

G. Waters,
Steam Boiler Condenser,
No 100,344. Patented Mar 1, 1870.

Fig.1.

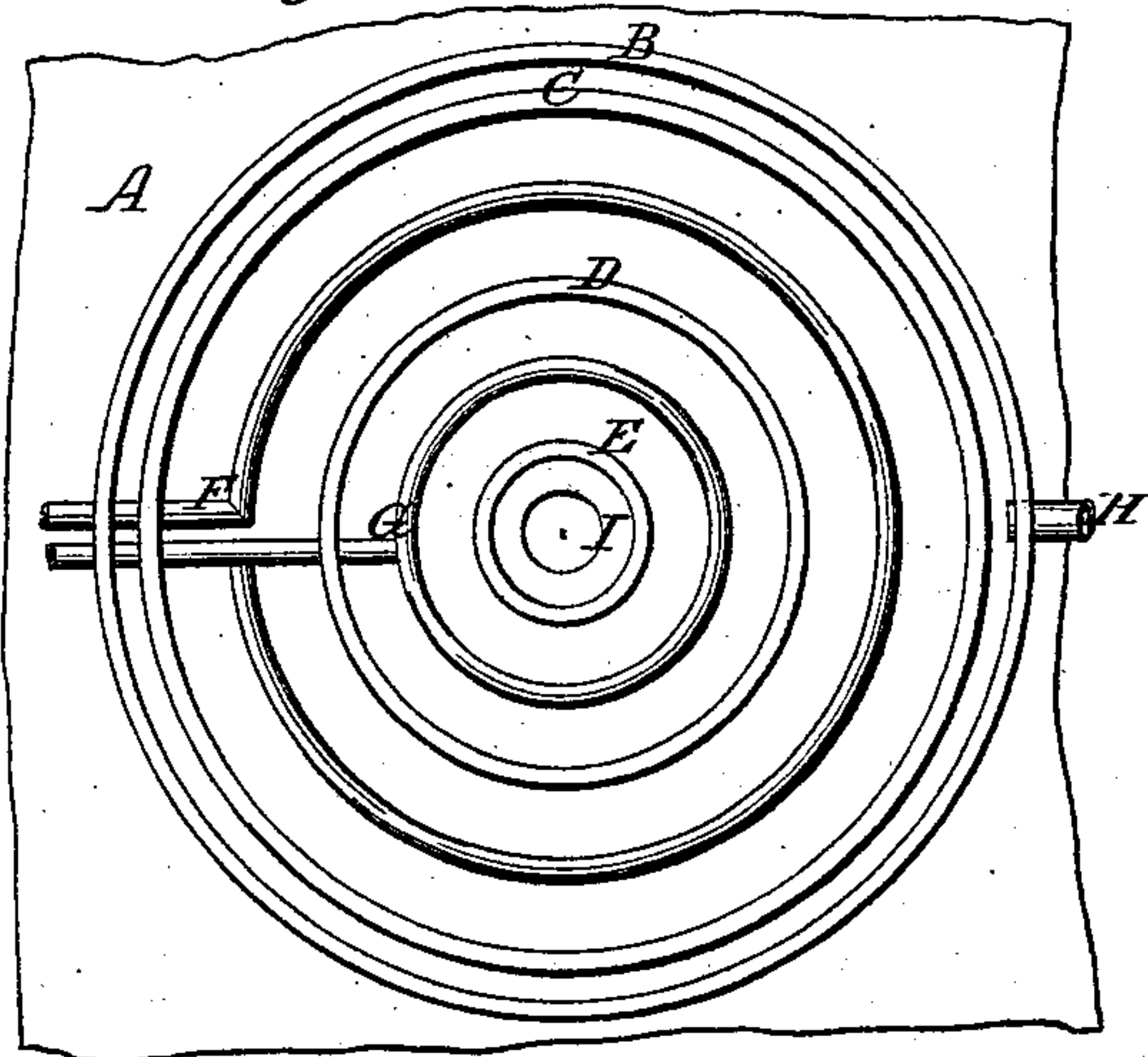
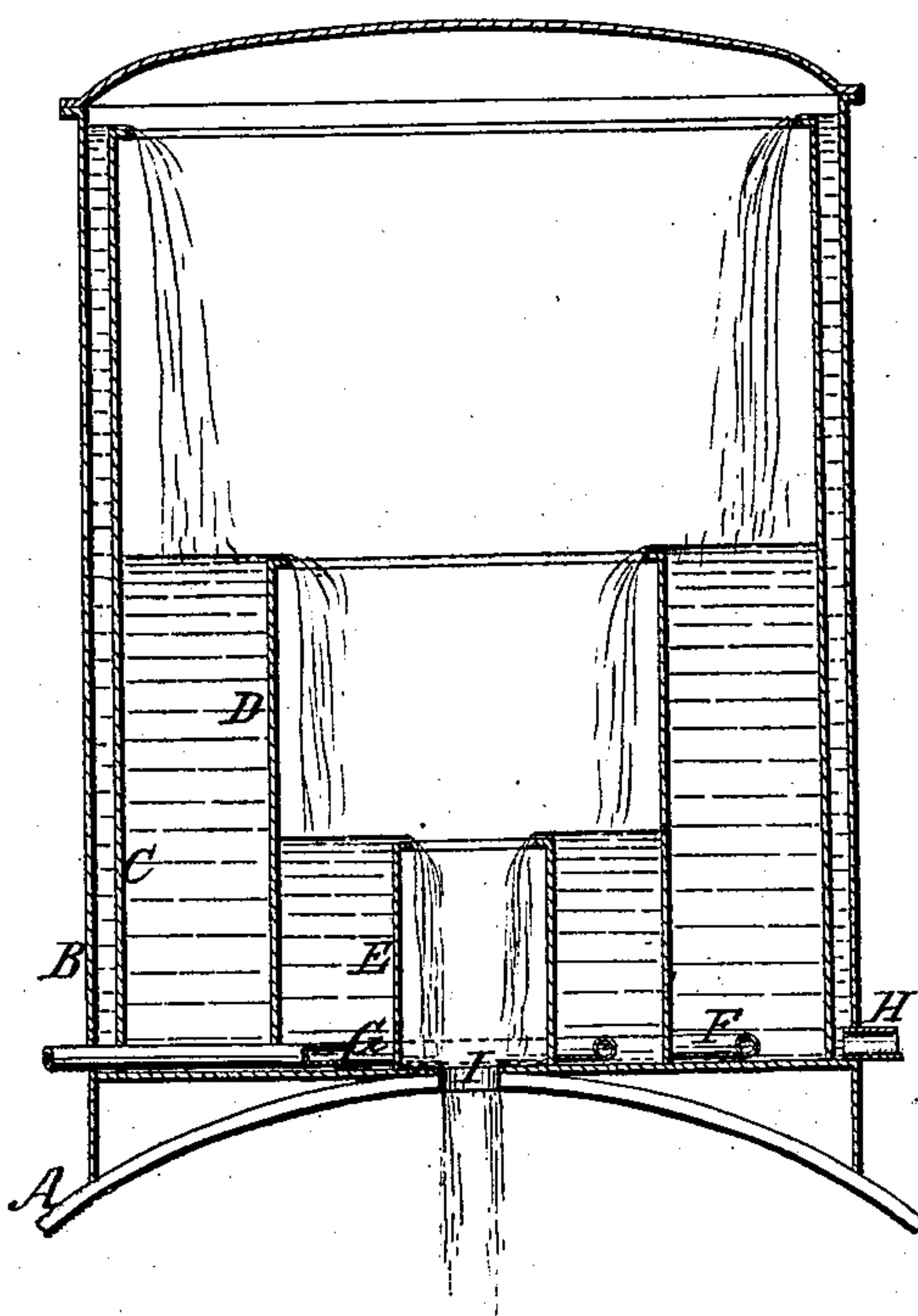


Fig.2.



Witnesses.
C. H. Riley
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G. WATERS, OF CINCINNATI, OHIO.

Letters Patent No. 100,344, dated March 1, 1870.

IMPROVEMENT IN FEED-WATER FILTERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, G. WATERS, of the city of Cincinnati, county of Hamilton, and State of Ohio, have invented a new and useful Improvement in Feed-Water Heaters and Purifiers for Steam-Boilers, and for the purpose of enabling others skilled in the art to make my invention, I append the following description of the same, which I hereby declare to be full and accurate, reference being had to the accompanying drawings which make a part of these specifications, with letters of reference marked thereon, in which drawing—

Figure 1 represents a plan of the purifier, having the top removed, and

Figure 2 is a transverse vertical section taken through the feed-pipe H.

A in the drawings represents a portion of the shell of the boiler to which the heater is to be attached

B is the external shell or main body of the purifier, of, say, thirty inches diameter, by thirty-six inches high.

C is another cylinder, say of from two to four inches less diameter than B, and not quite so high, and open at top, with the upper end turned over as shown.

D is another cylinder similar to the last in construction, and of less diameter, and about half the height of C; and

E, still another cylinder, in all respects similar to the last in construction, and of about twelve inches diameter, and twelve inches high.

All these concentric cylinders are attached to a common bottom, and the whole affixed in a suitable manner in a vertical position upon or over a boiler.

H is the water-supply pipe to the apparatus.

F and G are blow-off pipes perforated and arranged between the chambers C D, and D E.

I is a hole communicating between the bottom of apparatus and boiler.

This apparatus may be made round or square, of cast-iron or boiler-iron, or other suitable metal, but preferably of cylindrical form, and of boiler-iron for the external shell or casing B, while the interior concentric cylinders C D E, of which there may be any desirable number, may be of thinner sheet-iron. The

outer shell only has to withstand the steam pressure of the boiler to which it is attached.

The object of the apparatus is to purify the feed-water to steam-boilers by subjecting the same to the action of the heat of the steam while passing up through the annular space between B and C, and so on, as can be readily seen and comprehended by reference to the drawings, till it reaches the boiler through I.

In passing over the top of the cylinder C, and into the next compartment, the water will be subjected on all sides in a very thin sheet to the action of the steam, and in like manner as it passes over D and E.

In constructing the apparatus in this cylindrical form, I am enabled to have exposed a very large surface of water constantly to the action of the steam, and at the same time within a very small compass, and it is probably the only form and arrangement practically adapted to locomotive purposes. Lime and the various salts contained in water being subjected to such a heat of steam, will be split up into their elements, and then of their own gravity, aided by the pressure of steam downward, will be precipitated to the bottom, whence they can be blown off at pleasure through pipes F G provided for the purpose.

In this description I have supposed the hole I to be of such size as to enable the water to pass freely to the boiler, and have large communications or free passage of steam from boiler. If desirable, however, there may be two pipes or passages, one for steam and one for water; or the steam may be admitted at top. The pipe that passes the water to boiler may terminate below the water line if thought best.

Having thus sufficiently described my invention,

I claim and desire to have secured to me by Letters Patent of the United States—

The concentric cylinders B C D E, when constructed and arranged substantially as described and for purposes set forth.

In testimony whereof I have hereunto set my hand this day of , 1869.

G. WATERS.

Witnesses:

C. H. RILEY,
W. S. BROWN.