(No Model.)

T. DAVIS & W. W. TYLER.

FEED WATER HEATER AND PURIFIER.

No. 345,578. Patented July 13, 1886.

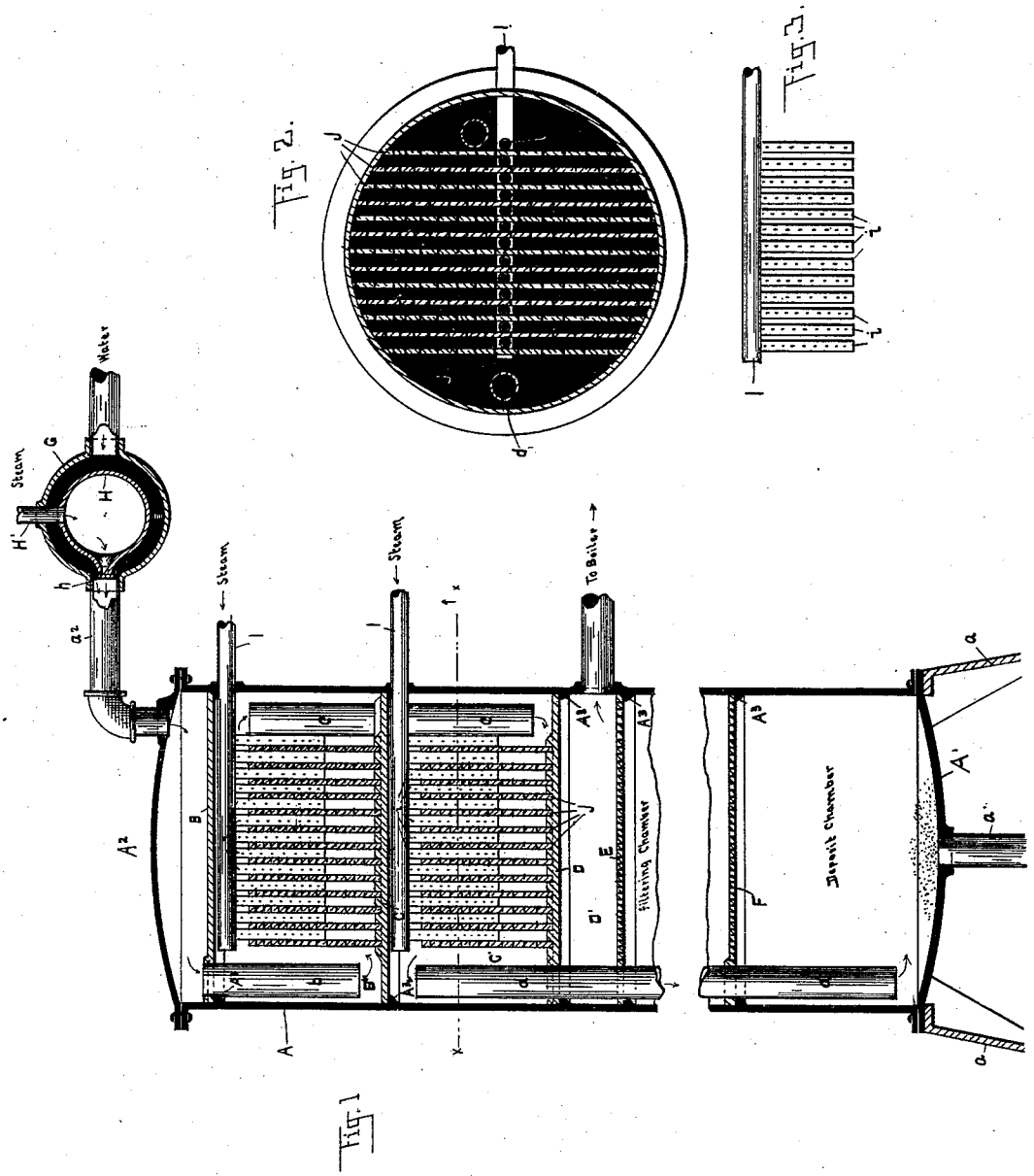

Fig. 1.

Fig. 2.

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

THOMAS DAVIS AND WILLIAM W. TYLER, OF CLEVELAND, OHIO; SAID TYLER ASSIGNOR TO SAID DAVIS.

FEED-WATER HEATER AND PURIFIER.

SPECIFICATION forming part of Letters Patent No. 345,578, dated July 13, 1886.

Application filed March 13, 1886. Serial No. 195,123. (No model.)

To all whom it may concern:

Be it known that we, THOMAS DAVIS and WILLIAM W. TYLER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Combined Feed-Water Heaters and Purifiers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

Our invention relates to improvements in combined feed-water heaters and purifiers; and it consists in certain features of construction, and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation in section of a device embodying our invention. Fig. 2 is a horizontal section on the line of *x x*, Fig. 1. Fig. 3 is an elevation showing in detail a section of the depending perforated pipes.

A represents a container, that is preferably cylindrical and upright, and having a concaved bottom, A′, supported on legs *a*, and a crowning detachable cover, A^2.

Internal flanges A^3 support the respective disks B, C, D, E, and F, that partition the container off into the several compartments.

The pipe *a′*, provided with suitable valve for blowing off sediment from the deposit-chamber, is connected with the head A′, and the induction feed-water pipe a^2 is connected with the head A^2.

G is a hollow ball, connected in the pipe a^2 near the container A, and has suspended inside a second hollow globe, H, that is connected with a steam-pipe, H′. A small nozzle, *h*, discharges from the ball H into the pipe a^2 in the direction shown by the arrow. The feed-water, in passing through the globe G and surrounding the steam-heated ball H, is raised in temperature, and is still further heated by the discharge of steam and condensed water from inside the ball H through the nozzle *h*. The feed-water next enters the compartment above the disk B, and passes from thence through the pipe *b* to compartment B′, the pipe *b* extending to near the bottom of this chamber. As the water reaches near the top of the chamber B′, it overflows into the pipe *c*, that is set in the disk C, and extends to near the bottom of the chamber C′. The overflow of the chamber C′ is through the pipe *d*, that extends through the discharging-chamber D′, and through the filtering-chamber, and to near the bottom of the deposit-chamber.

Pipes I, for the passage of live steam, lead, respectively, into the top of the chambers B′ and C′. These chambers are each provided with a series of perforated plates, J, that rest in grooves in the respective bottoms C and D, and extend to near the top of the respective chambers. Depending perforated pipes *i* lead from the pipes I down between the plates J, with the perforations arranged to discharge lengthwise of the plates J.

It will be observed that the inlet and outlet pipes of the respective chambers B′ and C′ are located on opposite sides of the respective chambers, so that the water in passing from the inlet-pipe to the outlet-pipe must pass through the series of perforated plates, and in the narrow spaces between these plates encounter jets of live steam from the pipes *i*. The result is that the feed-water, when it leaves the chamber C′, is usually at the boiling-point, so that when the water passes through the pipe *d* into the deposit-chamber the most of the impurities in the water, especially those of a mineral character, are precipitated, and such of a vegetable nature as are not precipitated are arrested as the water passes up through the filtering-chamber. The plates E and F are both perforated, and this latter chamber may be filtered with any of the well-known materials suitable for this purpose.

The heated and purified water is discharged into the chamber D′, from whence it passes through the pipe K to the boiler.

What we claim is—

1. In a feed-water heater and purifier, the combination, with an induction feed-water pipe, and a spherical container connected in the said pipe, of a second spherical container located inside the first, the second container having attached a pipe for supplying live steam, and having a discharging-outlet presenting in the same direction as the water flows through the said induction-pipe, the parts being arranged substantially as set forth.

2. In a feed-water heater and purifier, the

combination, with a heating-chamber having an inlet near the bottom and an outlet near the top, and arranged on opposite sides of the chamber, of a series of perforated upright partition-plates arranged between the inlet and outlet, substantially as set forth.

3. In a feed-water heater and purifier, the combination, with a heating-chamber, an inlet and outlet arranged, respectively, near the bottom and top, and on opposite sides of the heating-chamber, and a series of upright perforated partition-plates arranged between the inlet and outlet, of perforated steam-pipes arranged between the said partition-plates, the parts being arranged substantially as set forth.

In testimony whereof we sign this specification, in the presence of two witnesses, this 25th day of January, 1886.

THOMAS DAVIS.
WILLIAM W. TYLER.

Witnesses:
CHAS. H. DORER,
GEO. W. KING.