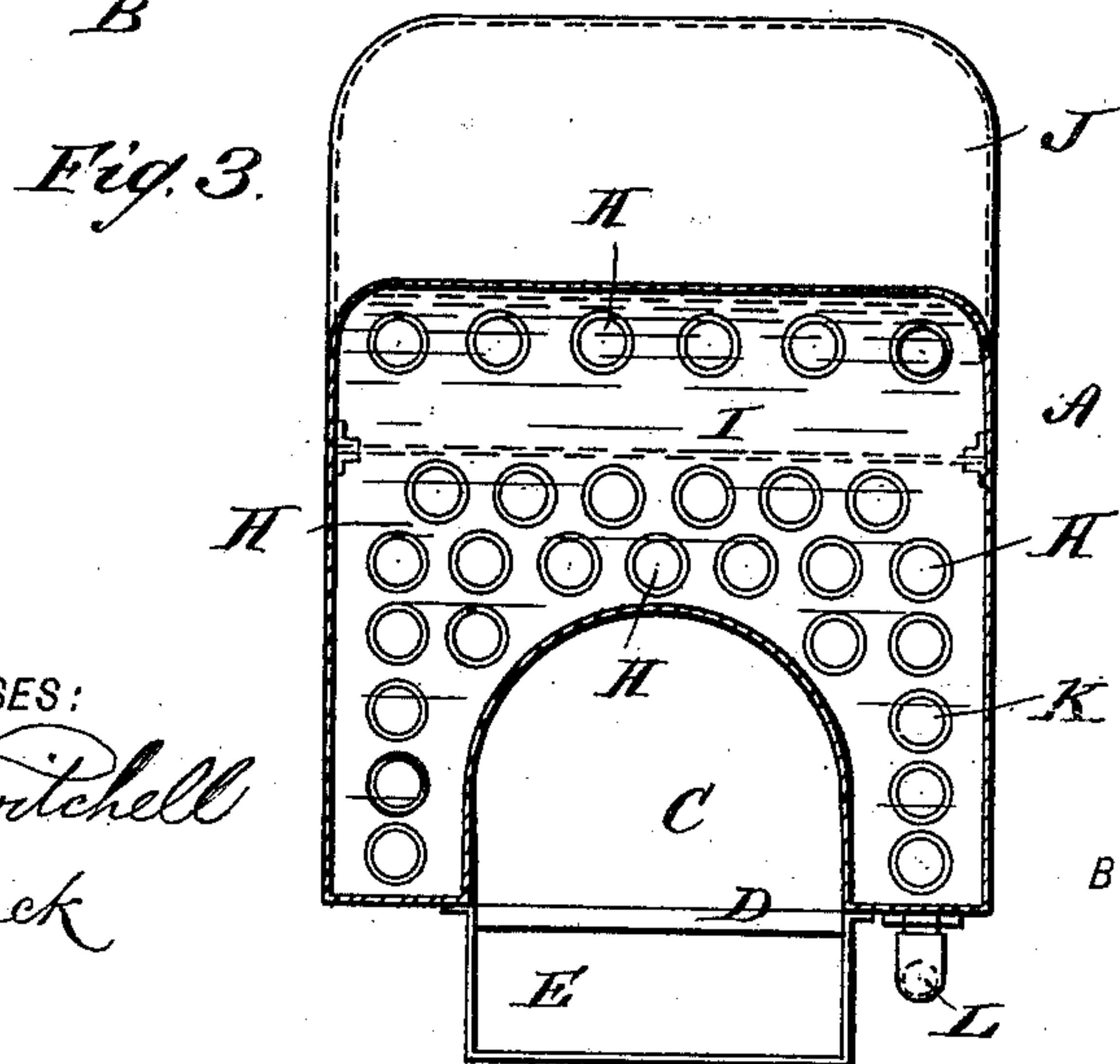
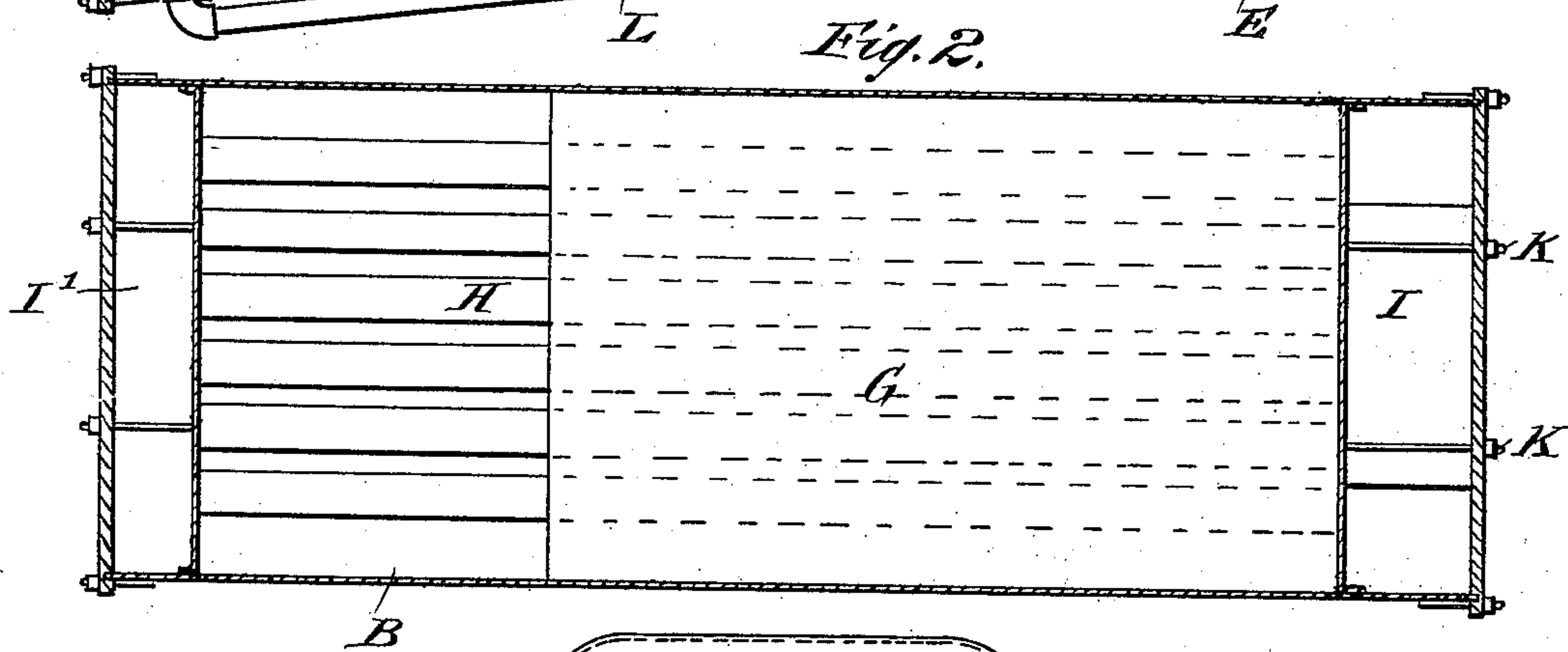
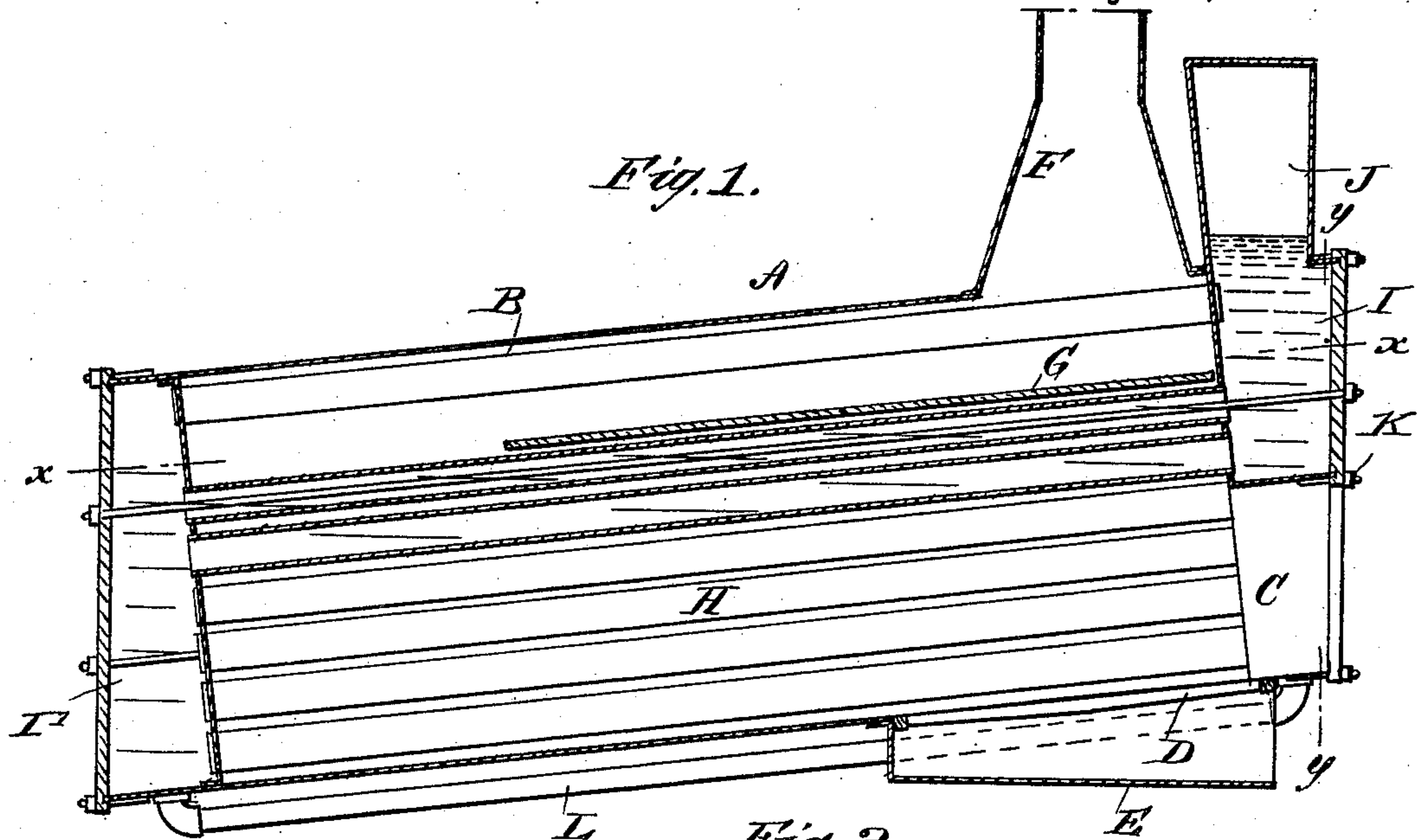


(No Model.)

C. O. TOOLE.  
BOILER.

No. 432,456.

Patented July 15, 1890.



WITNESSES:  
*Down Twitchell*  
*C. Sedgwick*

INVENTOR:  
*C. O. Toole*

BY  
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ATTORNEYS



# UNITED STATES PATENT OFFICE.

CHARLES O. TOOLE, OF DUBUQUE, IOWA.

## BOILER.

SPECIFICATION forming part of Letters Patent No. 432,456, dated July 15, 1890..

Application filed April 1, 1890. Serial No. 346,194. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES O. TOOLE, of Dubuque, in the county of Dubuque and State of Iowa, have invented a new and Improved Boiler, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved boiler, which is simple and durable in construction, prevents the rapid burning of the flues, and is adapted to generate steam with great rapidity.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a sectional plan view of the same on the line  $xx$  of Fig. 1, and Fig. 3 is a transverse section of the same on the line  $yy$  of Fig. 1.

The improved boiler A is provided with a heating-chamber B, having at one end a fire-box C, in which are arranged the grate-bars D, leading to the ash-pit E, secured to the under side of the heating-compartment B, as is plainly shown in Figs. 1 and 3.

On the top of the heating-compartment B, above the ash-pit E, is arranged the smoke-stack F, and in the upper part of the heating-compartment B is arranged a transverse partition G, extending from the front end of the compartment B a suitable distance rearward, as is plainly shown in Fig. 1, so that the heat and gases arising from the burning fuel on the grate-bars D in passing upward have to travel rearward on the under side of the partition G to the rear end of the compartment and then to pass upward onto the top of the said partition-plate before they reach the smoke-stack F.

Through the heating-compartment B pass the water-tubes H, which open into water-heads I and I', formed at the front of the rear ends of the heating-compartment B, as is plainly shown in the drawings. On the top of the front water-head I is arranged an upwardly-extending chamber or steam-dome J, from which the steam is taken to the machinery to be driven.

In the front of the head I is arranged a semicircular opening which leads to the fire-box C, formed in the heating-compartment B previously mentioned, as is plainly illustrated in Figs. 1 and 3. Through this opening fuel is introduced to the grate-bars D. In order to hold the heads I and I' securely in place on the ends of the heating-compartment B, bolts K are provided, which connect the heads with each other by passing through some of the water-tubes H.

In order to establish a complete circulation of the water in the water-heads, a pipe L leads from one leg of the water-head I outside of the heating-compartment B to the other water-head I' and opening into the same at the bottom. It will be seen that by this construction the heat and gases arising from the burning fuel pass around the several water-tubes H, so as to heat the water within, thereby quickly generating the water into steam, which accumulates in the dome J.

It will further be seen that whenever it is necessary to clean the tubes H the front plates of the heads I and I' can be readily removed, so as to get access to the flues extending through the compartment B. The latter can be readily cleaned at any time, as it is always open at the semicircular opening in the water-head I.

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

A boiler comprising the heating-chamber B, having the fire-box C at its front end, a transverse partition G, a smoke-stack F above the partition, the front and rear water-heads I I', the former of which has an opening leading into the fire-box, the outer plates of the said heads being removable, the steam-dome J on top of the front head, the water-tubes H, extending through the heating-chamber and connected to the inner plates of the water-heads, the longitudinal circulation-pipe L, connecting the two heads exterior to the heating-chamber, and the bolt-rods K, extending through certain of the tubes and bolting the outer plates of the heads to the ends of the heating-chamber, substantially as set forth.

CHARLES O. TOOLE.

Witnesses:

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