

(No Model.)

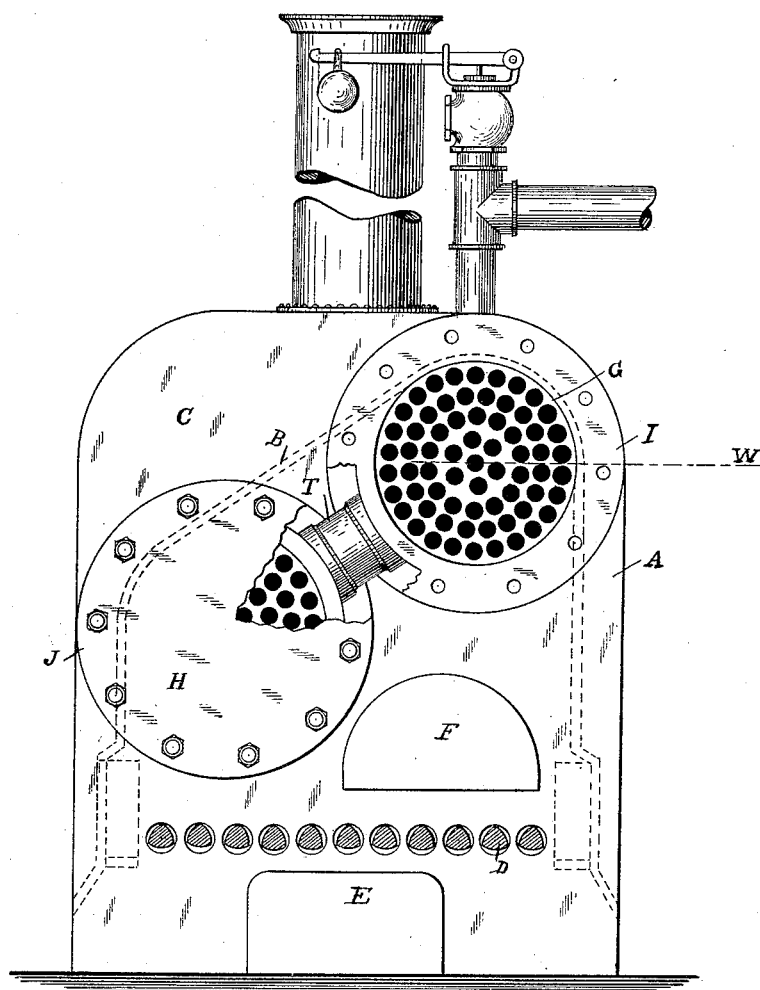
2 Sheets—Sheet 1.

L. B. BATTIN.  
BOILER.

No. 422,281.

Patented Feb. 25, 1890.

Fig. I.



Witnesses

*Lillie Hanna.*  
*Geo. H. Knight, Jr.*

Inventor

*Lambert B. Battin*  
By *Ames & Co.*  
*attys*

(No Model.)

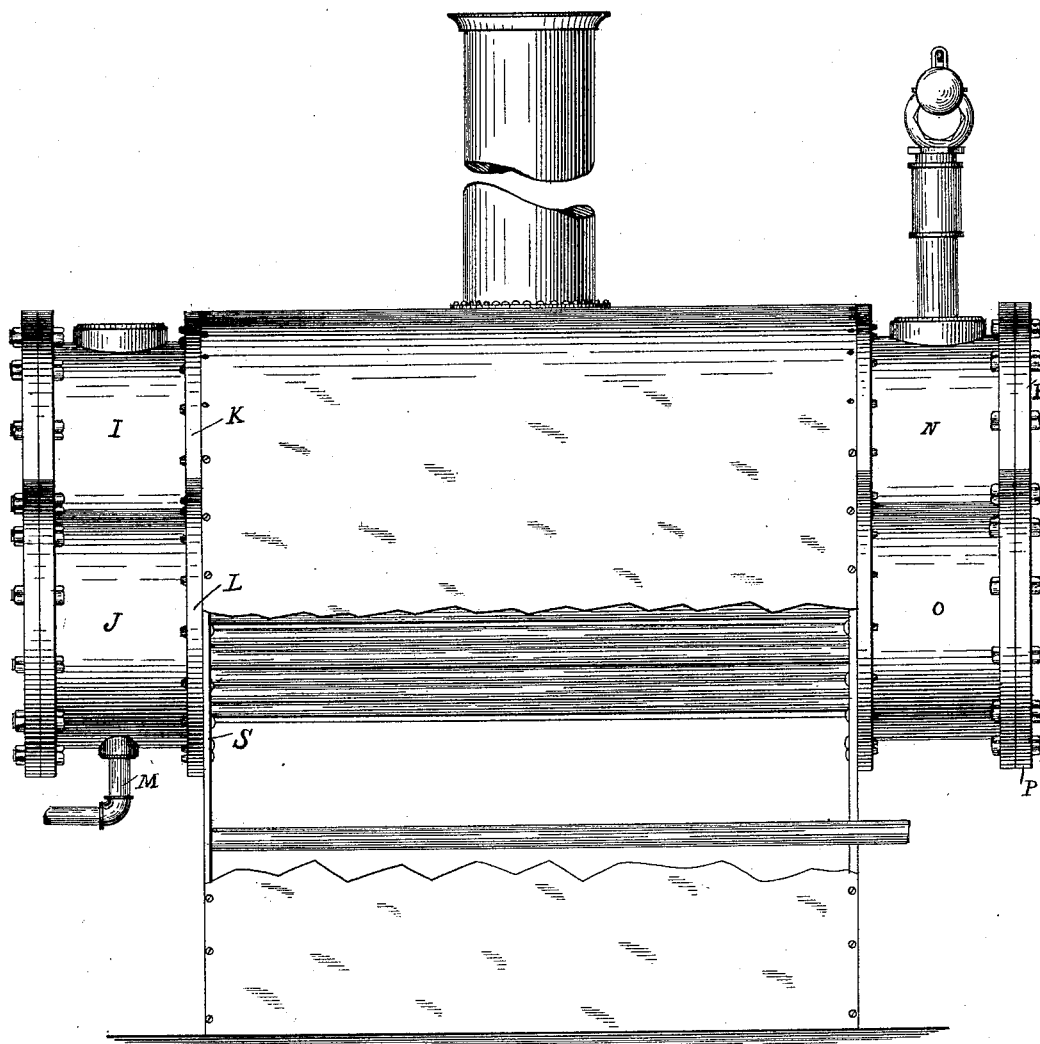
2 Sheets—Sheet 2.

L. B. BATTIN.  
BOILER.

No. 422,281.

Patented Feb. 25, 1890.

Fig. II.



Witnesses

*Killie Hanna.*

*Geo. H. Spright, Jr.*

Inventor

*Lambert B. Battin*

By *Ames & Co.*

Attorneys

# UNITED STATES PATENT OFFICE.

LAMBERT B. BATTIN, OF ELIZABETH, NEW JERSEY.

## BOILER.

SPECIFICATION forming part of Letters Patent No. 422,281, dated February 25, 1890.

Application filed October 11, 1889. Serial No. 326,732. (No model.)

*To all whom it may concern:*

Be it known that I, LAMBERT B. BATTIN, a citizen of the United States, residing at Elizabeth, county of Union, State of New Jersey, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

My invention relates, generically, to that class of boilers known as "water-tube boilers;" and the special objects to be attained in the present instance are certain economical arrangements of the parts and improvements on previous constructions, whereby the boiler is rendered more serviceable and durable in certain particular respects than any now on the market.

Specifically speaking, the principal object of my present invention is the construction of a water-tube boiler so arranged as that the interior parts can be rendered readily accessible by the removal of a single section, so that defects can be easily detected and at very little cost or trouble, and so that all the interior parts can be inspected and repaired, as will be hereinafter shown and described.

With these ends in view I arrange the water-tube generators in two or more series, as heretofore, and provide terminal chambers or cross-fittings for connecting the two series together, (where two series are employed,) and providing these fittings at their outer ends with removable caps or covers arranged directly opposite the openings of and in line with the series of parallel tubes. By this means and by removing the aforesaid cap or cover the interior of the tubes can be readily inspected and weak places detected, the tubes can be cleaned and repaired, and can, if desired, be removed and renewed at pleasure, without disturbing the greater portion of the boiler.

I will now proceed to describe the annexed drawings, which form a part of this specification, and which serve to illustrate my present invention.

Figure 1 represents an end elevation of my improved water-tube boiler, a portion of the cover being broken away so as to disclose the interior parts. Fig. 2 is a side elevation of

the same, a portion of the outer and inner jackets being removed so as to show the tubes and grate-bars.

In the drawings, A represents the exterior of the boiler, and B the line of the inside jacket, the interposed space C being filled with mineral wool or other non-conducting material. At D, I show grate-bars, at E an ash-pit, and at F a fire-door.

As shown in Fig. 1, I arrange one of the sections G of the water-tube boiler above and to one side of the other section H. In marine boilers such a construction would be of considerable importance, as the height of the boiler would be reduced about thirty-three per cent., which is in such boilers of great importance. They are shown in the accompanying drawings at an angle of about forty-five degrees, and this of course would be the most economical arrangement, as by it a minimum of height and width is attained, the lower section being very near the grate, while the upper section is sufficiently far above the latter to leave room for the fire-door, and to afford an ample space for the promotion of combustion. It is of course understood that the tubes extend longitudinally of the furnace or the combustion-chamber in the ordinary manner, while the obliquity of the series of tubes or sections is in a direction transverse to the combustion-chamber, or, in other words, transversely to the tubes themselves.

At the front end of the sections G and H, I locate the cross-fitting I and J, having flanges K and L, which are connected to the ends of the tubes, the tubes being expanded into heads S of ordinary boiler-iron, said heads being riveted to the flange of the cross-fitting, and, if it is so desired, the heads or tube-sheets may constitute the front and rear ends of the boiler.

The feed-water pipe is shown at M, and at the opposite ends of the sections G and H are located similar chambers N and O, constructed in the same manner as the cross-fittings I and J. These cross-fittings are provided with caps or covers, which are bolted to the outer flanges of the cross-fittings, and which can be easily taken off and replaced when-

ever it is desired to inspect or repair the interior parts of the boiler, especially the tubes, as hereinbefore set forth.

5 Connecting-pipes extending between the sections are shown at T, and at W is shown the water-line, a portion above said line constituting the steam or drying space.

10 By the use of the cross steam-fitting in the manner shown great strength is attained for resisting the steam-pressure, and a boiler of unusual lightness is secured. By means of riveting the tube-sheet with the boiler-heads additional strength and economy are obtained.

15 Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

20 1. A steam-boiler having all of its tubes or water and steam containing spaces divided into two sections or series arranged obliquely one above the other transversely of the combustion-chamber and connected together, substantially as set forth.

25 2. A steam-boiler having all of its tubes or water and steam containing spaces divided into two sections or series arranged one above the other at an angle of forty-five degrees to the horizontal and connected together, substantially as set forth.

30 3. A steam-boiler having the main body of its water and steam containing flues or spaces

divided into series arranged or extending in the same oblique direction transversely of the combustion-chamber within the furnace-jacket and equally disposed above the fire-grate, substantially as and for the purposes set forth. 35

4. In a steam-boiler, the combination, with the upper and lower water and steam tubes divided into series arranged in an oblique direction and connected together, a furnace-jacket provided with a fire-grate and having its upper side or top inclined to conform to the obliquity of said series of tubes, and a fire-door under the upper series, substantially as set forth. 45

5. In a steam-boiler, the combination, with the combustion-chamber, of the upper and lower series of tubes or flues, a flue-sheet at each end in which said flues are expanded, cross-fittings having flanges on their inner ends riveted to said flue-sheets and flanges on their outer ends, to which removable caps are secured, and the connection T, connecting said fittings together, substantially as set forth. 50

LAMBERT B. BATTIN.

Witnesses:

GEO. M. ROSS,

L. B. BARROWS.