

(No Model.)

T. J. REYNOLDS.

MEANS FOR PREVENTING INCRUSTATION IN BOILERS.

No. 324,596.

Patented Aug. 18, 1885.

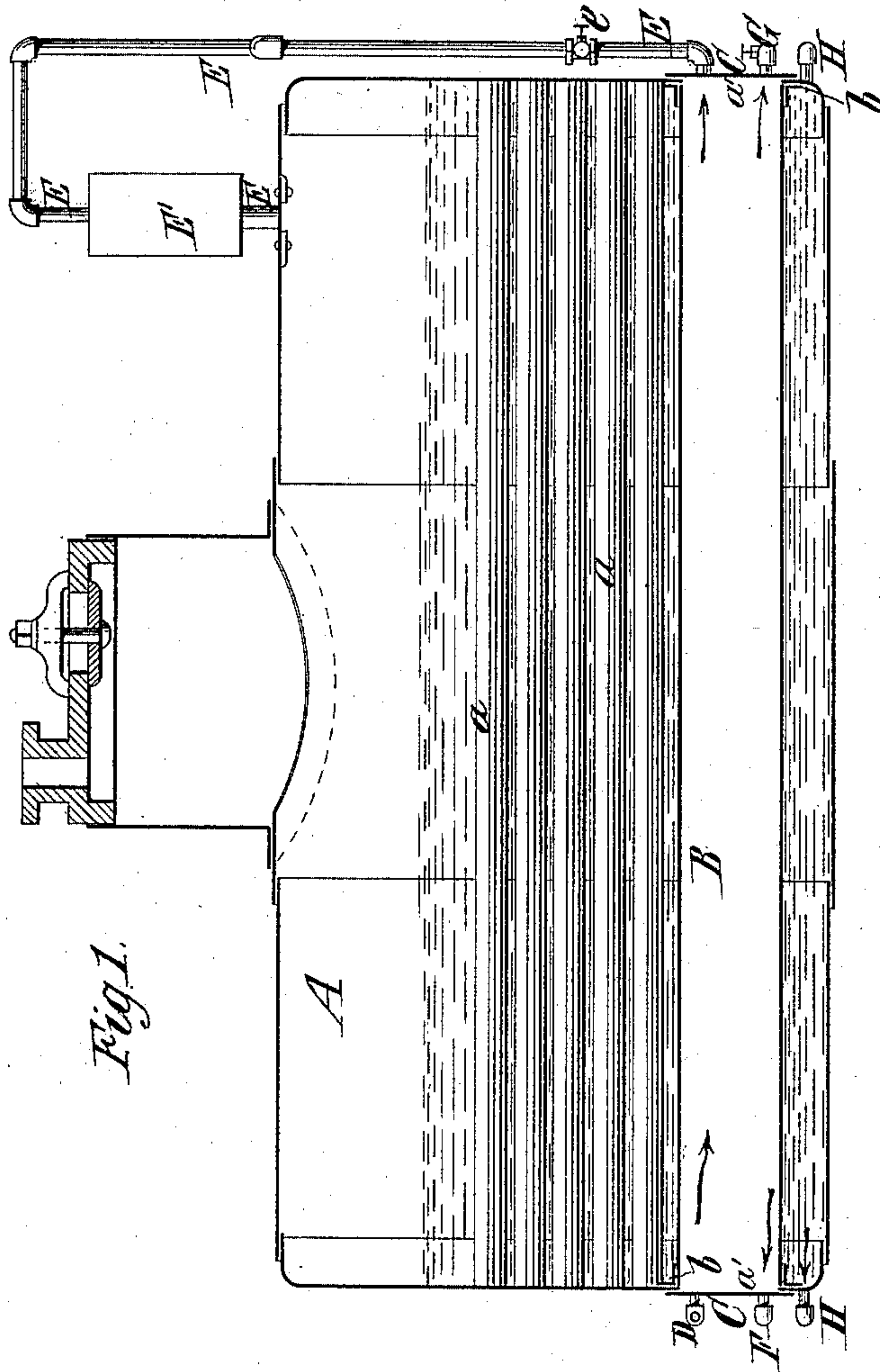


Fig. 1.

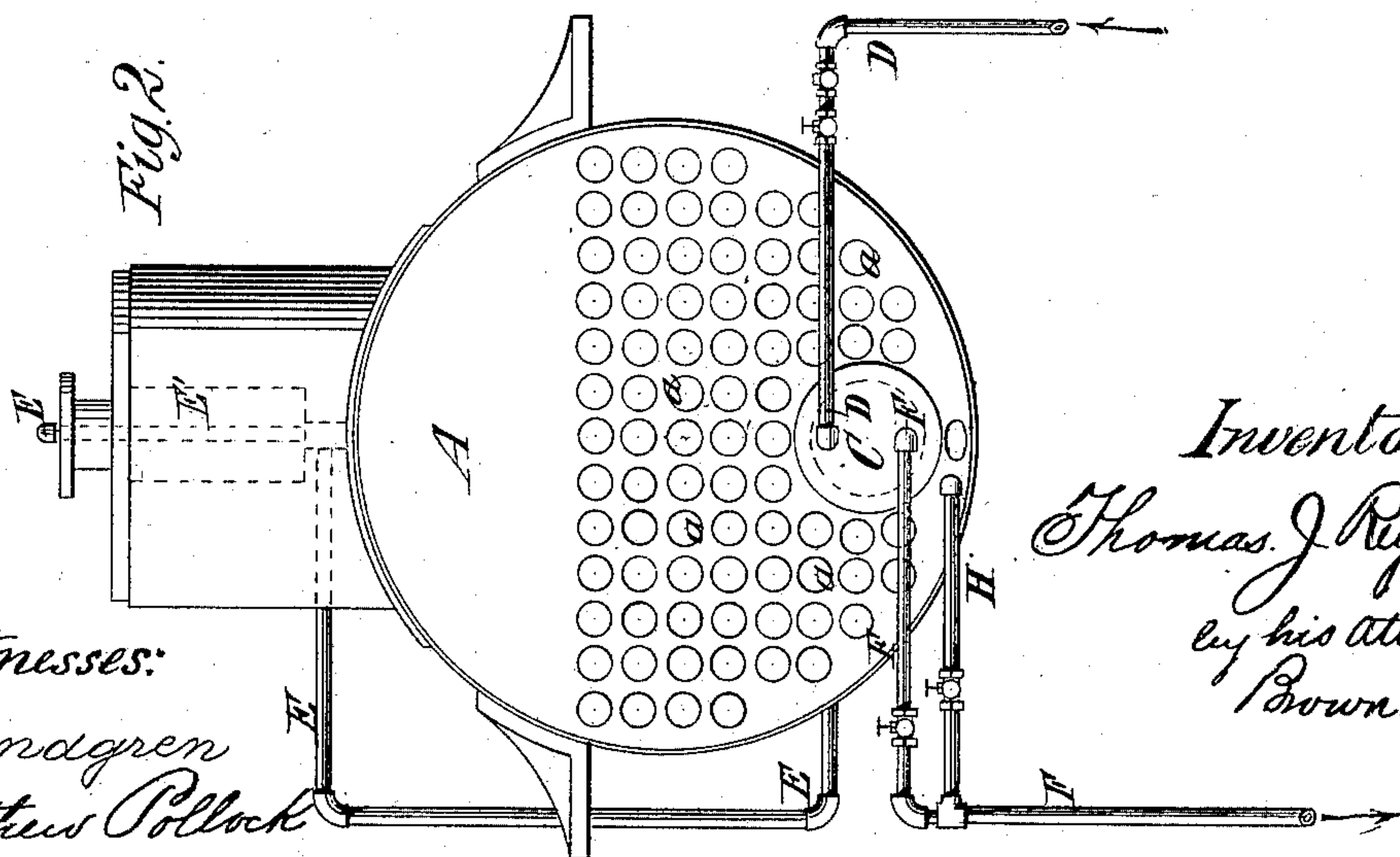


Fig. 2.

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UNITED STATES PATENT OFFICE.

THOMAS J. REYNOLDS, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF
TO FRANCIS NOLAN, OF SAME PLACE.

MEANS FOR PREVENTING INCRUSTATION IN BOILERS.

SPECIFICATION forming part of Letters Patent No. 324,596, dated August 18, 1885.

Application filed May 1, 1885. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. REYNOLDS, of the city of Brooklyn, in the county of Kings and State of New York, have invented
5 a new and useful Improvement in Means for Preventing Incrustation in Steam-Boilers and other Vessels for Evaporating Liquid, of which the following is a specification.

My invention relates more particularly to
10 feed-water heaters for steam-boilers in which the feed-water is heated and caused to deposit its foreign matters before being discharged into the boiler; but the invention may also, with advantage, be employed in connection
15 with oil-stills and other evaporating apparatus, for the purpose of causing the deposit of foreign matter from the oil or other liquid before it is delivered into the still or evaporating-vessel.

20 The invention consists in the combination, with a steam-boiler or other evaporating-vessel, of a liquid-heater consisting of a shell or casing arranged within the shell of the boiler or vessel, and preferably below the liquid-
25 level therein, a feed-pipe leading to the heater shell or casing and a pipe leading from the heater shell or casing for delivering the liquid into the boiler or evaporating-vessel after it has passed through the heater shell or casing.

30 The heater shell or casing may be of any suitable form; but I prefer that it shall be made in the form of a large tube or flue extending from end to end of the boiler or vessel, and provided at one end and near its top with a feed-
35 pipe, and at the other end and near its top with a pipe for conducting liquid from the heater into the boiler or vessel proper. The liquid will then have a very sluggish flow through the large tube or flue, and will be
40 caused to deposit therein foreign matters held in suspension. The above and other combinations of parts are included in my invention.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section of a
45 multitubular steam-boiler embodying my invention, and Fig. 2 represents an end elevation of such boiler.

Similar letters of reference designate corresponding parts in both figures.

50 A designates the boiler, which is of the or-

dinary return tubular type. *a* designates the fire-tubes, through which the heated products of combustion pass from the rear to the front end of the boiler.

B designates the feed-water heater and re- 55
pository for foreign matters, which constitutes the principal feature of my invention. This consists of a large tube or flue arranged lengthwise within the boiler and extending
60 from end to end thereof. The ends of this tube or flue B are flanged, as shown at *b*, and are riveted fast to the heads of the boiler, said heads being provided with openings *a'*, op-
posite the ends of the large tube or flue B. I have also here represented a cap or cover, C, 65
bolted to the outside of each head, so as to cover the hole or opening *a'*, and forming a water-tight joint at the end of the tube or flue B.

The tube or flue B is arranged within the shell of the boiler in all cases, and is submerged 70
in the water contained therein, said tube or flue being preferably arranged near the bottom of the boiler. At one end of the boiler is a feed-pipe, D, which is connected with the end of the tube or flue B near the upper side there- 75
of, and at the other end of the boiler is a discharge-pipe, E, also leading from a point near the upper side of the tube or flue B, and extending into the steam or water space of the
80 boiler.

I have also shown blow-off pipes F G, lead-
ing from opposite ends of the tube or flue B at points at or near the lower side thereof. These
several pipes D E F G may be connected se- 85
curely with the heads or caps C, which are re-
movably attached to the ends of the boiler.

For a boiler of ordinary size the tube or flue B may be, for example, about twelve inches in diameter; and hence it will be seen that the feed-water introduced through the pipe D will 90
have a very sluggish flow through the tube or flue B, and will be therein heated by the surrounding water of the boiler and caused to deposit foreign matters which may be contained in suspension within the tube or flue B, and 95
before such water is delivered through the pipe E into the boiler A.

When it is desired to remove such foreign matters as may be deposited in the tube or flue B, the feed-pipe D will be closed, and steam 100

from the boiler will be delivered through the pipe E into one end of the tube or flue B, and will blow off the foreign matters through the blow-off pipe F at the opposite end of such flue or tube.

When it is desired to wash out the flue or tube B, the valve *e* in the pipe E is to be closed, and then, by admitting feed-water through the pipe D the solid contents of the tube or flue B may be washed out through the pipe G at the opposite end thereof.

I have also shown the boiler as provided at opposite ends with ordinary blow-off pipes, H, at the bottom thereof and below the tube or flue B; but inasmuch as a large part of the foreign matter will be deposited in the tube or flue B and blown off therefrom, the blow-off pipes H, leading from the boiler proper, may be used to blow off the boiler much less frequently than heretofore.

If it be desired to discontinue the use of the tube or flue B as a feed-water heater and repository, the heads or caps C may be removed, and the tube or flue B will then serve as a heating-flue for the boiler.

Where my invention is to be applied to existing boilers of any make and in any position, I may insert therein a tube or flue which will communicate at one end with the ordinary man-hole near the bottom of the boiler, and may be attached to the opposite head of the boiler.

I desire to include in my invention a casing or shell of any description or form arranged within the shell of a boiler, into which the feed water or liquid is delivered, and from which the purified feed water or liquid is discharged into the boiler proper.

I may, if desired, introduce into the pipe E, through which water is discharged into the boiler, a filter, E', which may be of any suitable construction and packed with any suitable filtering material. This filter will catch and retain impurities in the water which may not be deposited in the heater-shell B.

My invention may be employed in connection with oil-stills and other evaporating-vessels wherein liquid is heated and into which liquid is fed either continuously or periodically.

I am aware that it is not new to employ in connection with a steam-boiler a cylindric feed-water heater constructed with steam-

chambers at the ends, and heating-tubes connecting such steam-chambers, such heater being arranged externally to and parallel with the boiler. My invention differs from this in that I arrange the heater wholly within the shell of the boiler and submerged in the hot water therein. This combination enables me to employ a heater consisting of a single tube or flue of sufficiently large size and without any internal chambers or tubes. Such a construction is desirable because of its simplicity and cheapness, and because of the ease with which the large single tube or flue which constitutes the heater may be cleaned.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with an evaporating-vessel, of a liquid-heater consisting of a shell or casing arranged within the vessel and preferably below the liquid-level, a feed-pipe connected with such heater shell or casing, and a pipe extending from such heater shell or casing into the vessel for delivering liquid therein from the heater shell or casing, substantially as and for the purpose herein described.

2. The combination, with an evaporating-vessel, of a tube or flue extending lengthwise therein and closed at the ends, a feed pipe communicating with one end of the tube or flue, and a pipe extending from the other end of the tube or flue into the evaporating-vessel, substantially as and for the purpose herein described.

3. The combination, with an evaporating-vessel, of the tube or flue B, extending lengthwise within the said vessel and closed at the ends, the feed-pipe D, connected with one end of the tube or flue at the top thereof, and the pipe E, leading from the other end of the tube or flue at the top thereof into the evaporating-vessel, substantially as and for the purpose herein described.

4. The combination, with the evaporating-vessel A, of the tube or flue B, and feed and discharge pipes D E, communicating at opposite ends with the top of said tube or flue, and the blow-off pipes F G, leading from the opposite ends of the tube or flue at the bottom thereof, substantially as herein described.

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Witnesses:

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