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(54) **Central heating device and method for performing maintenance to such a central heating device**

(57) The invention relates to a central heating device comprising a central heating boiler comprising connection provisions for connection of the boiler to external conduits such as a fuel supply line and conduits for supply of one or more media to be heated and transport of the one or more media heated by the boiler to a user. The central heating device comprises for each of the connection provisions of the boiler connection means for forming a fluid connection between the boiler and the external conduit concerned, wherein each of the connection means comprises a length of flexible conduit as well as a quick release coupling that is arranged for repeatedly coupling and decoupling. The invention also relates to method for performing maintenance to a central heating device according to the invention in which the boiler is replaced.

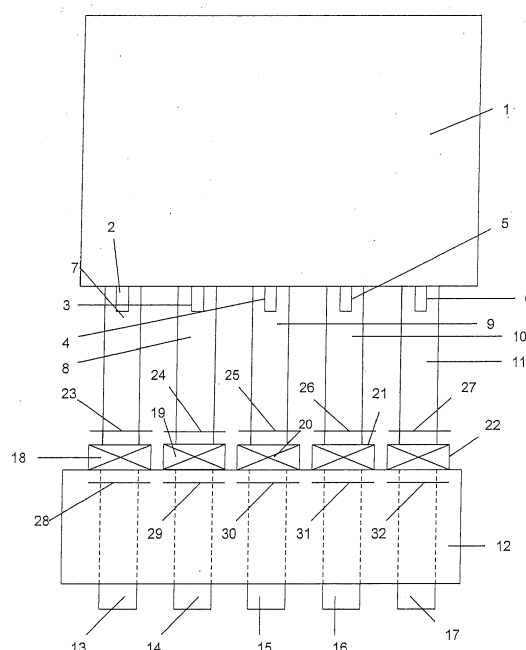


Fig. 1

Description

[0001] The invention relates to a method for performing maintenance and/or repair to a central heating device comprising a central heating boiler comprising connection provisions for connecting the boiler to a fuel supply line and to conduits for supplying one or more media to be heated and transport of one or more media heated by the boiler to a consumer. The invention also relates to a central heating device arranged for performing the method according to the invention.

[0002] The usual method at present for repair and maintenance of boilers such as central heating boilers takes place in that specialized mechanics in case of a failure or the equipment requires maintenance will visit the clients and in situ try to determine the cause of the failure and to repair this respectively will perform maintenance in situ to the boiler concerned. This means that the mechanics are supposed to exhibit a considerable technical knowledge, because they are supposed to be able to find the cause of all possible failures independently and remedy these. This further means that it is important that the mechanic in situ is equipped with suitable tooling and also have directly available a large variety of spares. It is not easy to ensure at all times that requirements regarding safety and hygiene for both the mechanic and the resident are being met. This is a rather cost intensive method because the specialized mechanic and his car with tools and spares uses a lot of traveling time which is non-productive. In addition it is hardly possible to have all special tools, test equipment and the like available in the car. Also it is practically not possible to have spares in the car for all potential cases. This again causes additional loss of time because the mechanic has to drive back and forth to his home base where usually there is a specialized workshop with specialized tools and spare parts to collect the tools and parts and subsequently go back to the clients house to perform this activities in situ. It requires a considerable investment to bring the mechanic to the desired level and it is not always possible to arrange it such that he only works to the type of boiler for which he has been educated.

[0003] Patent publication GB 2 409 895 A describes a central heating boiler with a manifold for conduits in which boiler and manifold can be coupled with each other. The heating boiler according to GB 2 409 895 and manifold need to fulfil mutual geometrical relationships of considerable accuracy to be able to function in practice. For coupling and/or decoupling of a boiler to the manifold GB 2 409 895 describes several desirable accessories such as guide rails and support rails.

[0004] It is a goal of the present invention to provide a method that is considerably more economic, safe and efficient, than the method in use at present. This goal is being reached with a method according to claim 11 of the present invention. With this method the boiler of a defected central heating device or of a central heating device on which maintenance and/or repairs must be per-

formed, is being disconnected from the respective connection conduits, is removed and is being replaced by another boiler. It should be remarked that repairs are considered to be included in the word maintenance in claim 12. The boiler in need of repair is being transported to a specialist workshop and, possibly supported by automation, to perform the maintenance there. Here it suffices that the person that performs the exchange of the boilers only has the ability of exchanging boilers and thus not necessary needs to have at his disposal a large variety of abilities such as are required for an all-round mechanic. Neither is it necessary that he needs to have at his disposal a large variety of special tooling and test equipment and also there is no need to have many spare parts available in the servicing car. Further it is of an important advantage that the work can be performed in a specialized workshop equipped with all equipment required and a complete set of spare parts, in a surrounding that fulfils all requirements with respect to safety and hygiene. This equipment and spare parts not only are more complete and what is possible to transport in the service car, but also savings can be made on the stock of both spare parts as of tooling, because they need to be available in smaller quantities than when this need to be available in each service car. The respective mechanics not only have a complete range of tools and test equipment at their disposal but also they do not lose time driving from customer to customer or driving back and forth between the customer and the workshop. This also means that operations are more predictable and can be better and more accurately planned so that also appointments with the customer can be planned more accurately which considerably increases the level of service for the customer. In addition performing maintenance and remedy failures can partly be automated or be supported by automation. Thus the method according to the invention enables maintenance and repair that is considerably more economic and efficient as compared to the method in general use until this moment.

[0005] It is another goal of the invention to provide a central heating device that amplifies and promotes the advantages of the method according to the invention. This goal is being reached with a central heating device with a central heating boiler according to claim 1. In such a device the boiler comprises connection provisions for connection of the boiler to a fuel supply line and to conduits for supply of one or more media to be heated and for transportation of the one or more media heated by the boiler to a consumer and the central heating device comprises for each of the connection provisions of the boiler connection means for forming of a fluid connection between the boiler and the conduit concerned, in which each of the connecting means comprises a quick release coupling. It is important to note that the quick release coupling is arranged for repeatedly coupling and decoupling. Often the term quick release coupling is used in those cases where a coupling can be made quickly, but is not suitable for repeatedly coupling and decoupling. In

a central heating device according to the invention the decoupling of a boiler in need of maintenance and the possibly temporarily coupling of a replacement boiler is an easy operation that is quickly performed. Also there is no need for a large variety of tooling. By choosing a suitable coupling it is even possible to couple and decouple manually without tooling. The advantages mentioned above of the method according to the invention are thus amplified considerably. Further the central heating device according to the invention may relate to a central heating device that exclusively services heating of one or more rooms using a closed circuit of warm water of heated air, but may also concern a central heating boiler that in addition is arranged for the delivery of hot water to a variety of taps. The central heating device according to the invention may be gas fired or oil fired. Electrical connections to for instance electricity grid or to a thermostat are not specifically mentioned here. These connections usually take place using plugs and sockets or female plugs and thus already comply to the condition that they can be coupled of decoupled quickly and repeatedly. The same goes for connections of ducts for discharge of flue gas and discharge of condensate. These ducts in the present state of the art are already executed in such a way that they can be quickly and simply coupled or decoupled.

[0006] In the central heating device according to the invention each of the connection means comprises a length of flexible conduit. It should be remarked that there are several variants possible of the positioning of the quick release couplings. This can be in the connection means that are adjacent to the supply or transport conduit concerned on one side and the flexible conduit on the other side, but also in the length of flexible conduit itself or adjacent to the flexible conduit on one side and the connection provision of the boiler on the other side. In each of the cases the operation of coupling and decoupling is considerably simplified. The mounting of the connection means concerned to the boiler and to the supply lines and transport lines needs to take place only once and thus it does not need to be of a quick release type. It is further of importance to remark that in the central heating device according to the invention there is no need for an accurate geometrical relationship regarding connections to a manifold as is being required in the central heating boiler and manifold according to GB 2 409 895. Due to the length of flexible conduits there is a large freedom of mounting positions of the coupling ends of the external conduits. In addition there is no need for a manifold, but the external conduits can separately be mounted in relatively random positions with respect to the boiler. In addition in a central heating device according to the invention it is very well possible to use a large variety of boilers generally available on the market to be part of the device according to the invention instead of a specially designed boiler as is required according to GB 2 409 895.

[0007] The effectiveness of the central heating device according to the invention is further increased when be-

tween the quick release coupling and the supply of transport conduits the device comprises a shut-off valve. For instance in a central heating installation the circulation water in the complete installation is preserved in the supply and transport conduits and refilling after replacement can be kept to a minimum and also the most important part of the so called dead water, meaning that the de-aired water, is being maintained so that no subsequent de-aeration is necessary or is hardly necessary.

[0008] When also between the quick release coupling and the boiler the central heating device according to the invention comprises a shut-off valve, then practically all water can be kept inside the system and the system does not need any additional filling at all nor needs to be de-aerated after reconnection of a replacement boiler. This further increases the advantages as mentioned above with respect to costs. Further the shut-off valves can be an integral part of the quick release coupling in such a way that when there is decoupled the shut-off valves are closing automatically and when the coupling is engaged again the shut-off valves are opening automatically. This enables to limit the loss of water to very little, just a few drops and with certain types to maximally a single drop, which is negligible for practical purposes.

[0009] For a central heating device according to the invention comprising shut-off valves as being described in claim 3 or 4, the method according to claim 10 can be applied with advantage.

[0010] The advantageous properties of the central heating device according to the invention are not limited to a central heating boiler that exclusively is arranged for heating water for an installation for central heating. The advantages are also applicable to a boiler that in addition is also arranged for heating consumer water. The supply and transport conduits for the consumer water are then embodied in the same way as for the supply and transport conduits for the central heating installation and the fuel supply line.

[0011] Economically the central heating device comprises a connection block to which on one hand the connection means may be connected and also the related external conduits can be connected in such a way that after connection a fluid connection is being established and the connection block is arranged for a fixed attachment to a wall or a floor.

[0012] The method according to the invention is even easier to perform and at the same time more reliable when each quick release coupling at both sides comprises a marking unique for the quick release coupling concerned. In this way in coupling it is easily recognised which parts need to be coupled. Mistakes in coupling are impossible in an embodiment of a central heating device according to the invention wherein each quick release coupling is shaped or mounted such that during coupling no mistakes in coupling the parts is possible. This can for instance be arranged by giving each quick release coupling a different size of dimension or a different coupling mechanism. Also it is possible to vary for each quick

release coupling the direction of the coupling part. When for instance the coupling comprises a male and female part, then two couplings of the same kind and size can be mounted such that in one coupling the male part is on the side of the boiler and the other coupling the female part. Also the desired result can be obtained by positioning the coupling in the connection means, for instance in the length of flexible conduit in such a way that in coupling with the length of flexible conduit only the suitable contra piece can be reached.

[0013] The invention will now be further explained using an example of an embodiment of method and a device according to the invention also with reference to the drawing comprising only one figure:

Fig. 1 is a schematic representation of an example of an embodiment of a central heating device according to the invention.

[0014] Fig. 1 shows schematically an example of an embodiment of a central heating device according to the invention. The central heating device comprises a central heating boiler 1, comprising provisions for connection respectively for a fuel supply line 2, for return water of a central heating installation 3, for transport of heated water to the central heating installation 4, for supply of cold consumer water 5 en for transport of heated consumer water 6. To connection provisions 2 to 6 are connected respectively lengths of flexible conduits 7 to 11. Flexible conduits 7 to 11 each have been connected by means of a respective quick release coupling 18 to 22 to connection block 12. Connection block 12 comprises fixed connections 13 to 17 for fixed connection of respectively the fuel supply line, the return conduit of central heating water, the transport conduit of heated water for the connected central heating installation, a supply conduit of cold consumer water, and a transport conduit of heated consumer water leading to consumer installations for the heated water. The internal of a connection block 12 comprises channels such that a fluid connection is established between respective connection 13 via quick release coupling 18 with line 7, between connection 14 via quick release coupling 19 and conduit 10, between connection 15 via quick release coupling 20 with conduit 9, from connection 16 via quick release coupling 21 with conduit 10 en from connection 17 via quick release coupling 22 with conduit 11. Between quick release coupling 18 to 22 and connection block 12 respective shut-off valves 23 to 27 have been arranged for closing of the respective fluid connection. On the other side of the quick release coupling, between quick release couplings 18 to 22 and conduits 7 to 11 shut-off valves 28 to 30 have been installed respectively.

[0015] When now boiler 1 is defect or requires maintenance, shut-off valves 23 to 32 will be closed and quick release coupling 18 to 22 are decoupled, so that boiler 1 with flexible conduits 7 to 11 and shut-off valves 28 to 32 as well as their part of the quick release coupling 18

to 22 belonging to the conduits are loosened and taken away and are exchanged by an equal or similar boiler also comprising the respective conduits, shut-off valves and quick release coupling parts. The defected boiler or the boiler requiring maintenance subsequently is transported to a maintenance workshop where repair or maintenance can be performed. The user of the boiler can continue to utilize the facilities connected to the boiler and does not need to be deprived e.g. in winter during sometimes rather long prepare a maintenance times of heating or warm water. In addition maintenance takes place in a properly equipped workshop with all required facilities. In addition highly qualified maintenance mechanics can devote all their time to what they are particular qualified for, notably performing maintenance or repair to central heating boilers, and they are not losing any time travelling back and forth. In addition for the customer there are direct advantages because he or she only is deprived from the operating central heating device for a very short period of time. In addition appointments can be better planned because less unpredictable factors are influencing the work. In a preferred embodiment of the invention the shut-off valves 23 - 32 have been integrated in quick release coupling 18 - 22. These couplings preferably operate such that in coupling the shut-off valves will open automatically and by decoupling these valves are closing automatically. This prevents loss of water and/or gas or fluid fuel completely or limits this to a single droplet. These couplings are publically available on the market and have proven to be very reliable and effective.

[0016] In the example of the embodiment described the quick release couplings 18 to 22 are situated at the ends of the length of flexible conduits 7 to 11, there where they connect to connection block 12. It is also possible to embody the central heating system according to the invention in such a way that the shut-off valves 23 to 27 are situated adjacent to connection provisions 2 to 6 and directly after these the quick release couplings 18 to 22 and again directly after these the shut-off valves 28 to 32. Also it is possible that in case quick release couplings 18 to 22 connect directly to connection provisions 2 to 6 and then shut-off valves 23 to 27, that are situated at the boiler side of the quick release coupling can be forgone. It is also possible that shut-off valves 23 to 27, quick release coupling 18 to 22 and subsequently shut-off valves 28 to 32 are situated on a freely chosen but defined position in flexible lines 7 to 11. Although using the connection block 12 gives certain advantages, it is possible to embody a central heating device according to the invention without connection block 12. In that case for instance flexible lines 7 to 11 at one end have been fixedly connected to the respective supply or transport conduit 13, 15 - 17 or return conduit 14. Also when no connection block 12 is being used, shut-off valves 23 - 32 and quick release coupling 18 - 22 can be positioned in various places in the respective flexible conduit 7 - 11, as has been indicated before in the examples of the embodi-

ments of the invention with a connection block 12.

[0017] With each of the described embodiments of the central heating device according to the invention, the advantages of a direct and quick exchange of the central heating boiler is being maintained.

List of reference numbers

[0018]

- 1. boiler
- 2. connection provision fuel
- 3. connection provision return water central heating
- 4. connection provision heated water central heating
- 5. connection provision supply cold water
- 6. connection provision heated consumer water
- 7-11. length of flexible conduit
- 12. connection block
- 13. fixed connection to a fuel supply line
- 14. fixed connection to return conduit from central heating
- 15. fixed connection to transport conduit to central heating
- 16. fixed connection to supply conduit of unheated consumer water
- 17. fixed connection with transport conduit heated consumer water
- 18-22. quick release couplings respectively between 3-6 and 12.
- 23-32. shut-off valves

Claims

- 1. Central heating device comprising a central heating boiler (1) comprising connection provisions (2-6) for connection of the boiler (1) to external conduits such as a fuel supply line and conduits for supply of one or more media to be heated and transport of the one or more media heated by the boiler (1) to a user, **characterized in that**, the central heating device comprises for each of the connection provisions (2-6) of the boiler (1) connection means for forming a fluid connection between the boiler (1) and the external conduit concerned, wherein each of the connection means comprises a length of flexible conduit (7-11) as well as a quick release coupling (18-22), that is arranged for repeatedly coupling and decoupling.
- 2. Central heating device according to claim 1, **characterized in that**, the connection means, between the quick release coupling (18-22) and the external conduit concerned comprise a shut-off valve (28-32) and the connection means between the quick release coupling (18-22) and the boiler (1) comprise a shut-off valve (23-27), wherein the shut-off valves

(23-32) are integrated in the coupling and are moved to the closing position during decoupling and to the opening position during coupling.

- 3. Central heating device according to claim 1, **characterized in that**, the connection means comprise, between the quick release coupling (18-22) and the external conduit concerned a shut-off valve (28-32).
- 4. Central heating device according to claim 1 or 3, **characterized in that**, the connection means, between the quick release coupling (18-22) and the boiler (1) comprise a shut-off valve (23-27).
- 5. Central heating device according to one of the claims 1-4, **characterized in that**, the central heating device comprises a connection block (12) that is part of the connection means and comprises means (13-17) for a fixed connection of the external conduits concerned.
- 6. Central heating device according to one of the claims 1-5, **characterized in that**, the connection block is arranged for attachment to a wall or floor.
- 7. Central heating device according to one of the claims 1-6, **characterized in that**, each quick release coupling (18-22) comprises at both sides a marking unique for the quick release coupling concerned.
- 8. Central heating device according to one of the claims 1-7, **characterized in that**, each quick release coupling (18-22) is arranged such or mounted such that during coupling no mistake is possible to be made between the quick release couplings.
- 9. Method for performing maintenance to a central heating device according to one of the previous claims, **characterized in that**, the method comprises the following steps:
 - a) by decoupling of the quick release couplings (18-22) decoupling of the boiler (1) from the external conduits concerned;
 - b) removing the boiler (1);
 - c) mounting of a replacement boiler (1); and
 - d) coupling of the replacement boiler (1) to the external conduits concerned by coupling of the quick release couplings (18-22).
- 10. Method according to claim 10, if dependent of claim 3 or 4, **characterized in that**, the method comprises prior to step a) the step:
 - a0) closing of the shut-off valves (23-32) concerned; and following the step d) comprises the step:
 - d1) opening of the shut-off valves (23-32) con-

cerned.

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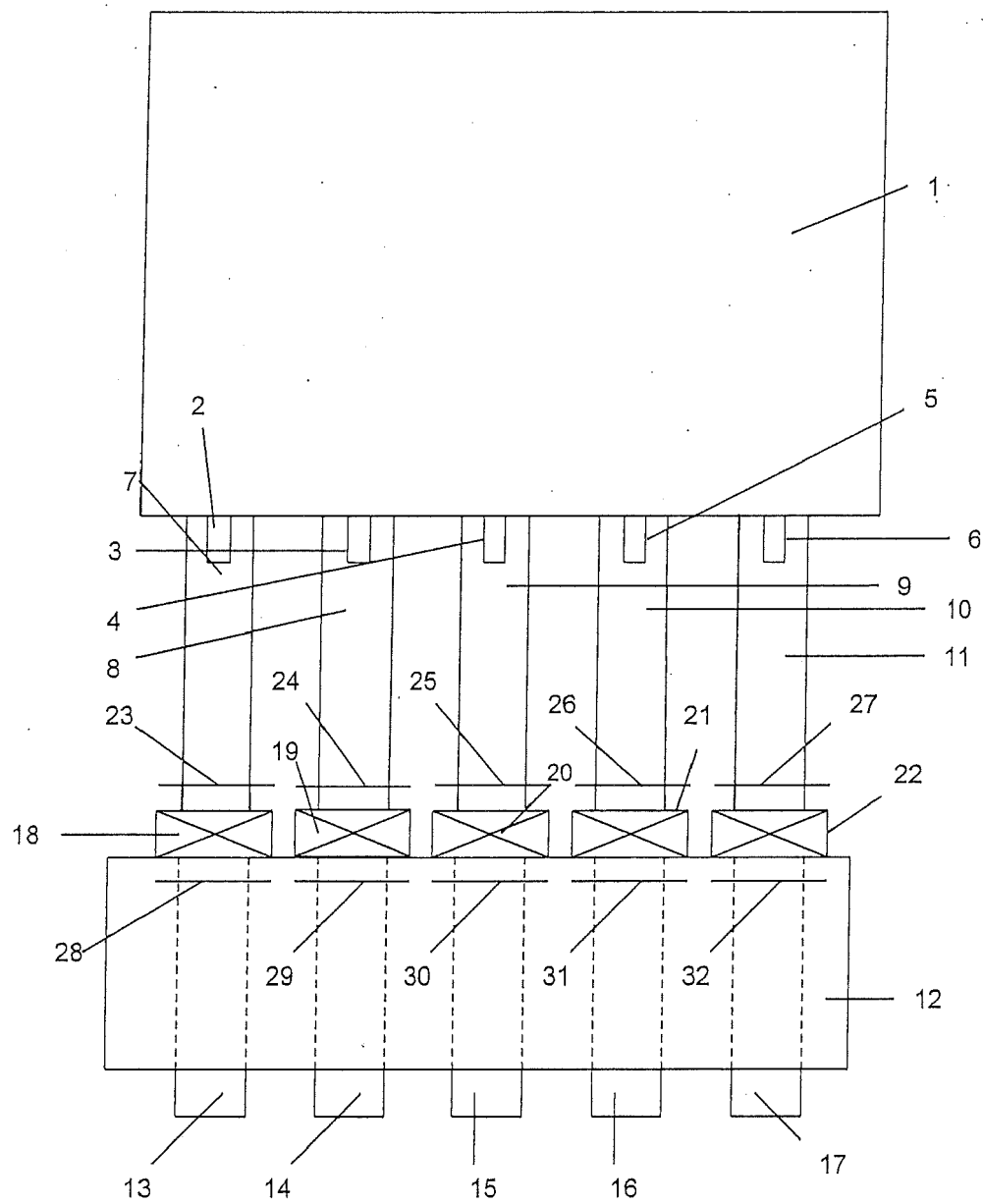


Fig. 1

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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