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(54) Gas-powered water heater.

(57) This gas-powered water heater is of the type comprising a water tank (1) which extends substantially vertically, a combustion chamber (2) arranged on the bottom of the tank and a gas burner (3) arranged inside the combustion chamber. In order to provide a high security against gas escape, simplicity in installation together with a simple structure, the combustion chamber (2) and the discharge duct (6,18) for the burnt gases are sealingly isolated from the room, the inflow of combustion air occurring through at least one duct (5,19) which connects the combustion chamber to the outside.

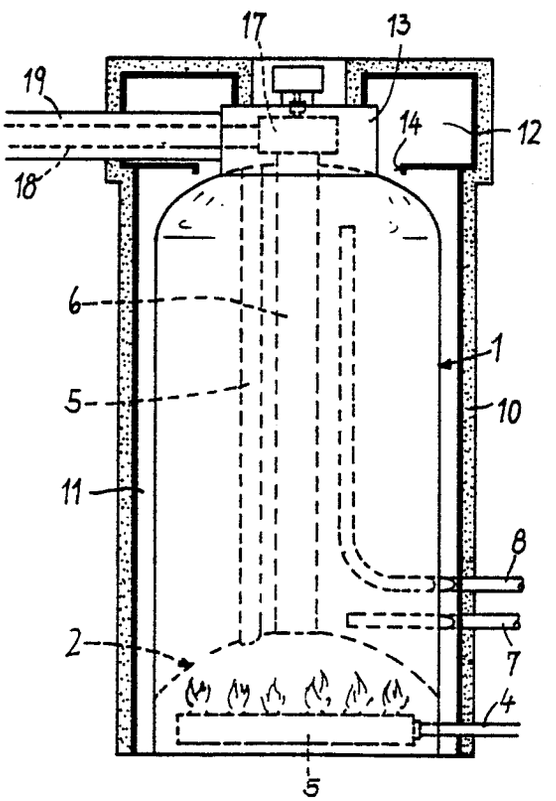

Fig. 5

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GAS-POWERED WATER HEATER

The present invention relates to a gas-powered water heater.

Water heaters are currently known which employ the heat produced by the combustion of a gas to produce hot water. Such water heaters substantially consist of a water tank which is outwardly thermally insulated and downwardly provided with a combustion chamber, wherein the gas burner is inserted. The combustion chamber is connected to the stack by means of one or more smoke-pipes extending in the tank of the water to be heated.

Though it is in particularly widespread use, this type of gas-powered water heater is highly dangerous due to the fact that the combustion chamber is not isolated from the room wherein the apparatus is installed since the air required for combustion is indeed taken from this room.

The consequent risks are sadly known: accidental leakage of gas from the burner; leakage of carbon oxide in case of poor draught of the stack.

Moreover, in water heaters of the type described above no possibility of use for heating rooms, in particular using stored heat, is provided.

The aim of the present invention is therefore to solve the above described problem by devising a gas-powered water heater which, besides having a particularly high thermal efficiency, is high secure, eliminating or at least reducing the risk of gas leaks.

Within this aim, an object of the invention is to provide a gas-powered water heater which can be conveniently employed to heat rooms and allows simultaneous production of hot water.

A further object of the invention is to provide a gas-powered water heater which is simple in concept, easy to install and to use and safely reliable in operation.

This aim and this object are both achieved, according to the invention, by the present gas-powered water heater, as defined in the appended claims.

The details of the invention will become apparent from the detailed description of two preferred embodiments of this gas-powered water heater, illustrated only by way of non-limitative examples in the accompanying drawings, wherein:

Figure 1 is a vertical cross section view of the water heater according to the invention;

Figure 2 is a top view thereof;

Figure 3 is a vertical view, in partial cross-section, of a different embodiment of the inventive water heater;

Figure 4 is a top view of the latter, in partial cross section; and

Figure 5 is a vertical cross-section view taken along a plane perpendicular to the one of figure 3.

With reference to the above figures, the water heater according to the invention comprises a cylindrical water tank 1 which extends substantially vertically. On the bottom of the tank 1 a combustion chamber 2 is arranged, inside which a gas burner 3, supplied by a conduit 4, is arranged.

The air required for combustion is sent to the chamber 2 by means of a pipe 5 vertically extending within the tank 1, adjacent to a pipe 6 for discharging the burnt gases. By virtue of this arrangement, the combustion chamber 2 is sealingly separated from the room wherein the water heater is installed.

Pipes 7 and 8, respectively intended for inflow and outflow of heated water, also lead into the tank 1.

The tank 1 is outwardly surrounded by a jacket 10 of thermally insulating material, such as cellular polyurethane and the like.

According to a different embodiment, illustrated in figures 3, 4 and 5, the outer insulation jacket 10 extends at a distance from the cylindrical body of the tank 1 and defines therewith an interspace 11 which is downwardly open onto the room. Upwardly, instead, the jacket 10 defines a chamber 12 which annularly surrounds a dome 13 arranged at the top of the tank 1 and is connected, through an annular opening 14, to the interspace 11.

Advantageously the chamber 12 laterally accomodates a fan element 15 having a horizontal axis and facing an opening 16 formed in the outer wall of the chamber 12. The fan 15, appropriately operated, is adapted to achieve a forced circulation of air through the interspace 11. In this manner the water heater is capable of providing air for heating purposes, simultaneously with hot water. In fact, the air sucked by the fan flows along the warm wall of the tank 1, moving from the bottom upwards, and then flows out of the opening 16 at a correspondingly high temperature. Of course, the fan 15 may be stopped when such heating is not required.

An aspirator element 17 is arranged inside the dome 13 and is connected to the pipe 6 for forced ejection of the burnt gases through an exhaust pipe 18. The pipe 18 is arranged coaxially inside a further pipe 19 through which the combustion air reaches the dome 13, which in turn is connected to the tube 5.

Thus the combustion air, before reaching the burner, is preheated by flowing in countercurrent along the burnt gas exhaust pipe 18, and subsequently releases part of this heat to the water contained in the tank by flowing in the pipe 5. Moreover, the forced draught provided by the aspirator 17 allows reduction of the fume passages and elimination of the flue, with obvious advantages as to efficiency and ease of installation.

Besides the safety provided by the intake of air from the outside of the building, and besides the improved thermal efficiency offered by the use of air as a means for recovering heat which would be otherwise dispersed, the present invention offers a further advantage which can be particularly appreciated during the installation of the apparatus. The advantage resides in the fact that it is possible to freely orientate the double pipe 18-19 which connects the apparatus with the outside environment, regardless of the position assumed by the water heater during mounting onto the wall. In fact, as is clear from fig. 1, the dome 13 is adapted to rest on a sealing gasket 20 and to be retained, by screw means, on the jacket 9.

The rotation of the dome occurs by pivoting on the central pipe 6 and also by virtue of a suitable gasket provided between this pipe and the aspirator 17 which moves with the dome.

In solutions using a bundle of smoke-pipes, the latter, before reaching the dome, converge into a single central pipe connected to the aspirator as described above.

In the practical embodiment of the invention, the materials employed, the shape and the dimensions may be any according to the requirements.

Claims

1. Gas-powered water heater, comprising a water tank (1) which extends substantially vertically, a combustion chamber (2) arranged on the bottom of said tank and a gas burner (3) arranged inside said combustion chamber, characterized in that the combustion chamber (2) and the discharge duct (6, 18) for the burnt gases are sealingly isolated from the room, the inflow of combustion air occurring through at least one duct (5, 19) which connects the combustion chamber to the outside.

2. Water heater according to claim 1, characterized in that it comprises an outer jacket (10) forming with said tank (1), an interspace (11) which is open onto the outer environment at the upper and lower ends, and ventilation means (15) for causing circulation of air through said interspace to produce air for heating.

3. Water heater according to claim 1, characterized in that said combustion air inflow duct (5, 19) at least partially extends coaxial to said burnt gas exhaust duct (6, 18) so as to achieve a recovery of heat.

4. Water heater according to claim 2, characterized in that said jacket (10) upwardly defines a chamber (12) which annularly surrounds the top (13) of said tank (1) and is connected, by means of a lower annular opening (14), with said interspace (11), said ventilation means (15) being arranged inside said chamber.

5. Water heater according to claim 4, characterized in that the outer wall of said chamber (12) has an opening (16) facing said ventilation means (15) for the outflow of said heating air.

6. Water heater according to claim 2, characterized in that said jacket (10) is made of an insulating material.

7. Water heater according to claim 1, characterized in that said tank (1) upwardly defines a dome (13) accommodating burnt gas suction means (17) and being connected with said combustion air inflow duct (5, 19).

8. Water heater according to claim 7, characterized in that said dome (13) is mounted axially rotatable on said tank (1), so as to be angularly orientatable.

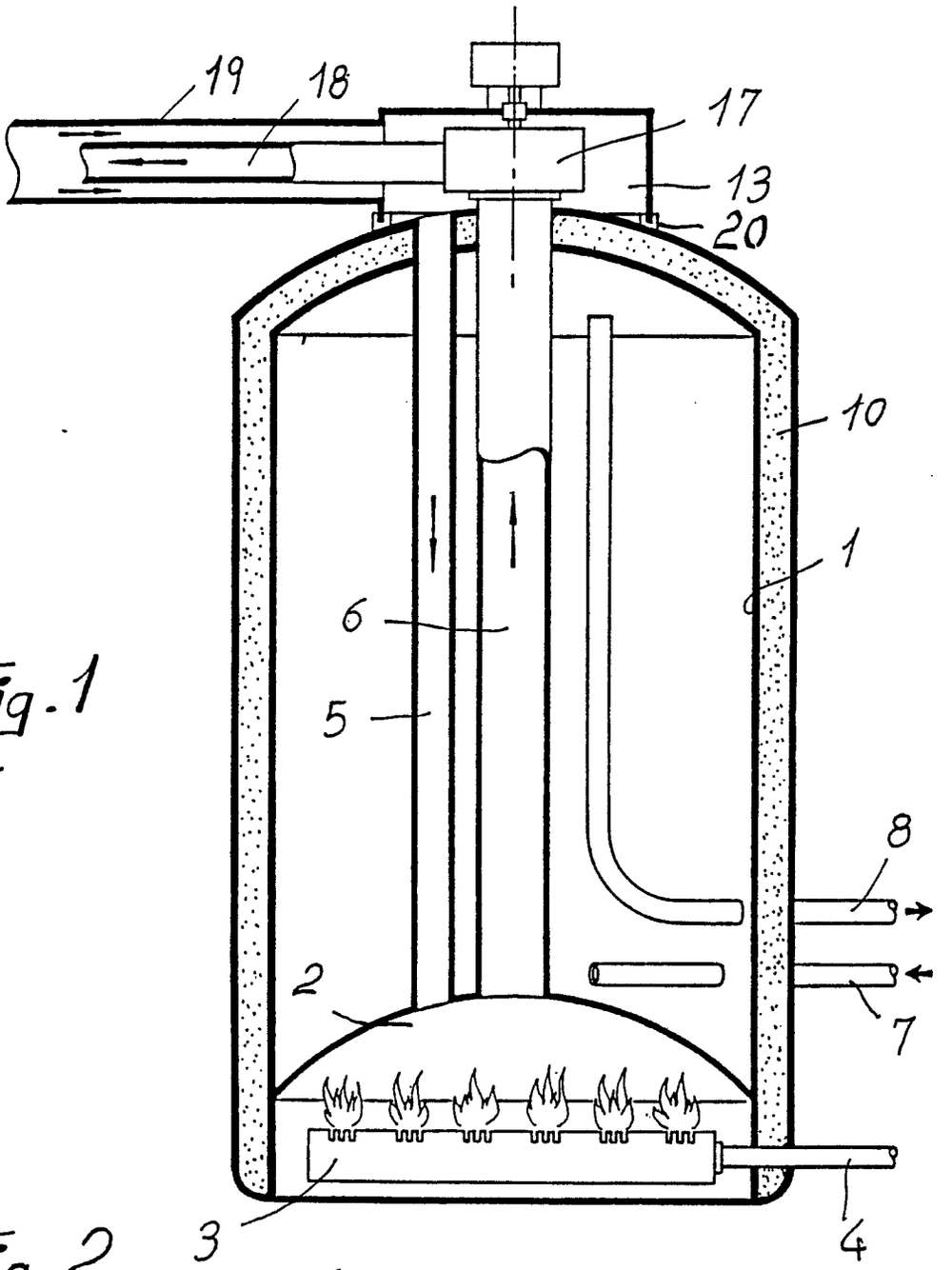
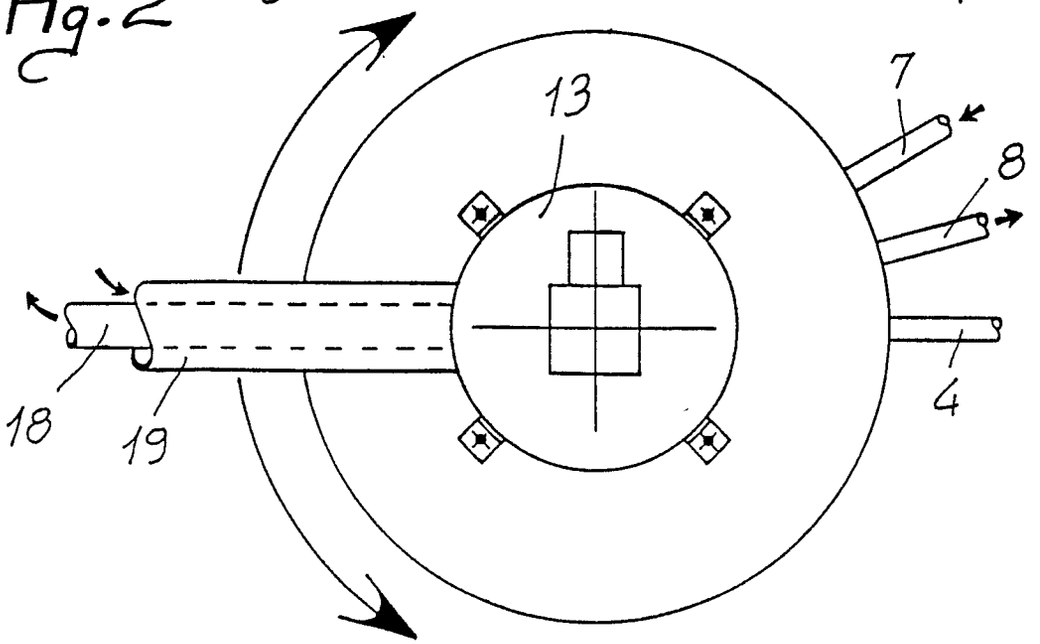


Fig. 1

Fig. 2



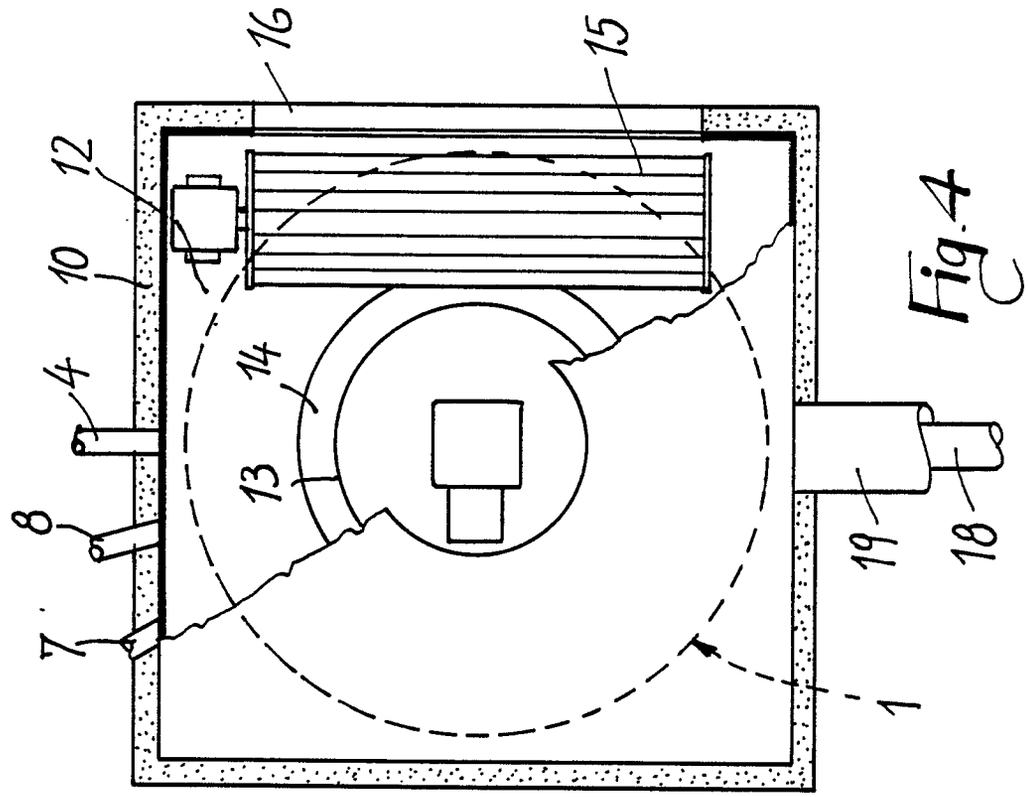


Fig.4

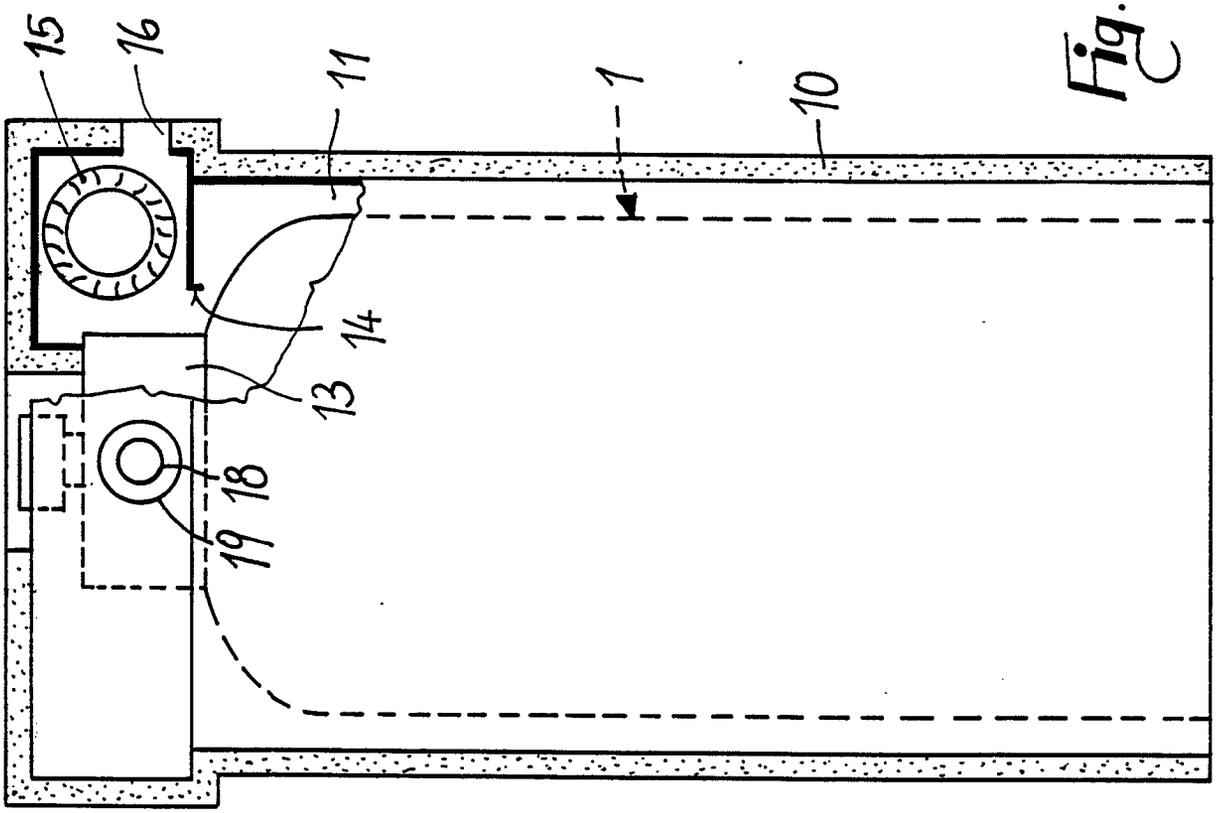


Fig.3

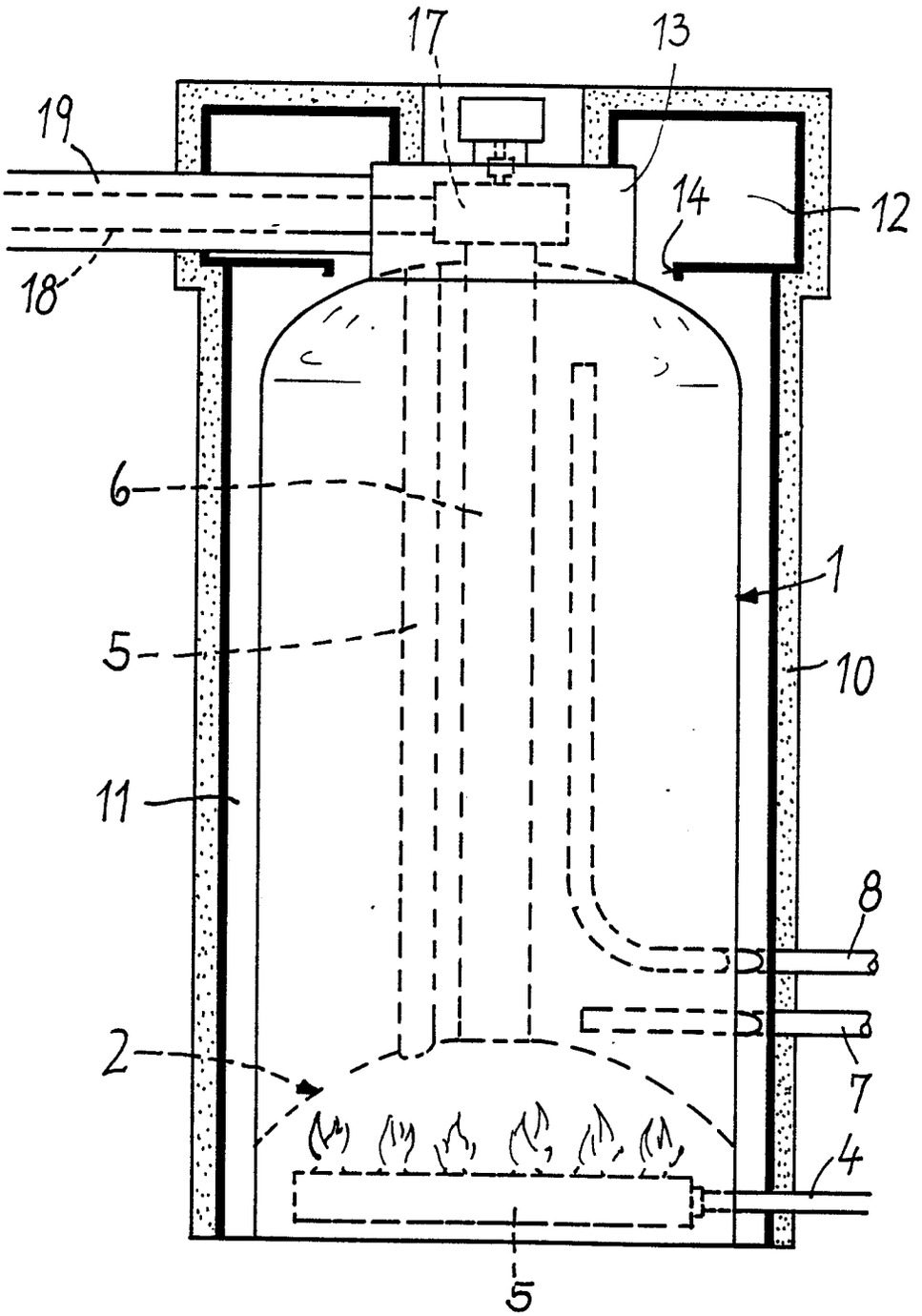


Fig. 5