

(No Model.)

2 Sheets—Sheet 1.

E. P. WATSON.
WATER TUBE BOILER.

No. 585,545.

Patented June 29, 1897.

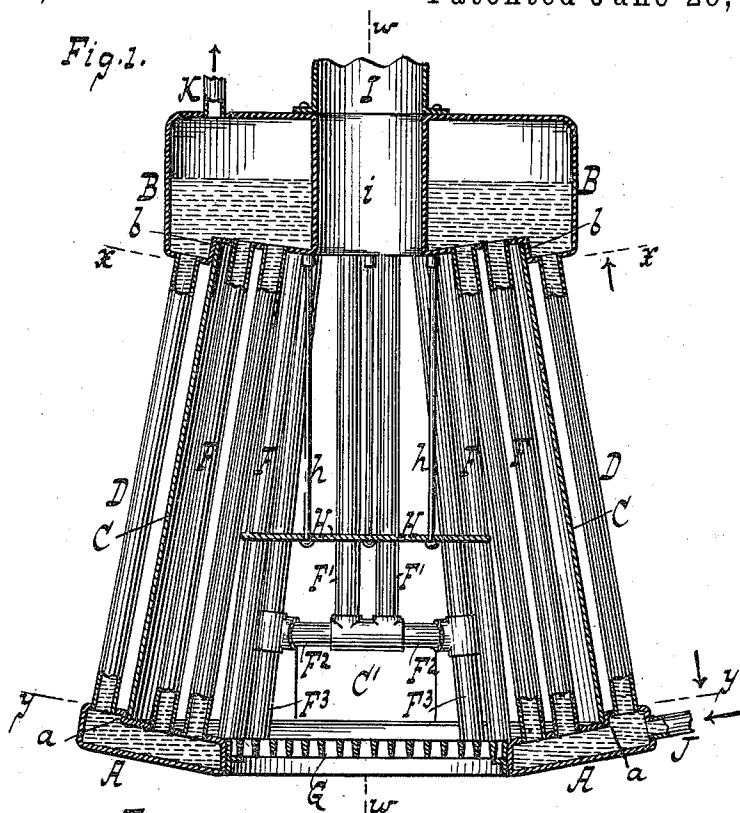


Fig. 2.

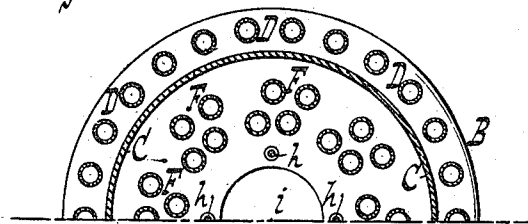
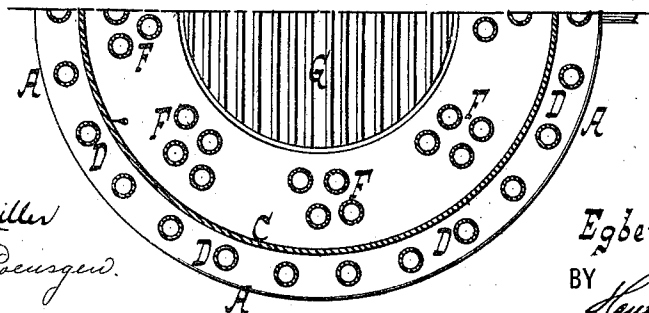


Fig. 3.



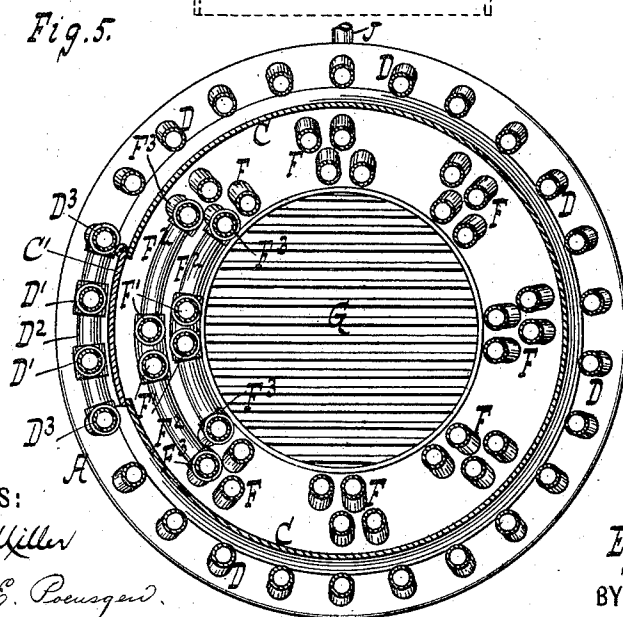
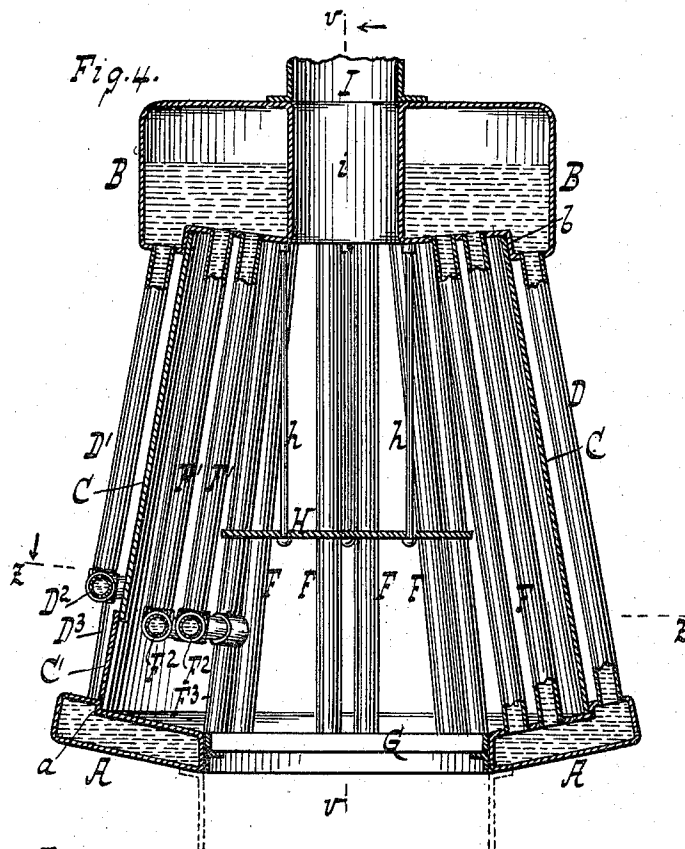
WITNESSES:
William Miller
Chas. E. Poeschew.

INVENTOR
Egbert P. Watson.
BY *Hauff & Hauff*
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UNITED STATES PATENT OFFICE.

EGBERT P. WATSON, OF ELIZABETH, NEW JERSEY.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 585,545, dated June 29, 1897.

Application filed November 19, 1896. Serial No. 612,756. (No model.)

To all whom it may concern:

Be it known that I, EGBERT P. WATSON, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented new and useful Improvements in Water-Tube Boilers, of which the following is a specification.

This invention relates to a novel construction of a water-tube boiler, as pointed out in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical central section in the plane *vv*, Fig. 4. Fig. 2 is a horizontal section in the plane *xx*, Fig. 1, looking upward. Fig. 3 is a similar section in the plane *yy*, Fig. 1, looking downward. Fig. 4 is a vertical central section in the plane *ww*, Fig. 1. Fig. 5 is a horizontal section in the plane *zz*, Fig. 4.

In the drawings the letter A designates an annular water-chamber, which may be made of sheet-steel or any other suitable material, and B is another annular chamber for water and steam. These two chambers are connected by a diaphragm C, best made of sheet-steel. In the example shown in the drawings this diaphragm is made conical and connected to annular shoulders *ab*, formed on the chambers A and B, respectively; but said diaphragm may be made cylindrical and connected to the two chambers in any other suitable manner.

On the outside of the diaphragm C are situated a series of pipes D, which are secured at their upper ends to and open into the water and steam chamber B, and at their lower ends they are secured to and open into the water-chamber A, so that the water can freely circulate through these pipes.

Inside of the diaphragm C are situated a series of pipes F, secured at their upper ends to and opening into the water and steam chamber B, while their lower ends are secured to and open into the water-chamber A, so that the water can freely circulate through these pipes.

G is the fire-grate, which is situated in the annular space of the water-chamber A, and above this fire-grate is placed a baffle-plate H, which may be secured in position by any suitable means, such as a series of rods *h*, sus-

pended from the bottom of the steam and water chamber B and at any desired distance above the fire-grate G.

I is the smoke-stack, the diameter of which corresponds to the central tubular passage of the steam and water chamber B and which in the example illustrated in the drawings is secured directly to the top of the chamber B.

The heated products of combustion which rise from the fire-grate strike the baffle-plate H and are caused to circulate between the pipes F, and in order to facilitate this circulation said pipes F may be arranged in groups of four, (more or less,) as shown in Figs. 2 and 5. The water in the pipes F is thus heated and caused to rise up, while the pipes D are protected against the direct influence of the heated products of combustion by the diaphragm C, so that the comparatively cool water in these pipes will descend and a rapid natural circulation of the water will be effected.

The water will be fed into the boiler through a pipe J, which may be connected to the chamber A, and the steam may be drawn off from the boiler through a pipe K, extending from the top of the chamber B.

In order to get access to the fire-grate G, the diaphragm C is provided with a door C' and the pipes D' D' F' F' are shortened, (see Fig. 4,) the pipes D' being connected at their lower ends to horizontal pipes D², which communicate with the pipes D³ D³, while the pipes F' F' are connected at their lower ends to horizontal pipes F² F², which communicate with the pipes F³ F³. (See Figs. 1 and 4.)

Instead of placing the fire-grate into the annular space of the chamber A it may be placed into a cylindrical jacket secured to the bottom of said annular chamber, as indicated in dotted lines in Fig. 4, and in that case no fire-door need be provided in the diaphragm C and the bottom ends of all the pipes D and F will be secured in the top of the chamber A.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a water-tube boiler, the combination of two annular chambers A B, an outer series of pipes D communicating with said chambers near their outer circumferences, an inner series of pipes F communicating with said chambers near their central portions, an annular

diaphragm C fastened to the annular chambers at some distance from their outer circumferences to form a solid shield between the outer series of pipes and the inner series of pipes and situated at some distance from each series of pipes, a fire-place situated practically beneath the center of the diaphragm C, and a smoke-flue extending through the center of the annular steam and water chamber B, substantially as described.

2. In a water-tube boiler the combination of two annular chambers A B, a practically unbroken diaphragm C fastened to the annular chambers at some distance from their outer circumferences, a series of pipes D connecting the chambers A B and situated on the outside of the diaphragm C, a series of pipes F situated inside of said diaphragm and also connecting the chambers A B, a fire-grate G situated in the annular space of the chamber A, the baffle-plate H and a smoke-stack extending through the center of the chamber B substantially as described.

3. In a water-tube boiler the combination of the annular chambers A B, a practically unbroken diaphragm C connected to the annular chambers at some distance from their outer circumferences, a series of pipes D connecting the chambers A B and situated on the outside of the diaphragm C, a series of pipes F situated inside of said diaphragm and also connecting the chambers A B, a fire-grate G situated in the annular space of the chamber A, a fire-door C' in the diaphragm C, pipes D' D², F' F² for giving access to the fire-grate and a smoke-flue extending through the center of the chamber B substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EGBERT P. WATSON.

Witnesses:

WM. C. HAUFF,
E. F. KASTENHUBER.