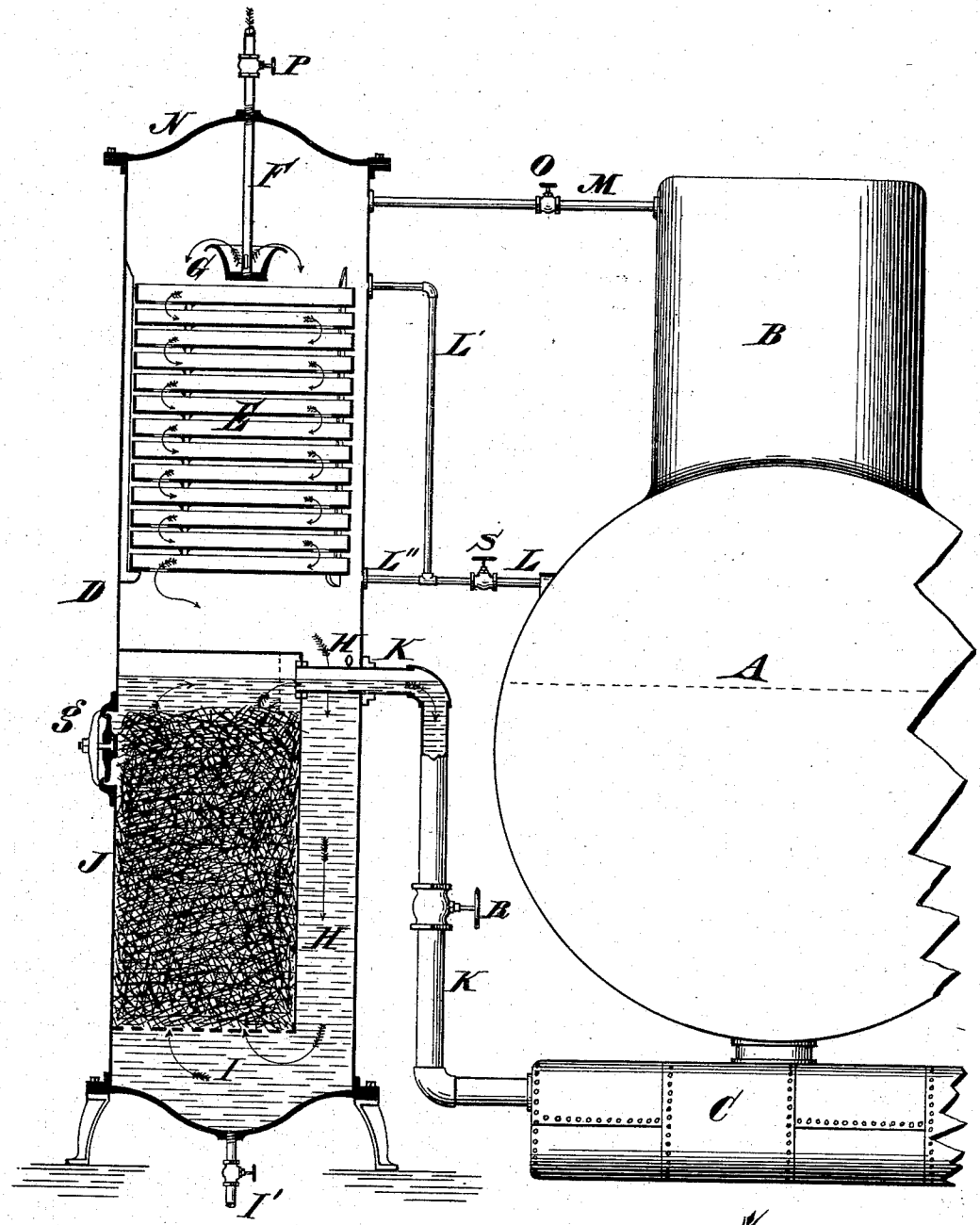
(No Model.)

E. R. STILWELL.

FEED WATER HEATER AND PURIFIER.

No. 274,048. Patented Mar. 13, 1883.



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UNITED STATES PATENT OFFICE.

EDWIN R. STILWELL, OF DAYTON, OHIO.

FEED-WATER HEATER AND PURIFIER.

SPECIFICATION forming part of Letters Patent No. 274,048, dated March 13, 1883.

Application filed December 6, 1882. (No model.)

To all whom it may concern:

Be it known that I, EDWIN R. STILWELL, a citizen of the United States, and a resident of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Feed-Water Heaters and Purifiers, of which the following is a specification.

My invention relates to feed-water heaters or purifiers, and especially to that class which employ live steam from the boiler to heat the feed-water.

One object of my invention is to connect the top of the heater or purifier with the top of the boiler or steam-dome by a pipe, so as to allow the direct escape of gases generated in the heater. It is especially adapted to be used with a combined heater and purifier, an improved form of which is shown in the drawing.

Other features of my invention will be fully set forth in the description of the said drawing, which is a central sectional elevation of the feed-water heater embodying my invention, showing it connected with a steam-boiler.

A represents a steam-boiler, B the steam-dome, and C the mud-drum.

D represents my improved heater and purifier, the shell of which is constructed of boiler-iron adapted to resist the same pressure as the boiler.

E represents a series of shelves or pans over which the water passes in the operation of heating and purification.

F represents the cold-water-supply pipe; G, the overflow-pan, into which the water is admitted. This overflow-pan is placed opposite the upper steam-pipe, L′, which is supplied by live steam direct from the boiler, so that a current of steam will strike against the water passing onto the pans E. As the water leaves the overflow-pan G in a thin stream it is readily heated, causing the separation of the minerals held in solution.

L″ represents a branch steam-pipe, admitting steam at or near the bottom of the series of shelves, which passes up over the pans in the opposite direction to the course of the water. By employing pipes L′ L″ of large area—say of two to four inches in diameter—the water in the purifier is kept at or near the same temperature as that in the boiler, and the space above overflow G forms, in fact, a part of the steam-dome of the boiler. As a consequence, deleterious gases escaping from the water as it is being freed from impurities rise into the space, and as steam is taken from the steam-dome these gases pass through pipe M directly into the steam-dome without passing through the boiler. Another very important result is obtained by thus highly heating the water in the purifier D. A much more perfect purification is obtained than in that class of purifiers where the purifier does not, in fact, form a part of the boiler, by employing live-steam-pipe connections to heat and purify the feed-water. The water, being heated and passing over the pans E, where the mineral impurities are mostly removed, is passed down the passage H, on one side of the filter-chamber J, into a mud-well, I, where the heavier substances settle and may be blown off from time to time through pipe I′. The water passes from the mud-well I up through any suitable filtering medium in chamber J, and thence through pipe K into the mud-drum C; or pipe K may connect with the boiler direct.

N represents a removable head, secured to the top of the heater by screw-bolts or suitable detachable fastenings, so as to provide easy access to the pans.

g represents a man-hole placed opposite the filter-chamber, so as to provide easy means for inserting and removing filtering material.

O P R S represent ordinary valve-cocks for regulating the steam and water pipes.

The principal feature of my invention, which consists in connecting the top of the heater with the steam-dome of the boiler, or with the steam-space of the boiler, can be employed with a combined heater and purifier, or with either a heater or purifier. Thus this escape-gas pipe would perform its office irrespective of the manner in which the heater would be constructed. For instance, either the shelf or the filter might be removed, so long as the feed-water was heated by a current of live steam in a vessel directly connected to the boiler itself. The escape-pipe M can be advantageously used in such construction, which is embraced in the first clause of the claims herein.

The heater might be connected directly to

the steam-space of the boiler by a single steam-pipe, L.

The drawing shows the preferred form of construction.

Another important feature of my invention is the employment of suitable steam-pipes connecting the purifier D with the water in the boiler A, so that the purifier can be kept at nearly the same temperature as that in the boiler itself.

I claim—

1. A live-steam feed-water purifying or heating apparatus, D, connected to the boiler by means of water-pipe K, steam-feed pipes L, and gas-escape pipe M, substantially as herein set forth.

2. A live-steam heater or feed-water purifier having a series of pans vertically above the filter, and a space or chamber above the pans, and water-inlet connected to the steam-dome by a pipe, so as to discharge the gases from the top of the purifier directly into the boiler, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWIN R. STILWELL.

Witnesses:

TORRENCE HUFFMAN,

O. M. GOTTSCHALL.