M. B. CHEEK.

FEED WATER HEATER.

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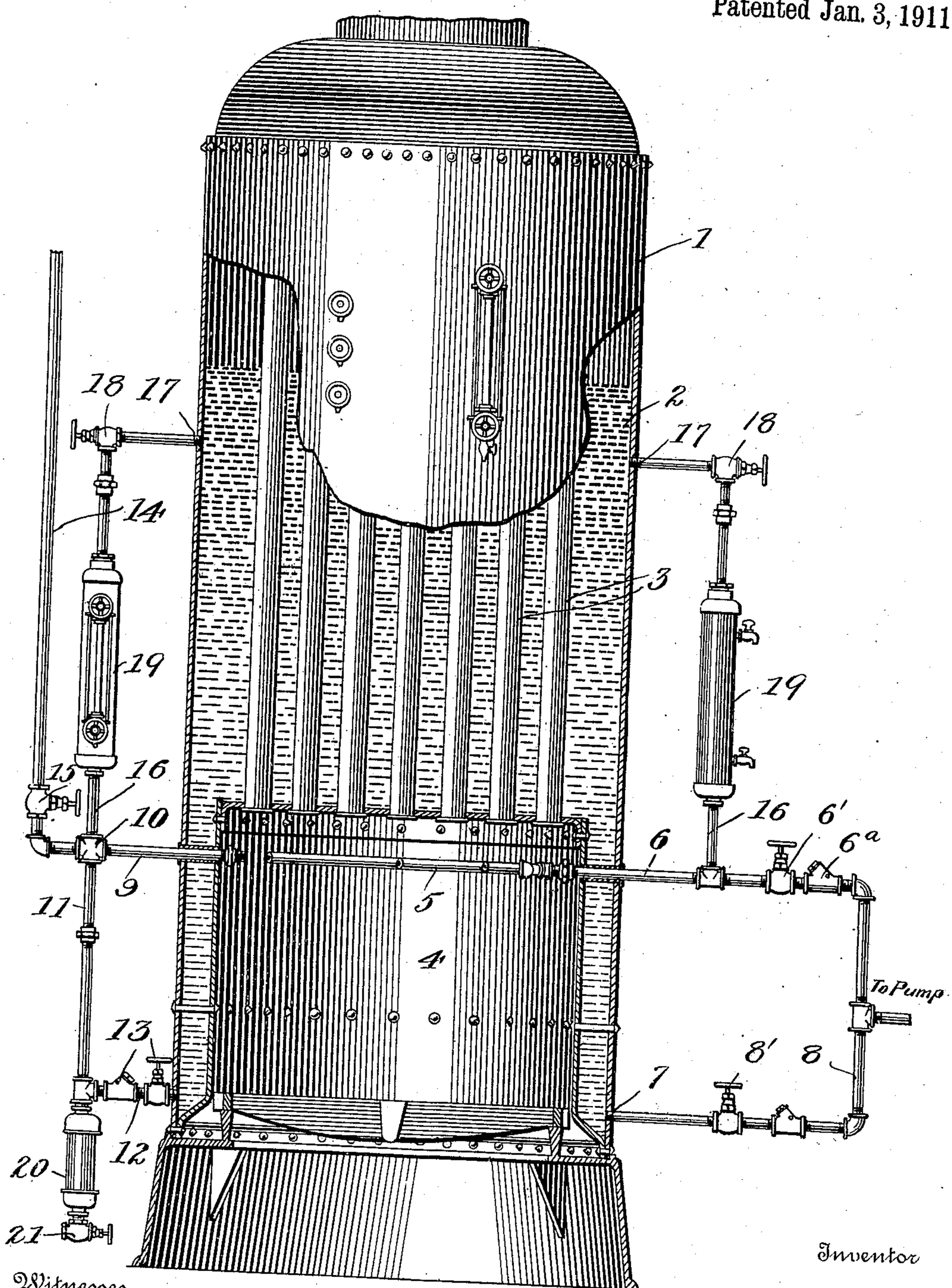
980,759.

Patented Jan. 3, 1911.



Witnesses

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FEED-WATER HEATER.

980,759. Specification of Letters Patent. Patented Jan. 3, 1911.

Application filed March 1, 1910. Serial No. 546,703.

To all whom it may concern:

Be it known that I, MARCELLUS B. CHEEK, a citizen of the United States, residing at Aurora, in the county of Dearborn and State of Indiana, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

This invention relates to an improvement in feed-water heaters for steam boilers, the primary object thereof being to deliver water to the boiler at a temperature substantially equal to or greater than the water already contained therein.

A further object is to provide a circulation through the heater coil and the boiler so that when the supply pump is out of operation, the heater coil will be automatically supplied with water from the boiler, which when heated to a greater temperature than the water in the boiler, will be displaced by water of a lower temperature, thus causing a continuous circuit of the liquid.

A still further object of the present invention is to provide a heater coil in combination with piping and valves whereby the water heated in the coil may be delivered to the boiler or may be delivered to any desired point remote from the boiler.

Further objects and advantages will appear from the following description with reference to the accompanying drawing, wherein a steam boiler embodying my invention is illustrated.

Referring more particularly to the drawing wherein like numerals of reference indicate like parts, the numeral 1 designates a steam boiler of the standard upright type which is provided with a water chamber 2 wherein the heating pipes 3 are positioned.

Within the fire-box 4 of the boiler a horizontal pipe coil 5 is arranged and suitably supported by brackets (not shown). One end of this coil 5 is connected to a supply pipe 6 through which water is forced by a suitable pump into the pipe coil. Connected to this pipe is a downwardly extending branch pipe 8 which enters directly into the boiler as at 7. The pipes 6 and 8 are each provided with globe and check valves so that the supply of water from the pump to the coil may be cut off and forced directly into the boiler through the pipe 8 or by so adjusting the globe valves in each of the pipes, the water may be directed and pumped into the coil. The opposite end of the pipe coil 5 is connected to a pipe 9 which extends through a casing formed in the side of the boiler, and is connected to a pipe union 10, which in turn is connected to a downwardly extending pipe 11, whereby water is conducted into an abbreviated pipe 12 having globe and check valves 13 arranged thereon. This pipe 12 communicates with the water chamber of the boiler. Secured to the pipe union 10 and extending to any point where the use of heated water may be desired is a pipe 14, this pipe being provided with a globe valve 15 adjacent to the pipe union 10.

From the above it will be seen that when the globe valve 8′ in the branch pipe 8 is closed and the globe valve 6′, of the pipe 6 is opened the water will be forced into the heater coil and upon being heated will pass through the pipe 9 into the pipe 11 when the valve 15 is closed, thence downwardly and into the water chamber of the boiler via the pipe 12. If, for any reason, it is desired to supply some point remote from the boiler with hot water, the valve 15 is opened and the valve 13 located in the pipe 12 is closed so that the water from the coil 5 will be prevented from entering the boiler and will therefore be directed to any point to which the pipe 14 extends. Under certain circumstances the pump will be out of operation thus cutting off all outside supply of water to the coil and it will be appreciated that under this condition there will be great danger of the coil being burned out. To prevent the burning out of the coil it is necessary to have a constant supply of water in the coil, and it is desirable that this water have free circulation through the coil; this is accomplished by connecting, to the pipe union 10, on one side of the coil and to the coupling carried by the pipe 6 on the opposite side of the coil, two upwardly extending pipes 16, which enter the boiler by pipe 17. Intermediate the ends of each of these pipes 16 expansion chambers 19 are located, and are provided with gage cocks and water glasses. These pipes are also provided with globe valves 18. It will now be seen that in case the operation of the pump is discontinued, the water from the boiler will force its way through the pipe 17 downwardly through the expansion chambers 19 and into the heater coil through the pipe 6, the check valve 6^a preventing any back flow of water into the pump. As soon as the water which

has flowed into the coil becomes heated to a temperature which is higher than the temperature of the water located in the expansion chambers and their adjacent pipes, it will force its way through the pipes and back into the boiler, in the meantime being displaced by water of a lower temperature. It will be seen that the circulation of the water from the boiler through the pipes 16 into the coil and thence back into the boiler will be continuous as long as the water supply in the boiler remains above the point where the pipes 17 enter therein. For this reason the entrance of the pipes 17 into the boiler are located a short distance below the position of the lowest gage cock thus practically insuring a sufficient supply of water at all times, to keep the coil automatically supplied with water.

It will be understood that the two expansion chambers 19 provide an expansion chamber for any steam which may be generated in the coil at any time, thereby preventing the rattling of the check valves.

As is well known, the water which is supplied to the coil often contains considerable sediment and other foreign matter which it is desirable to keep from entering the boiler. In order to prevent any objectionable matter from entering the boiler, there is a reacting chamber 20 which is located as near the check valve 13 as possible. There is always a certain reaction of the water before it enters the boiler and it will thus be seen that any matter which would tend to clog the check valve 13 will be deposited in the chamber 20. Connected to the lower end of this chamber is a blow-off valve 21, so that the chamber 20 may be thoroughly cleaned by opening the valve 21 and closing the globe valve 13 and thus permitting the steam and hot water from the coil to pass out through the chamber 20.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent, is:—

1. In combination with a boiler, of a heater coil located therein, a delivery pipe connected to one end of said coil and communicating with the water chamber of the boiler, a pair of upwardly extending pipes connected to each end of said coil, and communicating with the water-chamber of the boiler below the water level, an expansion chamber positioned in one of said pipes, and a suction chamber located in the other pipe, whereby a continuous circulation of water will be automatically maintained between the water chamber and the coil.

2. In a steam boiler having a water chamber, the combination with a heating coil, a source of water supply connected to one end thereof, a delivery pipe communicating with the water chamber of the boiler, and connected to the opposite end of said coil, and upwardly extending pipes connected to each end of said coil, and communicating with the water chamber of the boiler below the water level, whereby the coil will be automatically supplied with water from the boiler when the source of water supply to the coil is cut off.

3. In a device of the class described, the combination of a heating coil, a source of water supply connected therewith, and pipes connected to the opposite ends of the coil, and communicating with the boiler, and expansion chambers located intermediate the ends of each of said pipes, whereby the coil will be automatically supplied with water from the boiler, when the water supply to the coil is cut off.

The foregoing specification signed at Aurora, Indiana, this 21st day of Feby, 1910.

MARCELLUS B. CHEEK.

In presence of—
JAMES C. COX,
CHAS. W. SCHULER.