METHOD IN PRODUCING A WATER HEATER, AND A WATER HEATER

The invention relates to an arrangement for a tank (1) having an inlet spigot (2) and an outlet spigot (3) and, attached to at least one of the spigots, a pipe (6) projecting into the tank, and where a coupling member (5), for example, a valve, an elbow, a knee or the like is detachably mounted on the outer free ends of the spigots (2,3). The invention is characterised in that the said pipe (6) is fastened to the coupling member (5) and projects freely into the tank (1).
Method in producing a water heater, and a water heater.

The invention relates to a method for manufacturing a water heater comprising a tank having an inlet spigot and an outlet spigot and, attached to at least one of the spigots, a pipe that projects into the tank, and where a water fitting is detachably mounted on the outer free ends of the spigots, wherein a suitable coating material is introduced into the tank, the tank is heated, tumbled and rotated whereby an inner coating is formed in the tank.

The invention also relates to a water heater comprising a tank having an inlet spigot and an outlet spigot and, attached to at least one of the spigots, a pipe that projects into the tank, and where a water fitting is detachably mounted on the outer free ends of the spigots, wherein the tank is provided with a inner coating.

The invention has been especially developed in connection with water heaters which have an inlet spigot and an outlet spigot for cold water and hot water respectively. Such spigots can be mounted on the top of the water heater or in the bottom. When they are top mounted, cold water is fed into the tank through a pipe connected to the inlet spigot and that extends into the tank towards the bottom area of the tank, whilst the hot water passes out through the outlet spigot arranged at the top of the tank. When the spigots are bottom mounted, cold water passes in through an inlet spigot in the bottom of the tank, and the hot water passes out through a pipe that extends from the upper area of the tank down to the hot water outlet spigot.

In known embodiments, the pipe or pipes that extend into the tank are welded to the respective inner end of the spigots.

The vast majority of water heaters of the type described above are made of a steel material that is welded, wherein the interior of the tank is provided with a vitreous coating. A powder (powder plastic) of coating material is introduced into the pre-welded tank and the tank is heated, tumbled and rotated so that a coating settles on the internal wall of the tank. The pipes inserted into the tank and welded in place will not be coated in a satisfactory manner by such a process.

When cold water pipes or hot water pipes are welded in place in the tank, the steel used must have a thickness of at least 1.2 mm. These pipes must be coated with plastic, and this is often unsuccessful, especially on the edges and inside, and corrosion occurs.
A problem specific to water heaters is that the pipe or pipes which project into the body of water in the tank are prone to corrosion and/or furring. As the pipe or pipes are welded in place, it is not possible to gain access to them, and therefore in the event of failure, the whole tank must be removed and discarded.

The object of the present invention is to provide an arrangement that permits the pipe or pipes which extend into the tank to be inserted after the coating of the inside wall of tanks, and allows them to be easily replaced.

Therefore, according to the invention there is proposed a method as mentioned in the introduction, characterised in that the tank is welded together of steel elements, with associated spigots, and that cold water and/or hot water pipes are subsequently mounted in the associated spigot in that the said pipe is passed into the tank through the spigot and fixed in place by a fitting fastened to the pipe.

It is particularly advantageous to fasten the pipe to the fitting by screwing it into the fitting.

According to the invention, there is also proposed a water heater as mentioned above, characterised in that the said pipe is secured in the fitting or the like which is fastened to the spigot, and projects freely therefrom into the tank.

It is particularly advantageous to screw the pipe into the fitting.

One of the pipes can advantageously be provided with an anode.

The invention gives the advantage that the tank can be coated as mentioned, without any inserted pipes, and that the pipes can be installed after the tank has been coated as mentioned. The invention also allows the placing of an anode (to avoid pores in the plastic coating) in the tank, as the hot water or cold pipe can be made in the form of an aluminium pipe, which will act as an anode. This results in fewer spigots on the tank.

The invention will now be described in more detail with reference to the drawings, wherein:

Fig. 1 is a sectional view through a water heater with a valve on the cold water pipe;
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Fig. 2 is a sectional view through a water heater with a combined valve mounted on both the cold water pipe and the hot water outlet; Fig. 3 shows a water heater with a bottom-mounted valve for the cold water pipe and the hot water pipe; and Fig. 4 shows a section of Fig. 3, where the fastening of spigots and pipes is shown in more detail.

Fig. 1 shows a water heater 1 in section. The water heater has two spigots mounted on the top, an inlet spigot 2 for cold water and an outlet spigot 3 for hot water. A valve 5 is mounted on the inlet spigot 2 with the use of a known coupling 4. The valve 5, which represents a water fitting in the terminology used herein, is fastened to a cold water pipe 6 that extends downwards in the tank 1. At the bottom, the cold water pipe 6 has sideways directed slots 7 through which the cold water can flow into the tank 1 when the valve 5 is opened. Hot water will then pass out through the top outlet spigot 3.

A heating coil etc for heating the water in the tank 1 is not shown as such elements are considered to be well-known to the skilled artisan. The applies also to the valve 5, which is therefore not described in more detail here either.

Fig. 2 shows a modified embodiment of the water heater 1 in Fig. 1. The water tank 1 in Fig. 2 has an inlet spigot 2 for cold water and an outlet spigot 3 for hot water, as in Fig. 1. Unlike the embodiment in Fig. 1, the embodiment in Fig. 2 is provided with a combined valve 8, also of a known type per se, which by means of a suitable coupling 9 is connected to the hot water outlet spigot 3 and by means of a suitable coupling 10 is connected to the cold water inlet spigot 2. As in Fig. 1, a cold water pipe 6 is secured in the valve 8, which represents a water fitting in the terminology used herein. With the valve 8, it is possible, in a known way, to control the flow of cold water into the pipe 6 and to regulate the temperature of the hot water flowing out through the spigot 3, as some of the cold water is diverted through the valve 8 and conveyed together with the hot water from the tank 1.

Fig. 3 shows an embodiment where the water heater tank 1 is provided with a bottom mounting, i.e., that the cold water inlet spigot 11 and the hot water outlet spigot 12 are mounted in the bottom of the tank 1. As in Fig. 2, a combined valve 13, like the valve 8 in Fig. 2, is provided and connected to the two spigots 11 and 12 by suitable couplings 14, 15. A cold water pipe 16 extends into the tank, the cold water pipe 16 being secured
in the valve 13, and similarly a hot water pipe 17 extends into the tank 1, this pipe 17 being secured in the valve 13.

In the three embodiments shown in Figs. 1, 2 and 3, the illustrated valves 5, 8 and 13 can be unscrewed in that the respective couplings 4, 9, 10 and 14, 15 can be undone. Thus, the valve can be removed, and the pipe 6 or the pipes 16, 17 will then accompany the valve out of the tank 1.

Fig. 4 shows on a slightly larger scale how the pipes 16, 17 are mounted in the valve 13.

In Fig. 4 it can be seen that the partly cutaway valve 13 has in the coupling portions internal threads 18, 19 that interact with external threads 20, 21 on the respective pipes 17 and 16. The valve 13 is fastened to the spigot 11 and the spigot 12 by means of known screw couplings 15 and 14.

The two spigots 11 and 12 are welded to the tank 1 as shown at 22 and 23 respectively, in a manner that is known per se, the tank 1 being provided with depressions where the spigots are positioned and welded in place as shown.

The tank 1 in all the figures is provided with a non-illustrated internal plastic coating, as known per se.

Fig. 4 also shows a anode 24 of aluminium, arranged on the pipe 17.

Advantageously, ST 37 can be used as material in the tank. The pipes are advantageously made of stainless steel. In a practical embodiment, the pipes have a wall thickness of 0.5mm.

The anode 24 is simple to remove (the pipe 17 is taken out of the tank). The replacement of the anode is done once a year. The replacement of the whole pipe and anode results in an automatic clean-out of pipes as regards internal furring etc in pipes and valves and a cleaning of the tank.
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**Patent claims**

1. A method for manufacturing a water heater comprising a tank (1) having an inlet spigot (2; 11) and an outlet spigot (3, 12) and, attached to at least one of the spigots, a pipe (6; 16; 17) projecting into the tank, and where a water fitting (5; 8; 13) is detachably mounted on the outer free ends of the spigots, wherein a suitable coating material is introduced into the tank (1), the tank is heated, tumbled and rotated, whereby an inner coating is formed in the tank (1), characterised in that the tank (1) is welded together of steel elements, with associated spigots (2, 3; 11, 12), and that cold water and/or hot water pipes (6; 16, 17) are subsequently mounted in the associated spigot (2; 11, 12) in that the said pipe is inserted into the tank (1) through the spigot (2; 11, 12) and fixed in place by a fitting (5; 8; 13) fastened to the pipe.

2. A method according to claim 1, characterised in that the pipe (6; 16, 17) is fastened to the fitting (5; 8; 13) in that it is screwed into the fitting.

3. A water heater, comprising a tank (1) having an inlet spigot (2; 11) and an outlet spigot (3, 12) and, attached to at least one of the spigots, a pipe (6; 16; 17) projecting into the tank (1), and where a fitting (5; 8; 13) is detachably mounted on the outer free ends of the spigots, which tank (1) is provided with an inner coating, characterised in that the said pipe or pipes (6; 16, 17) are secured in the fitting (5; 8; 13) that is fastened to the spigot (2; 11, 12) and project freely therefrom into the tank (1).

4. A water heater according to claim 3, characterised in that the pipe (6; 16, 17) is screwed into the fitting (5; 8; 13).

5. A water heater according to claim 3 or 4, characterised in that one of the pipes (17) is provided with an anode (24).
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: F24H 9/12
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)

IPC7: F24H

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

SE, DK, FI, NO classes as above

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

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Date of the actual completion of the international search

11 December 2001

Date of mailing of the international search report

17-12-2001

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