

P. DORAN.
STEAM BOILER FURNACE.
APPLICATION FILED MAR. 1, 1909.

953,023.

Patented Mar. 29, 1910.

Fig. 1.

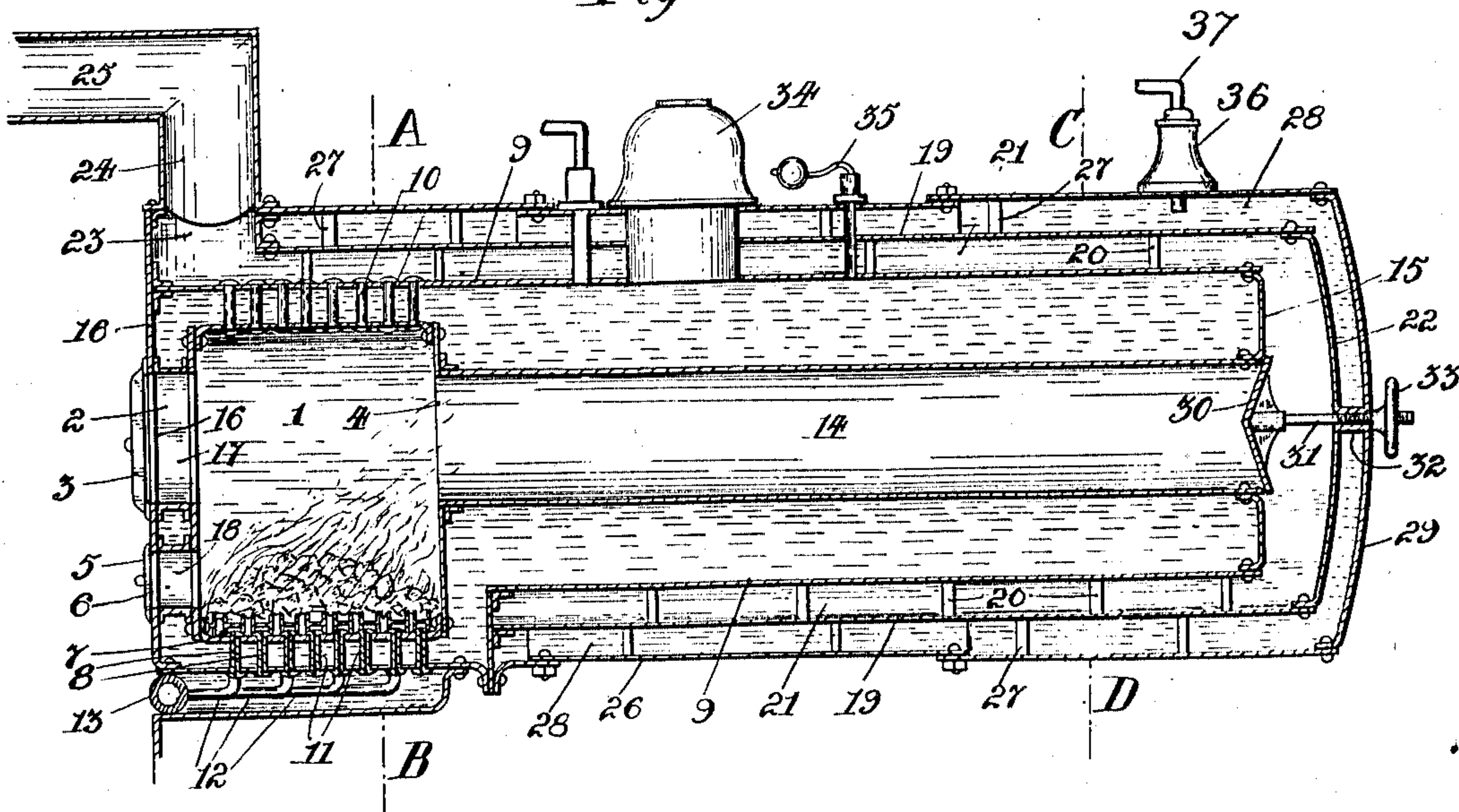
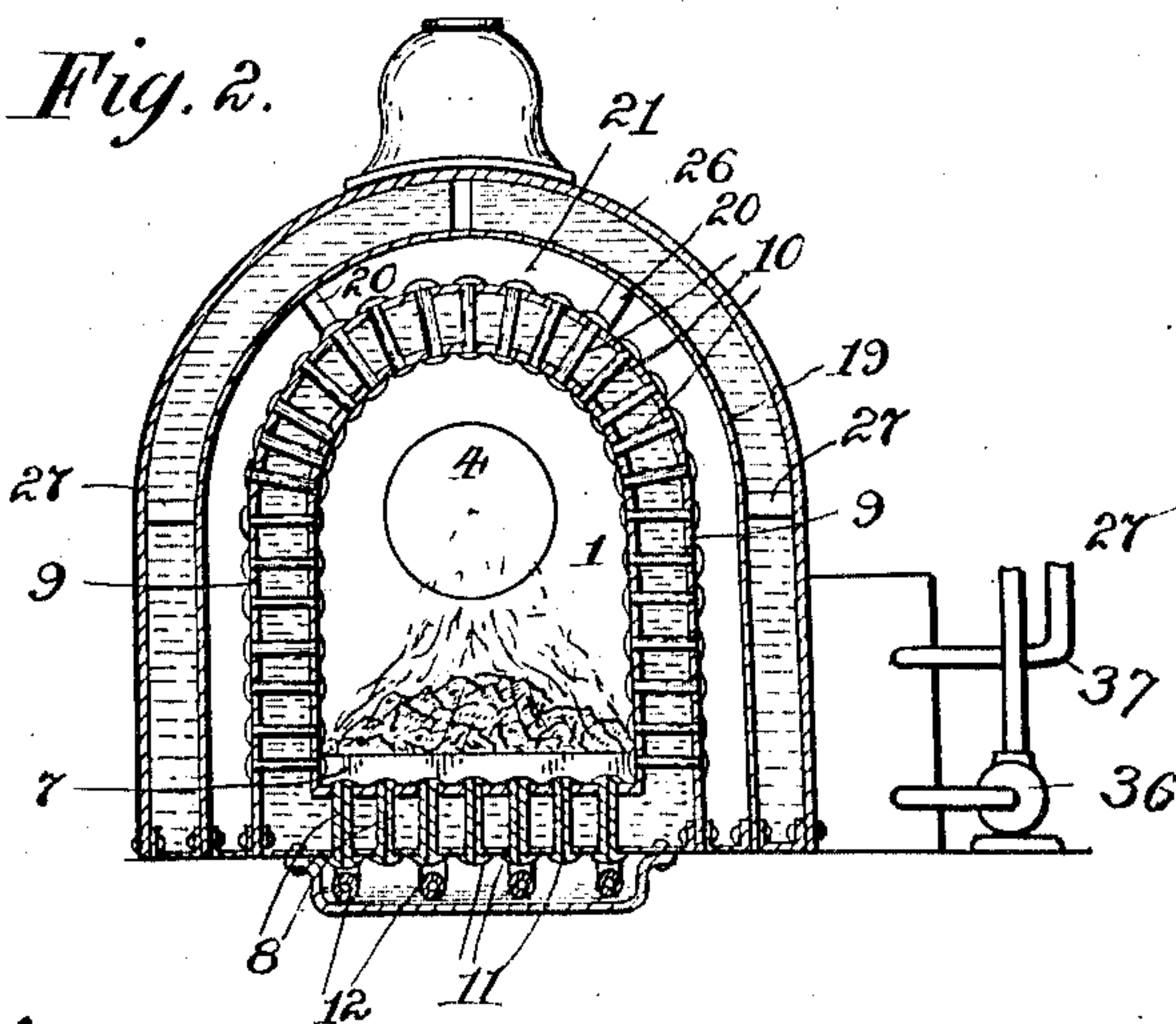


Fig. 2.

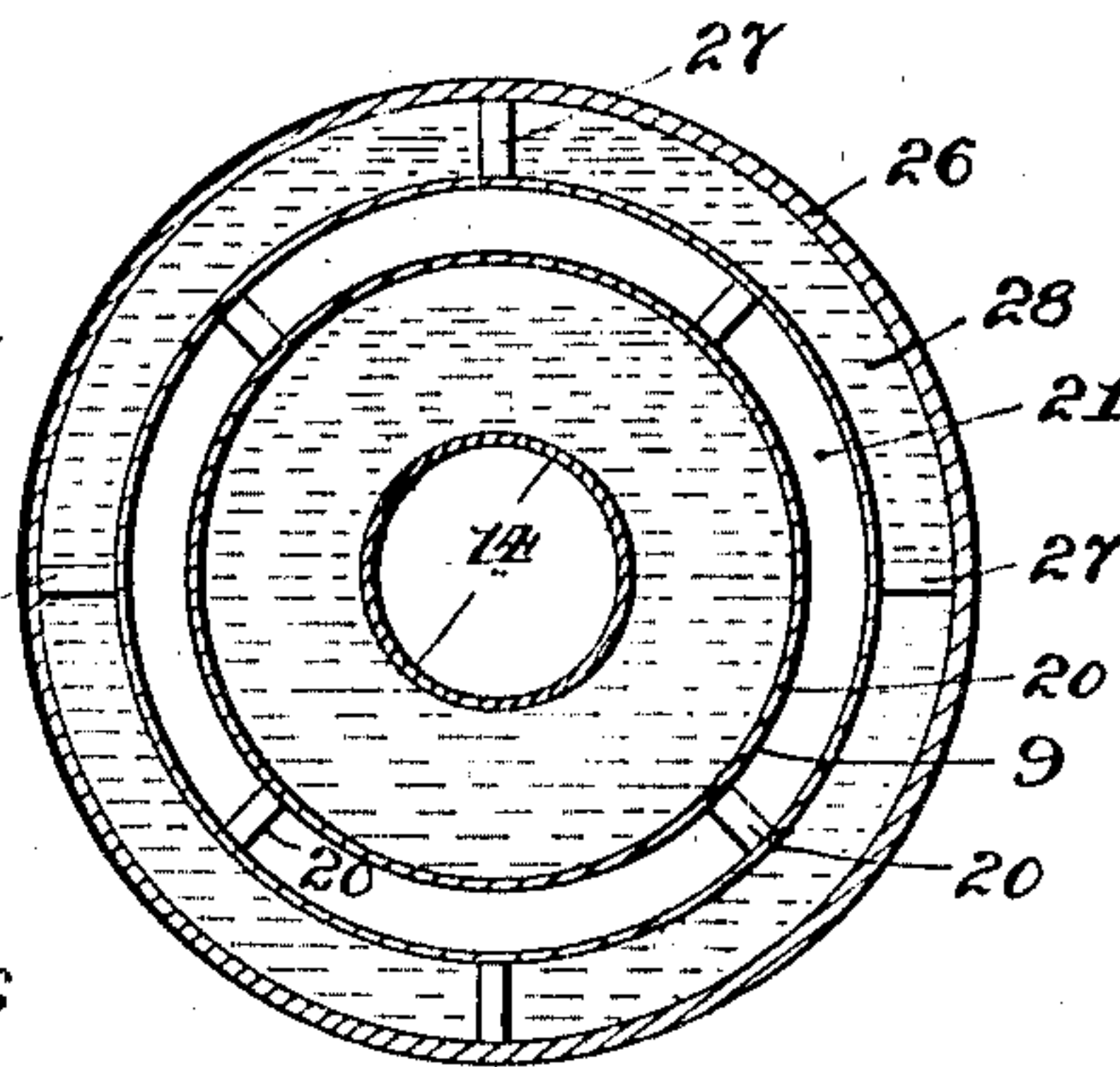


Witnesses.

Harry Davis.

Ben Sigeon

Fig. 3.



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UNITED STATES PATENT OFFICE.

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STEAM-BOILER FURNACE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PATRICK DORAN, a citizen of the United States of America, residing at 48 Conroy street, in the city of Quebec, in the Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Steam-Boiler Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same.

The invention relates to improvements in steam boiler furnaces, as described in the present specification and illustrated in the accompanying drawings that form part of the same.

The invention consists essentially in the novel arrangement and construction of parts, whereby a forced draft emanating from a compressed air reservoir reaches the fire box through the stay bolts supporting the floor of the fire box, the fuel resting directly on said floor and whereby the gases are retained in the said fire box by a suitable stop on a central flue during the consumption of the smoke.

The objects of the invention are to economize in the consumption of fuel, to devise a furnace particularly applicable to marine boilers and locomotive boilers but applicable to other purposes and generally to provide an efficient device of simple and comparatively cheap construction.

In the drawings, Figure 1 is a longitudinal vertical section through a steam boiler and furnace. Fig. 2 is a cross section on the dotted line A—B in Fig. 1. Fig. 3 is a cross section on the dotted line C—D in Fig. 1.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings 1 is the fire box here shown as having the customary door opening 2 and door 3 and the flue opening 4 from the rear wall thereof, said box also having the ash door 5 closing the opening 6 immediately above the substantially solid flooring and fuel support 7 and said flooring or fuel support having a plurality of air holes 8 therethrough.

9 is the shell of a steam boiler, in which the fire box is shown as contained, said fire box 1 being rigidly secured centrally toward one end of said boiler by the stay

bolts 10 and 11, the stay bolts 11 are shown in plurality extending upwardly and through the boiler shell and are of tubular construction, so that there is a clear passage.

12 are branch pipes leading to the several tubular stay bolts 11 from the main supply pipe 13, the latter leading from a compressed air reservoir, thus a forced draft by means of the compressed air can be sent into the fire box from the compressed air reservoir through or around the stay bolts 11.

14 is a flue longitudinally arranged within the shell 9 and extending from the flue opening 4 centrally through the head 15, closing in the end of the shell 9, said shell being closed at the other end by the head 16, in which is the door opening to which the doors 3 and 5 are attached.

17 and 18 are passages formed between the head 16 and the fire box 1, the latter being well within the inner boiler shell 9 so as to form a complete water space around said fire box, the stay bolts 10 and 11 spacing said fire box from said shell at the top, bottom and sides.

19 is the middle shell encircling the shell 9 and spaced therefrom by the stay bolts 20 forming the heating gas space 21 and extending from the head 16 to the head 22, the latter being beyond the head 15.

23 is an outlet from the inner end of the space 21 having a pipe 24 leading therefrom, said pipe being connected to a distributing pipe 25.

26 is the outer shell suitably spaced from the middle shell 19 by the stay bolts 27 forming a water jacket 28, said outer shell 26 extending from the head 16 to the head 29, the latter being beyond the head 22.

30 is a stop closing the flue opening in the head 15.

31 is a threaded spindle secured to the stop 30 and extending outwardly through the middle and outer shell within a suitable block 32.

33 is a hand wheel having a correspondingly threaded hub to the spindle 31 and turning thereon and adapted on rotation to open or close the stop 30.

It will be thus seen that the flue 14 may be opened and closed according to the state of the fire in the fire box, thus retaining any

fouling gases passing into the space 14 or therebeyond before they are consumed in the fire box.

34 is a steam dome receiving the steam from the boiler.

35 is a safety valve.

36 is a steam chest receiving the steam from the water jacket 28.

In the operation of this furnace the firing up of the furnace is accelerated by a blow lamp, thus the fuel reaches its state of incandescence in a comparatively short time, consequently the air which has been turned on through the branch pipes 12 mixes with the gases and is consumed thereby aiding in the combustion of said fuel, as well as creating a forced draft in the fire box. The heating gases flow through the flue and opening therefrom to the space 21 encircling the boiler and completely envelop the water in said boiler, consequently there is an inner and outer heating surface which very rapidly generates steam, the heating gases proceeding in their flow further from said space through the pipe 24 into the distributing pipe 25.

In this invention, the arrangement of the furnace is, of course, the salient feature, that is the furnace, the flues and the heating spaces, and with modifications it can be used for various purposes such as for blast furnaces and all kinds of melting furnaces, but the particular purpose and form described herein is the most useful as it is very applicable to marine boilers in sea going vessels where the salt water can be pumped into the water jacket and steam generated therefrom and said steam condensed and returned to the main boiler in the form of water.

What I claim as my invention is:

1. In a steam boiler furnace, a fire box having a plurality of holes in its flooring or fuel support, a compressed air reservoir, a plurality of pipes leading to said holes and fed from said reservoir, a flue extending from said fire box, a stop secured to the end of said flue, a casing inclosing said fire box and flue and forming a heating gas space

having an outlet beyond said stop and flue, means for opening and closing the said stop, and a pipe leading from outlet of said heating space.

2. In a steam boiler furnace, a fire box, a casing inclosing said fire box and having an extending portion therefrom, a flue projecting from said fire box within the extending portion of said casing, a stop secured on the end of said flue, means for opening and closing said stop, a plurality of stay bolts spacing said fire box from said casing, a plurality of tubular members forming stay bolts and air passages into said fire box, a compressed air reservoir suitably connected to said tubular members, and a plurality of shells inclosing a portion of the aforesaid casing and forming a heating gas chamber, and an auxiliary chamber for substances to be heated.

3. In a device of the class described, in combination, an inner, a middle and an outer shell suitably spaced apart forming a water boiler, a heating gas space and a water jacket in the spaces within and therebetween, a fire box having a substantially solid flooring or fuel support, a plurality of hollow stay bolts leading from said inner shell to the bottom of said fire box and forming passages therein and spacing said fire box from said inner shell, said fire box having an ash door opening adjacent to the flooring thereof and a fuel opening thereabove, a plurality of pipes leading to said hollow stay bolts, an air reservoir suitably connected to said pipes, a flue leading from said fire box centrally and longitudinally through said water boiler, a stop at the end of said flue, means for opening and closing said stop and a distributing pipe leading from said heating gas space.

Signed at the city and district of Montreal, in the Province of Quebec, in the Dominion of Canada, this 17th day of February, 1909.

PATRICK DORAN.

Witnesses:

G. H. TRESIDDER,
P. SHEE.