

No. 719,670.

PATENTED FEB. 3, 1903.

H. A. HOUSE, JR.
STEAM BOILER.

APPLICATION FILED FEB. 25, 1902.

NO MODEL.

Fig. 1.

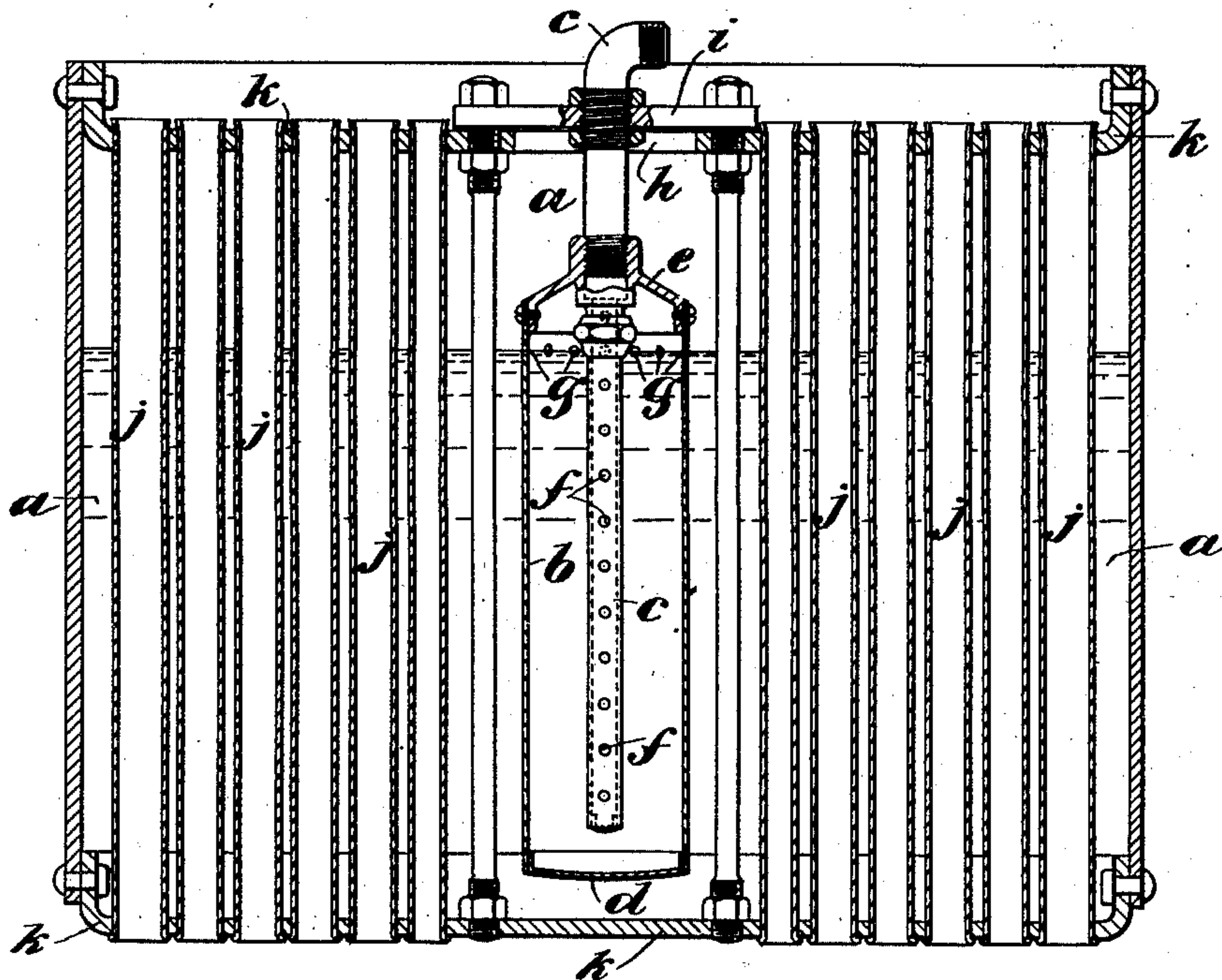
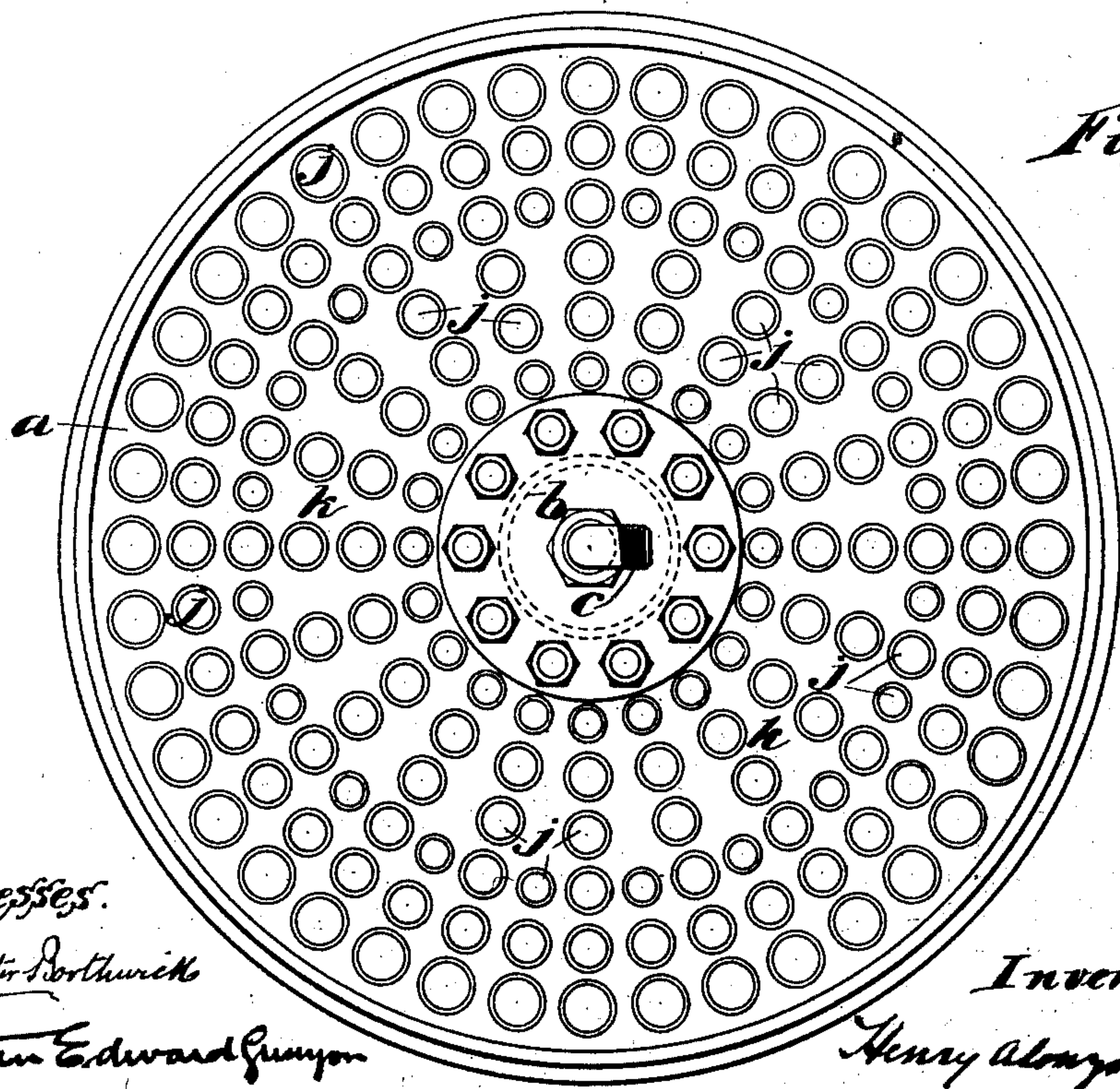


Fig. 2.



Witnesses.

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HENRY ALONZO HOUSE, JR., OF HAMPSTEAD, ENGLAND.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 719,670, dated February 3, 1903.

Application filed February 25, 1902. Serial No. 95,595. (No model.)

To all whom it may concern:

Be it known that I, HENRY ALONZO HOUSE, Jr., a citizen of the United States of America, residing at Hampstead, in the county of Middlesex, England, have invented certain new and useful Improvements in or Connected with Steam-Boilers; and I 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 appertains to make and use the same.

One part of this invention relates to improved means for effecting the deposit of the lime and other salts or substances contained in the feed-water in such a manner that they shall be prevented more or less from depositing on those parts of the boiler where they would be liable to form a hard scale, such as those parts, for example, that are exposed to the heat of the fire or of the hot products of combustion.

Another part of this invention relates to means for facilitating the cleaning of the sides of the smoke-tubes that come next the water in vertical multitubular boilers.

In order that the said invention may be fully understood, I will proceed to describe the same with the aid of the accompanying sheet of drawings, in which—

Figure 1 is a sectional elevation of the steam-generating part of a vertical multitubular boiler with my improvements applied thereto, the uptake above and the furnace below the said steam-generating part of the boiler not being shown in the figure. Fig. 2 is a plan view of same.

For the purpose of the first part of the invention I place inside the boiler *a* and in any convenient and suitable position therein—in the center, for example, as shown—a vessel *b*, hereinafter called a “depositing vessel,” of any suitable shape—such as a vertical cylinder, for example—and into this depositing vessel I lead the feed-water inlet-pipe *c*. The said depositing vessel is preferably closed at the bottom, as shown at *d*, and may be closed at the top, as shown at *e*. The feed-pipe *c* extends down to a considerable distance inside the depositing vessel *b* and is provided with holes *f* at its sides, through which holes the feed-water is delivered into the deposit-

ing vessel. Openings *g* are left at the upper part of the depositing vessel, which allow free communication between the interior thereof and the main body of the water in the boiler, so that the same pressure pervades both. The depositing vessel is preferably made of thin metal having a high coefficient of expansion under the action of heat—such as copper, for example—for a reason that will hereinafter appear.

It will now be understood that the depositing vessel and the water contained in it will take up heat rapidly from the surrounding boiler-water in which the vessel is immersed and that when feed-water is pumped into the said depositing vessel such water will be rapidly heated while still isolated from the main body of boiler-water. This heating of the feed-water causes more or less of the lime and other salts and in some cases other substances to separate from it and to fall to the bottom of the depositing vessel, leaving the thereby softened water free to rise to the upper part thereof, where it overflows or passes through the openings *g* into and mixes with the main body of water in the boiler. The deposits are thus retained wholly or partly in the depositing vessel and little or none get into the body of the boiler to be deposited upon the hot surfaces. If and when the lime and other salts or substances deposit to a certain extent upon the inner surface of the walls of the depositing vessel *b* they are cracked off therefrom when the fire is let out and the boiler is cooled down by reason of the contraction of the material of which the said vessel is constructed, the greater the coefficient of expansion and contraction of the said material the better it will be for this purpose.

When it is desired to clean out the aforesaid depositing vessel, it may be removed bodily from the boiler through a suitably-arranged hand-hole *h*, through the cover *i* of which the feed-water inlet-pipe *c* may be led, as shown.

Instead of the depositing vessel being provided with lateral openings *g* for the passage of the softened water therefrom into the body of the boiler the said vessel may be left more or less open at the top, so that the softened water can flow over the top edge thereof, in

which case the close cover *e* is dispensed with and a cross-bar or bridge substituted for it, by which to suspend the depositing vessel to the feed-pipe *c*, or any other suitable means
5 may be employed for supporting the said vessel.

For the purpose of the second part of the invention I arrange the single tubes *j* in the tube-plates *k* in lines radiating from the center, as shown clearly in Fig. 2, instead of
10 staggering them, as heretofore. By this means a cleaning-brush can be passed in between the rows of tubes *j* from the center outward, which is not possible when the tubes
15 are so arranged as not to leave a clear straight passage-way between the rows.

When the tubes are arranged in lines radiating from the center, as above described, these lines of course diverge from one another as
20 they are extended outward, and heating-surface would be lost if the tubes were all made of a size suitable for the inner ring of tubes. To obviate this loss, the tubes may be made of larger diameter as they are farther re-

moved from the center, as shown in the
25 drawings.

I claim—

1. In combination with a steam-boiler, a removable vessel *b* having a plurality of openings near the upper end thereof and a feed-
30 water pipe depending vertically within said vessel, said pipe having a closed lower end and a plurality of openings in its wall, substantially as described.

2. In combination with a steam-boiler, a removable closed cylindrical vessel having an
35 annular row of perforations near its upper end, and a water-inlet pipe axially arranged in said vessel, said pipe having a closed lower end and a plurality of openings in its wall,
40 substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HENRY ALONZO HOUSE, JUNIOR.

Witnesses:

ROBERT FORRESTER BORTHWICK,
STEPHEN EDWARD GUNYON.