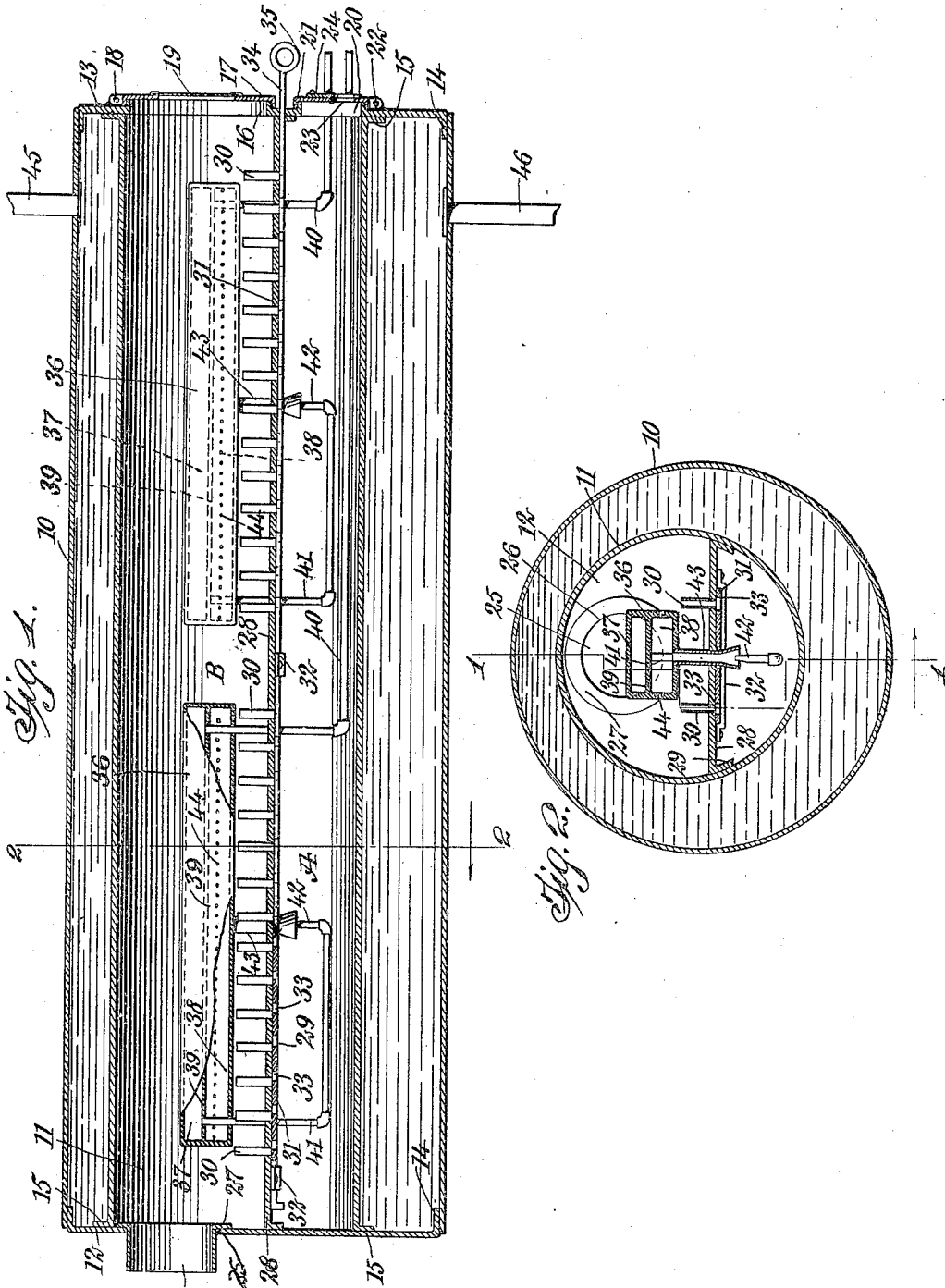


J. G. HAYDEN.
BOILER.

APPLICATION FILED JAN. 29, 1909.

952,429.

Patented Mar. 15, 1910.



WITNESSES
L. P. [Signature]
John R. Brachvogel

INVENTOR
James G. Hayden
BY *Mumford*
ATTORNEYS

UNITED STATES PATENT OFFICE.

JAMES G. HAYDEN, OF NEW LEXINGTON, OHIO.

BOILER.

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Specification of Letters Patent. Patented Mar. 15, 1910.

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To all whom it may concern:

Be it known that I, JAMES G. HAYDEN, a citizen of the United States, and a resident of New Lexington, in the county of Perry and State of Ohio, have invented a new and Improved Boiler, of which the following is a full, clear, and exact description.

This invention relates to boilers, especially useful for supplying hot water to dwellings and the like, and relates more particularly to a boiler adapted to be heated by means of natural gas, and comprising an outer shell and an inner shell forming a flue, a partition dividing the flue into an air chamber and a combustion chamber, and a burner in the combustion chamber, means being provided for regulating the supply of air necessary for the combustion of the gas, the arrangement being such that the gas can be pre-heated to insure thorough combustion.

The object of the invention is to provide a simple, inexpensive and durable boiler for heating water for dwelling houses and the like, which includes a burner especially adapted for the use of natural gas, which can be easily regulated to insure efficient combustion, by means of which water can be readily heated, and which is compact in form.

The invention consists in the construction and combination of parts, to be more fully described hereinafter, and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both figures, and in which,

Figure 1 is a longitudinal section, on the line 1—1 of Fig. 2, of a boiler constituting an embodiment of my invention; and Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

Before proceeding to a more detailed explanation of my invention, it should be clearly understood that, while the same is particularly useful for supplying hot water in dwellings and the like, it can also be advantageously applied to other similar purposes.

I provide a special burner in connection with the boiler, which is particularly useful with natural gas. However, any other suitable fluid fuel adapted to the purpose can be used as well. It is known that natural gas,

when used for heating purposes, operates with the production of greater heat when it is pre-heated before ignition. My burner provides means for pre-heating the gas. It is also essential to regulate the supply of air, so that the combustion of the gas can be controlled, and I provide means which can be easily operated from the outside of the boiler, for simultaneously regulating the flow of air from the air-chamber to the combustion-chamber through the various inlets of the combustion-chamber.

In the accompanying drawings, I have shown for example a cylindrical boiler having a single flue extending therethrough. It will be understood that the boiler may have any other suitable form, and if so desired, a number of flues may be provided therein, each of the flues, if so desired, including a burner or a plurality of burners. The boiler is connected with a chimney or other suitable outlet conduit, to permit the gases of combustion to escape freely.

Referring more particularly to the drawings, I provide an outer shell of cylindrical form. Within the outer shell is located an inner shell or cylinder, substantially smaller in diameter than the outer shell and eccentrically located with respect thereto. The longitudinal axis of the inner shell is preferably located above the corresponding axis of the outer shell, as is clearly shown in Fig. 2. At the respective ends, the boiler has heads 12 and 13, which are of any suitable form, and are secured in place in any convenient manner; for example, the heads have angularly-disposed flanges 14 engaging at the inside the ends of the outer shell. The inner shell may have outwardly-disposed flanges 15 set against the heads. It will be understood that the parts can be riveted or otherwise suitably joined.

The head 13 has an opening provided with an outwardly disposed rim against which fits tightly a door 17 mounted to swing by means of hinges 18. The door has a window 19, in which is fitted isinglass or the like, so that the interior of the inner shell can be viewed from the outside. Underneath the door 17, the head 13 has a further opening 20, against which fits securely a closure 21 mounted to open and shut upon hinges 22. The closure has a draft-opening 23 and a slidable shutter 24 adapted to close the opening 23.

The head 12 has an opening 25, in which is

fitted a collar 26 having at the inside of the head an outwardly-disposed flange 27. The collar can be connected in any suitable way with a chimney or the like.

5 Within the flue formed by the inner shell is arranged a substantially horizontal longitudinal partition 28, which divides the flue into a lower or air chamber A and an upper or combustion chamber B. The partition is secured in place in any suitable manner and extends the entire length of the flue and from side to side of the same, having the edges 29 downwardly-disposed to seat against the sides of the flue and against the heads. The partition has a plurality of openings therethrough, in which are arranged upwardly-extending air-pipes 30, for a purpose which will appear more clearly hereinafter. Underneath the flue is positioned a movable sliding plate 31 adjustably held in place by offset brackets 32 secured at the under side of the partition. The sliding plate has openings 33 therethrough adapted to register respectively with the air-pipes 30 in a predetermined position of the plate. The latter has a stem 34 projecting through an opening of the head 13 on the outside of the boiler, where it is provided with a grip 35, so that the plate can be easily manipulated. By moving the plate, the lower opening of the air-pipes 30 can be more or less obstructed to regulate the passage of air from the air-chamber to the combustion chamber.

35 Within the combustion-chamber are located two burner casings 36, substantially rectangular in form, and each consisting of an upper or pre-heating chamber 37 and a lower or flame-chamber 38, being divided by a substantially horizontal wall 39. It will be understood that any desired number of casings can be employed, depending upon the size and purpose of the boiler. Each casing has a gas inlet pipe 40 extending longitudinally to the air-chamber and upwardly-disposed through openings in the partition 28 to the preheating chamber, so that the gas first enters the latter. Gas outlet pipes 41 extend from the preheating chambers through the partition to the air-chamber of the flue and have discharge nozzles 42 under flame-chamber inlets 43. The latter extend through openings of the partition to the air chamber of the flue, where they are outwardly flared. The flame-chambers of the burner casings have partitions 44 through which the gases escape and at which they are burned. The air pipes 30 are arranged to discharge at points adjacent to the peripheral side of the burner casings, so that the air is supplied at the points of combustion. The sliding plate has suitable slots through which the pipes 40 and 41 and the inlets pass.

65 The water to be heated is located between

the outer and the inner shell. The latter has an inlet 45 and an outlet 46, connected respectively with the supply system and the outlet.

The opening 23 and the shutter 24 are used to regulate the air entering the air-chamber of the flue. The sliding plate controls the air fed to the burners, and the combustion of the gas can thus be properly regulated. Needless to say, the gas inlet pipes are provided with suitable means, such as valves, for controlling the flow of gas therethrough.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. A boiler, comprising an outer shell, a flue therein consisting of an air chamber and a combustion chamber, a burner in said combustion chamber, said chambers being in communication whereby air can escape from said air chamber to said burner in said combustion chamber, and a conduit for conducting fluid fuel to said burner, said conduit being partly in each of said chambers.

2. A boiler, comprising an outer shell, an inner shell having a flue, a partition dividing said flue into an air chamber and a combustion chamber, a burner in said combustion chamber, a conduit for conducting fluid fuel to said burner, said conduit being partly located in said combustion chamber, whereby the fuel is pre-heated, said partition having openings therethrough permitting the escape of air from said air chamber to said combustion chamber, and a member for adjusting said opening to control the air passing through said opening.

3. A boiler having a flue, a partition in said flue dividing the same into a combustion chamber and an air-chamber, a plurality of burners in said combustion chamber, means for controlling said burners independently of one another, said partition having a plurality of openings therethrough for permitting air to pass from the said air-chamber to said combustion-chamber at said burners, and means for simultaneously regulating the flow of air through all of said openings.

4. A boiler, comprising an outer shell, an inner shell forming a flue, a partition dividing said flue into an air-chamber and a combustion chamber, a burner in said combustion chamber, a pipe for conducting fluid fuel through said air-chamber into said combustion chamber and to said burner, and means for controlling the escape of air from said air-chamber to said burner said pipe being located partly in said combustion chamber.

5. A boiler having a flue therein, a partition dividing said flue into an air chamber and thereabove a combustion chamber, a burner casing in said combustion-chamber

and comprising a pre-heating chamber and a flame-chamber, said partition having openings therethrough, a fuel inlet pipe discharging within said pre-heating chamber, 5 a fuel outlet pipe passing from said pre-heating chamber through said partition into said air-chamber of said flue and having a discharge nozzle therein, and a flame-chamber inlet extending through said partition 10 and having an opening adjacent to said nozzle.

6. A boiler having a flue therein, a partition dividing said flue into an air chamber and a combustion chamber, burner casings 15 in said combustion chamber and each comprising a pre-heating chamber and a flame-chamber, said partition having a plurality of openings therethrough, a movable member for adjusting said openings, inlet pipes 20 for introducing fuel into said pre-heating chambers, and outlet pipes for conducting the fuel from said pre-heating chambers,

said flame-chambers having inlets, said outlet pipes discharging at said inlets, said flame-chambers having perforations. 25

7. A boiler having a flue therein, a partition dividing said flue into an air chamber and a combustion chamber, said partition having a plurality of openings therethrough arranged in spaced series, a burner casing 30 between said series of openings, air pipes leading from said openings to points adjacent to the sides of said burner casing, a member for adjusting said openings of said partition, and a conduit for introducing fuel 35 into said burner casing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES G. HAYDEN.

Witnesses:

B. B. FRISTOE,
R. G. THARP.