

R. GARSTANG.
Feed-Water Heaters.

No. 152,360.

Patented June 23, 1874.

fig. 1

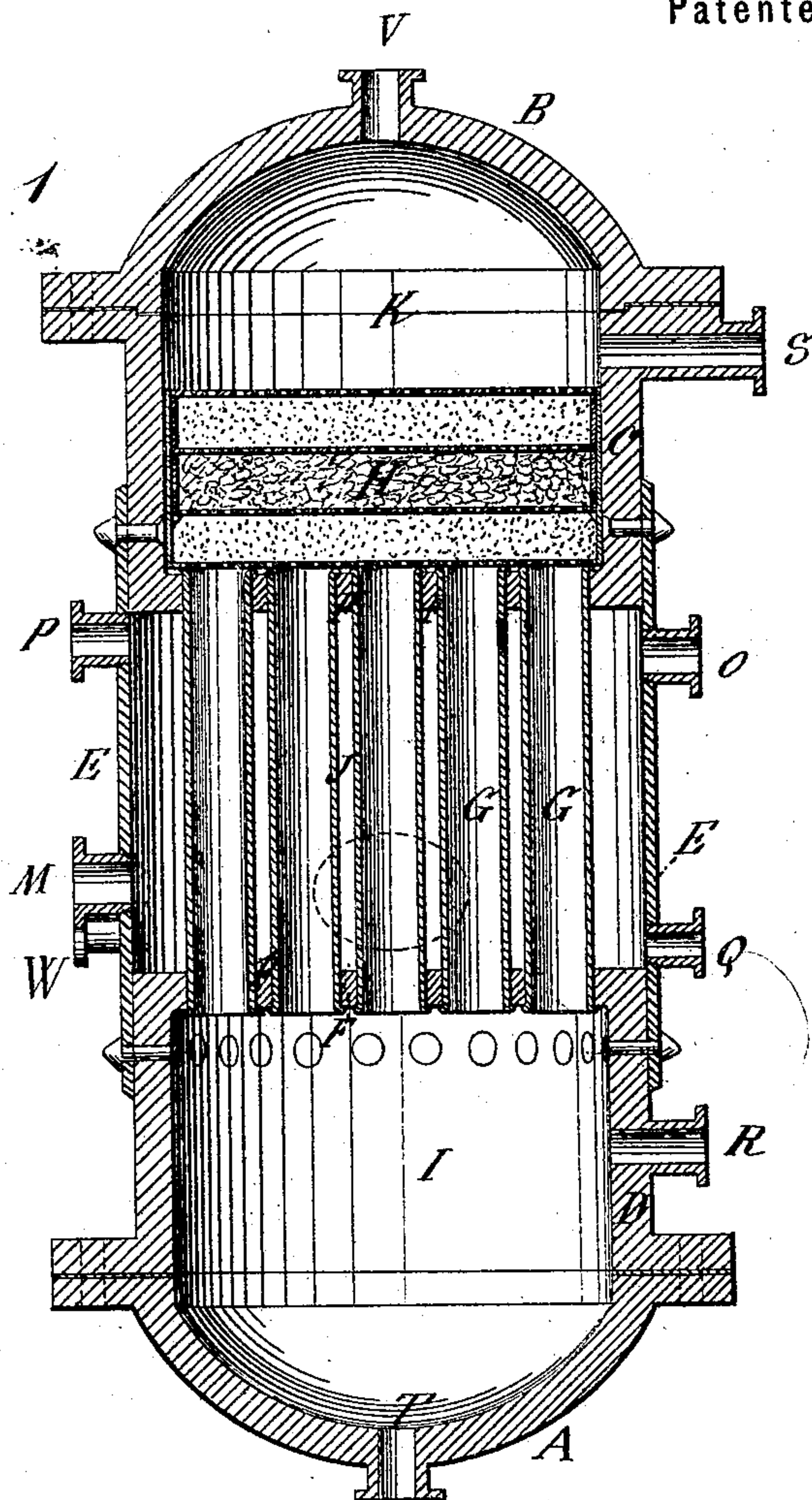
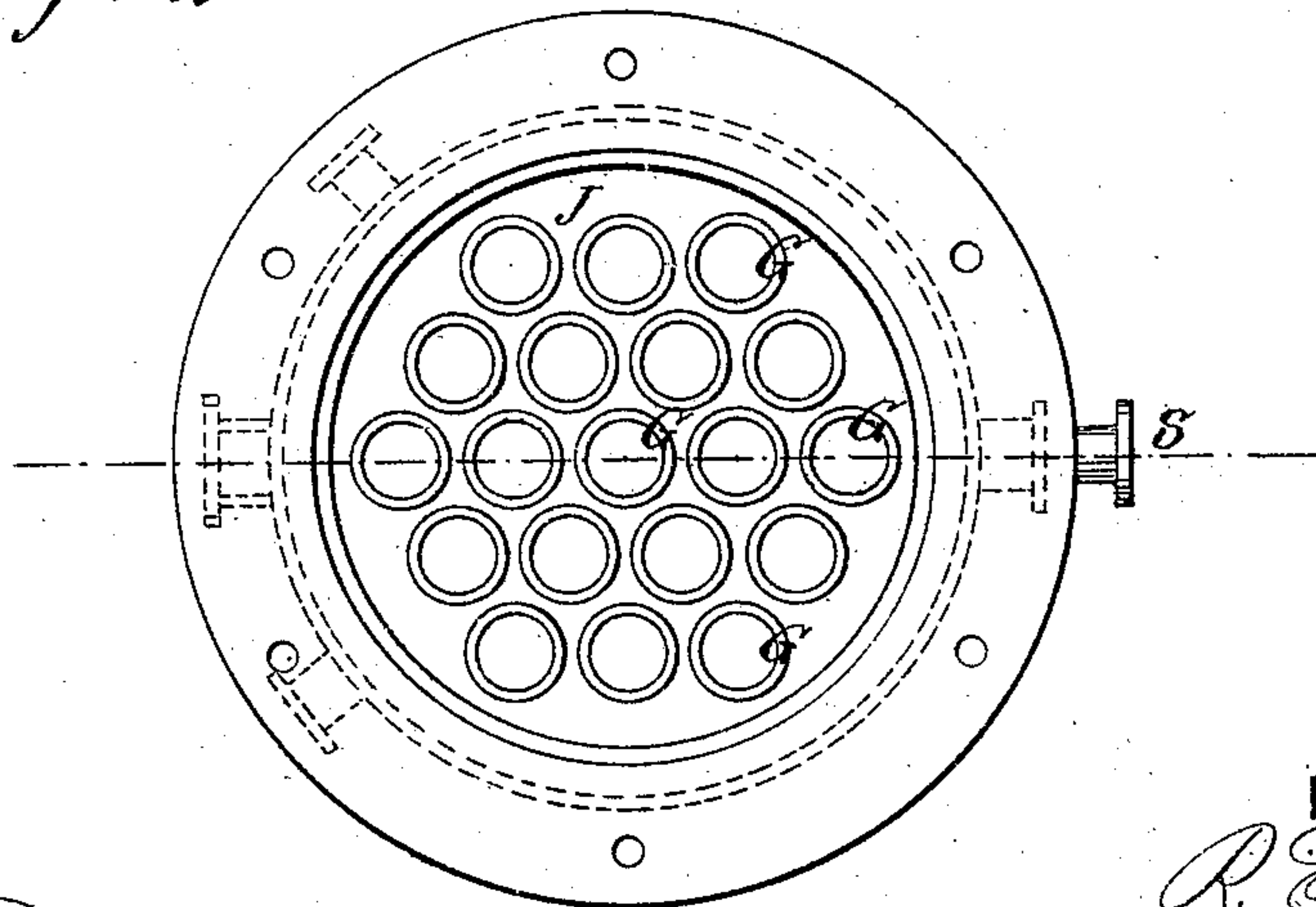


fig. 2



WITNESSES:

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UNITED STATES PATENT OFFICE.

RICHARD GARSTANG, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **152,360**, dated June 23, 1874; application filed May 29, 1874.

To all whom it may concern:

Be it known that I, RICHARD GARSTANG, of the city and county of St. Louis, Missouri, have invented a new and Improved Feed-Water Heater, of which the following is a specification:

My invention consists of a feed-water heater composed of two cast-metal oval heads, with short cylinder attachments, connected to an intermediate cylinder containing tubes fitting into tube-sheets in the cast-metal cylinders, all forming a heater of three compartments, in one of which is a filter, and in another of which the feed-water is supplied in direct contact with the waste steam, after which it is forced by a pump through the other compartments, also through the tubes surrounded by the exhaust steam, and also through the filter into the boiler, all in a way calculated to be very efficient in heating the water.

The construction of the heater is simple, cheap, and durable.

Figure 1 is a sectional elevation of my improved heater, taken on the line *x x*, Fig. 2. Fig. 2 is a top view with one of the heads removed.

A and B represent the oval cast-metal ends; C and D, the cast-metal cylindrical attachments to the heads; E, the sheet-metal cylinder forming the middle portion of the heater, and riveted to the cast-metal attachments C D. F represents tube-sheets of the attachments C D, dividing the heater into three compartments, I J K; and G represents tubes in the middle compartment, forming communica-

tion between the end compartments. H represents the filter in the upper compartment.

The exhaust steam of the engine is admitted to the middle compartment J through pipe M, and discharged at O. The water is admitted to the same compartment from a reservoir or any other source through pipe P, and is pumped out at Q, and into compartment I at R, and forced up through the tubes G heated by the exhaust steam; also, through filter H into K, and from K into the boiler through the pipe S.

In compartment I some of the foreign matters will fall from the water to the bottom, while other matters will be separated by the filter to be removed from time to time through mud-pipe T. Any scum or other light matter rising to the surface of the water in the upper compartment may be blown off from time to time through the pipe V. W is a waste-pipe for drawing off the water from compartment J when required.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The compartments I J K, tubes G, and filter H, combined and arranged, and having pipe-connections, for operating substantially in the manner described.

2. The cast-metal ends A B, and cylindrical attachments C D, tube-sheets F, and metal cylinder E, and tubes G, combined and arranged substantially as specified.

Witnesses: RICHARD GARSTANG.

HENRY VERBARG,

JACOB FILBER.