

W. KANE.
STEAM BOILER.
APPLICATION FILED AUG. 4, 1908.

933,370.

Patented Sept. 7, 1909.

2 SHEETS—SHEET 1.

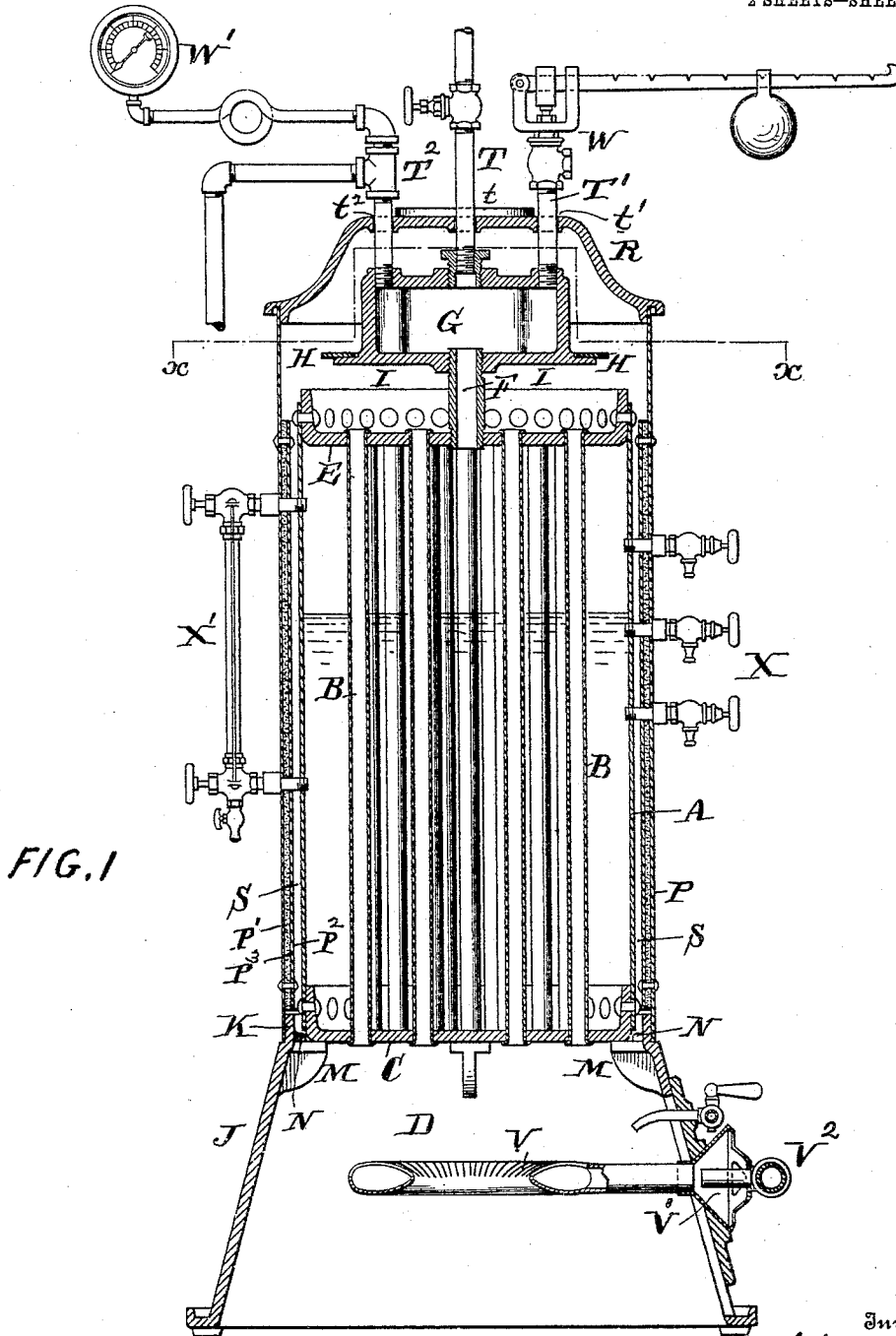


FIG. 1

Inventor

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Witnesses

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By

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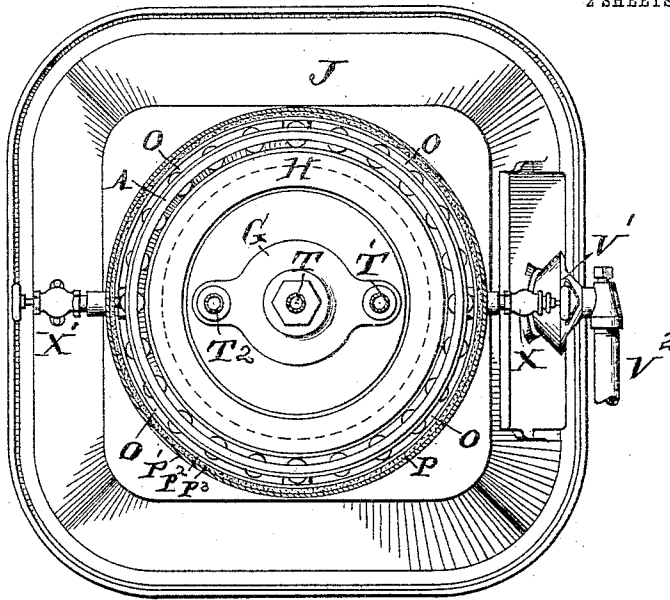


FIG. 2

FIG. 3

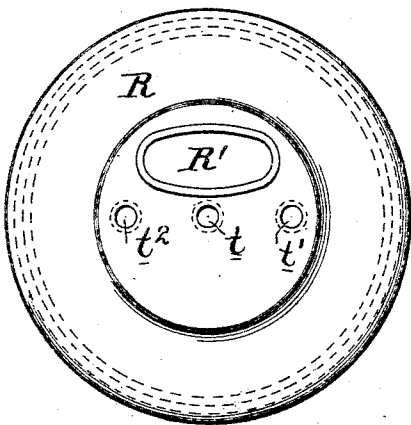
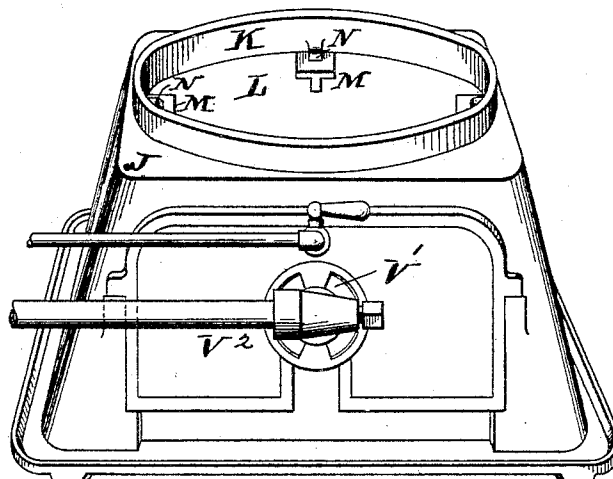


FIG. 4



Inventor

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UNITED STATES PATENT OFFICE.

WILLIAM KANE, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER.

933,370.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed August 4, 1908. Serial No. 446,972.

To all whom it may concern:

Be it known that I, WILLIAM KANE, a citizen of the United States, and resident of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Steam-Boilers, of which the following is a specification.

My invention has reference to steam boilers and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a construction of steam boiler, more particularly for small powers which may be heated economically by gas or other fuel, the improvement comprehending the simultaneous heating of the tubes and exterior shell of the boiler.

My invention consists of a tubular boiler, combined with an outer jacket, preferably of non-conducting structure, surrounding the boiler so as to provide an annular heating flue around the boiler, and a fire box in communication with both the tubes and annular flue.

My invention further consists in the above construction when combined with a steam chamber above the tubes and in communication with the steam space of the boiler proper, said chamber being extended laterally so as to act as a baffle to the rising products of combustion issuing from the tubes and directing them laterally to commingle with the products rising through the annular heating flues, and a cap over the outer jacket and steam chamber for guiding the products of combustion to the chimney outlet.

My invention also comprehends details of construction which, together with the features above specified, will be better understood by reference to the drawings, in which:—

Figure 1 is a sectional elevation of a steam boiler embodying my invention; Fig. 2 is a plan view of the same with the jacket cap removed; Fig. 3 is a plan view of the jacket cap; and Fig. 4 is a perspective view of the furnace base.

The boiler A is shown as an upright one with vertical tubes B. The crown sheet C above the furnace chamber D is preferably close to the lower edge of the boiler shell. Screwed into the middle of the upper tube sheet E is a pipe section F and screwed upon

the upper end of this pipe section is a steam chamber G which is preferably of malleable iron and flanged as at H, adjacent to the bottom, so as to form a baffle over the several tubes B and thereby somewhat retard the passage of the heating gases through the tubes. The steam chamber and its flanged part are arranged comparatively close to the tube sheet E, but so that there is formed an annular heating chamber I which deflects the products of combustion radially or outward. The flange H may be detachable so as to be replaced without replacing the entire steam chamber. This boiler structure is supported upon the base J, within which is the furnace chamber D. The upper part of the base J is provided with an upwardly extending flange K about an opening L of greater diameter than the diameter of the boiler A, and inwardly extending from the sides of the opening at brackets M upon which the boiler is supported. To center the boiler there are employed spacing lugs N on the brackets, which insure the centering of the boiler so as to leave openings O between the boiler and flange for the passage of products of combustion to the outside of the boiler.

Surrounding the boiler so as to form an annular heating flue S is an outer jacket P, resting upon the base and centered by the flange thereof. This jacket is preferably formed of an outer sheet metal shell P', an inner sheet metal lining P² and an interposed non-conducting layer P³ of asbestos or refractory material. These layers may be riveted together. Supported upon the top of the outer jacket and inclosing the steam chamber G of the boiler is a cap R which is provided with a chimney or smoke outlet R'. This cap causes the hot products which pass upward through the annular flue S and those which escape laterally from under the steam chamber to commingle and then pass over the steam chamber G and escape from the chimney or smoke outlet R'.

T is the steam supply pipe and extends through a hole *t* in the center of the cap and is screwed into the steam chamber at the middle. T' is a steam pipe, extending through another hole *t'* in the cap and is screwed into the steam chamber to one side and is provided with a safety valve W. T² is a third steam pipe and also passes through a hole *t*² in the cap and connects with the steam chamber and is provided with a steam

gage W'. The extension of the steam pipes through the cap centers it and indirectly insures the upper part of the jacket P maintaining a concentric position around the boiler to provide uniformity in the width of the annular flue S.

X are gage cocks and X' a water glass gage.

The furnace chamber D may be provided with any means desired for supplying the heating products of combustion, but in the preferred means the heat is obtained from gaseous fuel. In the means shown, V is the burner, V' the air mixing device and V² the gas supply. Any of the well-known forms of gas burners may be used in lieu of that shown.

In the form of boiler illustrated, the bottom tube sheet C which forms the crown of the furnace chamber, is on a level with the bottom of the boiler. By reason of this construction the heated products of combustion will pass, not only through the tubes, but also freely up the outside of the boiler through the annular flue S. The steam chamber G and its flanges, acting as a baffle, retards too free passage of the heated products through the tubes and hence assists in directing such products through the flue S.

I have shown the construction of my boiler in the form which I have found most excellently adapted to commercial use and while I prefer the construction shown, the details may be modified without departing from the spirit of the invention.

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

1. In a steam boiler, the combination of an upright tubular boiler proper, with an outer jacket forming an annular heating flue surrounding the boiler, a base supporting both the boiler and jacket from below and having a furnace chamber in direct communication with both the under part of the boiler and the annular heating flue between it and the case, and a cap at the top of the jacket provided with a smoke outlet and inclosing the upper part of the boiler.

2. A vertical boiler having tubes of substantially the full height of the boiler, combined with a jacket surrounding the boiler and forming an annular heating chamber about it, a base for supporting both the boiler and jacket from the bottom having a furnace chamber directly opening into the boiler tubes and also into the annular heating chamber and comprising a box shaped casting having a circular opening in its top

of larger diameter than the diameter of the boiler and smaller diameter than the diameter of the jacket and also having inwardly extending brackets at intervals for supporting and centering the boiler from below, whereby products of combustion simultaneously pass from the furnace chamber both through the boiler and about its outer surface and all strain for supporting the boiler is concentrated at its lower portion.

3. A vertical steam boiler having tubes of substantially the full height of the boiler, combined with a jacket having a filling which is non-conducting to heat surrounding the boiler and forming an annular heating chamber about it, and a base having means for supporting both the boiler and jacket at their bottom parts and having a furnace chamber opening into the boiler tubes and also directly opening into the annular heating chamber, whereby products of combustion divide and simultaneously pass from the furnace chamber both through the boiler and about its outer surface.

4. A vertical steam boiler having tubes, combined with a steam chamber above the boiler having a laterally extending flange, a central tubular connection between the boiler and steam chamber, a jacket surrounding the boiler and forming a heating chamber about its outer surface and extended upward beyond the laterally extending flange of the steam chamber, and a cap supported by the jacket inclosing the steam chamber, and a supporting furnace base having flanges upon which the bottom of the boiler and jacket rest and providing communication for the products of combustion directly with the boiler tubes and with the heating chamber about the boiler whereby the boiler structure and the jacket are supported wholly from the bottom and the boiler is heated externally and internally with independent portions of the products of combustion.

5. A vertical tubular steam boiler having a steam chamber supported above it, and in communication with it, combined with a detachable deflecting flange surrounding the steam chamber a short distance above the tube sheet of the boiler, said steam chamber and flange acting as a baffle for the rising products of combustion, and a surrounding casing inclosing the boiler and steam chamber.

In testimony of which invention, I have hereunto set my hand.

WILLIAM KANE.

Witnesses:

R. M. HUNTER,
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