

(No Model.)

2 Sheets—Sheet 1.

M. H. C. SHANN.
WATER TUBE BOILER.

No. 527,079.

Patented Oct. 9, 1894.

Fig. 1.

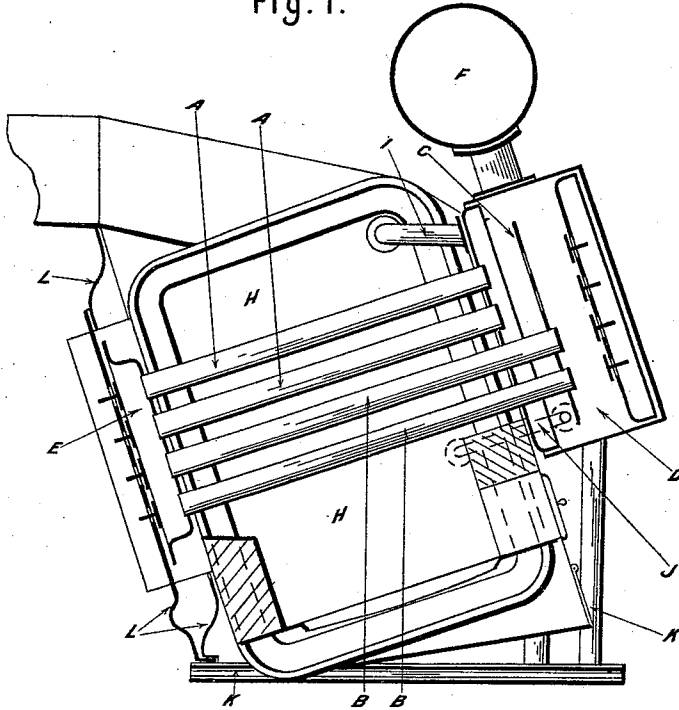
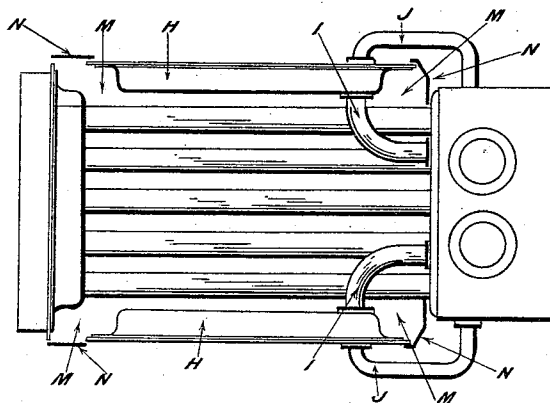


Fig. 2.



Witnesses

Allen E. S. Shawson
R. Churchill Shann

Inventor:

Marshall H. C. Shann

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Fig. 3.

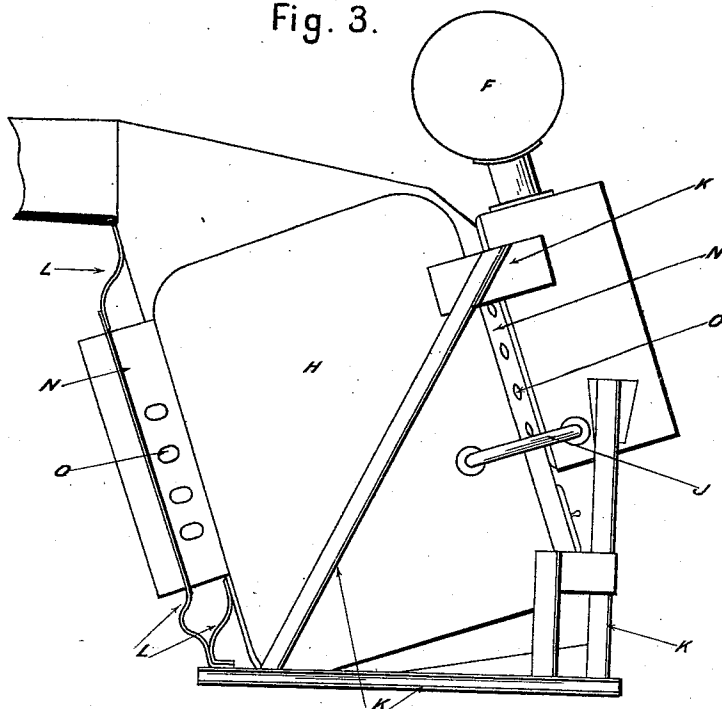
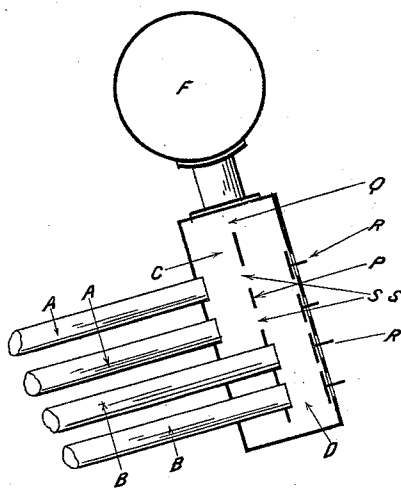


Fig. 4.



Witnesses
Albion E. Strancon
R. Churchill Shann

Inventor:
Montague H. C. Shamm

UNITED STATES PATENT OFFICE.

MONTAGUE H. C. SHANN, OF BRISBANE, QUEENSLAND.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 527,079, dated October 9, 1894.

Application filed January 29, 1894. Serial No. 498,394. (No model.)

To all whom it may concern:

Be it known that I, MONTAGUE H. C. SHANN, a subject of the Queen of Great Britain and Ireland, and a resident of 173 Wicklam Terrace, Brisbane, in the Colony of Queensland, have invented a certain new and useful Improvement in Self-Contained Water-Tube Boilers, (for which I have filed an application for a patent in the Colony of Queensland, on the 12th day of July, 1893, numbered 27,408, from which I claim protection under the International Union for the Protection of Industrial Property,) of which the following is a specification.

My invention relates to improvements in water-tube boilers, and has for its object an arrangement whereby they may be self-contained—that is to say the usual brick-work surrounding the furnace and stack of tubes may be dispensed with, and the hot gases passing among the tubes may be retained by a water-jacket on either side.

My invention consists of rows of parallel inclined tubes, arranged over the fire in a special manner to be hereinafter described; and a special arrangement of the front connections to be hereinafter described; and any convenient means of connecting the rear ends of the tubes; and a steam drum attached to the front connections, with a water-jacket on either side of the said tubes. Said water-jackets extend lengthwise between the front and back connections, and in height extend from the fire bars to above the top of the tubes, or thereabout. Each said water-jacket is connected to the front connections by two pipes or any similar convenient means, one at the top and the other at the bottom, so as to provide for the exit of steam and inflow of water respectively. Each of said water-jackets is constructed of two flat plates, stayed together, forming its inner and outer sides. The top and bottom and two ends may be formed by flanging the plates themselves, and riveting the flanges, or by any other convenient means—the whole forming a flat box of approximately rectangular shape. The whole of aforesaid parts I brace together by suitable framework. The back connection is fastened to the rear end of each of the water-jackets by means of curved flat bars, and the rear ends of the water-jackets

are supported by similar flat curved bars attached to the frame work.

The top of the stack of tubes between the water-jackets on either side, and between the front and back connections at either end, I cover over with a suitable casing of sheet iron, or other suitable material. I lead the exit flue from the top of said casing.

Between each end of each water-jacket and the front and back connections, I leave a small space, which I incase with plate-work, and in said plate-work I provide a series of small holes with a door to each. Said holes are opposite the opening between each of the horizontal rows of tubes, the object of which holes is to enable a steam or other brush to be inserted between each of the horizontal rows of tubes from each corner of the tube stack for the purpose of cleaning the exterior of the tubes.

The ash pit I form of flat-work, supported from the front and back connections, and from the water-jackets. Said ash pit is provided with a damper door and rack in the usual manner.

The special arrangement of tubes hereinbefore alluded to consists in terminating the upper and lower rows of tubes in separate vessels or chambers at their front or higher ends—that is to say, the upper rows of tubes at their front ends are terminated in one vessel, or set of vessels, and the lower rows at their front ends are terminated in another vessel or set of vessels.

The special arrangement of the front connections may be effected in three different ways. The first way consists of a vertically inclined diaphragm plate, fixed centrally between the front and back plates, to form two chambers. Between the top of said diaphragm plate and the crown of the two chambers a passage is provided so as the steam may pass from said chambers to the steam drum, the upper rows of tubes terminating at the said back plate, and the lower rows of tubes with the diaphragm plate, which terminations are effected by making the upper rows of tubes shorter than the lower rows. The front plate of the front connection has formed therein the same number of holes as there are water-tubes, and each hole is provided with a cover to permit of the inspection of, or re-

pairs to, the tubes. The holes aforesaid correspond with the holes provided in the upper part of the diaphragm plate for the circulation of the water from one of said chambers to the other chamber, and also for the inspection of the upper rows of tubes. The second way consists of a diaphragm plate fixed horizontally, and inclined to form two chambers one above the other. There are two circulating pipes, termed side pipes, connected with the sides of the lower chamber and the upper portion of the sides of the upper chamber above the water level. Hand-holes and covers are provided similar to those described in the first style. The third way consists of the arrangement of the upper rows of tubes to communicate with the upper portion of one or more water chamber or chambers, and the lower rows of tubes with the lower portion of one or more other chamber or chambers, all of which chambers are separately arranged, and form the front of the boiler. Hand-holes and covers are provided similar to those described in the first style. The object of these special arrangements of the tubes and their front connections in combination with the aforesaid water-jackets, is that the special arrangements promote such a rapid circulation down the upper rows and up the lower rows that a very high rate of evaporation per square foot of heating surface on the tubes is obtained. Consequently a much smaller number of shorter tubes are required than is usual with boilers of this type for the same power, so that the water-jackets are kept within reasonable limits as to size and weight, which hitherto has been the great objection to the employment of this simple means of of water-jacketing the furnace and stack of tubes.

In order that my said invention may be better understood, I now refer to the accompanying sheets of drawings, which form a part of this specification and in which the same

letters indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation. Fig. 2 is a plan view. Fig. 3 is an outside elevation. (A A) and (B B) are the upper and lower rows of tubes respectively. (C) and (D) are the two front connections. (E) is the back connection. (F) is the steam drum. (H H) are the two water-jackets. (I I) are the two top pipes connecting (H H) to (C), (D). (J J) are the two bottom pipes connecting (H H) to (C), (D). (K) is the framework. (L L) are the flat curved bars connecting (H H) to (E) and to (K). (M M) are the spaces between (H) and (C), (D), and (E). (N) is the plate-work incasing (M). (O O) is the series of holes or soot-cleaning doors in (N).

Fig. 4, is a modification showing a different way of arranging the vertically inclined diaphragm plate (P) separating (C) and (D). (Q) is the passage on top of (P) leading to (F). (R R) are the hand-holes and covers in front of (D). (S S) are the holes in (P).

The arrangement of parts shown in Fig. 4, may be further modified as desired.

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

In a water tube boiler, a series of tubes, a steam drum, an intermediate chamber between the tubes and said drum, receiving one end of the said tubes, a chamber connecting the opposite ends of the tubes, a water jacket forming the sides of the space inclosing the tubes and double pipe connections between said water jacket and chamber, one set of connections J being outside the casing and the other set I within the same, substantially as described.

MONTAGUE H. C. SHANN.

Witnesses:

ALBERT E. B. SWANSON,
 R. E. CHURCHILL SHANN.