

(No Model.)

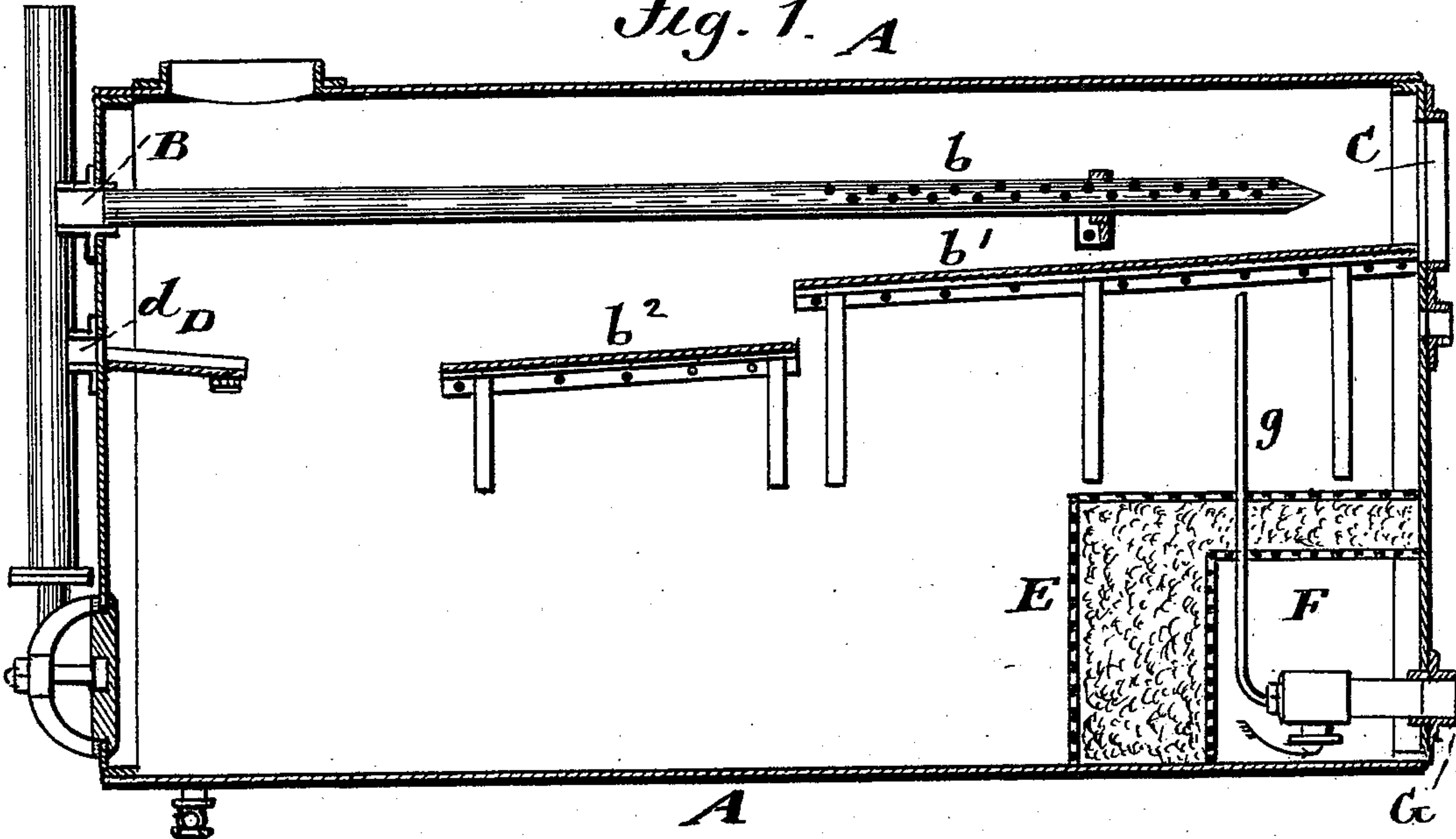
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# FEED WATER HEATER FOR STEAM BOILERS.

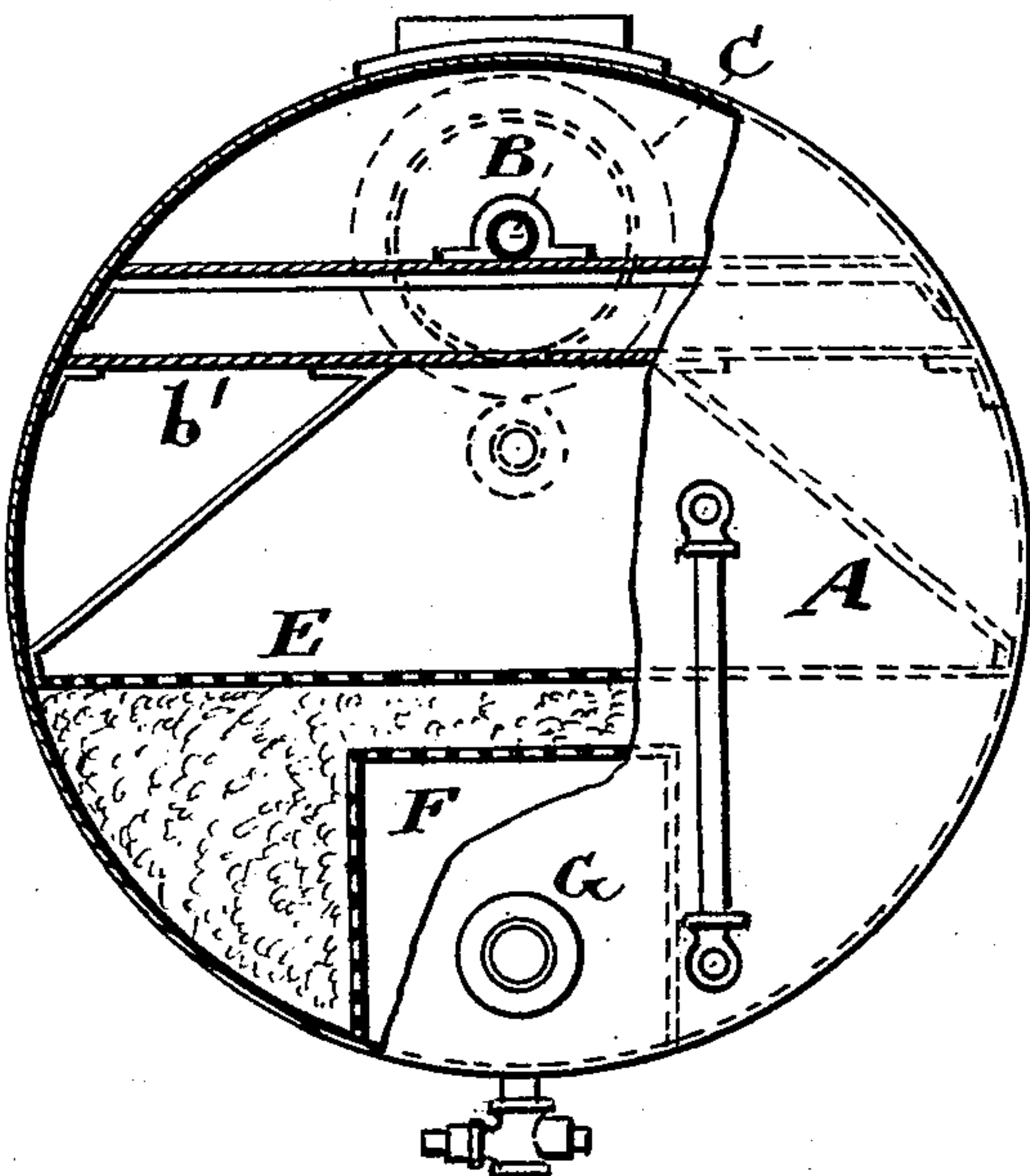
No. 539,436.

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Fig. 1. A

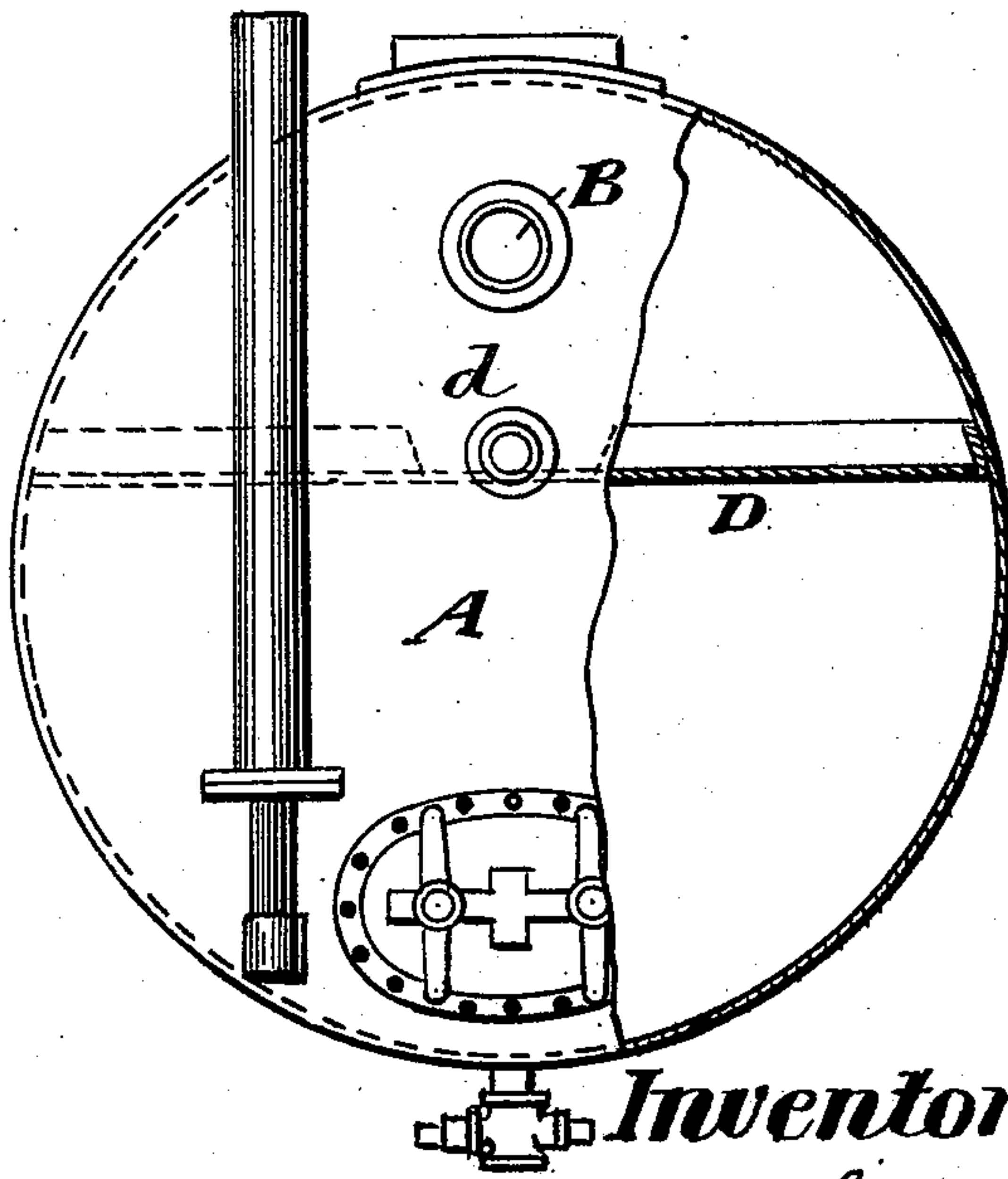


*Fig. 2.*



Witnesses,  
A. Ruppert.  
H. A. Daniels

*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

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## FEED-WATER HEATER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 539,436, dated May 21, 1895.

Application filed January 31, 1895. Serial No. 536,882. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT LOWE, a citizen of the United States, residing at Washington, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Feed-Water Heaters for Steam-Boilers; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The special object of the invention is to combine exhaust steam with aqueous spray to form feed water for a steam generator or boiler; also to remove all floating impurities before the water has passed through the filter; also to prevent any precipitated impurities or sediment from going into the boiler.

Figure 1 of the drawings is a longitudinal vertical section of my feed-water heater; Fig. 2, a rear elevation partly broken away; and Fig. 3 a front elevation, also partly broken away.

In the drawings, A represents the shell of my feed water heater, B the inlet pipe which receives the cold water at one end, and C the inlet for exhaust steam at the opposite end, the two inlets B C being in alignment.

The cold water pipe B extends nearly to the steam inlet C and its end, which is closed, is opposite the center thereof, while the upper half, near the closed end, is provided with perforations *b* so that the cold water will be sprayed upward and to each side. As the exhaust steam rushes into the heater, it mixes with the spray, is condensed and the product falls into the plate *b'*, thence into the lower plate *b<sup>2</sup>* and then falls to the lower part of the heater, being at that time at about a temperature of 210° Fahrenheit.

The interior plate D is just at or a little

below the level of the water to be kept in the heater so that the floating impurities may pass out at the escapement hole *d* before any part thereof can enter the filter E which may be made of any suitable material. This filter together with the end and bottom of heater forms a chamber F from which passes the filtered and skimmed feed water out through the exit pipe G to the boiler. The pipe G is raised above any possible accumulation of sediment, and has a vertical air pipe *g* to insure a free flow of water after the level thereof is above the pipe, the inner end being closed and an opening being provided below for the ingress of water.

The plates *b' b<sup>2</sup>* are placed on a slight incline so as to catch as much as possible of any sediment or matter which has a tendency to be precipitated.

I am aware that it is not new to use exhaust or live steam in feed water heaters or cold water spray pipes or overflow troughs for retaining sediment, but

What I claim as new is—

The boiler A having the water and steam inlets B, C, opposite to each other and, between them, the side-perforated sprayer *b*; the subjacent plates *b' b<sup>2</sup>* in the same vertical plane but one below and in advance of the other; and the plate D, the said plates *b<sup>2</sup>* D being at or about on a level with the escape-hole *d* of the boiler; whereby the feed water is first mixed with steam and then carried down the plates *b' b<sup>2</sup>* to the plate D over which the floating impurities will pass out through the escape hole *d* in the manner described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT LOWE.

Witnesses:

A. RUPPERT,  
CHAS. L. DUBOIS.