March 8, 1932. W. A. HAGSTRUM 1,848,878

STEAM BOILER

Filed May 2, 1930 2 Sheets-Sheet 1

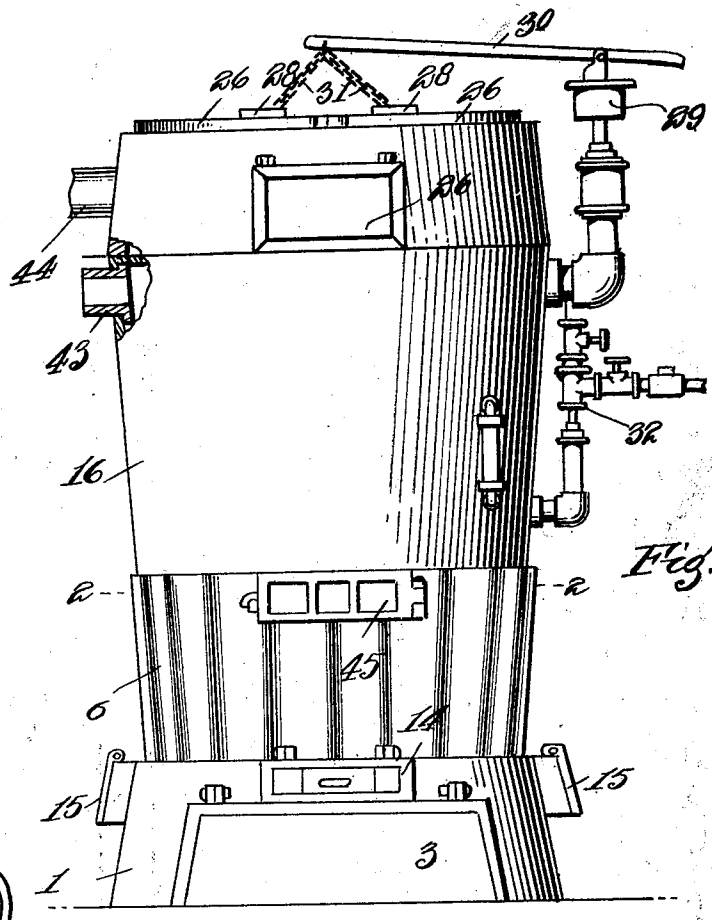


Fig. 1.

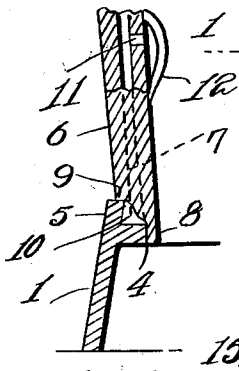


Fig. 7.

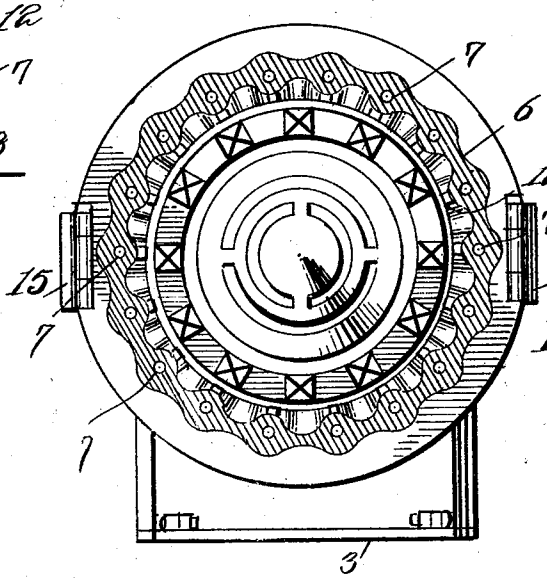


Fig. 2.

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Fig. 3

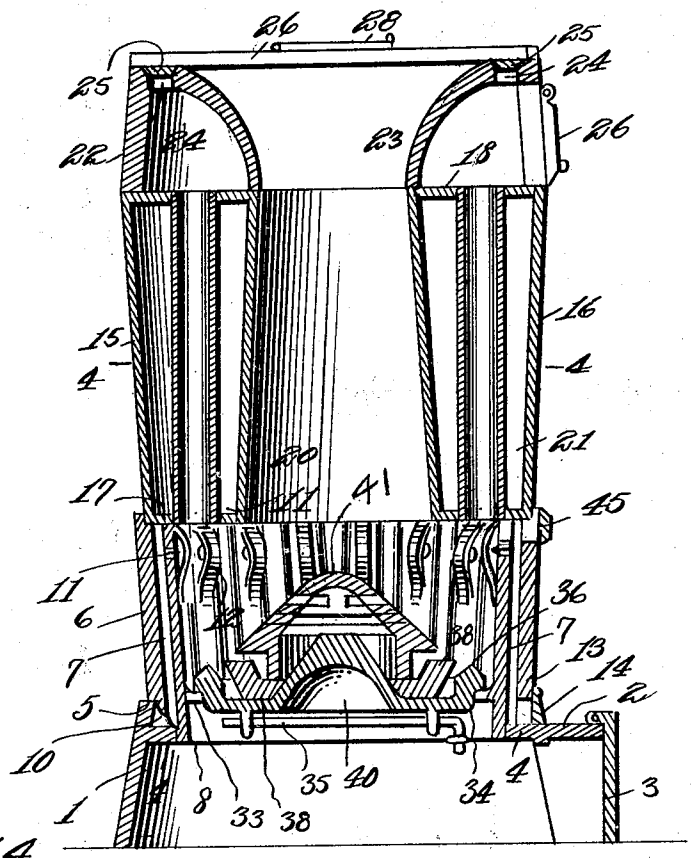


Fig. 4.

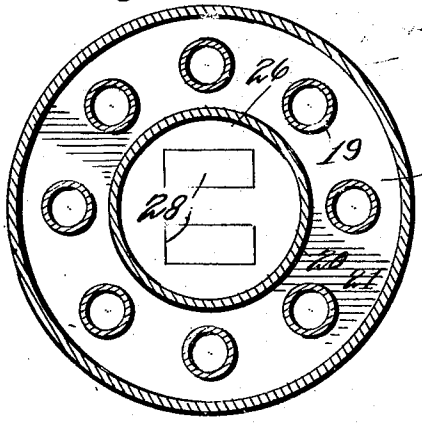


Fig. 5

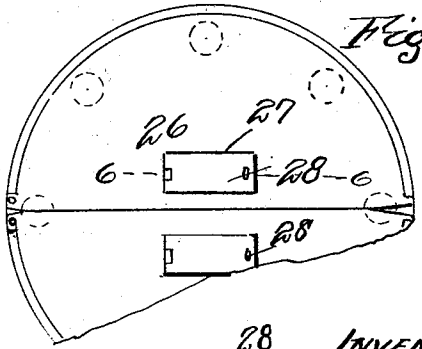
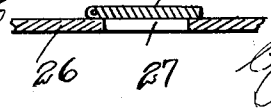


Fig. 6



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UNITED STATES PATENT OFFICE

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STEAM BOILER

Application filed May 2, 1930. Serial No. 449,304.

The present invention is directed to improvements in steam boilers for domestic purposes, but is not necessarily limited to such use.

The primary object of the invention is to provide a device of this character so constructed that water in the boiler can be quickly heated to generate steam, the construction being such that the steam may be maintained for a considerable time without refueling the fire bowl, due to the presence of a chute or magazine.

Another object of the invention is to provide a device of this kind constructed in such manner that the coal will be heated by the contents of the boiler.

Another object of the invention is to provide a device of this type wherein a downdraft is prevalent so that the gases liberated from the fuel in the chute or magazine will pass into the combustion chamber of the fire bowl where it commingles with the preheated air flowing into the bowl, thus assuring effective combustion.

With these and other objects in view, this invention resides in the novel features of construction, formation, combination and arrangement of parts to be hereinafter more fully described, claimed and illustrated in the accompanying drawings, in which:—

Fig. 1 is a side elevation of a steam boiler embodying the present invention;

Fig. 2 is a horizontal section through the fire bowl;

Fig. 3 is a central vertical section;

Fig. 4 is a horizontal section through the boiler;

Fig. 5 is a top plan view;

Fig. 6 is a detailed sectional view of one of the draft plates; and

Fig. 7 is a detail vertical section of the fire bowl.

Referring to the drawings, 1 designates a base providing an ash pit which communicates with a housing 2, said housing being equipped with a hinged door 3 to permit removal of ashes. The base is formed with an inturned flange 4 and a vertical marginal flange 5.

The fire bowl 6 has formed in its wall a plurality of vertically disposed ducts 7 of any determinate number, said bowl having its lower end formed with an extension 8 adapted to snugly fit into the opening defined by the flange 4 in order that the shoulder 9 will rest upon the flange 5, thus providing an annular fresh air chamber 10 with which the lower ends of the ducts 7 communicate. Air ports 11 are provided and open into the ducts 7 near their upper ends, said ports opening into the fire bowl.

In order to prevent coal entering the ports 11 and clogging them as well as the ducts 7, bowed guards 12 are cast with the bowl.

At one point the bowl is provided with a door way 13 which opens into the chamber 10, there being a door 14 for the door way to control the admission of fresh air into said chamber. Additional doors may be employed for the same purpose, if desired.

The boiler 16 has its lower header 17 resting upon the upper end of the fire bowl, thus closing the upper ends of the ducts 7, as more clearly shown in Figure 3 of the drawings. The lower header 17 and the upper header 18 have the respective ends of the flues 19 fixed therein, there being an axially disposed fuel chute 20 supported between the headers, and forms in conjunction with the boiler wall, an annular water and steam chamber 21.

A smoke dome 22 is mounted upon the boiler 16 and is provided with a flared fuel intake 23 for the introduction of fuel into the chute 20, or which may be termed a fuel magazine. The dome is provided with a plurality of openings 24, corresponding in number to the flues 19, in order that a brush may be used for cleaning the flues, when necessary, said openings being normally closed by removable lids 25. A door 26 is provided to permit convenient cleaning of the dome.

The fuel intake is normally closed by a pair of pivotally mounted segmental shaped lids 26—26 capable of swinging laterally when opened or closed. Each lid has an opening 27 therein, and cooperative therewith is a hingedly connected draft plate 28 adapted to swing vertically.

A conventional form of thermostat 29 is associated with the boiler and the cooperative

lever 3 thereof is connected with the plates 28 by chains or the like 31, it being obvious that the temperature of the water in the boiler will control the swinging of the draft plates 28 in order to regulate the draft.

Any means, such as a pipe assembly 32 may be employed for replenishing the chamber 21 with water, said assembly being connected with the water service pipe, as customary.

The fire bowl is formed with a horizontal flange 33 upon which is rotatably received the grate ring 34 having a rod 35 connected therewith, which may be connected with a lever in any approved manner to permit agitation of the ring. The ring is provided with lugs 36 which co-act with lugs carried by the auxiliary ring 38, which rests upon the ribs 39 of the rings 34. The ribs support conical head 40 and associated therewith is a conical spreader 41 formed with spaced bars to permit ashes to pass therethrough when the grate is shaken.

Steam generated in the boiler is conducted through the nipple 43 to its point of use. Obviously a number of such connections may be used.

Smoke from the dome 22 may be conducted therefrom through the nipple 44, to which the usual smoke pipe is connected, not shown.

In operation, coal is placed in the chute or magazine to assure a plentiful supply of fuel for the fire bowl, and since the products of combustion pass through the flues 19 the water in the boiler will be effectively heated, the heated water and the steam serves to heat the coal so that it will give off gas, and the preheated air flowing from the ports 11 mixes with the fuel gases and a thorough combustion of gases is obtained, the combustible gases passing upwardly through the flues to the dome 22, and escapes through the nipple or thimble 44.

The thermostat will obviously regulate the opening and closing of the draft plates 28 in order that the proper down draft is assured.

Since the chamber 10 is annular air will be equally distributed to the ports 11, and is obviously preheated before entering the combustion area of the fire bowl.

The fire bowl is provided with a door 45 so that access can be had to the interior thereof to make repairs or replacements.

What is claimed:—

1. A boiler of the class described, comprising a hollow base, a fire bowl mounted thereon and having ducts in its wall, means for admitting fresh air to the ducts, a boiler section having a vertical fuel magazine therein mounted on the fire bowl, a smoke dome upon the boiler section, flues affording communication between the dome and fire bowl and passing vertically through the boiler section, means for conducting air from the ducts into the fire bowl, and a grate construction mounted in the fire bowl.

2. A boiler of the class described, comprising a hollow base having an annular horizontal flange and a vertical flange, a fire bowl having an extension upon its lower end engageable within the confines of the horizontal flange and forming in conjunction therewith and with the vertical flange an annular air chamber, means for admitting air thereto, said fire bowl having ducts therein and ports connecting the ducts and interior of the fire bowl, a boiler section mounted upon the fire bowl and including a fuel feed magazine and heat conducting flues annularly spaced therefrom, means for regulating the draft downwardly through the magazine to the fire bowl, the air from said chamber passing through said ducts and ports into the fire bowl, as and for the purpose set forth.

3. A boiler of the class described, comprising a base constituting an ash pit, a fire bowl mounted thereon and having a plurality of vertically disposed ducts therein and ports communicating therewith, guards carried by the inner surface of the fire bowl and disposed in spaced relation over the inner ends of the ports, means for conducting fresh air into the ducts for discharge from the ports into the fire bowl, and a fire tube boiler section having a vertical fuel magazine provided centrally therein, mounted on the fire bowl.

In testimony whereof I hereto affix my signature.

WILLIAM A. HAGSTRUM.