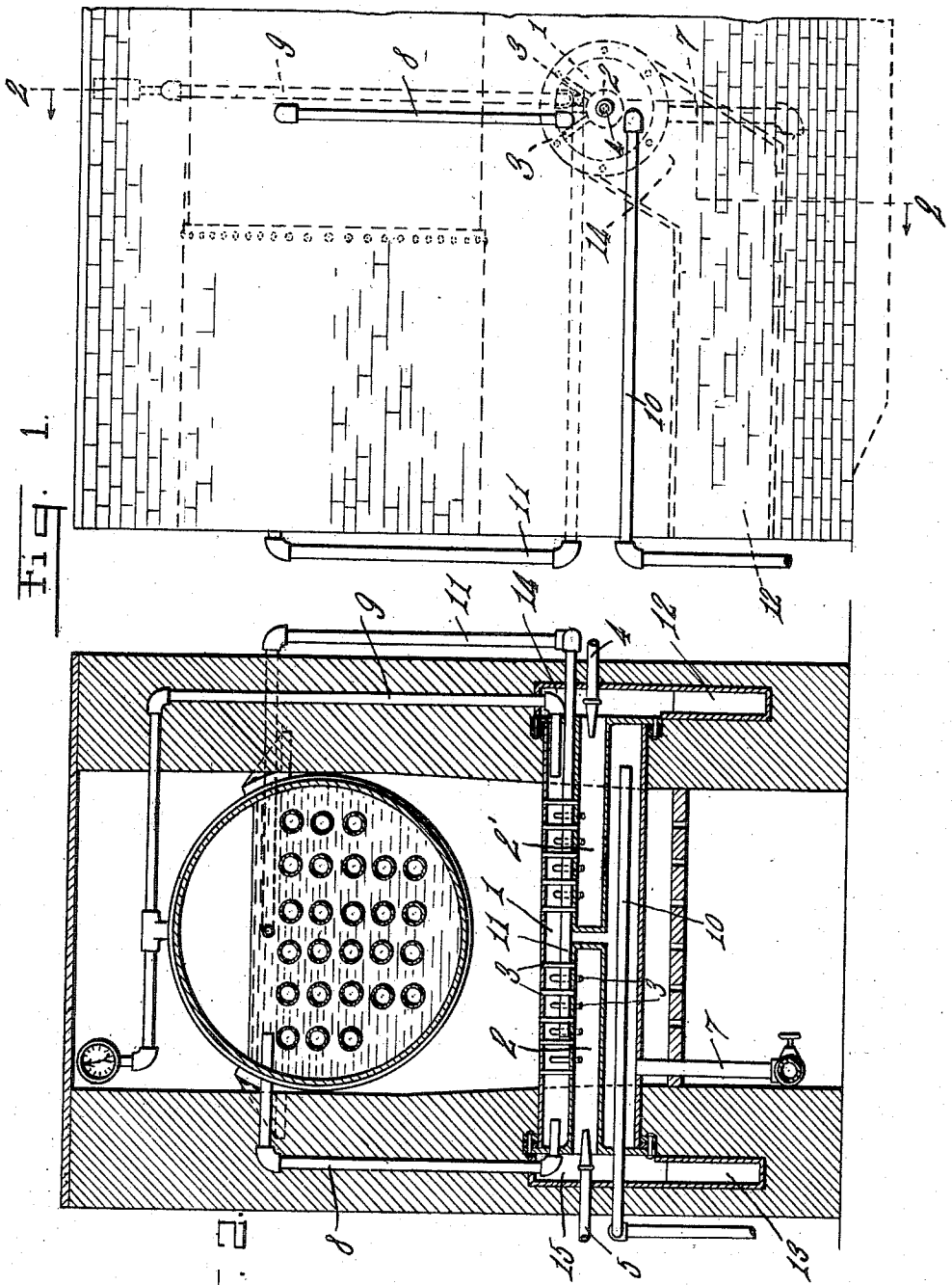


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 FEED WATER HEATER AND SMOKE CONSUMER.  
 APPLICATION FILED AUG. 12, 1909.

972,772.

Patented Oct. 11, 1910.



Witnesses  
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# UNITED STATES PATENT OFFICE.

GEORGE C. MILLER, OF FITCHBURG, MASSACHUSETTS.

FEED-WATER HEATER AND SMOKE-CONSUMER.

972,772.

Specification of Letters Patent.

Patented Oct. 11, 1910.

Application filed August 12, 1909. Serial No. 512,604.

*To all whom it may concern.*

Be it known that I, GEORGE C. MILLER, a citizen of the United States, residing at Fitchburg, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Feed-Water Heaters and Smoke-Consumers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a combined smoke consumer and feed water heater.

One object of the invention is to provide a simple and efficient device for supplying heated fresh air to mingle with the gases as the pass over the bridge wall of the boiler furnace and thereby aid combustion.

Another object of the invention is to provide for the passage of the boiler feed water through said device to increase the temperature thereof.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claim.

In the accompanying drawings: Figure 1 is a side elevation of a boiler equipped with this improvement; Fig. 2 is a transverse vertical section, taken on the line 2—2 of Fig. 1, looking in the direction of the arrows.

In the embodiment illustrated the device is shown applied to a stationary boiler and comprises a tank 1 constructed of steel, iron, copper or other suitable material adapted to withstand the working pressure of the boiler to which it is applied. This tank 1 is arranged laterally in the bridge wall extending transversely under the boiler and is partially or wholly exposed to the fire. Air pipes 2 and 2' are arranged centrally within the tank and preferably extend throughout the greater portion of its length having their inner ends closed and spaced apart to permit the free circulation of water between them and with their outer ends opening through the ends of the tank. A plurality of air vent pipes as 3 extend from the air pipes 2 and 2' through the upper wall of the tank 1 and discharge above the bridge as is shown clearly in Figs. 1 and 2 whereby the air passing therethrough is thoroughly commingled with the gases passing over the

bridge and a thorough combustion is produced thereby consuming all smoke. The air pipes 2 and 2' are provided at their outer ends with steam jets 4 and 5 which are designed for cleaning out said pipe by the injection of steam thereinto and may also be used for injecting steam to draw in air which is commingled therewith and discharged through the pipes 3 thereby facilitating the combustion of the gases. A valved blow off pipe 7 is connected with the tank 1 for blowing off sediment and mud when necessary.

A pipe 8 connects the tank 1 with the boiler below the water level thereof and is designed for supplying water to said tank and a pipe 11 is also connected at one end with the tank 1 and at its other end it is connected with the boiler at a point below the water level thereof to complete the circulation and keep the tank filled with water whereby burning out thereof is prevented. Another pipe 10 is connected with the feed water pipe from a pump (not shown) and extends through and discharges into the tank 1 and by means of the pipe 11, the water which is heated in said tank 1 is conducted to the boiler.

A pipe 9 is connected at one end with the steam space of tank 1 and at its other end discharges into the steam space of the boiler and is designed to discharge steam generated in tank 1 into the boiler steam space. The tank 1 thus performs the double function of an auxiliary steam generator and feed water heater and as means for supplying air to the furnace over the bridge wall thereof.

The air pipes 2 and 2' are connected at their outer ends with air openings 12 and 13 by means of pipes 14 and 15 and when the tank and boiler have been filled with water and the fire started in the fire box fresh outside air will enter through the openings 12 and 13 and passing through the pipes 14 and 15 into pipes 2 and 2' and will be discharged through the small vent pipes as 3 at a point above the bridge wall whereby the fresh air so supplied is thoroughly commingled with the gases as they pass over the bridge wall completing the combustion thereof and avoiding the production of smoke and economizing in fuel, the water in tank 1 being primarily designed to prevent the burning out of said tank.

From the foregoing description taken in connection with the accompanying draw-

ings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

5 Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended claim.

10 I claim as my invention;

15 The combination with a boiler, of a tank arranged above the fire box of said boiler in the bridge wall thereof, air pipes extending longitudinally of said tank from opposite ends thereof with their inner ends closed

and spaced apart, said air pipes being spaced from the inner side walls of said tank, a plurality of vent pipes extending transversely through said tank into said air pipes, means for supplying water to said tank and steam jets discharging into the open ends of said air pipes.

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

GEORGE C. MILLER.

Witnesses:

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FESTUS C. CURRIER.