2 480 669 A (ZONEALONE LTD [IE]) 30 November 2011 (2011-11-30) abstract; figures 1,2	1-7, 24-32
X	DE 10 2009 051782 A1 (SCHMALHORST HAGEN [DE]) 12 August 2010 (2010-08-12) abstract; figure 2	24-26
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IE2016/000007

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