(No Model.)

2 Sheets—Sheet 1.

D. KING.

BOILER SETTING.

No. 423,170. Patented Mar. 11, 1890.

Fig. 1.

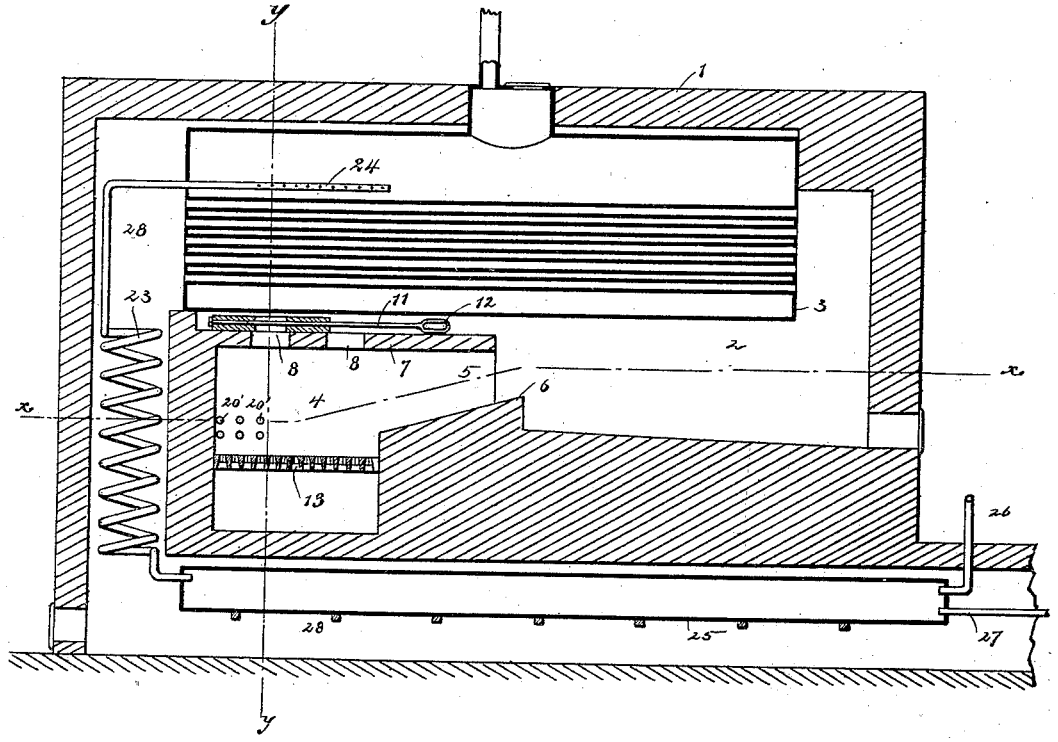
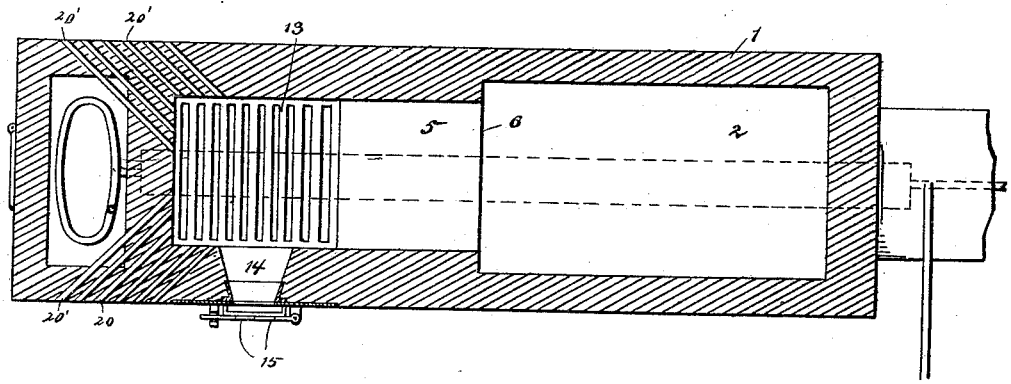


Fig. 2.



WITNESSES:

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(No Model.)

2 Sheets—Sheet 2.

D. KING.

BOILER SETTING.

No. 423,170. Patented Mar. 11, 1890.

Fig. 4.

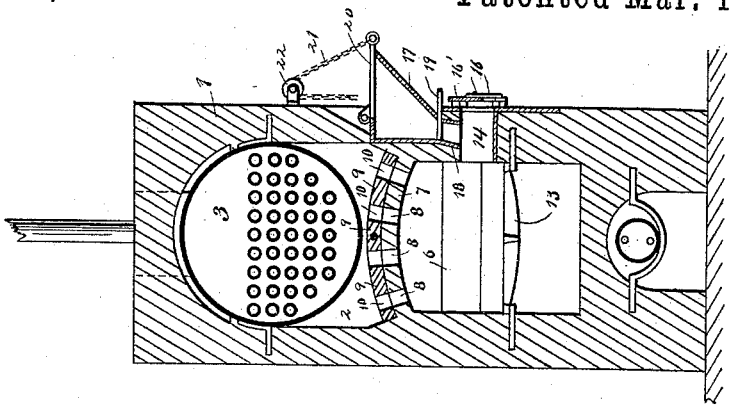
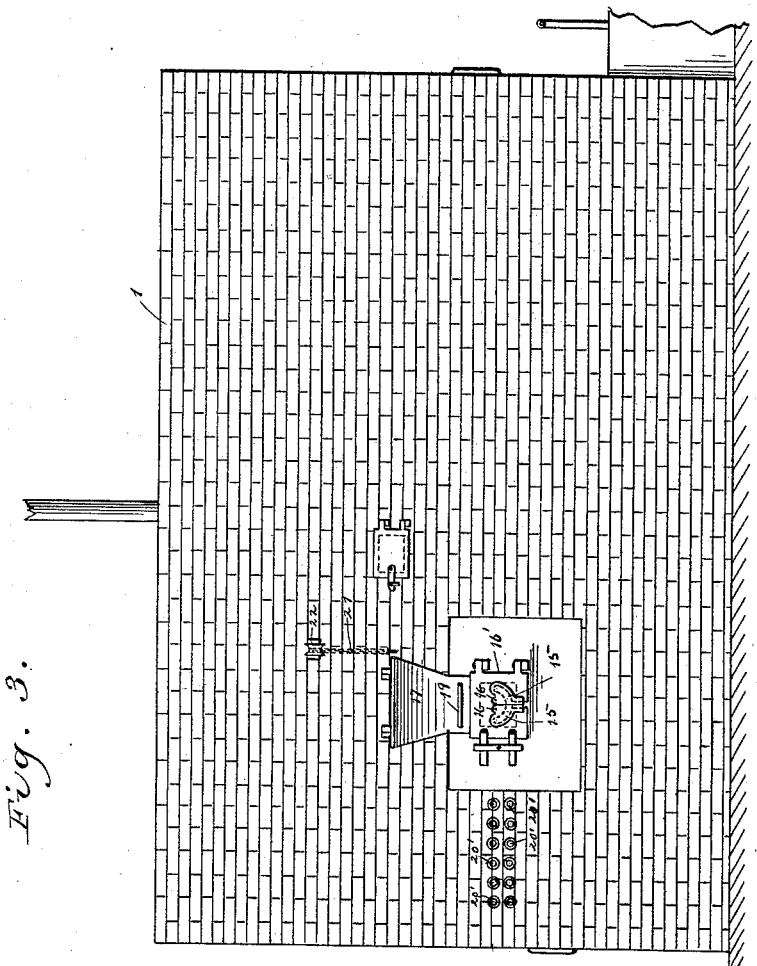


Fig. 3.



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UNITED STATES PATENT OFFICE.

DANIEL KING, OF FINKSBURG, MARYLAND.

BOILER-SETTING.

SPECIFICATION forming part of Letters Patent No. 423,170, dated March 11, 1890.

Application filed April 22, 1889. Serial No. 308,103. (No model.)

To all whom it may concern:

Be it known that I, DANIEL KING, of Finksburg, in the county of Carroll and State of Maryland, have invented a new and Improved Boiler-Setting, of which the following is a full, clear, and exact description.

The invention will be first described, and then specifically pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal vertical sectional view of the invention Fig. 2 is a plan view thereof in horizontal section on the line *x x*, Fig. 1. Fig. 3 is a side elevation of the furnace; and Fig. 4 is an end view in vertical transverse section on the line *y y*, Fig. 1.

In the construction of this invention, 1 indicates the furnace, formed with a chamber 2, in the top of which is mounted a boiler 3.

Underneath a portion of the furnace 1 is located a reverberating combustion-chamber 4 for solid fuel, and extending and having an opening or passage-way 5 over the wide bridge-wall 6 to burn the fuel-gases. The openings 8 in the top of the chamber 4 are controlled by means of fire-brick slides 9, having openings 10, adapted to register with the openings 8, and operated by a rod 11, having a looped or slotted end 12, adapted for connection with a suitable operating rod or handle projecting through an opening in the side of the furnace.

In the wall of the furnace and opening into the combustion-chamber 4 adjacent to the grate-bars 13 is located a side chamber 14. The side chamber 14 is closed by means of a suitable door or doors, and as here shown by means of two curved doors 15, pivoted or hinged at their upper corner, as at 16, to a hinged door 16′, so as to close by gravity, and covering similarly-shaped openings in said door 16′, as shown in dotted lines. By this means the doors 15 cannot be left open and are only intended to be occasionally opened.

To avoid the opening of the doors, and also permit fuel to be fed into the combustion-chamber, a coal-pocket 17 is located about the side chamber 14 with a narrow lower end or neck 18 opening into said chamber 14. Coal is held in the pocket 17 by means of a slide 19, extending and movable across the neck 18 and permitted to be fed into the chambers 14 and 4 by withdrawing the slide 19. The pocket 17 is closed by means of a hinged cover 20, operated by a chain 21, passing over a pulley 22.

In use, a charge of coal in the combustion-chamber 4 having been started, the fuel-gases from the burning coal pass through the opening 5, over the bridge-wall 6, and through the openings 8 in the arch 7, the slides 9 having been opened into the chamber 2, and circulate about the boiler 3. When the brick-work of the arch 7 has become thoroughly heated, the openings 8 are wholly or partly closed. From the pocket 17 a charge of coal is delivered into the chamber 14, and its volatile matter is driven off and ignited by the hot air passing over the previous charge burning on the grate 13. By means of the automatically closing doors 15 the fuel can be spread over the grate without opening the doors any farther than to insert a rod or tool between them. It will thus be seen that by the foregoing-described arrangement of furnace and boiler the heat from the fuel-gases and the fuel will be effectively utilized and the boiler be able to be thoroughly heated.

In order to admit heated air or steam to the furnace when required for combustion of the gases, rows of pipes 20′ are inserted in the sides of the furnace near its front end, and may be regulated on the outside by a register. The steam may be introduced by separate pipes controlled by a valve. Observation-openings fitted by transparent diaphragms are placed at suitable points to permit full view of the fuel-bed. A coil of pipe 23 is located in front of the chamber 4 and has a perforated end 24 located in the boiler, and its other end connected to one end of a mud-drum 25, having at its other end a feed-pipe 26 and a blow-off pipe 27. The coil 23 and drum 25 are located in a chamber 28, communicating with the chamber 2, and are exposed to and heated by the products of combustion.

The advantages of this invention are as follows: thorough combustion of the fuel-gases mixed with air and steam, when necessary, in a highly-heated reverberatory furnace before contact with the boiler-surface; ad-

mitting the air over the fuel in front, expanded very little by heat until its oxygen is given up, thereby carrying the greatest amount of that constituent for the volume of air; the slow driving off and consequent thorough combustion of the volatile matter in the fuel by the air over the incandescent coal and highly-heated broad bridge-wall; heating the feed-water always to the temperature in the boiler before it enters it, thus insuring protection from the incalculable strains of contraction and expansion, and thereby removing that prolific cause of ruptured sheets and explosions; having a mud-drum for the deposit of sediment, lime, salts, &c., with means for blowing off said drum; a minimum of heat lost through the doors, and an entire utilization of all the heat from the fuel and fuel-gases.

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

1. A boiler-furnace 1, having a combustion-chamber 4, provided with a top or arch 7, a bridge-wall 6, a chamber 2 in rear thereof, a boiler-space above the said arch and chamber 2, and a chamber 28, extending from the front end of the boiler-space down in front of and under the combustion-chamber and under the chamber 2, substantially as set forth.

2. A boiler-furnace 1, having a fire or combustion chamber 4, an apertured top or arch 7 therefor, an apertured slide 9 on said top or arch, the bridge-wall 6, the passage 5 between said top or arch and the bridge-wall, the chamber 2 in rear of the bridge-wall, and the boiler-space above the chamber 2 and top or arch 7, substantially as set forth.

3. The combination, with the fire or combustion chamber, of a hinged door 16′, having an opening and two gravity-closing doors pivoted at their upper ends to the face of the door 16′ to swing parallel therewith and abutting at their adjacent vertical inner edges, whereby a rod may be inserted between the said meeting edges and passed into the fire-chamber to act on the fuel, substantially as set forth.

4. The combination, with the combustion-chamber having a fuel-opening 14 and a pocket 17, leading through the top wall of the said opening and having a cover 20 and a slide 19, of the door 16′ at the front of the opening 14 and provided with a transverse curved opening, and the doors 15, hinged to the face of the door 16′ to swing parallel therewith and abutting at their inner vertical edges across the said curved opening, whereby a rod may be passed between said doors 15 to spread the fuel descending from the pocket, substantially as set forth.

5. The combination, with the furnace and the boiler, of the chamber 28, leading downward from the front end of the boiler under the furnace, below its ash-pit, substantially as set forth.

DANIEL KING.

Witnesses:
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WM. MILNES, Sr.