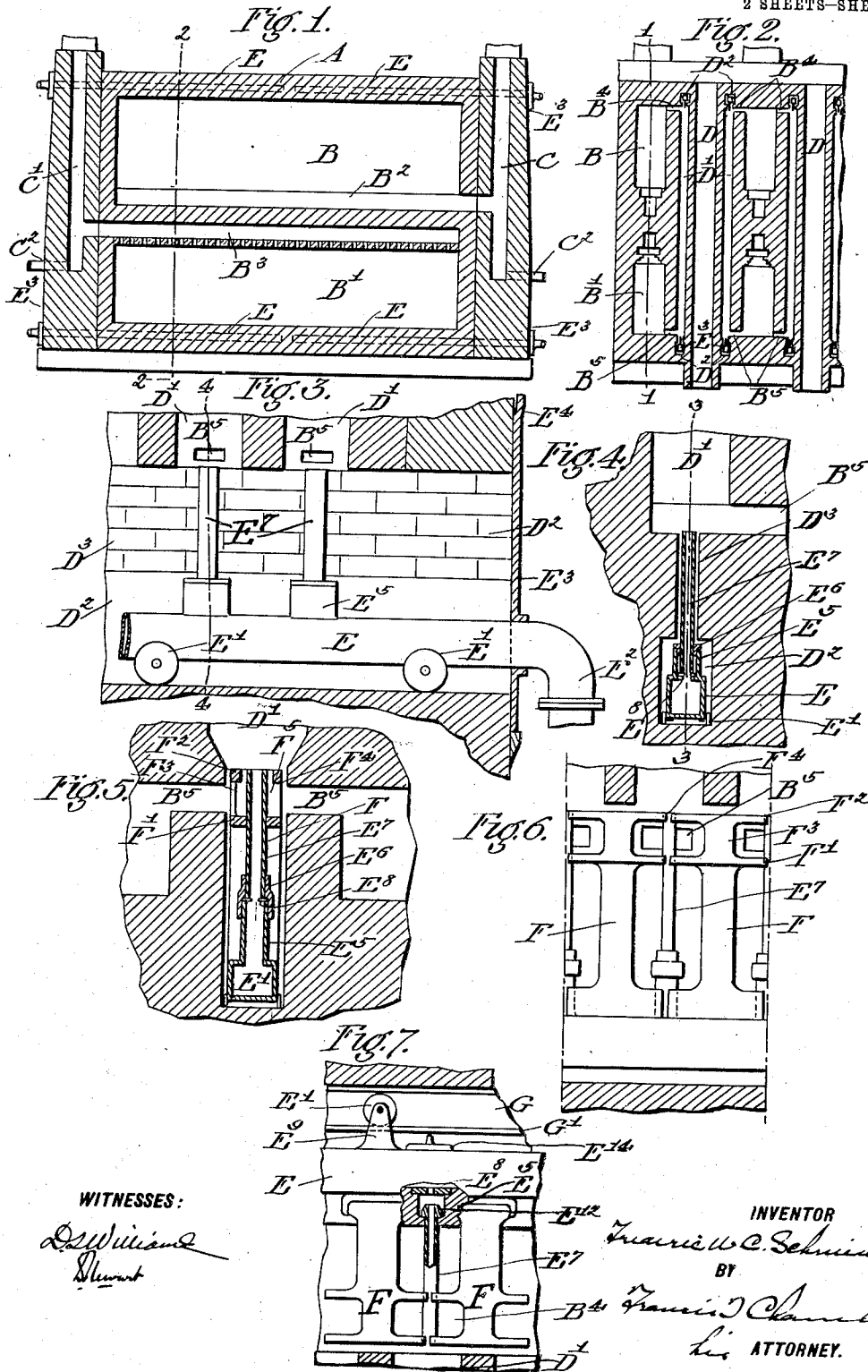


F. W. C. SCHNIEWIND.
BURNER FOR COKE OVENS.
APPLICATION FILED OCT. 24, 1907.

976,929.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 1.



WITNESSES:
L. Williams
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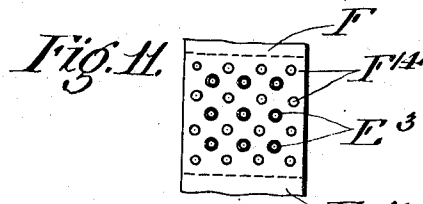
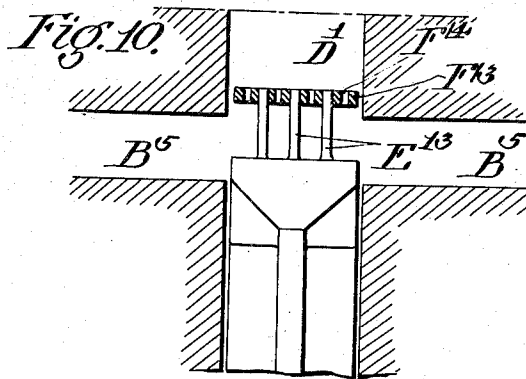
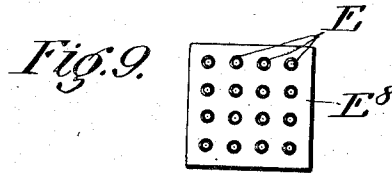
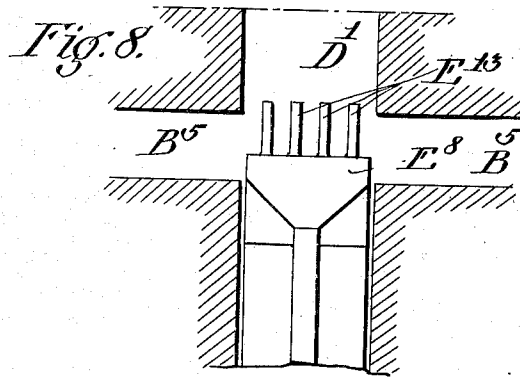
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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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BURNER FOR COKE-OVENS.

976,929.

Specification of Letters Patent.

Patented Nov. 29, 1910.

Application filed October 24, 1907. Serial No. 398,900.

To all whom it may concern:

Be it known that I, FREDERIC W. C. SCHNIEWIND, a citizen of the United States of America, residing in the city, county, and State of New York, have invented a certain new and useful Improvement in Burners for Coke-Ovens, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

The present invention relates to coke ovens and the like and particularly to improve the construction and arrangement of the burners employed in such ovens.

In large capacity coke ovens the burner nozzles or twyers need to be placed at intervals along a combustion space or spaces extending far into the oven body. These twyers and nozzles require considerable attention from time to time and in many cases it is highly undesirable to provide burner chambers large enough to allow of the nozzles being adjusted or repaired *in situ*. Moreover where such chambers are provided the operation of inspecting or repairing the twyers in place without interrupting the operation of the oven is a serious one on account of the high temperatures to which the attendant is exposed.

The main objects of the present invention is to provide a construction and arrangement in which the various twyers or nozzles and connections to them can be quickly withdrawn and inspected and if defective can be replaced by a new set of twyers and connections, all without materially interfering with the operation of the oven structure of which they form a part.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention however reference may be had to the accompanying drawings and descriptive matter in which I have illustrated and described forms in which my invention may be embodied.

Of the drawings, Figure 1 is a sectional elevation of one retort of the coke oven structure taken on the line 1—1 of Fig. 2. Fig. 2 is a sectional elevation taken on the line 2—2 of Fig. 1. Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 4. Fig. 4 is a sectional elevation taken on the line 4—4 of Fig. 3. Fig. 5 is a sectional

view taken similarly to Fig. 4, but showing a modified construction. Fig. 6 is an elevation taken at right angles to Fig. 5. Fig. 7 is an elevation of an upper burner construction generally similar to the construction shown in Figs. 5 and 6. Fig. 8 is a view taken similarly to Fig. 4, but on a larger scale and showing a modified burner nozzle construction. Fig. 9 is a plan view of the nozzle construction shown in Fig. 8. Fig. 10 is a view taken similarly to Fig. 8, but showing a construction differing somewhat from that of Fig. 8. Fig. 11 is a plan view of the construction shown in Fig. 10.

In the drawings, and referring first to the constructions shown in Figs. 1 to 4 inclusive, A represents the masonry wall of the coke oven structure, which has formed in it a plurality of coking retorts D open at top and bottom and heated at the sides by heating flues D', which are connected at their ends by passages B⁴ and B⁵ respectively with regenerator chambers B and B'. Each regenerator chamber B has an inlet-outlet passage B² connected to a chimney C at one side of the oven, and each chamber B' has an inlet-outlet passage B³ connected to the chimney C'. Suitable dampers and valves (not shown) placed in the upper ends of the chimneys C and C' and in the air inlet pipes C² connected to the lower ends of the chimneys provide for a flow from the chimney C into the regenerator chamber B, and thence through passages B⁴, flues D', passages B⁵, through the regenerator chamber B', from thence it passes into the chimney C', or in a reverse direction if desired.

The general arrangement of the retorts and heating system therefor disclosed but not claimed herein forms the subject matter of my copending application Serial No. 398,902, filed of even date herewith. It is to be understood moreover that the present invention is capable of use with many different systems.

At the upper ends of the flues D' are burner chambers D², and similar chambers are located at the lower ends of the flues. In the form shown in Figs. 2, 3 and 4 the burner chambers proper are connected to the adjacent flue spaces by narrow passages D³. In each burner chamber there are preferably a pair of burners E which are inserted in the opposite ends of the burner chamber, and are readily removable.

In the main form shown in Fig. 3 the

burner E comprises a body member or main fuel chamber usually formed of metal and has secured to it at its outer end a flange-like portion E³ forming a door for closing the burner chamber D². To facilitate the operation of inserting and withdrawing the burners are preferably provided with wheels as shown. By this arrangement when any burner becomes defective it can readily be withdrawn and a new burner inserted without other than temporary interruption of the burner. The defective burner can of course be removed to a proper place for adjustment or repairs. From the upper side of the burner chamber or body extends the nozzles or tuyers E⁷ preferably formed of refractory material as fire clay. These, in the form shown in Figs. 3 and 4, are inserted in hollow bosses E⁵ extending upward from the burner body. The nozzles are held in place by removable cap pieces E⁶ in the upper ends of the bosses E⁵, and the admission of fuel from the burner chamber into each nozzle is controlled by perforated plate E⁸ located at the lower end of the nozzle. In the preferred construction shown, there is one nozzle E⁷ for each of the heating flues D', and, in the form shown in Figs. 3 and 4, the nozzle of each burner projects to the mouth of the heating flue through the narrow slit D³.

In the arrangement shown in Figs. 5 and 6, provision is made for regulating the character of the flame produced. The regulating means comprising specially shaped firebrick or tile F each having two horizontal portions F² and F' connected by a bracket portion F³. The horizontal portions F' and F² thus unite to form an air chamber F⁵ beneath the upper end of a nozzle E⁷ into which lead the air ports B⁵, which, in the particular arrangement shown in Fig. 5, lead to the flues from both sides instead of from one side, as in the construction shown in Figs. 1 to 4 inclusive. In this form also the burner chamber is of the same width from top to bottom. By suitably shaping the upper ends of the brick or tile F and particularly the passages leading from this chamber into the flue proper, the direction and shape of the air stream surrounding the nozzle and thereby the character and shape of the flame produced can be regulated.

The construction shown in Fig. 7 differs from that of Figs. 5 and 6 in that the burner shown is an upper burner and has the wheels E' connected to the burner body by brackets E⁹. In this case the wheels run trolley fashion on the lower flanges G' of an I beam G secured against the upper wall of the upper burner chamber. In this form of the invention, the brick or tile F are supported by flanges E¹² formed on the lower ends of the boss E⁵ which, in this form of the inven-

tion, project downwardly. Similarly, each nozzle E⁷, in this form of the invention, is provided with a collar at its upper end which prevents it from dropping through the bushing E⁶. A tight joint between the nozzle and burner body may be obtained by a packing of sand or clay. The gas flow regulating diaphragm is of course located above the upper end of the nozzle E⁷ in this form of the invention, and the nozzle and diaphragm are inserted through the hole normally closed by the cover E¹⁴. It will be observed that both in this construction as well as that shown in Figs. 5 and 6, the tiles F are readily removable, but are positively and definitely held in place by suitably forming engaging surfaces between them and the burner proper.

The nozzle E⁷ instead of being of the simple form shown in Figs. 3, 4, 5 and 6, may be modified in various ways. In the constructions shown in Figs. 8 and 9 for instance each nozzle E⁷ proper terminates in a plurality of small nozzles E¹³. In the construction shown in Figs. 10 and 11, these nozzles E¹³ pass through horizontal flanges F¹³ of the firebrick F, and the flange portions F¹³ are formed with a plurality of small air ports F¹⁴ interspersed among and around the nozzles E¹³.

While the burners shown are particularly designed for use with gas as the fuel burned they can of course be used in burning oil or even in burning powdered solid fuel.

It will be observed that with the constructions shown the burner body and tuyers with any attachments necessary or desirable to shape or control the flame may be readily put in place or removed without exposing the attendants to excessive temperatures or interrupting the operation of the oven structure in any appreciable degree. The provision of the door flange E⁴ assists greatly as the formation of a tight closure can thereby be quickly had. The joint between the door and oven wall proper may be packed with clay or the like if necessary. An advantage of the arrangement shown is that the burner body which ordinarily is made of much less refractory material than the tuyers is located at the side of the burner chambers remote from the combustion space or spaces which of course only begin where the air and gas mix, *i. e.* the ends of the flues.

In the construction shown in Figs. 1 to 4 inclusive the burner bodies are directly exposed to direct radiation from the hot gases through the narrow slit like passages D³ and in the construction where the bricks F are employed they serve of course to protect the burner body.

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

1. In combination with a coke oven hav-

ing an elongated burner chamber open at one side of the chamber to a combustion space, an elongated burner body located in said chamber and readily removable from
5 and insertible in said chamber through one end thereof, and nozzles or twyers supported by and removable and insertible with said burner body, said twyers extending from the burner body to said combustion space.

10 2. In combination with a coke oven having an elongated burner chamber open at one side only to a combustion space, an elongated burner body removably inserted in said chamber through one end thereof,
15 nozzles or twyers supported by and removable and insertible with said burner body, said twyers extending from the burner body to said combustion space, bodies of refractory material supported on said
20 burner body and surrounding the twyers to influence the form and direction of the air currents blowing by the flame ends of the twyers, said bodies serving also to protect the burner body from heat from the com-
25 bustion space.

3. In combination with a coke oven having an elongated burner chamber open at one side only to a combustion space, an elongated burner body removably inserted
30 in said chamber at one end thereof and located adjacent the side of the chamber remote from the combustion space, nozzles or twyers supported by and removable and insertible with said burner body, said
35 twyers extending from the burner body to said combustion space, and interchangeable and removable bodies of refractory material supported on said burner body and provided with air deflecting walls for influenc-
40 ing the form and direction of the air currents blowing by the flame ends of the twyers.

4. In combination with a coke oven having an elongated burner chamber open at its
45 lower side only to a combustion space, an elongated burner body removably inserted

in said chamber at one end thereof and supported adjacent the upper side of the burner chamber, said burner body being provided with a series of openings formed in its upper
50 and lower walls, each lower opening registering with the upper opening, a twyer projecting through each lower opening to the combustion space, each twyer being inserted through the corresponding upper opening
55 in the burner body and being provided with a collar arranged to prevent the twyer from falling through the lower opening and removable covers for the upper openings in
60 said body.

5. In combination a coke oven, and a burner construction therefor comprising an elongated burner body, a plurality of twyers extending from and along one side of
65 said body, and a plurality of interchangeable and removable bodies of refractory material supported by said burner body and so shaped and arranged that a pair of said bodies at opposite sides of each twyer unite to provide air deflecting walls for influenc-
70 ing the form and direction of the air current blowing by the flame-end of the twyer.

6. In combination a coke oven, and a burner construction therefor comprising an elongated burner body, a plurality of twyers extending from and along one side of
75 said body and a plurality of interchangeable and removable bodies of refractory material supported by said burner body and arranged one between each adjacent pair of twyers,
80 said bodies being so shaped and arranged that each body unites with the corresponding bodies at the opposite sides of the two twyers between which the first mentioned body is placed to provide air deflecting walls
85 for influencing the form and direction of the air currents blowing by the flame-ends of said two twyers.

FREDERIC W. C. SCHNIEWIND.

Witnesses:

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D. W. KINCAID.