(No Model.)

J. J. HOPPES.

FEED WATER PURIFIER.

No. 457,157. Patented Aug. 4, 1891.

Fig. 1

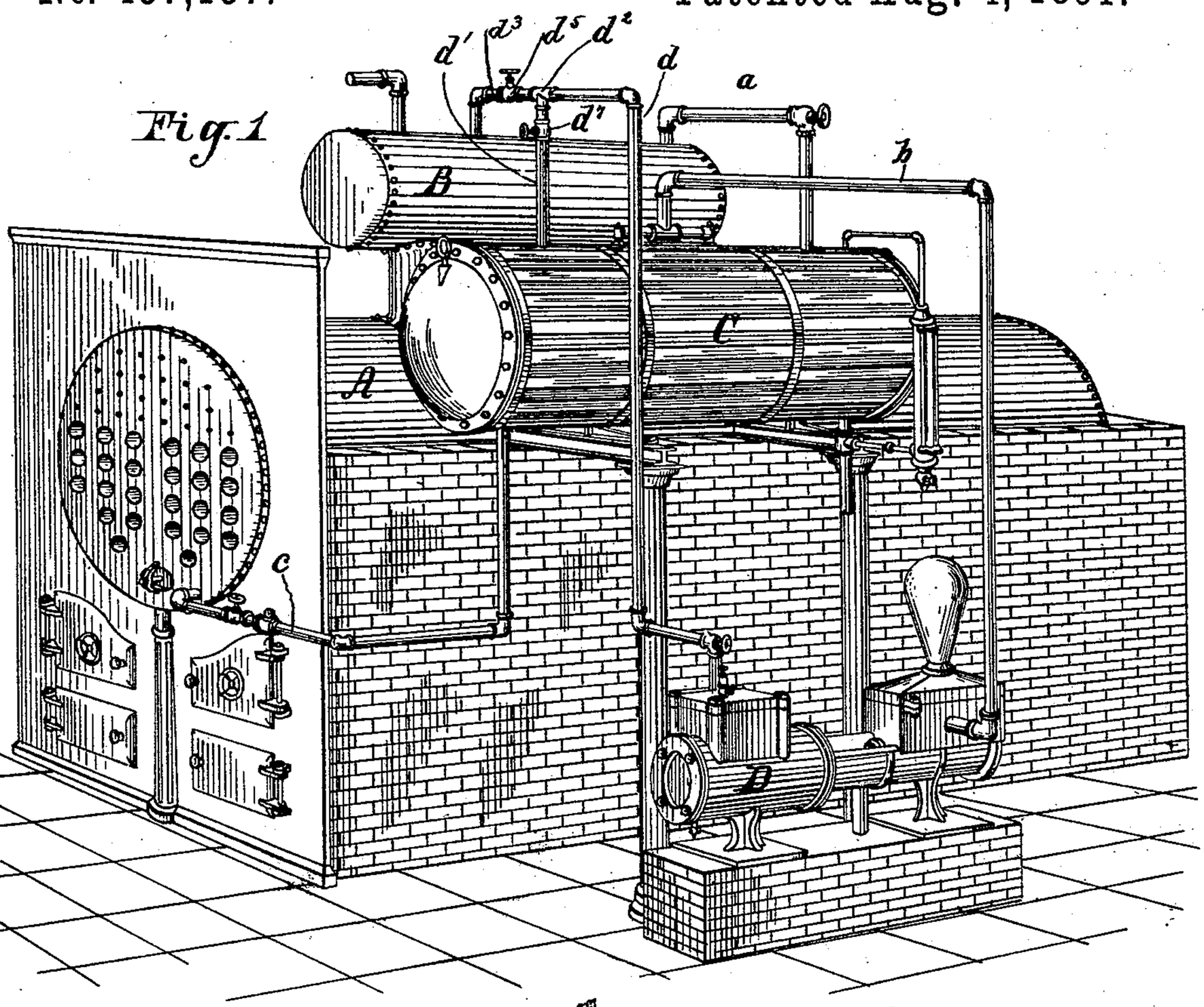
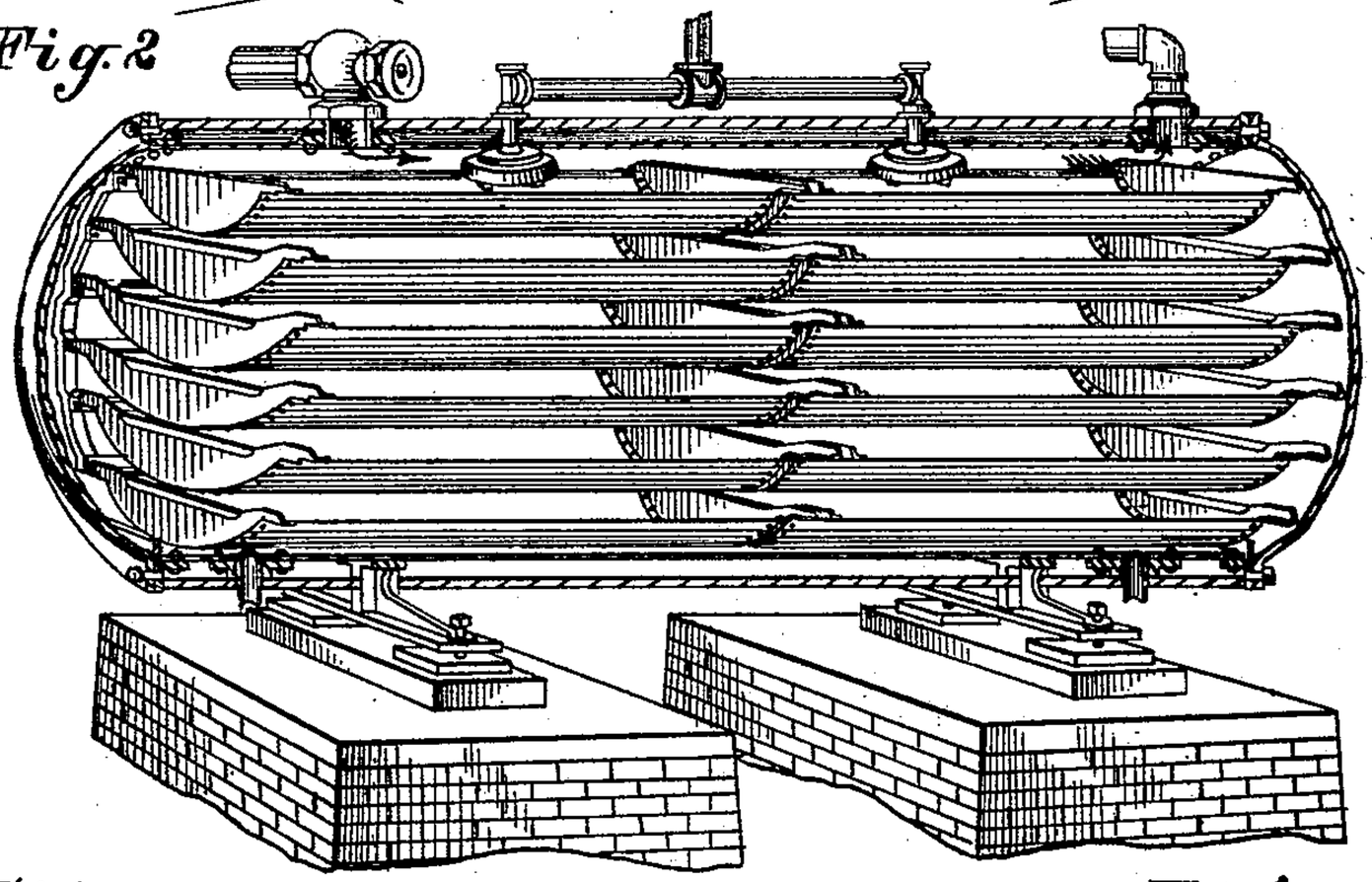


Fig. 2



Witnesses

Chas. L. Goesmin

W. A. Grover

Inventor

John J. Hoppes

By Paul N. Whitney

Atty.

UNITED STATES PATENT OFFICE.

JOHN J. HOPPES, OF SPRINGFIELD, OHIO.

FEED-WATER PURIFIER.

SPECIFICATION forming part of Letters Patent No. 457,157, dated August 4, 1891.

Application filed June 30, 1888. Serial No. 278,692. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. HOPPES, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Feed-Water Purifiers, of which the following is a specification.

My invention relates to improvements in feed-water purifiers for steam-boilers; and it particularly relates to that class of purifiers which are connected to the steam-boiler and supplied with the live steam therefrom, so that the conditions to which the water is subjected in the purifier are substantially the same as those in the boiler proper.

The object of my invention is to provide means for carrying off air or gases that collect in the top of purifiers of this character from the heating of the water and the incrustating and other substances therein contained. This I accomplish by connecting to the purifier a pipe leading to the boiler-feeder or other device requiring a steam-supply, and thus create a circulation through the purifier by which any air or gases therein contained will be drawn off.

In the accompanying drawings, which form a part of this specification, Figure 1 is a perspective view of a feed-water-purifier mechanism embodying my invention. Fig. 2 is a longitudinal sectional view, also in perspective, of a purifier, showing the arrangement of the connections thereto.

Like parts are indicated by similar letters of reference throughout the several views.

In the said drawings, A represents a steam-boiler of ordinary construction. B is a steam-drum attached thereto.

C is a purifier, which may be of any well-known construction adapted to be connected direct to the boiler and supply with steam therefrom. The purifier C is connected directly to the steam-drum B by a pipe *a*. The feed-water enters through a pipe *b* and passing over a series of pans or shelves, as the case may be, of the purifier, is discharged into the boiler near the bottom or below the water-line thereof through the pipe-connection *c*. Since the pressure in the purifier *c* is substantially the same as that in the boiler A, means must be provided for forcing the feed-water through the supply-pipe *b* into said purifier. This is preferably accomplished by an ordinary steam-pump boiler-feeder D in the ordinary manner.

In purifiers of this character connected directly to the steam-boiler there is a constant flow of steam from the boiler to the purifier caused from the condensation of the steam therein owing to a constant supply of feed-water to said heater. The feed-water for steam-boilers contains in many cases large quantities of foreign matter, which, when heated, give off carbonic-acid gas, hydrochloric-acid gas, muriatic fumes, or other gases. Inasmuch as there is a constant flow of steam from the boiler to the purifier, these gases collect in the purifier, and if not removed fill the purifier to such an extent as to materially interfere with the purifying effect of the steam therein. To overcome this difficulty, I provide an additional connection to the purifier C, which leads direct to the boiler-feeder or other steam-using device, which thus continually drives off the gases, air, or steam from the said purifier, creating a circulation therein which keeps the same at all times full of live steam adapted to act upon the feed-water therein. In Fig. 1 the preferable method of forming this connection is shown. It consists in running the supply-pipe *d*, which leads to the boiler-feeder D, to the purifier C, through a branch pipe *d'*, connected with a T d^2, which is also connected by a pipe d^3 to the boiler-supply, the pipes d^3 and *d'*, respectively, being supplied with stop-valves d^5 and d^7, by which the steam-supply for the feed-pump may be drawn either from the boiler or from the purifier, as desired, or partly from both. By this arrangement if the purifier in any event is cut off for any reason the boiler-feeder may receive the steam-supply direct from the boiler. I preferably make the connection with the boiler-feeder, since the supply of feed-water for the purifier is dependent upon the said boiler-feeder, and as the gases collected in the purifier come from the water-supply pipe and said boiler-feeder, the action of the pump which supplies the said gases will also furnish the means for removing the same.

Having thus described my invention, I claim—

1. The combination, with a steam-boiler and

a feed-water purifier connected together by suitable steam-pipes, of a steam-pump having a steam-pipe connection with said purifier for producing a circulation in said purifier and thus removing the gases, substantially as specified.

2. The combination of a steam-boiler, a purifier connected thereto by a suitable steam-pipe and also connected to the feed-water pump by suitable pipe connections, and a discharge-pipe from said purifier connecting the purifier with the boiler below the water-line, substantially as specified.

3. In combination with a steam-boiler, a purifier having a steam-pipe connected thereto, a pump connected directly to said purifier by a steam-supply pipe, a feed-water pipe extending from said pump to said purifier, and a discharge-pipe connecting the purifier to the boiler below the water-line, substantially as specified.

In testimony whereof I have hereunto set my hand this 21st day of June, A. D. 1888.

JOHN J. HOPPES.

Witnesses:
JOSHUA SCOTT,
PAUL A. STALEY.