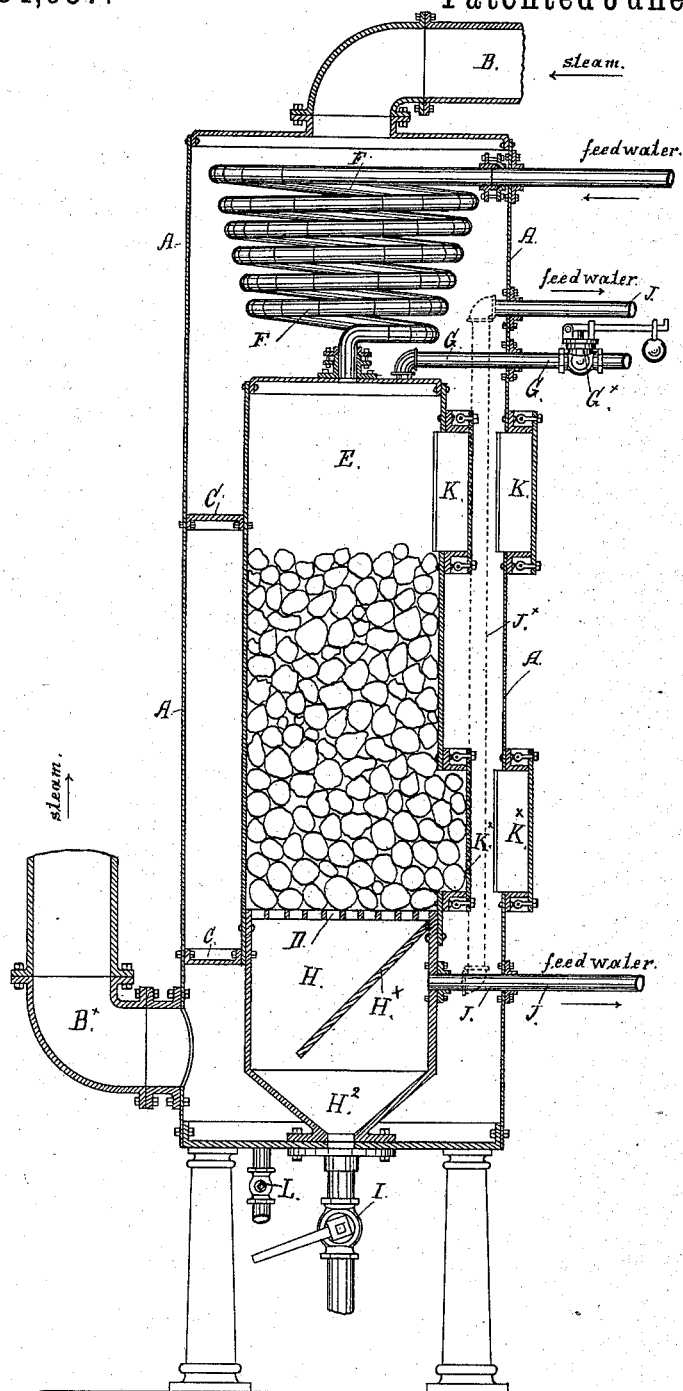


(No Model.)

D. STARK.
FEED WATER HEATER.

No. 384,937.

Patented June 19, 1888.



Witnesses:

Wm. Mayer
Joseph Ford

By

Inventor:

David Stark
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UNITED STATES PATENT OFFICE.

DAVID STARK, OF SAN FRANCISCO, CALIFORNIA.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 384,937, dated June 19, 1888.

Application filed May 31, 1887. Serial No. 239,904. (No model.)

To all whom it may concern:

Be it known that I, DAVID STARK, a subject of the Queen of Great Britain, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Feed-Water Heaters and Purifiers for Steam-Boilers, of which the following is a specification.

My invention relates especially to that class of water heaters and purifiers in which the water is heated and purified before entering the boiler, and has for its object the production of a means whereby the water is heated to a high degree of heat, under pressure directly from the water-main, without passing through intermediate machinery of the boiler and becoming impregnated with oleaginous matter, so incident to the lubrication of such mechanisms.

To attain this end my invention consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

The figure represented by the accompanying drawing is in vertical section taken through filtering-chamber and steam-jacket.

A represents the outer or steam jacket provided with the inlet pipe and port B, connecting with the exhaust of the boiler, and B^x the escape or outlet pipe or port, through which the steam, after passing through the jacket, escapes into the open air. Within the jacket is placed the filtering-chamber, suitably supported by the angle-braces C and the lower end bolted to the base-plate of the steam-jacket, as shown. The filtering material of this chamber, which may be composed of broken stone cobbles, pebbles, or bricks or other matter, is supported upon a perforated plate, D, and occupies about one-half of the space of the cylinder, and so that a chamber or open space, E, is left above the filtering substance. Sufficient space is also left above the filtering-cylinder within the steam-jacket to receive the water-heating coil F, which latter is constructed of copper. As it becomes necessary in practice to heat the water quickly as it passes through the coil into the filtering-chamber, I construct my coil of copper, this metal being more sensitive to heat than iron. The lower end of this coil is coupled to the top plate of the filtering-cylinder and passes into

the chamber, while the outer end extends through the shell of the steam-jacket and connects with the cold-water main. (Indicated in the drawing as a feed-water pipe.) The head of this cylinder also receives a pressure-regulating pipe, G, which extends through the shell of the steam-jacket, and is provided with a pressure-gage or safety-valve.

A hot-water chamber, H, is formed in the lower end of the filtering-cylinder, and an inclined deflecting-plate, H^x, is connected to the side of the chamber and extends downward to near the funnel-shaped mouth of the sediment collector or settler H², which deflects or conducts the sediment thrown down from the filtering-chamber below and into the settler, leaving the water to be drawn off from the chamber H through the feed-water pipe J, at the rear or back of the inclined plate above the sediment deposit, in a comparatively pure condition. A suitable draw-off cock and pipe, I, connects with this chamber H² for drawing off all sediment that passes down through the filtering material upon the inclined plates.

The hot-water chamber is tapped just below the upper end of the inclined plate to receive a feed-water pipe, J, which extends through the shell of the steam-jacket and connects with the steam-boiler to be supplied with the hot and purified water which is drawn off above the collected sediment. This pipe may, however, extend up above the pressure-gage, as shown by dotted lines J^x, as the filtering-chamber is always under pressure.

Suitable man-holes, K K K^x K^x, are provided in both the steam-jacket and filtering-cylinder for removing or cleansing the filtering substance, and a draw-off cock, L, connects with the steam-jacket, through which to draw off the water of condensation.

In operation cold water from a water main or tank is admitted to the copper coil within the steam-jacket through the upper feed-water pipe, and exhaust-steam from the steam-boiler is received upon the coil through the medium of the pipe B, which quickly heats the water as it passes through the copper coil into the filtering-chamber, where the impurities are filtered from the water. If any sediment fails of being collected by the filtering material, it will pass down into the lower chamber or settler at the bottom of the filtering-cylinder,

leaving the hot water pure and deprived of all foreign substances, to be drawn off into the boiler for use in making steam in a rapid manner. It should here be observed that, the outlet-pipe B^x being of the same diameter as that of the inlet-exhaust pipe, no undue pressure will be exerted upon the shell of the steam-jacket. By this construction it will be seen that I am enabled to supply boilers with pure heated water free from oily matter and without the necessity of passing the hot water through pumps, by which operation the valves of these pumps so employed soon become greatly impaired and necessitate constant attention or renewal.

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

1. An apparatus for heating and purifying feed-water, consisting of an inner filtering-cylinder under pressure and an outer shell or steam-jacket provided with a copper heating-coil leading from the supply-pipe or cold-water main into the head of the filtering-cylinder and adapted to discharge hot or heated water upon the filtering material when heated by exhaust-steam admitted to the outer shell or steam-jacket, the hot-water chamber provided with the deflecting-plate H^x, and the funnel-shaped mouth H², as set forth.

2. The feed-water heater and purifier herein

described, consisting in an inner cylinder under pressure, provided with an upper chamber and superposed filtering material, in combination with an outer shell or steam-jacket having inlet and outlet ports or pipes and a water-heating coil therein, through which water heated by the exhaust-steam from a boiler passes into the filtering-chamber, the hot-water chamber located below the filtering-chamber and provided with the deflecting-plate H^x, and the funnel-shaped mouth H², all arranged as set forth.

3. In a feed-water heater and purifier, the combination, with the filtering-chamber, steam-jacket surrounding the same, and heating-coil above, of the hot-water or draw-off chamber of the deflecting or sediment-conducting plate H^x, as and for the purpose specified.

4. In a feed water heater and purifier, the combination, with the inner filtering and purifying chamber or cylinder and outer shell or steam jacket, of the man-holes K K K^x K^x, for the purpose of removing, cleansing, and replacing the filtering material, as specified.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

DAVID STARK. [L. S.]

Witnesses:

C. W. M. SMITH,
CHAS. E. KELLY.