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WATER HEATING SYSTEM

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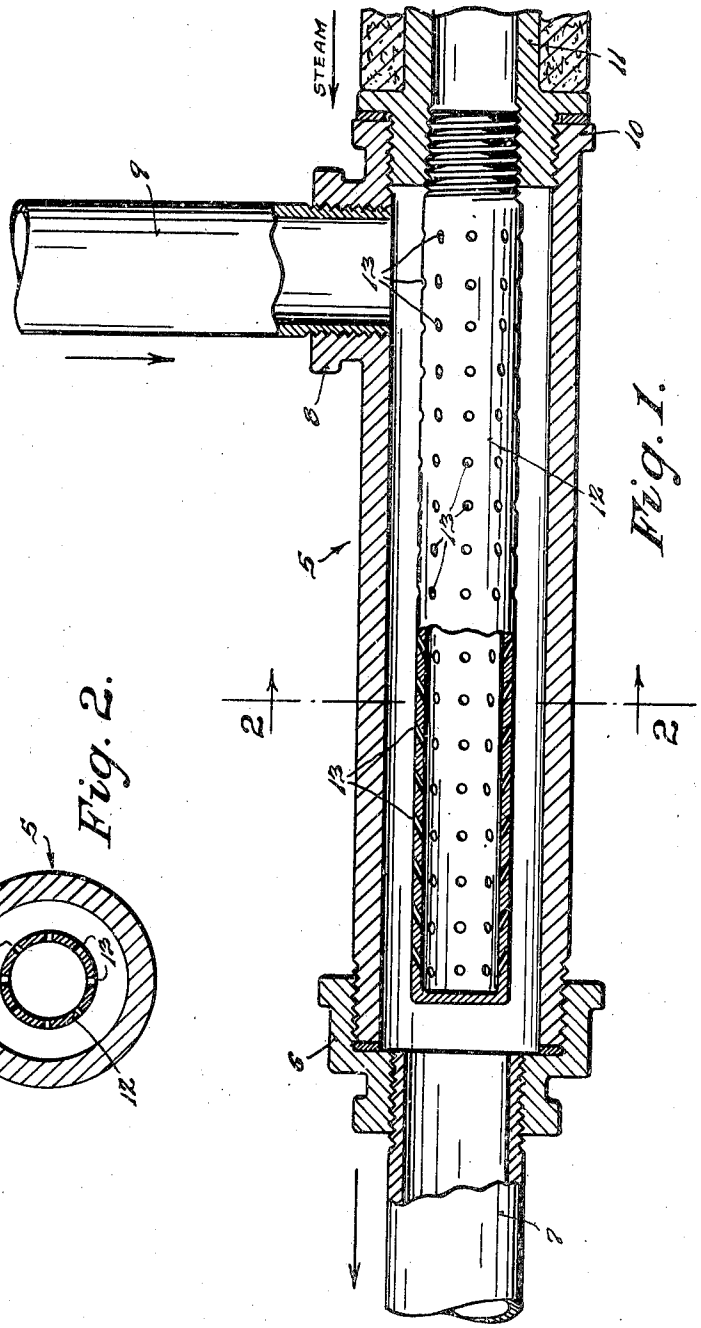


Fig. 1.

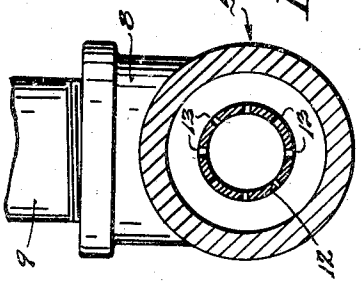


Fig. 2.

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WATER HEATING SYSTEM

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5 Claims. (Cl. 261—15)

My invention relates to an improved water heating system and particularly has reference to an installation operating through the injection of steam into water.

Generally stated, the object of my invention is to provide a highly efficient yet simple and economical arrangement for heating water and one in which an immediate and unlimited supply of hot water may be obtained.

More particular objects and advantages, in addition to the foregoing, will become apparent in the course of the following detailed description and in the claims annexed thereto, the invention consisting in an improved method of heating water and in the novel construction, adaptation, and combination of parts hereinafter described and claimed.

In the drawing:—

Figure 1 is a longitudinal section, parts being broken away and other parts shown in side elevation, indicating the now preferred embodiment of the invention; and

Fig. 2 is a transverse section thereof taken on the line 2—2 of Fig. 1.

With reference to the drawing, the heating chamber of my invention is represented by the numeral 5 and comprises a pipe cast in the form of an elongated T-fitting with its outlet end exteriorly threaded for the reception of a reduction coupling 6. Engaged in the reduced end of said reduction coupling is a pipe 7 leading to a delivery hose or the like (not shown).

In the branch opening 8 of the pipe 5, located relatively remote from the outlet end of the same, a cold water pipe 9 from a source of pressure supply is received and in the run opening 10 adjacent said branch I introduce a pipe 11 from a source of steam supply, said pipe 11 being located centrally or axially of the pipe 5 and extending into the heating chamber to terminate adjacent the outlet end.

Said extended end of the steam pipe, indicated by 12 and which constitutes a steam nozzle, is of a reduced diameter as respects the dimensions of the heating chamber to afford a relatively restricted circulation space between the nozzle and the inner wall of the chamber, being closed at its innermost end with the side walls perforated to provide a plurality of relatively minute openings 13. Each of said openings preferably is inclined retrogressively as regards the direction of water flow.

Said steam admission line, comprising the pipe 11 and nozzle 12, is formed desirably with the nozzle threading in the terminal end of the pipe and with a jacket of heat-insulating material such as asbestos surrounding the latter. Similar insulation may be provided about the chamber 5 and the pipe 7.

The operation of the invention is believed clear. The capacity of the chamber about the nozzle 12 is substantially that of the supply and delivery pipes 9 and 7 to and from the heating unit in affording a continuous pressure flow of hot water which, by reason of the small volume of water under the influence of the steam jets, is heated to the boiling point practically instantaneously. The inclined disposition of the jets operates to especial advantage in injecting the steam such as to afford a more effective action on the circulating water with less tendency to impinge against the chamber walls with resulting heat waste through radiation.

The arrangement serves to especial advantage in dairies and other like or similar plants.

It is not my intention to limit the invention to the described structure nor to any specific application and I accordingly confine myself only within the scope of the hereto annexed claims.

What I claim, is:—

1. In a water heating system, the combination with a heating chamber comprising a relatively extended pipe open at the two ends and having a branch opening in proximity of one of said end openings, said last-named end opening receiving a steam conduit from a source of steam supply, said other end and the branch openings respectively receiving a delivery conduit for the hot water and a supply conduit for cold water from a pressure source, a nozzle of a reduced diameter as respects the diametrical dimension of the heating chamber extending axially into the heating chamber from said steam conduit, said nozzle projecting into proximity of the delivery opening from said heating chamber and being formed with a dead end and having a perforate side wall, the perforations of said side wall being inclined retrogressively as regards the direction of water flow.

2. The method of heating a circulating body of water through the instrumentality of steam injection which consists in injecting the steam in a direction converse to the direction of circulation of the water in a plurality of fine closely-associated jets whereby the steam pressure opposes the water flow and transmits the heat of the collective jets over an extended area in which the individual jets successively influence small volumes only of the body of water.

3. In a water heating system, the combination

with a system of piping extending from a pressure source of water supply, means comprised of a dead-end nozzle having its side wall perforated and introduced in said system of piping to lie in the path of circulation of the water, said nozzle being connected with a source of steam supply and being formed to inject, through said side-wall openings, fine closely associated jets of steam under pressure and at retrogressive inclinations as regards the direction of circulation of the water into the water stream circulating under pressure through the system of piping.

4. In a water heating system, the combination with a heating chamber comprising a relatively extended pipe having a run opening in one end of the same and a branch opening adjacent said run opening, a water conduit connecting with the opposite end of the heating chamber for delivering hot water from the heating chamber, a water conduit connecting with the branch opening for supplying cold water to the heating chamber, and a steam conduit received in the run opening provided with a nozzle the openings from which are provided only in the side wall, said nozzle lying within the heating chamber and projecting beyond the water-admission opening thereto with a multiplicity of said openings being disposed directly in the path of the incoming water as the latter is initially delivered from the supply conduit into the heating chamber, said openings which lie directly in the path of the incoming water being formed to project the steam therefrom in a direction opposing the direction of travel of the initially admitted water to co-act with the wall-impinging action of the latter for agitating the incoming water stream.

5. The method of heating water through the instrumentality of steam injection which consists in forcing the water under pressure through a system of piping of which the volumetric flow capacity of one pipe in said system is reduced by a steam pipe lying centrally of the same, and injecting the steam from said steam pipe in a plurality of fine closely-associated jets and at inclinations diagonal to the direction of water flow into the water stream passing through the restricted flow channel surrounding the steam pipe, the inclination of the steam jets to locate the same diagonally to the direction of water flow acting to oppose impingement of the steam jets against the immediately adjacent walls of the surrounding pipe whereby to promote the heating efficiency of the steam by eliminating direct transmission of heat from the steam to the surrounding pipe.

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