

UNITED STATES PATENT OFFICE.

JOHN W. HYATT, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE HYATT
PURE WATER COMPANY, OF SAME PLACE.

APPARATUS FOR PURIFYING THE WATER IN STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 366,170, dated July 5, 1887.

Application filed August 6, 1886. Serial No. 210,160. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HYATT, a citizen of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Apparatus for Purifying the Water in Steam-Boilers, fully described and represented in the following specification and the accompanying drawing, forming a part of the same.

The object of this invention is to purify the contents of a steam-boiler where the feed-water used has salts in solution, but is not contaminated with suspended matter.

In my co-pending patent application, No. 207,960, I have shown how an injector may be used to propel a current of impure feed-water mingled with the contents of the boiler through a filter, so as to purify both whenever the boiler is supplied with feed-water. Such a process is evidently useful where the feed-water contains any substances that can be removed by filtration, but would only occasion a needless resistance to the flow of the feed-water where the latter contained only saline ingredients in solution. Where salts are contained in the feed-water, the evaporation of the latter concentrates such salts to such a degree that it is customary to blow off the boiler from time to time to avoid the crystallization of such salts therein.

In my invention the evaporation of the water would be carried to a sufficient degree for the salts to crystallize; and my improvement consists in the combination, with the boiler, of a filter having its inlet connected with the water-space of the boiler, and its outlet connected with the suction of a water-injector inserted in the feed-pipe, and a water-connection from such feed-pipe to the outlet of the filter, to reverse the current of fluid through the same when required.

The feed-water may be propelled to the boiler by a pump, an injector, or other source of pressure, but its current, from wherever derived, operates in passing through the circulating or water injector to induce a suction of the boiler's contents through the filter, and to propel the same into the boiler mingled with the new feed-water.

The annexed drawing shows a water-tube

boiler mounted in brick-work, with its setting partly broken away on the line *xx*, to expose the rear of the tubes A and the settling-drum B; and the feed-water pipe C is shown provided with a steam-injector, D, to propel the feed-water into the boiler E, a water-injector, F, being inserted in such pipe between the steam-injector and the boiler, to draw the boiler-fluid through the filter G in the desired manner. The inlet of the filter is connected by a pipe, H, to the settling-drum B, and the discharge from the filter is connected by pipe I to the suction-opening J upon the water-injector F.

l is a steam-pipe to actuate the injector D, and it is obvious that the water propelled by such injector would pass through the bore of the circulating or water injector F and induce a current from the pipe I, which could only be supplied by drawing the boiler-fluid from the drum B through the pipe H and filter G. A check-valve, *m*, would be inserted in the pipe C near the boiler, so that the stoppage of the feed at any time would prevent any reflux of water in the pipe, and the injector F and the filter would then cease to operate until the feed were again actuated.

The filter may be washed by reversing the current through the same, as is common; and a convenient means for effecting such washing is shown in a connection, *n'*, from the feed-pipe C to the filter outlet-pipe I, a cock, *n*, being provided in such connection, and a cock, *I'*, inserted in the pipe I, adjacent to the water-injector. The waste-pipe *o*, used in cleansing the filter, and the inlet-pipe H, would also be provided with cocks *o'* and *H'*. By closing the cocks in the pipes H and I, which effect the normal circulation through the filter, and opening the water-supply cock *n* and the waste-cock *o'*, the current would be reversed through the filter and the deposited impurities would be washed away.

Having thus set forth my invention, what I claim is—

1. The combination, with a boiler, of a filter, a feed-water pipe, and a water-injector, the filter inlet being connected with the water-space of the boiler, its outlet with the suction of the water-injector, and the feed-water for

the boiler being propelled through the bore of the said injector into the boiler, as and for the purpose set forth.

2. The apparatus for purifying the fluid in
5 a steam-boiler, consisting in a filter, and a
feed-water pipe having a water-injector and a
steam-injector inserted therein, the steam-in-
jector operating to propel the feed-water
through the bore of the water-injector into the
10 boiler, the filter having its inlet connected
with the water-space in the boiler, and its out-
let connected with the suction of the water-
injector, and a connecting-pipe, *n*, uniting the

feed-water pipe with the said outlet of the
filter, and the filter being provided with a 15
waste-pipe and the necessary cocks to reverse
the current of water through the filter, sub-
stantially as herein set forth.

In testimony whereof I have hereunto set my
hand in the presence of two subscribing wit- 20
nesses.

JOHN W. HYATT.

Witnesses:

THOS. S. CRANE.

L. LEE.