June 15, 1926. 1,589,162

J. S. HILLYER

BOILER

Filed May 24, 1924

Fig. 1.

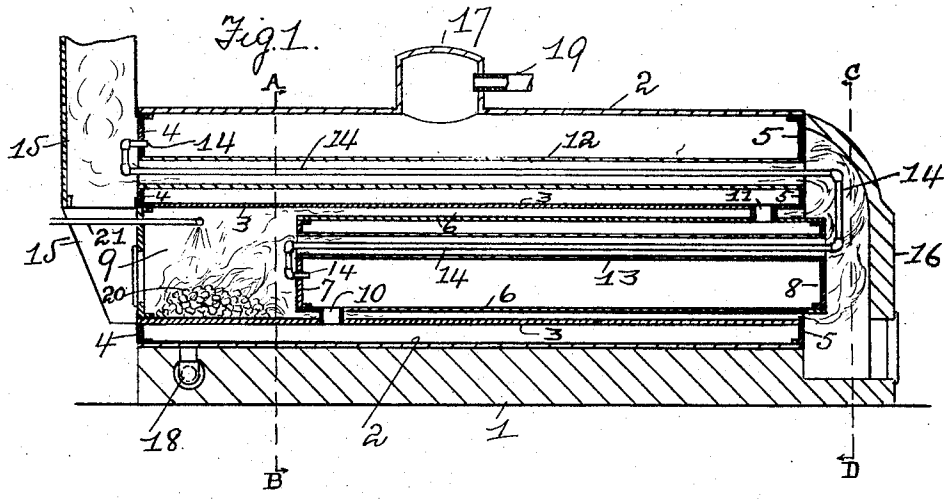


Fig. 2.

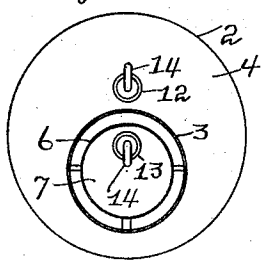


Fig. 3.

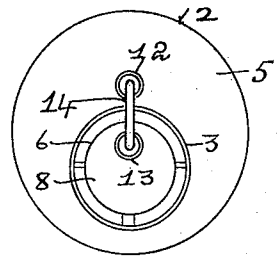
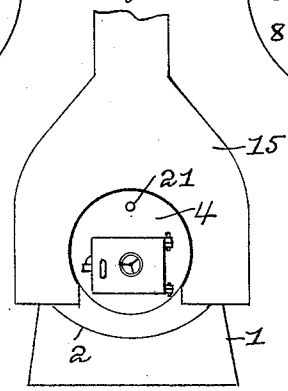


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES S. HILLYER, OF DULUTH, MINNESOTA.

BOILER.

Application filed May 24, 1924. Serial No. 715,705.

My invention relates to steam or hot water boilers and has for its object the provision of an improved boiler of that type for heating or power purposes. It consists of the structures, combinations and arrangements of parts hereinafter described and claimed.

In the drawings, Fig. 1 is a central vertical longitudinal section through one form of my said invention. Fig. 2 is a vertical transverse section of the same on the line A—B of Fig. 1. Fig. 3 is a vertical transverse section on the line C—D of Fig. 1. Fig. 4 is a front elevation of said invention.

In the drawings, 1 is a base of any suitable material or construction upon which the boiler embodying my invention rests. Said boiler comprises an exterior tank provided with an exterior side shell 2, an interior side shell 3, and opposite end walls or heads 4 and 5 respectively; an interior tank within said interior wall and spaced therefrom, said interior tank being provided with a side wall 6 and opposite end walls or heads 7 and 8, respectively. Said interior tank is preferably shorter than said exterior tank, the forward end of said exterior tank being preferably arranged to extend a considerable distance forward of the front end of said interior tank whereby a fire chamber 9 is provided in the forward end of said exterior tank.

Said tanks are connected in any suitable manner as by couplings 10 and 11 to provide direct circulation from one to the other.

Extending through each of said tanks are any suitable number of fire flues as 12 and 13, respectively.

Said tanks are further connected by any suitable number of water circulation pipes as 14, each of which circulation pipes communicates at one end with the free body of water at one end of said interior tank and extends through one of said flues to the opposite end of said interior tank, thence returns through one of said flues in said exterior tank and discharges into the free body of water in said exterior tank. While any suitable number of said flues and circulation pipes may be used, I have, in order to avoid confusion, shown only one of said flues in each of said tanks, and only one of said water circulation pipes.

A smoke chamber and stack 15, of any suitable construction, is provided at one end of said boiler, and a recessed cover 16 of any suitable structure or material is provided at the opposite end of said boiler. If desired the outer tank may be provided with a steam dome 17.

A water feed or supply pipe 18 communicates with said exterior tank, preferably at or near the bottom thereof, and preferably near the forward end thereof. A discharge pipe 19 for steam or hot water communicates in any suitable manner or place with said exterior tank preferably at or near the top thereof.

It will be observed that the space between said tanks is adapted to operate as a fire flue of great area through which the heated gases pass in a thin stream or current from which the heat is rapidly absorbed by said tanks. Also it will be observed that the water circulation pipes extending through said fire flues compels the gases to flow through said flues in a tubular current from the interior of which the heat is absorbed by said circulation pipe and from the exterior of which the heat is absorbed by the inclosing tank or tanks. Thus there is no central strata to the currents of hot gases to retain and carry away and waste the heat.

Any suitable fuel may be used to fire said boiler and any suitable apparatus may be installed in said combustion chamber to receive or manipulate or feed such fuel. In the drawings I have shown for this purpose a pile of refractory material as broken brick, 20, deposited upon the floor of said chamber, upon which brick fuel oil is sprayed from a pipe, 21, entering said chamber through its forward end.

It is obvious that said structure may be modified in various particulars within the spirit and scope of certain of my claims.

What I claim is—

1. In a boiler, the combination of an exterior tank, an interior tank extending into said exterior tank and spaced therefrom, connecting means for permitting the circulation of water from one to the other of said tanks, a fire flue extending through one of said tanks, another fire flue extending through the other of said tanks, and a water circulation pipe extending through both of said flues, one end of said circulation pipe communicating with the interior of one of said tanks and the opposite end of said circulation pipe communicating with the interior of the other of said tanks.

2. In a boiler, the combination of a tank containing a water chamber between its in-

terior and exterior surfaces, a second water chamber extending partly through said tank and spaced therefrom, connecting means for permitting the circulation of water from one to the other of said chambers, a combustion chamber within said tank forward of said second chamber, fire flues extending through the first chamber, other fire flues extending through the second chamber, a smoke box and stack for inclosing the forward end of said boiler, and a cover for the rear end of said boiler.

3. In a boiler, the combination of a tank containing a water chamber between its interior and exterior surfaces, a second water chamber extending partly through said tank and spaced therefrom, connecting means for permitting the circulation of water between said chambers, a fire flue extending through one of said chambers, another fire flue extending through the other of said chambers, a water circulation pipe extending through both of said flues, said circulation pipe being adapted to communicate at one of its ends with one of said chambers, and at its opposite end with the other of said chambers, a combustion chamber within said tank, a smoke box and stack at one end of said tank, a cover at the opposite end of said tank, a pipe for supplying water to said first chamber, and a discharge pipe for said first chamber.

In testimony whereof, I hereunto affix my signature.

JAMES S. HILLYER.