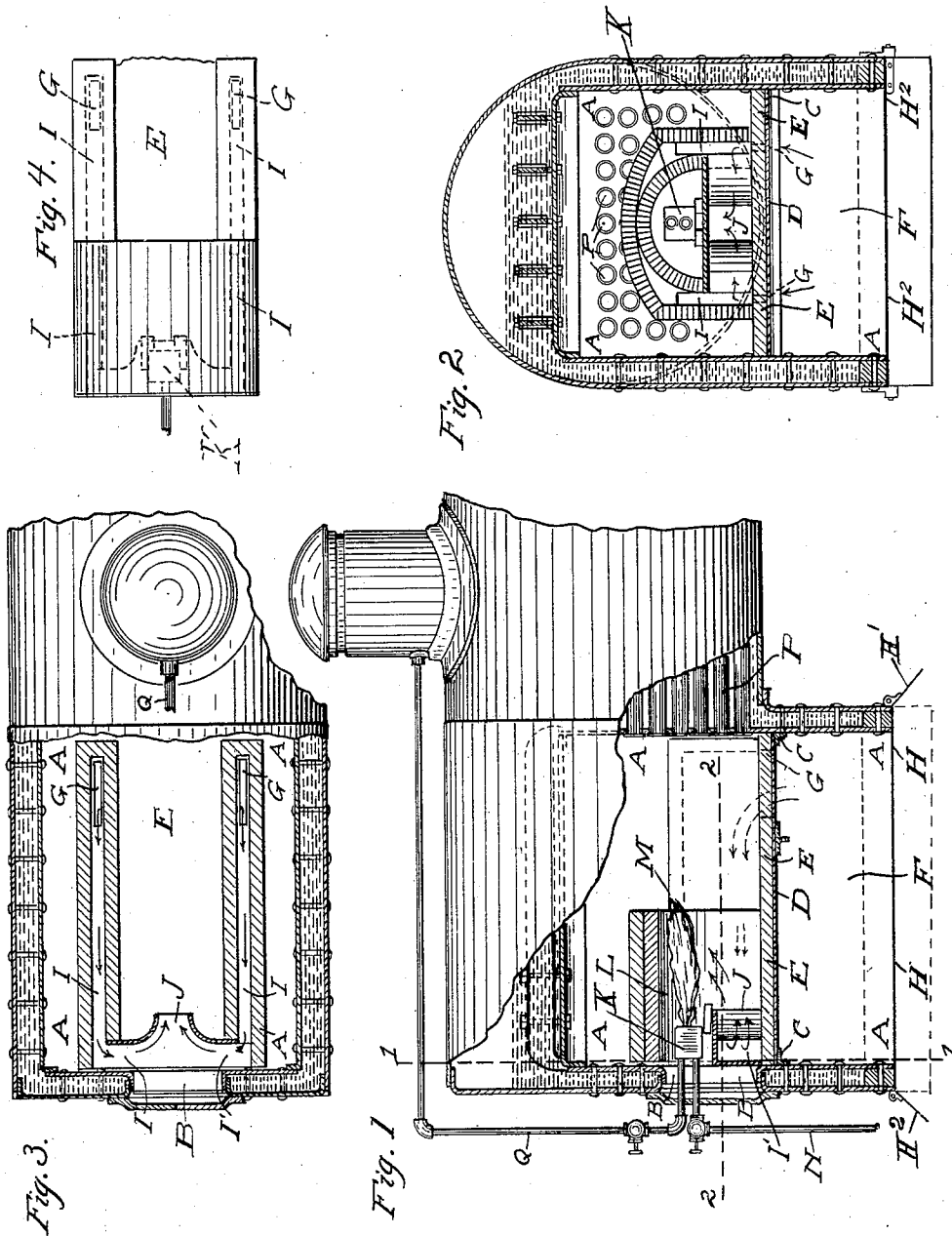


T. C. MASON.
 INTERNALLY FIRED BOILER.
 APPLICATION FILED MAY 6, 1907.

902,893.

Patented Nov. 3, 1908.

3 SHEETS—SHEET 1.



Witnesses:
Roni S. [Signature]
Ida M. Daskam.

Inventor
 Thomas C. Mason
 By *John Day.*
 Attorney

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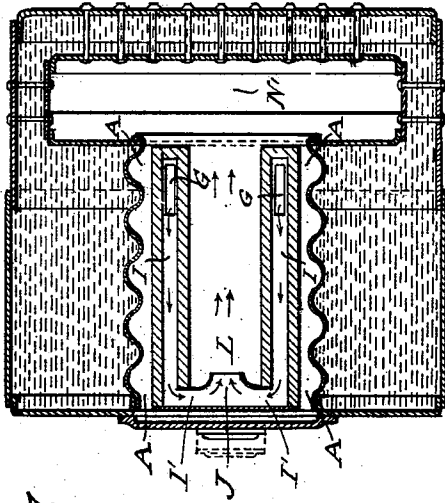


Fig. 7.

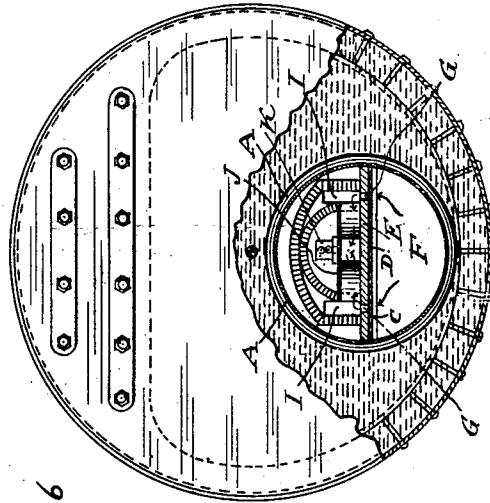


Fig. 6.

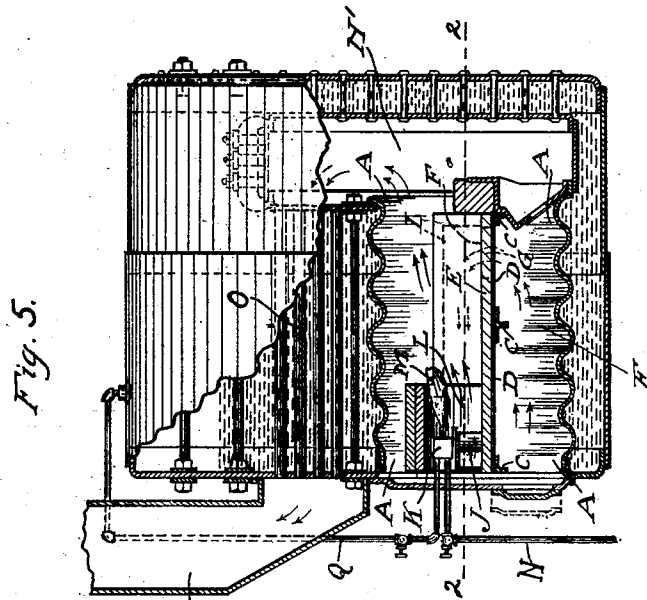


Fig. 5.

Witnesses.
Rm. S. Berry
Ida M. Daskam.

Inventor.
Thomas C. Mason
 By *J. H. John Day*
 Attorney.

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3 SHEETS—SHEET 3.

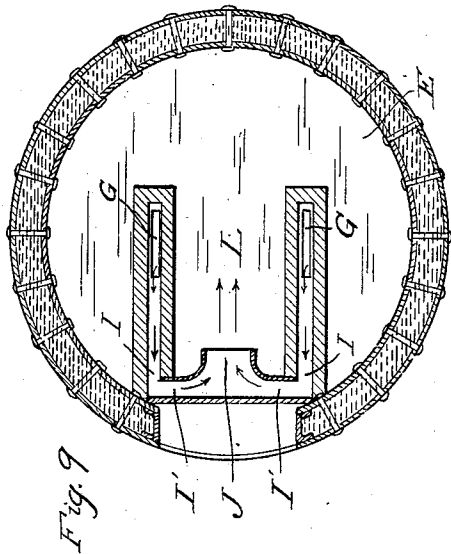


Fig. 9.

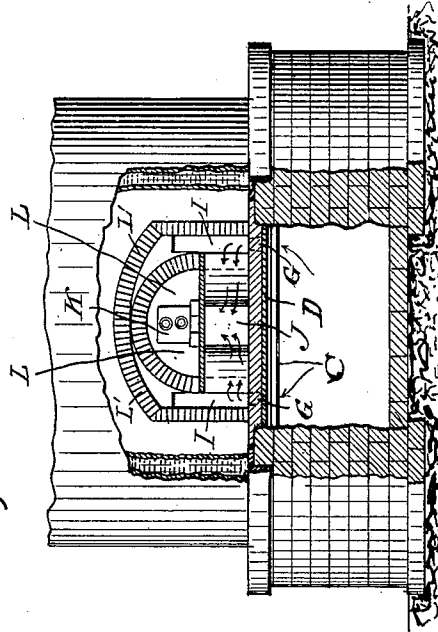


Fig. 10.

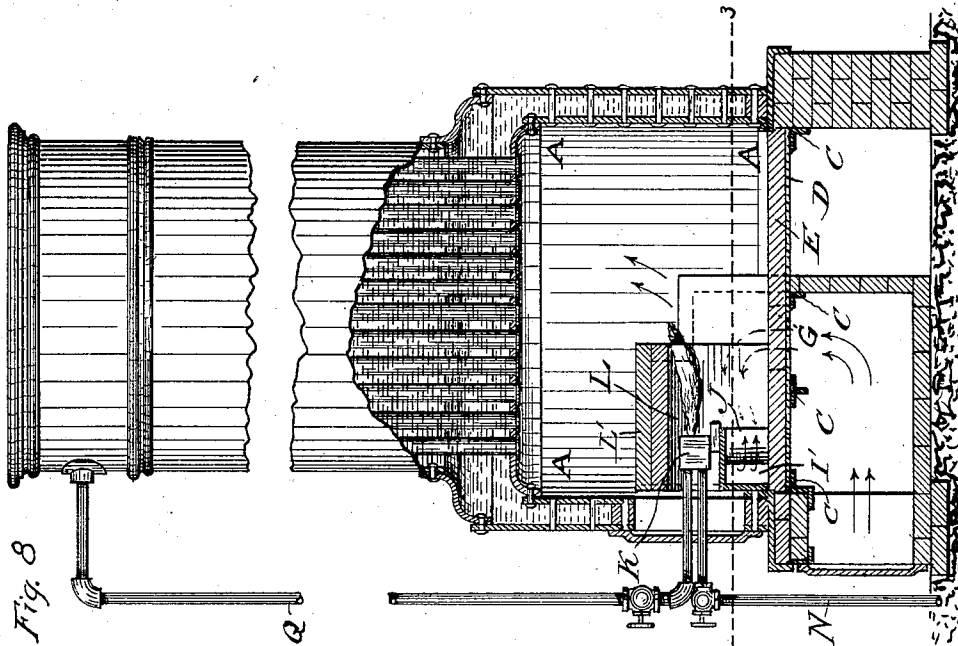


Fig. 8.

Witnesses.
Roni A. Berry
Ida M. Daskam.

Inventor
 Thomas C. Mason
 By *J. F. John Day.*
 Attorney

UNITED STATES PATENT OFFICE.

THOMAS C. MASON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO MASON SMOKELESS COMBUSTION COMPANY, INCORPORATED.

INTERNALLY-FIRED BOILER.

No. 902,893.

Specification of Letters Patent.

Patented Nov. 3, 1908.

Application filed May 6, 1907. Serial No. 372,282.

To all whom it may concern:

Be it known that I, THOMAS C. MASON, of the city of Los Angeles, in the county of Los Angeles, in the State of California, have invented certain new and useful Improvements Applicable to Internally-Fired Boilers, of which the following is a full, clear, and exact specification, reference being had to the annexed drawings, and to the figures and letters marked thereon.

My said invention which relates to certain new and useful improvements applicable to internally fired boilers, is as hereinafter described, especially adapted for use in the boilers of locomotive engines, marine boilers, and vertical stationary boilers, that is to say, to what are generally known as internally fired boilers.

In my application for Letters Patent, Serial Number 361,143, filed March 7th, 1907, I have set forth and claimed a new or improved means for burning oil as fuel for generating heat, in my said specification have described, and in the drawings forming part of said application, have shown the adaptation of the same to an externally fired boiler, that is to say, a boiler whereto the heat is applied from the apparatus constituting part of my invention being set in brick work below the boiler itself, and not in any respect contained within the fire box of a boiler as under my present improvements herein.

My present improvements consists in the adaptation of the device or apparatus constituting part of my aforesaid application for Letters Patent to that class of boilers wherein the heat is generated, and applied within a fire box as an inherent part of the class of boiler referred to as distinguished from the external brick work of a boiler setting, and the external heating surfaces of a boiler set in brickwork.

Upon the annexed drawings, Figure 1, is partly a longitudinal section and partly a side elevation of the fire box end of the boiler of a locomotive engine, showing the combination therewith, or adaptation thereto, of the apparatus or device constituting part of the invention set forth in my aforesaid application for Letters Patent. Fig. 2, is a transverse section of the same on the line 1, 1, Fig. 1. Fig. 3, is a horizontal section of the fire box, and a horizontal section of the apparatus for burning oil as fuel within the

fire box of a locomotive engine according to my said invention on the line 2, 2, Fig. 1. Fig. 4, is a plan of the device constituting my said invention shown complete in itself, that is to say, without combination or adaptation to the boiler of a locomotive engine. Fig. 5, is in part a longitudinal section, and in part a side elevation of another form of internally fired boiler, namely, the boiler commonly known as a marine boiler, used on board ships for driving marine engines. Fig. 6, is a front elevation with the lower part of the casing of the boiler, and doors removed, for the purpose of showing the emplacement of the apparatus constituting my invention within the fire box of a marine boiler. Fig. 7, is a horizontal section of the marine boiler shown in Figs. 5, and 6, taken on the line 2, 2, Fig. 5. Fig. 8, is still another form of an internally fired boiler, namely, of the type known as a vertical stationary boiler, and showing the combination therewith, or the adaptation thereto, of the device or apparatus constituting my invention for burning mineral oil as fuel. Fig. 9, is a horizontal section of the same, on the line 3, 3, Fig. 8. Fig. 10, is in part a front elevation of the lower part of the vertical boiler illustrated by Figs. 8, and 9, but wherein the front lower portion of the boiler is broken away in order to show the adaptation thereto of the oil burning device.

In Figs. 1, 2, and 3, the fire box proper of the boiler of a locomotive engine is marked A, and the rear portion of the said fire box has the ordinary fire hole B, therein, as shown in Figs. 1, and 3. Across the interior of the fire box and above the bottom H, thereof, angle irons C, are fastened in any convenient manner to support the plate D. Upon the plate D, there is built or laid the fire clay bottom E, Figs. 1, and 2. From the chamber F, beneath the plate D, there extend the openings G, shown in full lines in Fig. 3, and in dotted lines in Figs. 1, 2, and 4. The lower part of the locomotive engine boiler, that is to say, the part below the base H, thereof, is fitted in the ordinary manner common to locomotive engines with a damper H', and H'', at the front and rear, respectively so that according to the direction in which the locomotive engine is traveling, that is to say, either forwards or backwards upon a line of railway, the front or rear damper is shut as the case may be to enable fresh air to

pass into the chamber F, and up through the openings G, into the flues I, and from the flues I, around the front portion I', thereof, into the contracted, lower and central front portion as shown by the arrows in the drawings. The air heated in passing through the openings G, along the flues I, and into the discharge opening J, issues beneath the burner K, and ascends to meet the hydro-carbon vapor or gas escaping from the openings of the burner K, which on entering into combustion therewith, and generating very high temperature, rushes into the combustion chamber L, as a short blow-pipe flame M, wherein all the combustible matter of the oil entering the burner by the pipe N, and that of the steam entering the burner by the pipe Q, are so completely burned that nothing but the highly heated non-combustible products of combustion escape from the combustion chamber L, into the fire box A, and thence into the tubes P, of the boiler, and thence to the smoke box thereof, but without the production of smoke. The combustion chamber L, consists of the lower and inner fire clay arch L', and the upper arch L², incloses the combustion chamber L, and with the combustion chamber L, forms the lateral flues I, and transverse front flue I'.

As shown by Figs. 5, 6, and 7, representing an internally fired boiler of the marine type, with an internal circular corrugated fire box A, the circular corrugated fire box is provided with a plate D, supported horizontally within the fire box A, by means of angle irons C, upon which the fire clay bottom E, of the flue and combustion apparatus is supported. This apparatus extends by preference throughout nearly the entire length of the circular corrugated fire box A, and air passes from the lower chamber F, thereof, up through the openings G, into the flues I, around the front of the device into the contracting portion J, wherein the flues I, and I', unite to discharge highly heated air up through the opening in the bottom of the combustion chamber L, to meet and enter into combustion with the hydro-carbon oil or gas issuing from the burner K, supplied with regulated quantities of oil and steam by the pipes N, and Q, respectively, as shown in Fig. 5. The flame issuing from the burner K, is marked M, in Fig. 5, and the products of combustion escape therefrom into the upper portion of the fire box A, thence through the heating chamber N', thence through the tubes O, into the uptake P, as shown at Fig. 5.

As shown by Figs. 8, 9, and 10, the bottom of the fire box A, of the vertical boiler, is

closed by a plate D, and through the bottom of the device constituting part of my aforesaid application for Letters Patent, the openings G, lead into the flues I, extending laterally through my device, between and beneath the arches of the combustion chamber L, and the upper arch L', respectively, which lateral flues are united by the cross front flues I', uniting into a single contracting flue J, leading into the combustion chamber L, of the apparatus, wherein the ascending heated air meets, and enters into combustion with the hydro-carbon issuing from the openings in the burner K, in the combustion chamber I.

In Figs. 1, 2, 5, and 8, of the annexed drawings the front of the lower chamber through which air passes through the openings in the bottom of the rear end of the flues into the lateral flues, and thence along the front flues and thence into the central flue beneath and leading to the burner, it will be noticed that doors or dampers, are provided for the purpose of regulating the amount of air allowed to pass up through these openings, leading into the horizontal lateral flues, and it has been explained that in the case of the locomotive boiler shown in Figs. 1, 2, 3, and 4, the ordinary dampers, which form part of the ash pan of an ordinary locomotive boiler, are applied with reference to Figs. 1, 2, and 3.

I claim as my invention.

As an oil burning apparatus, an internally fired boiler, a partition in the fire box thereof of dividing the same into an air chamber below, and a combustion chamber above said partition, a damper at the bottom of the air chamber, horizontal flues at each side of the combustion chamber, the partition having apertures connecting one end of the flues with the air chamber, two partly spaced arches at one end of the combustion chamber, the other end of the flues communicating with the space between the arches, a burner located in the combustion chamber under the arches, and a transverse flue connected at each end with the space between the arches and having an outlet beneath the burner whereby heated air is discharged beneath the flame from the burner.

In testimony whereof, I have hereunto set my hand and seal at the city of Los Angeles aforesaid, in the presence of two subscribing witnesses.

THOMAS C. MASON. [L. s.]

Witnesses:

ST. JOHN DAY,
J. D. CORY.