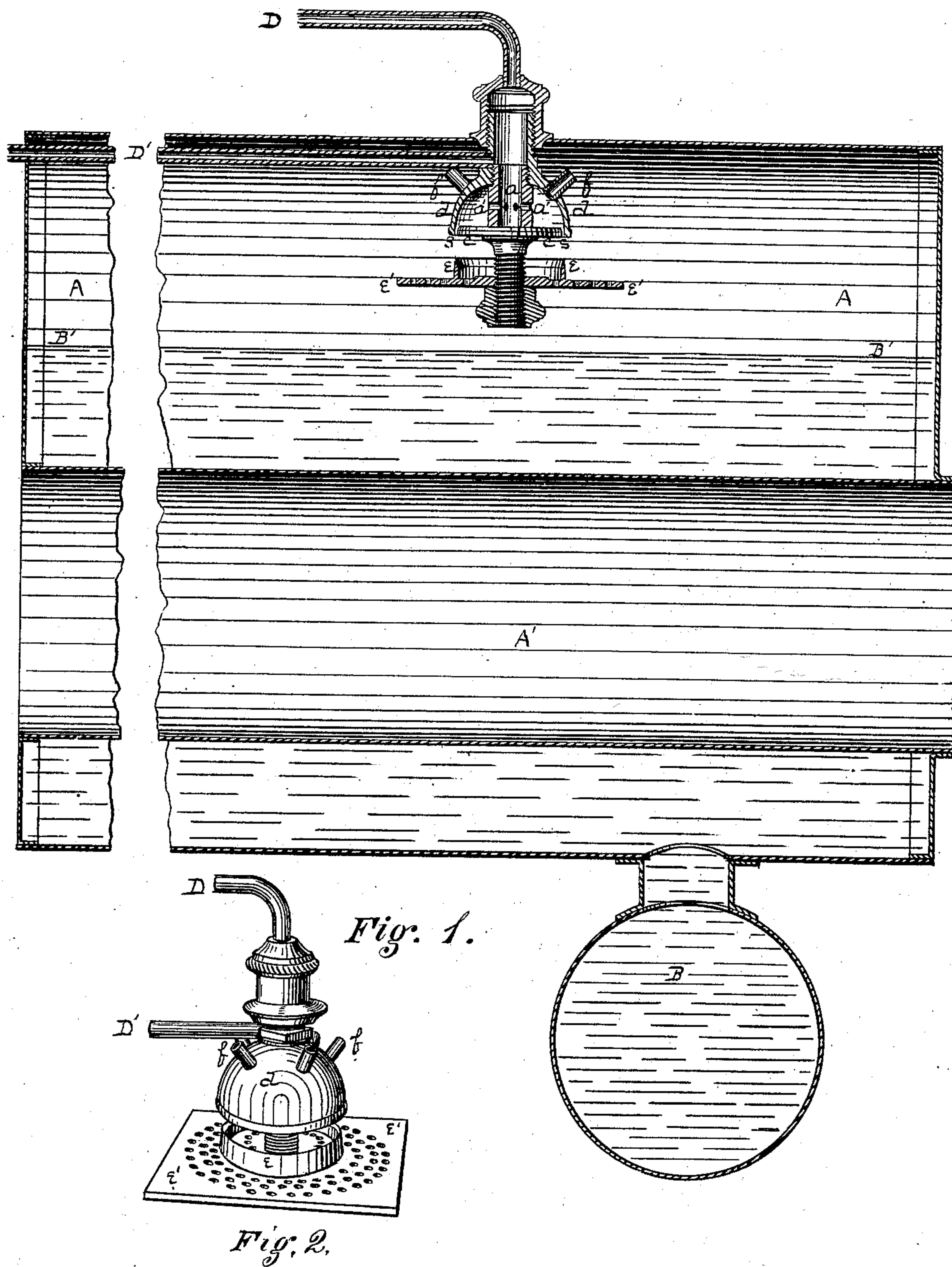


S. M. FULTON.
 Heating and Feeding Water for Steam-Boilers.
 No. 198,737. Patented Jan. 1, 1878.



Witnesses
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UNITED STATES PATENT OFFICE.

SAMUEL M. FULTON, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN HEATING AND FEEDING WATER FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **198,737**, dated January 1, 1878; application filed November 26, 1877.

To all whom it may concern:

Be it known that I, SAMUEL M. FULTON, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Boiler-Feed; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a longitudinal sectional view of an ordinary flue-boiler with my improvement applied thereto, the latter being also represented in section; and Fig. 2 is a detached perspective view of the added improvement.

My invention relates to that class of steam-boilers in which a considerable body of water inclosed in an ordinary tubular or non-tubular boiler gives off steam on the principle of the ordinary surface-evaporator. Such a boiler (fueled) is shown at A, A' being a flue, and B the mud-drum.

In the steam-space above the water-line (represented at B' B') I apply my improved feed-water attachment. The water-supply pipe may enter through the top of the boiler, as represented by the pipe D, or it may enter at one end and pass along the steam-space, as represented at D', or may be introduced at any desired point. Such pipes are to be supplied with cocks and other necessary or desired appliances, in the usual manner and for the ordinary purposes. In either or any case the supply-pipe opens into a chamber or tube, *a*, preferably closed at its lower end; and laterally in, or at the mouth of, such chamber I make one or more small ports or holes, *a'*. Through such hole or holes the feed-water is discharged onto a disk or plate, *e*.

A hood, *d*, is arranged over and around the lower end of the chamber *a*, and its lower edge comes down around the edge of the disk *c*, and in such proximity thereto as to leave a small annular opening, *s*, (either continuous, as shown, or interrupted at intervals,) for the discharge in a thin annular sheet, or in small finely-subdivided streams, or in drops, of the feed-water from the top of the disk *c*.

The water thus discharged falls onto the

top edge of an annulus or ring, *e*, which is arranged in proper position for the purpose beneath the annular opening, *s*, and is thereby further broken up or subdivided, so as to be more fully and perfectly subjected to the heating action of the steam.

The ring *e* is made on or as a part of a plate, *e'*, which is perforated both inside and outside the ring, as shown. The water flowing down the sides of the ring *e*, either inside or outside, flows in or out, as the case may be, over the surface of the plate *e'*, and trickles through the holes therein into the body of water below.

As a part of my object is to raise the feed-water to a temperature near or about that of the body of water in the boiler before it enters or commingles with such body of water, I make further provision to this end by introducing steam into the space included between the hood *d*, the disk *c*, and the supply-chamber *a*; and I so introduce it that, as it flows in, it shall act downward on the inflowing supply, exterior thereto, but in the general direction of the onward flow, so that the two shall be more intimately commingled in such onward flow through the annular opening *s*. This I accomplish by jet-holes in the upper part of the hood, preferably above the level of the supply-holes *a'*, and in such jet-holes I arrange, by preference, short jet-tubes *f*, though such tubes may be omitted. When present, however, they facilitate the creation of circulatory steam-currents, so as to bring fresh steam into intermixture with the feed-water as it enters by the holes *a'*; and so far as the steam can exercise any propelling force in the direction of its flow inside the hood, it will act on the injector principle, to aid the inflow of water.

By the use of such devices, in the manner set forth, the feed-water will be raised to the desired temperature before it commingles with the body of water below, and the ordinary known useful effects will follow.

I claim herein as my invention—

1. The disk *c* and hood *d*, forming the annular openings *s*, in combination with annular ring *e*, arranged to receive the feed-water discharged through *s*, substantially as set forth.

2. The disk *c*, hood *d*, and ring *e*, in combination with plate *e'*, substantially as described.

3. A hood, *d*, having jet-holes, with or without jet-tubes, above the level of the water-supply inlet-ports *a'*, in combination with such ports, substantially as set forth.

In testimony whereof I have hereunto set my hand.

SAMUEL M. FULTON.

Witnesses:

J. J. McCORMICK,

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