Jan. 3, 1933. W. T. BOSLER 1,893,468

APPARATUS FOR COOLING COKE

Filed Jan. 20, 1926 6 Sheets-Sheet 1

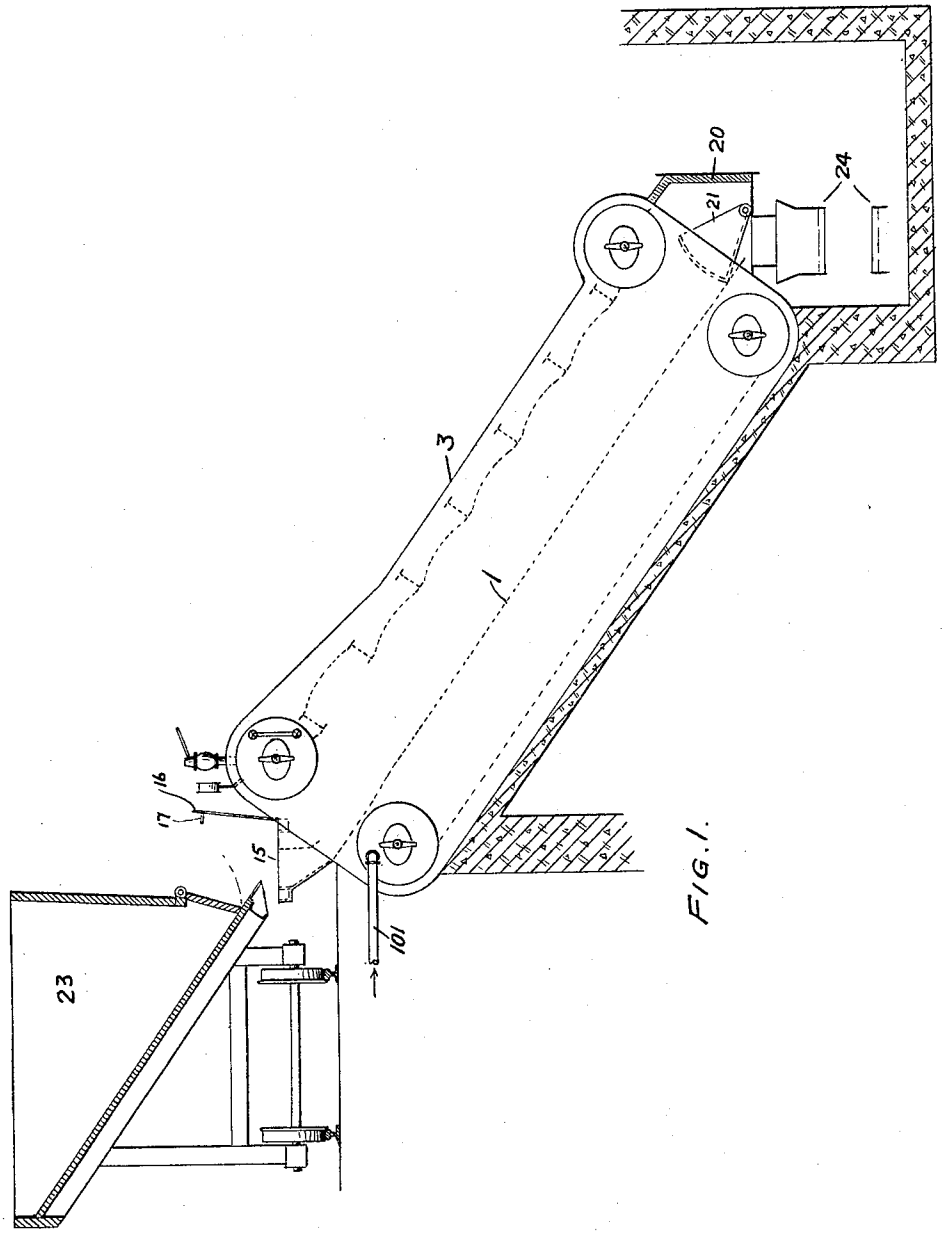


FIG. 1.

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APPARATUS FOR COOLING COKE

Filed Jan. 20, 1926 6 Sheets-Sheet 2

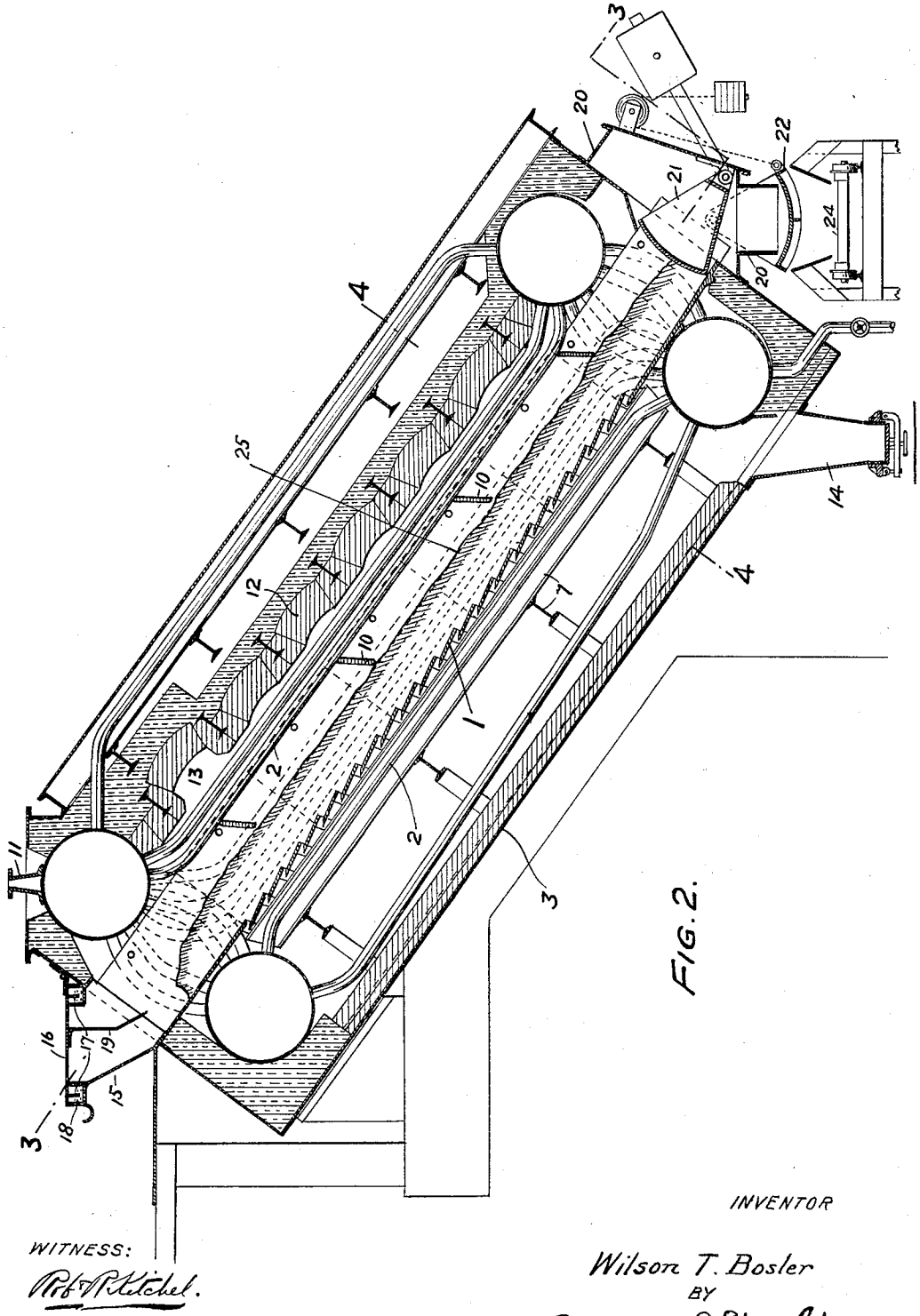


FIG. 2.

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APPARATUS FOR COOLING COKE

Filed Jan. 20, 1926 6 Sheets-Sheet 3

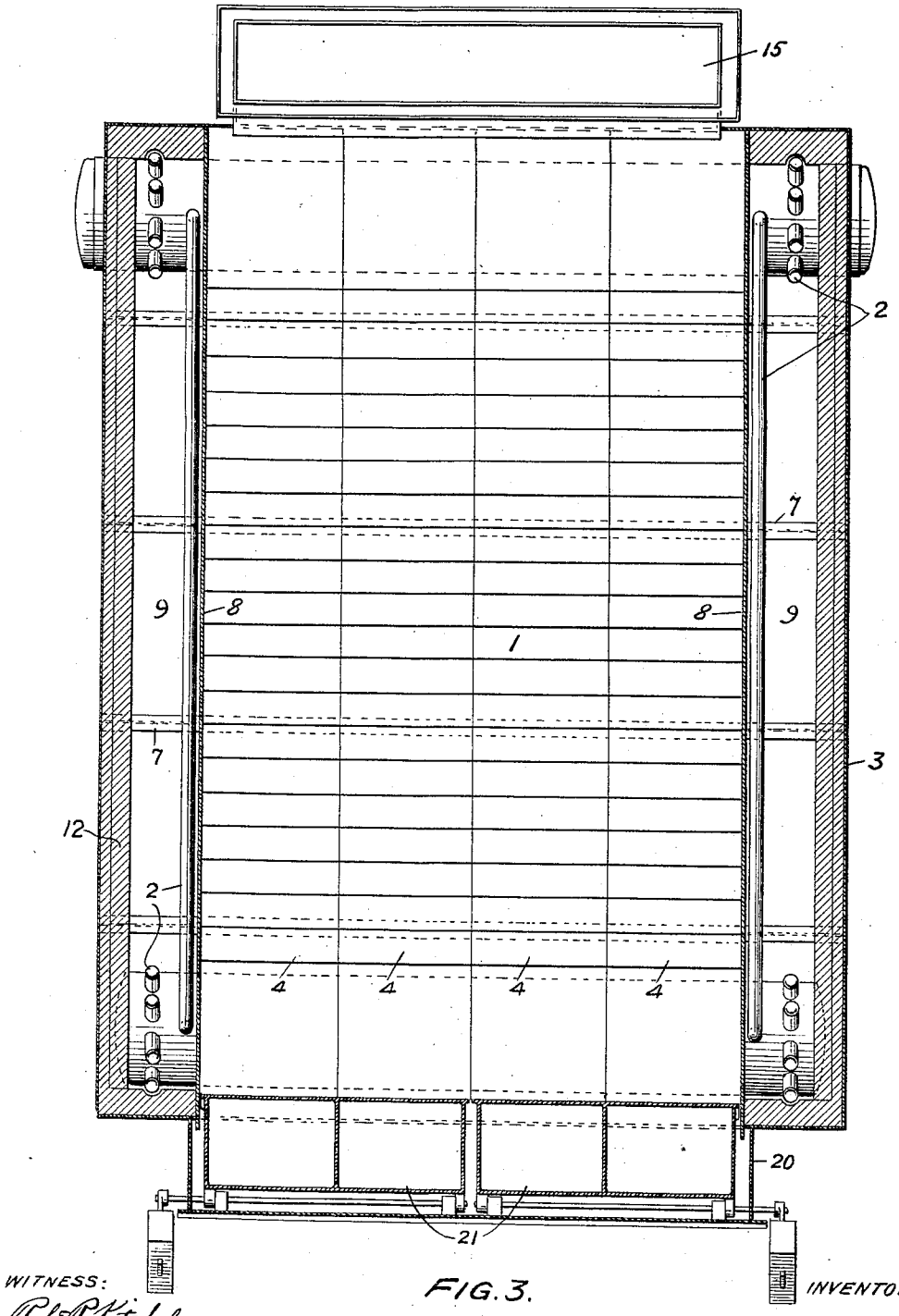


FIG. 3.

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APPARATUS FOR COOLING COKE

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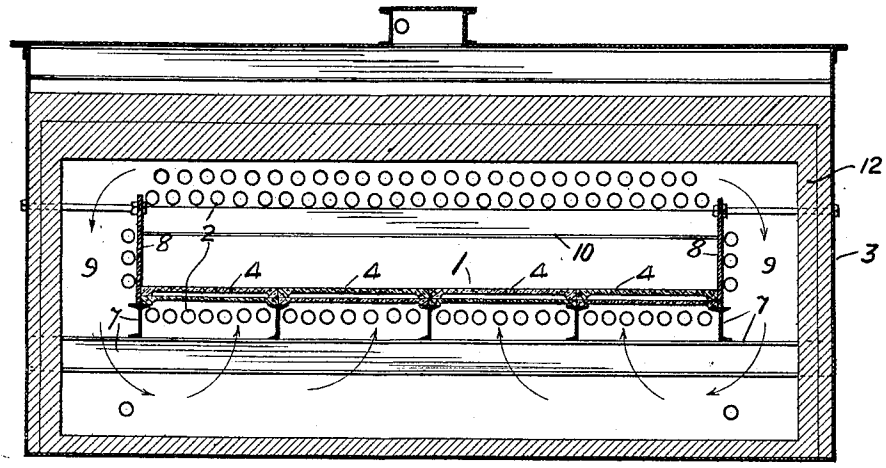


FIG. 4.

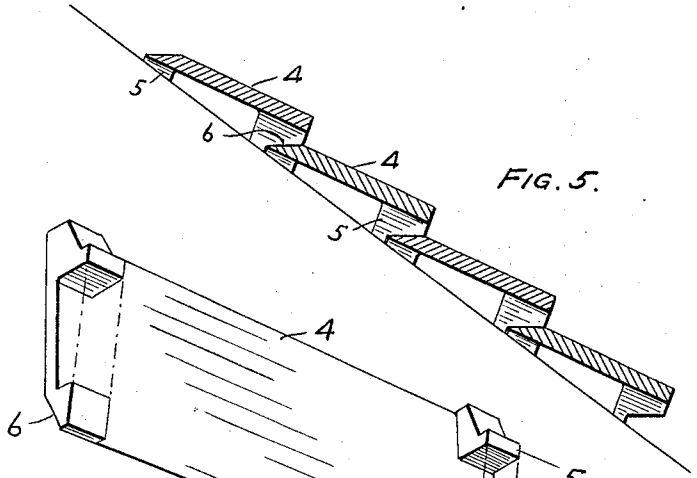


FIG. 5.

FIG. 6.

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APPARATUS FOR COOLING COKE

Filed Jan. 20, 1926 6 Sheets-Sheet 5

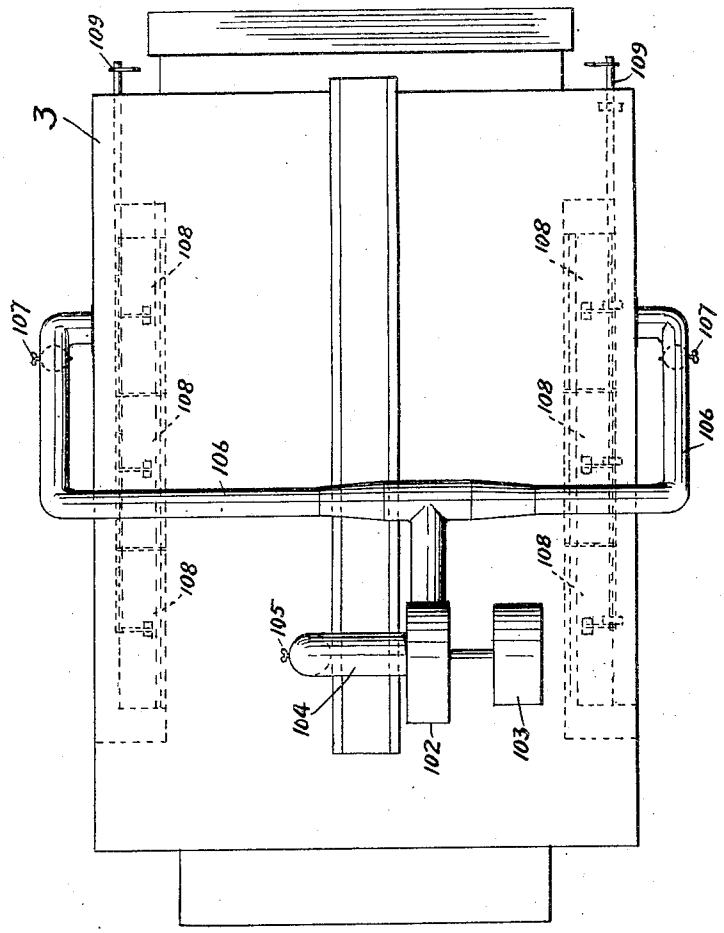


FIG. 7.

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APPARATUS FOR COOLING COKE

Filed Jan. 20, 1926 6 Sheets-Sheet 6

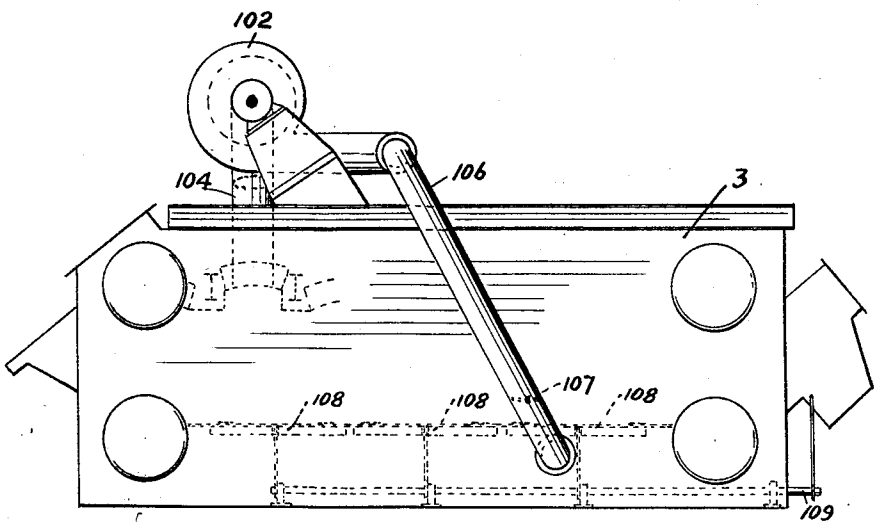


FIG. 8.

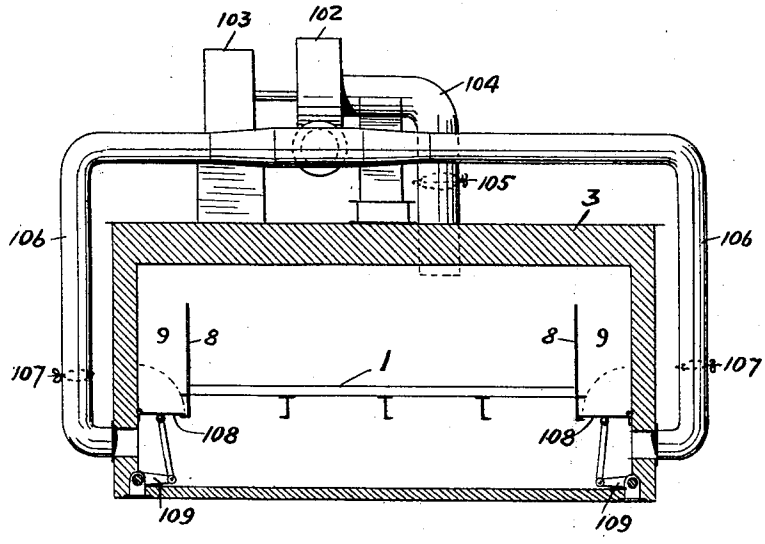


FIG. 9.

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ATTO

Patented Jan. 3, 1933

1,893,468

UNITED STATES PATENT OFFICE

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APPARATUS FOR COOLING COKE

Application filed January 20, 1926. Serial No. 82,555.

The principal objects of the present invention are to provide compact, efficient and comparatively inexpensive apparatus for cooling coke in such a way that water or moisture is not added to the coke and in such a way that heat is recovered from the coke and in such a way that the coke is not unduly oxidized, and to accomplish the above results, if preferred, without the expense of installing pumps or machinery for effecting circulation and consequently with a saving of the power that would be required for operating such machinery if present.

Another object of the invention is to provide apparatus of the type mentioned which, if preferred, may be used without power driven moving parts.

Other objects of the invention will appear from the following description at the end of which the invention will be claimed.

Generally stated, the invention may be said to consist in apparatus for cooling coke including a coke wharf or platform and boiler tubes or other boiler elements juxtaposed in confronting heat radiating relation, and arranged in the same internally uninterrupted chamber, a casing providing the chamber and of which the walls enclose both the wharf and the tubes, means for introducing incandescent coke into the chamber, means for withdrawing cool coke from the chamber, and steam offtake provisions.

The invention also comprises the improvements to be presently described and finally claimed.

In the following description reference will be made to the accompanying drawings forming part hereof and in which

Figure 1 is a side elevation partly in section illustrating one form of apparatus for cooling coke selected from among other forms for the purpose of describing the invention.

Fig. 2 is a sectional view drawn to an enlarged scale and illustrating the apparatus shown at the central portion of Fig. 1.

Fig. 3 is a sectional view taken generally on the line 3—3 of Fig. 2.

Fig. 4 is a cross-sectional view taken generally on the line 4—4 of Fig. 2.

Fig. 5 is an enlarged view principally in section illustrating the louverlike construction of the coke platform.

Fig. 6 is a perspective view of one of the wharf plates, and

Figs. 7, 8 and 9 are respectively a plan, a side elevation and an end view with parts broken away illustrating a modification.

In the drawings, referring more particularly to Figs. 1 to 6, 1 is a coke wharf or platform and 2 are boiler tubes or elements juxtaposed in confronting relation and arranged in the same chamber. 3 is a casing providing a chamber shown as rectangular and of which the walls enclose both the wharf and the tubes. As shown the coke wharf 1 is foraminous and it is louverlike. As shown it consists of spaced lapping wharf plates 4, Fig. 5, mounted upon stools or feet 5 and beveled as at 6 where they underlap. The wharf or platform is shown as inclined from the inlet to the outlet and when it is inclined the feed is affected by gravity. 7 is a frame shown to consist of lengthwise ranging girders upon the latter of which the wharf plates are mounted. The frame also provides side guide walls 8 for the wharf. The wharf is spaced from the internal top, bottom and side walls of the chamber, and the space is generally indicated at 9. 10 are baffle plates shown as carried by the side guide walls 8 of the frame 7 and they overlie the platform 1 and are inclined in the direction of feed. The boiler tubes 2 may in general be disposed above and below and at the sides of the coke wharf 1 and they connect with steam offtake provisions 11. 101, Fig. 1, is a water inlet. In general the casing 3 is lined with refractory heat insulating material as at 12 and if desired a flue 13 or flues may be provided in it. 14 is a clean-out device for the casing. 15 is an inlet for the casing and it is shown as provided with a hinged lid 16 having flanges 17 for cooperation with a water seal 18. The lid is also provided with a guard 19 for protecting the water seal against the admission of coke and dust. 20 is an offtake hopper provided with two counterweighted hinged gates 21 and 22, the latter preferably providing a water seal.

The casing may be fixed as shown, or it may be portable and it may contain a duplication of coke wharfs and boiler tubes as described.

The mode of operation will be explained in connection with the embodiment illustrated in Figs. 1 to 6 of the drawings in which the apparatus is shown as fixed and arranged to receive hot coke from a car 23 and to deliver cool coke to a conveyer 24, Fig. 2. However, the charge of coke 25, Fig. 2, may have been introduced upon the wharf and however it may be fed through the casing it is juxtaposed in confronting heat radiating relation to the boiler tubes or elements 2 with no separating medium between them, or perhaps more accurately, no substantial separating medium between them because the wharf is foraminous and the side guide walls 8 are negligible. The baffle plates 10 insure an even distribution of the coke on the platform or wharf 1 and assist in bringing it into the described relation with the boiler tubes. Heat convection currents may develop within the interior of the casing as indicated by arrows but the exchange of heat is essentially effected by heat radiation and without the intervention or assistance of applied power or of moving parts. The louverlike construction of the wharf plates provides the necessary openings through the platform 1 and also prevents the passage of coke through the openings when the coke is fed or permitted to gravitate through the chamber.

The construction and mode of operation of the modification illustrated in Figs. 7 to 9 inclusive are as above described with the following exceptions:

102 is a blower shown as driven by a motor 103, and the intake of the blower is connected by pipe 104, having a damper 105, with the interior of the casing 3 above the coke wharf 1. The outlet of the blower is connected by pipes 106, having dampers 107, with the interior of the casing below the coke wharf 1. At the sides of the coke wharf 1 are provided valves or shutters 108 adapted to open and close the space 9 and thus establish and disestablish communication from below to above the coke wharf 1 at the sides thereof. These valves or shutters are shown as pivotally mounted and they may be opened and closed from one end of the apparatus by mechanism 109.

Gases are taken from above the coke wharf 1 and the closed shutters or valves 108 and are returned to below the coke wharf 1 and the closed shutters or valves 108, by the blower 102, and its described connections, and thus the gases are recirculated through the coke and through the openings provided through the coke wharf 1. The construction shown in Figs. 7 to 9 may be operated in the manner described in connection with the construction shown in Figs. 1 to 6, by opening the valves or shutters 108, closing the dampers 105 and 107, and stopping the motor 103.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details of construction, arrangement and mere matters of form without departing from the spirit of the invention which is not limited as to those matters or otherwise than as the prior art and the appended claims may require.

I claim:

1. Apparatus for cooling coke comprising a casing, a foraminous coke wharf arranged in the casing and spaced from the internal surface thereof, means for causing movement of coke on said wharf, water tubes arranged in the same casing as the wharf and grouped around and juxtaposed with the wharf and disposed above and below and at both sides of the wharf and spaced therefrom, means for introducing coke into the casing and for sealing the casing, means for taking coke out of the casing, and steam offtake provisions from the water boilers.

2. Apparatus for cooling coke comprising a casing, a wharf, means for causing a movement of coke on the wharf, a boiler element juxtaposed in confronting relation to the top and the bottom and both sides of the wharf for heat radiation and both arranged in the said casing, said casing providing walls enclosing both the boiler element and the wharf, sealing means for introducing hot coke into the casing, sealing means for withdrawing cool coke from the casing, and steam offtake provisions from the boiler element.

3. Apparatus for cooling coke comprising a casing, a foraminous wharf and a boiler element both arranged in the said casing, said casing providing walls enclosing both the boiler element and the wharf with space between the four sides of the wharf and the boiler element, means for introducing incandescent coke into the chamber, means for withdrawing cool coke from the chamber, and steam offtake provisions from the boiler element.

4. Apparatus for cooling coke comprising a casing, an inclined wharf having louvers therein and a boiler element both arranged in the said casing, said casing providing walls enclosing both the boiler element and the wharf with space between the top and bottom and both sides of the wharf and the walls, means for introducing incandescent coke into the casing, means for withdrawing cool coke from the casing, and steam offtake provisions from the boiler element.

5. Apparatus for cooling coke comprising a casing, wharf plates having feet or stools and arranged in inclined underlapping relation at their edges, side guide walls at the sides of said plates, boiler tubes grouped around said plates and side guide walls and arranged in the said casing therewith, said casing pro-

viding space between its walls and the plates and the side guide walls, means for introducing incandescent coke into the casing, means for withdrawing cool coke from the casing, and steam offtake provisions from the boiler element.

6. Apparatus for cooling coke comprising a casing, a foraminous wharf and a boiler element in the said casing, said casing providing walls enclosing both the boiler element and the wharf with space between the top and the bottom and both sides of the wharf and the walls and the boiler element, shutters for closing said space at the side edges of the wharf or platform, provisions for introducing incandescent coke into the casing, means for withdrawing cool coke from the casing, steam offtake provisions from the boiler element, and a blower and connections for recirculating gas through the wharf.

7. In a plant for cooling hot coke, the combination of an inclined cooling chamber having a coke inlet at its upper portion and a coke outlet at its lower portion, steam boiler tubes in said chamber defining the top wall of a passageway for the coke from the inlet to the outlet, overlapping baffles defining the bottom wall of said passageway, steam boiler tubes arranged closely adjacent to said overlapping baffles.

8. In a plant for cooling hot coke, the combination of a cooling chamber having a coke inlet at one portion and a coke outlet at another portion, means for transferring coke through said chamber from said inlet to said outlet, steam boiler tubes in said chamber defining the top wall of a passageway for the coke from said inlet to said outlet, a perforated bottom wall for said passageway supporting the coke thereon, and means for passing fluid through said bottom wall and through the coke thereon to cool the coke.

9. In a plant for cooling coke having a casing and a coke inlet at one portion of said casing and a coke outlet at another portion of said casing, a foraminous wharf for supporting coke comprising a plurality of lapping wharf plates mounted on stools of unequal height at the opposite edges of the plate so that the upper surfaces of said plates slope relative to the plane of the wharf.

10. In a plant for cooling coke having a casing and a coke inlet at one portion of said casing and a coke outlet at another portion of said casing, a foraminous wharf for supporting coke mounted in said casing and spaced at its bottom and its top and at both sides from said casing to provide a passage for fluid therebetween, guide walls for coke adjacent said spaced sides of said wharf, and means for recirculating fluid through said casing, through said wharf, and through the coke on said wharf.

11. In a plant for cooling coke having a casing and a coke inlet at one portion of said casing and a coke outlet at another portion of said casing, a foraminous wharf in said casing with space between the top and the bottom and both sides of the wharf and the casing to provide a passage for fluid, guide walls at the sides of said wharf for guiding the coke on said wharf and for defining the passages for the circulation of fluid, and shutters for controlling the flow of fluid through said passages between the said guide walls and said casing.

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