(No Model.)

G. W. BAIRD.

STEAM GENERATOR OR EVAPORATOR.

No. 417,803. Patented Dec. 24, 1889.

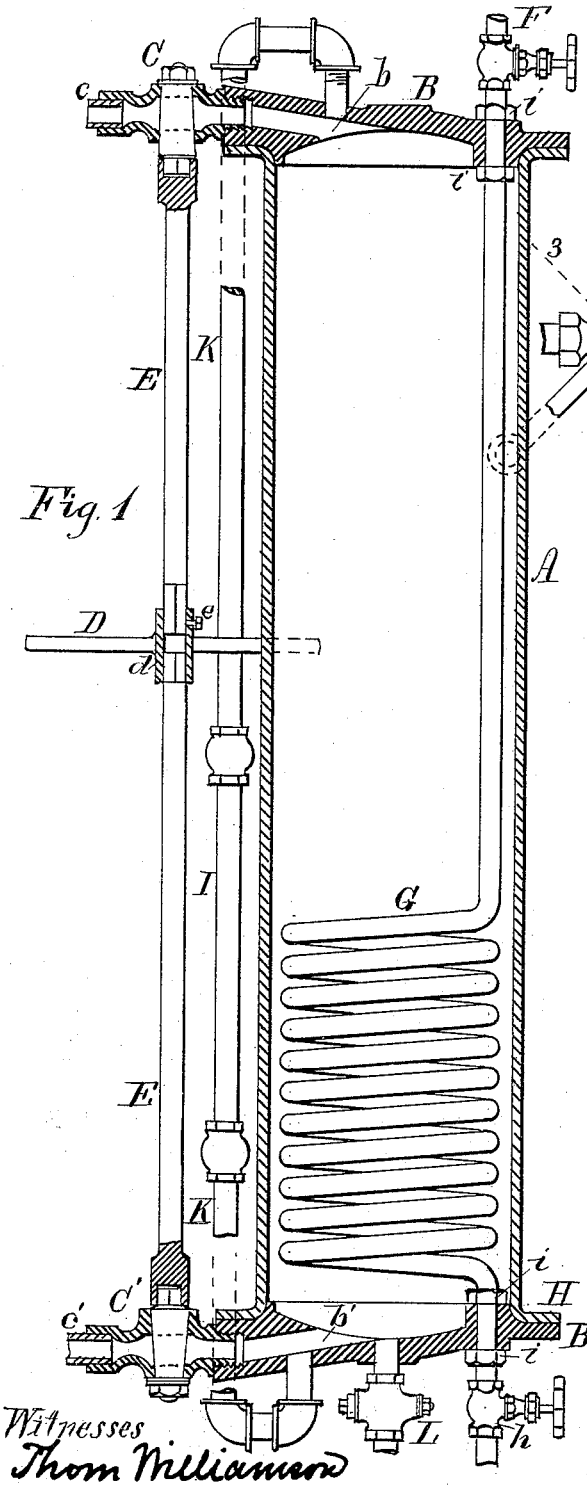

Fig. 1

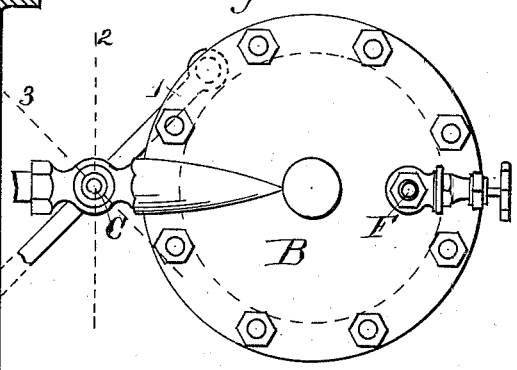

Fig. 2

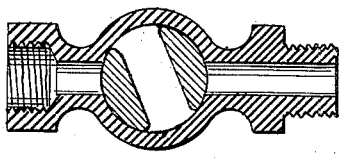

Fig. 3

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UNITED STATES PATENT OFFICE.

GEORGE W. BAIRD, OF THE UNITED STATES NAVY.

STEAM GENERATOR OR EVAPORATOR.

SPECIFICATION forming part of Letters Patent No. 417,803, dated December 24, 1889.

Application filed September 3, 1889. Serial No. 322,814. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. BAIRD, an engineer officer in the Navy of the United States, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Steam Generators or Evaporators for Making Pure Water for Feeding Boilers, for Drinking, and for Culinary and for other Purposes, of which the following is a specification.

The principal object of my invention is to supply pure water for steam-boilers, for drinking purposes, &c.; and it is an improvement on my device shown in my patent of August 23, 1887, No. 368,642, in which a steam-pump was used to feed the generator, separate blow and feed pipes were provided, and a salinometer was necessary.

In the present invention the generator is designed for small vessels—such as steam-launches—and is composed of a very few parts, and is easily manipulated.

The invention consists in the construction and arrangement of the two cocks, one in the pipe leading from the top of the generator to the condenser and the other in a pipe leading from the bottom of the same to the sea, whereby, on a certain movement of a rod connected with the handles of the cocks, the water may be drawn in, the water blown out, or the steam admitted to the condenser, to be condensed and pumped into the boiler.

It also consists in attaching the glass water-gage pipes to the top and bottom of the generator.

Figure 1 is a vertical section of my generator. Fig. 2 is a top plan showing the different positions to which the handle of the cock is moved, and Fig. 3 is a section of one of the cocks.

A is the shell, which is made of any suitable metal and having both ends flanged to receive the cast-iron heads B and B′. These heads are similar in construction, each having passages *b* and *b′* cast into them, into which the ends of the cocks C and C′ are screwed. From the cock C leads a pipe *c* to a condenser, and from the cock C′ leads a pipe *c′* to the water-supply. The cocks are operated by a lever D, which has an elongated square opening *d* through its center for the reception of the socket-wrenches E and E′. The wrench E′ is placed on the cock C′, and the lever D is placed on the head of the wrench. The head of the wrench E is slipped into the square opening of the lever. The socket of the wrench is then slipped up over the square on the socket C and held in this position by the set-screw *e*. Through the upper head enters the steam-pipe F, which passes down into the shell, where it forms a coil G. The end of the coil terminates in a straight pipe H, that passes through the bottom head and is provided with a valve *h*. The steam-pipe is also provided with a valve F. The coil and steam-pipe are held in place and to the heads by the nuts *i* and *i′*.

I is a glass water-gage, which is connected to the generator by the pipes K and K′, which extend around and enter the top and bottom heads.

I have found in practice that with a gage placed upon the side, as in ordinary boilers, the height of water was not correctly indicated, owing to the violent ebullition. By placing the connections of the gages as I have described the difficulty has been entirely overcome. In the bottom head is placed a drain cock and pipe L to drain the water from the generator when desired.

The cocks, as shown in Fig. 3, are so arranged with relation to each other that when the lever D is in the position shown in Fig. 2 the upper cock is open to the condenser and the lower cock is closed. It is understood that the steam has been admitted from the main boiler through the pipe F to the coil. The cocks remain in this position until the water has been evaporated down to a predetermined point in the generator, usually determined by the bottom of the glass, which indicates the saturation or density of the water, at which time the lever is turned to position 3, (shown in dotted lines,) which position closes the upper cock and opens the lower cock. A pressure of steam is then generated, which blows the remaining water out. The lever is now turned to position 2, which opens the upper cock, placing the generator in communication with the condenser and the sea, when the vacuum draws in the water, and when the height of water reaches a predetermined point the lever is moved to posi-

tion 1 again, when vaporization again takes place. The generator or evaporator is so proportioned that if the normal sea-water be used—that is, sea-water containing about one thirty-second part of saline matter—and if vaporization be commenced when the gage-glass is full and continued until the gage-glass be just emptied, the density of the remaining water will be about six thirty-seconds. Though I usually construct the evaporators of these proportions, I do not confine myself to the exact proportions. The object of placing the limits and indicating them by the terminals of the gage-glass or by marks on the gage-glass is to obviate the necessity of a salinometer to enable a man unskilled in the art of measuring densities of fluids to effectively operate my generator.

The valve II, leading from the coils, is opened when the machine is in use, and a steam-trap (not shown) keeps the steam-pressure in the coil and permits the condensed water to escape to the hot-well or feed-tank. No water is therefore lost.

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

1. In a steam generator or evaporator, the combination of the shell with the steam-coil, the steam-discharge cock, the blow-off and feed cock, and means for operating the cocks simultaneously, substantially as shown and described.

2. In a steam generator or evaporator, the combination of the shell with the steam-coil, the steam-discharge cock, the blow-off and feed cock, the socket-wrenches, and the lever for simultaneously operating them and the cocks, substantially as shown and described.

3. In a steam generator or evaporator, the combination of the shell and its head with the water-gage connected to the generator at its ends through the heads, substantially as shown and described.

4. In a steam generator or evaporator, the combination of the two cocks with the wrenches, and the lever for operating and holding the wrenches in position, substantially as and for the purpose described.

GEORGE W. BAIRD.

Witnesses:
THOM WILLIAMSON,
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