L. WILPUTTE.

COKE OVEN DOOR MECHANISM.

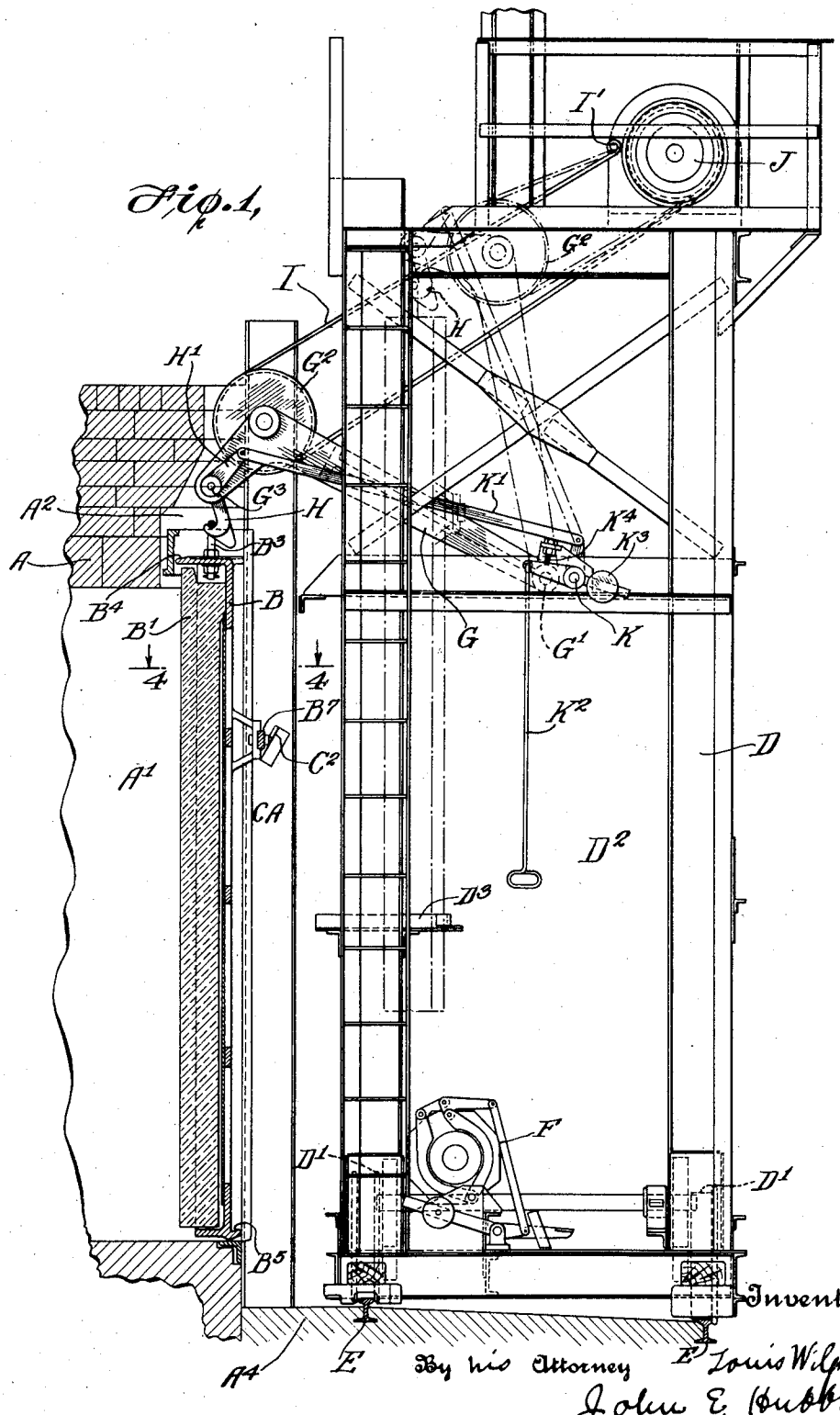
APPLICATION FILED OCT. 16, 1918.

1,344,218.

Patented June 22, 1920.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor

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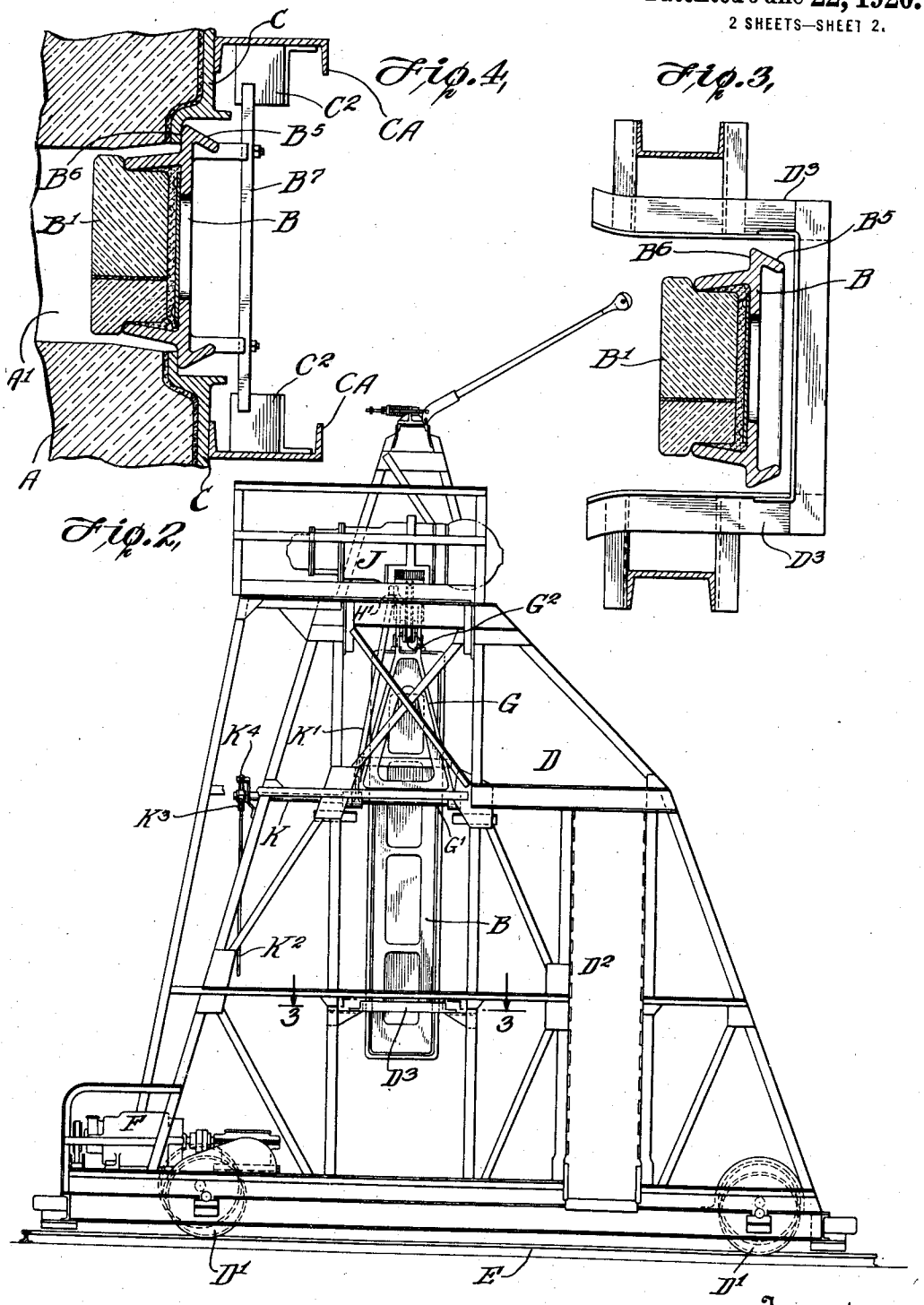


Fig. 4.

Fig. 3.

Fig. 2.

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UNITED STATES PATENT OFFICE.

LOUIS WILPUTTE, OF NEW ROCHELLE, NEW YORK, ASSIGNOR OF TWO-THIRDS TO ALICE A. WILPUTTE, OF NEW ROCHELLE, NEW YORK.

COKE-OVEN-DOOR MECHANISM.

1,344,218. Specification of Letters Patent. Patented June 22, 1920.

Application filed October 16, 1918. Serial No. 258,332.

To all whom it may concern:

Be it known that I, LOUIS WILPUTTE, a citizen of the United States, and resident of New Rochelle, in the county of Westchester and State of New York, have invented certain new and useful Coke-Oven-Door Mechanism, of which the following is a specification.

The general object of my present invention is to provide improved means for opening and closing the ends of horizontal coking chambers. More specifically, the object of my invention is to provide a horizontal by-product coke oven having an oven door and doorway construction permitting the door to have a substantial upward movement out of its closed position, with a novel door handling mechanism, proper, characterized by its simplicity and reliability of construction and operation.

The various features of novelty which characterize my 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, and the advantages possessed by it, reference should be had to the accompanying drawings and descriptive matter, in which I have illustrated and described a preferred embodiment of my invention.

Of the drawings:

Figure 1 is an elevation of the door handling mechanism, and also shows a portion of the coke oven structure in section on a plane passing centrally through one of the oven chambers.

Fig. 2 is an elevation at right angles to Fig. 1, showing the door handling mechanism proper.

Fig. 3 is a partial plan in section on the line 3—3 of Fig. 2; and

Fig. 4 is a partial plan in section on the line 4—4 of Fig. 1.

The horizontal coke oven structure shown is of the type illustrated in my copending application, Serial No. 228089, filed April 12, 1918; in that a door receiving groove A^2 is formed in one side wall or face of the oven structure A above the corresponding end of each coking chamber A^1. Each door B has its upper end received in the corresponding groove A^2 while the lower portion of the door projects into the corresponding oven chamber (see Fig. 4) as does the ordinary plug door now in general use in by-product coke ovens in this country. The door B shown comprises a metallic rim and a refractory body portion B^1. The metallic rim comprises side flanges or shoulders B^6 which abut against metallic flash plates C at the sides of the doorway in the closed position of the door. A tight joint is obtained by applying luting clay along the surface B^5 at the bottom and sides of the door, and along the surface B^4 at the top of the door. Each door B is provided at its upper end with an eye B^3 for engagement by the door handling mechanism proper. The described door and oven arrangement permits the door to have a substantial vertical movement upward out of its closed position while still between the side walls of the oven chamber. In its closed position the shoulders B^6 of each door are held snugly against the corresponding flash plates C by means of a bar B^7 secured to the door and engaging inclined guides C^2 secured to the adjacent buckstays CA.

The door handling mechanism is mounted on a carriage D having wheels D^1 running on track rails E carried by the coke bench or platform A^4. As shown, this carriage is also provided with a coke guide D^2 through which the coke mass discharged from an oven chamber is pushed on to the usual coke quenching car or other coke receiving device. F represents the motor for moving the carriage D along the rails E. The door handling mechanism proper comprises a lever arm G which is pivotally connected through a shaft G^1 to the framework of the carriage D at a level approximately that of the tops of the doors to be manipulated when the latter are in their closed positions. The lever arm G is provided at its free end with a hook H pivotally connected at G^3 to the lever G and adapted to engage the eye B^3 of a door to be moved into and out of place. The lever arm G also has pivotally connected to it, adjacent its free end, a pulley G^2. A cable or other flexible element I running over the pulley G^2 has one end fixed to the framework of the carriage D at I′ and the other end secured to the drum of a suitable hoisting device J. The latter may well be an electric motor driven drum hoist of standard type, and is suitably mounted on the carriage D.

To facilitate the engagement of the hook H with, and its disengagement from the eye

B^3 of each door operated upon, I advantageously provide the hook H with an operating arm H^1 which is connected by a link K^1 to a rock shaft K mounted on the carriage D, and having an arm from which an operating handle K^2 is suspended. The shaft K is located at about the same level as the shaft G^1 and the parts are preferably so proportioned that as the arm G is turned about the axis of the shaft G^1, the hook H may maintain its vertical position without causing the shaft K to rotate appreciably. By means of a counterweight K^3 secured to an arm carried by the rock shaft K and tending to rotate the latter in the direction to swing the hook H toward the door, and an adjustable stop K^4 limiting this turning movement of the rock shaft K, the hook H may be caused to automatically engage the eye B^3 of a door to be opened, when the arm G is lowered into the door engaging position. The handle K^2 forms a means for disengaging the hook H from the door eye B^3 after the door has been returned to its closed position.

In operation, after the carriage D is brought into the proper position in front of the door to be opened, the hoist J is operated to lower the lever arm G from a previously elevated position in which it clears the buckstays CA into the position shown in full lines in Fig. 1. Then, after the hook H is engaged in the eye B^3, the hoist J is operated to move the arm G and the door into position shown in dotted lines in Fig. 1 and in full lines in Fig. 2. Since the fulcrum axis of the lever G is at approximately the level of the top of the door B, the initial opening movement of the door is mainly vertically upward, but as the opening movement continues, the door is carried outward to clear by a sufficiently wide margin, the oven buckstays CA. To prevent undesirable swaying of the door when in the position shown in dotted lines in Fig. 1, I advantageously provide the carriage D with guides D^3 between which the door is received when in its elevated position.

When it is desired to put the door back into its closed position, it is necessary only to make sure that the carriage D is in the proper position in front of the coking chamber, and then to operate the drum J to permit the door to move back into its seat under the action of gravity. As the door moves back into its seat, the ends of the bar B^7 engage the corresponding lugs C^2 carried by the buckstays CA, and thus wedge the door into place with the shoulders B^6 in snug engagement with the corresponding portions of the flash plates C. Preparatory to closing the door, a layer of luting clay may be placed at the bottom of the doorway in position to be engaged by the bottom portion of the door luting surface B^5 when the door returns to its closed position. Preferably the eye B^3 is above the center of gravity of the door so that the latter tends to remain plumb when suspended from the hook H.

As those skilled in the art will well understand, practical consideration frequently makes it desirable to employ different types of doors and door handling machines at the opposite ends of the coking chambers, and while the present invention may be used at either side of the oven structure, I consider it especially desirable for use, as shown, at the "coke side" of the battery.

While with my improved form of door handling mechanism the initial opening movement of the door is a substantially vertical movement of considerable magnitude, the door is not entirely removed from the oven chamber shown by this vertical movement, and the groove A^2 above each oven chamber A^1 need not be shaped as shown in my previously mentioned application so as to permit the door to be elevated for its full length through this groove. It is apparent, however, that the improved door handling mechanism shown herein can well be used with an oven structure formed exactly as shown in my said prior application, as well as with still different types of door and doorway constructions.

While in accordance with the provisions of the statutes, I have illustrated and described the best form of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of my invention as set forth in the appended claims, and that certain features of my invention may sometimes be used with advantage without a corresponding use of other features.

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

1. The combination with a coke oven structure comprising a horizontal coking chamber, a track extending transversely of the length of the chamber in front of one end of the chamber and a door removably closing said chamber end, of a carriage running on said track, an arm pivotally connected to said carriage to turn with respect to the latter about a horizontal axis at approximately the level of the top of the door in the closed position of the latter, means for detachably connecting the arm to the top of the door, and means for swinging said arm about its pivotal connection to the carriage to move said door upward and outward from the oven structure.

2. The combination with a coke oven structure comprising a horizontal coking chamber, a track extending transversely of

the length of the chamber in front of one end of the chamber and a door removably closing said chamber end, of a carriage running on said track, an arm pivotally connected to said carriage to turn with respect to the latter about a horizontal axis at approximately the level of the top of the door in the closed position of the latter, means for detachably connecting the arm to the top of the door, and means comprising a hoisting drum mounted on the carriage and a cable connecting the hoisting drum to the lever for swinging said arm about its pivotal connection to the carriage to move said door upward and outward from the oven structure.

3. The combination with a coke oven structure comprising a horizontal coking chamber, a track extending transversely of the length of the chamber in front of one end of the chamber and a door removably closing said chamber end, of a carriage running on said track, an arm pivotally connected to said carriage to turn with respect to the latter about a horizontal axis at approximately the level of the top of the door in the closed position of the latter, means for detachably connecting the arm to the top of the door and means for swinging said arm about its pivotal connection to the carriage to move said door upward and outward from the oven structure and to return it to its closed position and coöperating provisions carried by the door and oven structure for wedging the door into place as the latter is lowered into the closed position.

4. The combination with a coke oven structure comprising a horizontal coking chamber, a track extending transversely of the length of the chamber in front of one end of the chamber and a door removably closing said chamber end, of a carriage running on said track, an arm pivotally connected to said carriage to turn with respect to the latter about a horizontal axis at approximately the level of the top of the door in the closed position of the latter, means for detachably connecting the arm to the top of the door, means for swinging said arm about its pivotal connection to the carriage to move said door upward and outward from the oven structure, and guides mounted on the carriage adapted to engage the door and prevent the latter from swaying when in its open position.

5. The combination with a coke oven structure comprising a horizontal coking chamber, a track extending transversely of the length of the chamber in front of one end of the chamber and a door removably closing said chamber end, of a carriage running on said track, an arm pivotally connected to said carriage to turn with respect to the latter about a horizontal axis at approximately the level of the top of the door in the closed position of the latter, a door engaging hook pivotally connected to the free end of said arm, and hook releasing means, comprising an element pivotally connected to said carriage, tending to hold said hook in a vertical position as said arm turns about said axis.

6. The combination with a coke oven structure comprising a horizontal coking chamber, a track extending transversely of the length of the chamber in front of one end of the chamber and a door removably closing said chamber end, of a carriage running on said track, an arm pivotally connected to said carriage to turn with respect to the latter about a horizontal axis at approximately the level of the top of the door in the closed position of the latter, a door engaging hook pivotally connected to the free end of said arm and comprising a portion extending upward above its pivotal connection, a rocking element pivotally connected to the carriage at the outer side of said axis, a link connection between said portion and rocking element, counterweight provisions tending to turn said hook toward the door, and a stop limiting such movement of the hook.

Signed at New York city in the county of New York and State of New York this 14th day of October, A. D. 1918.

LOUIS WILPUTTE.