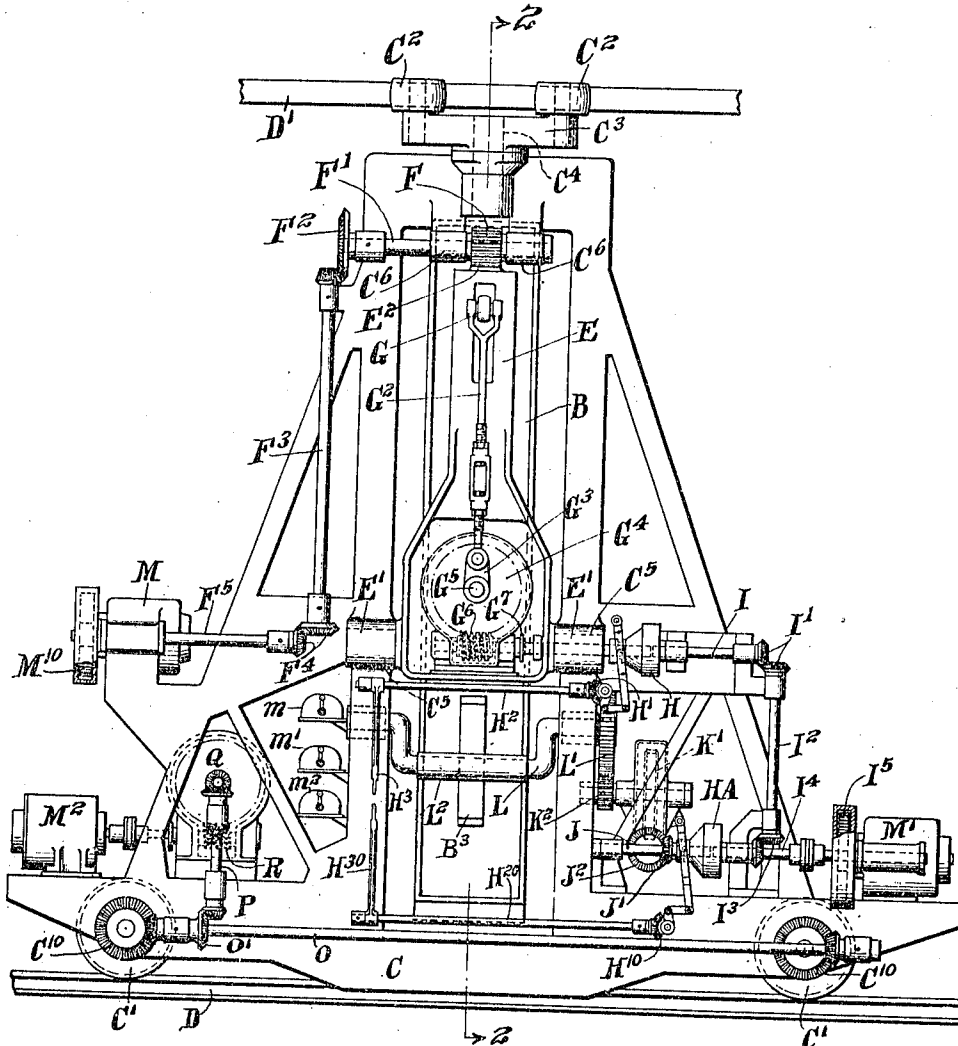


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FIG. 1



Charles V. McIntire

Witness
Daniel Webster, Jr.

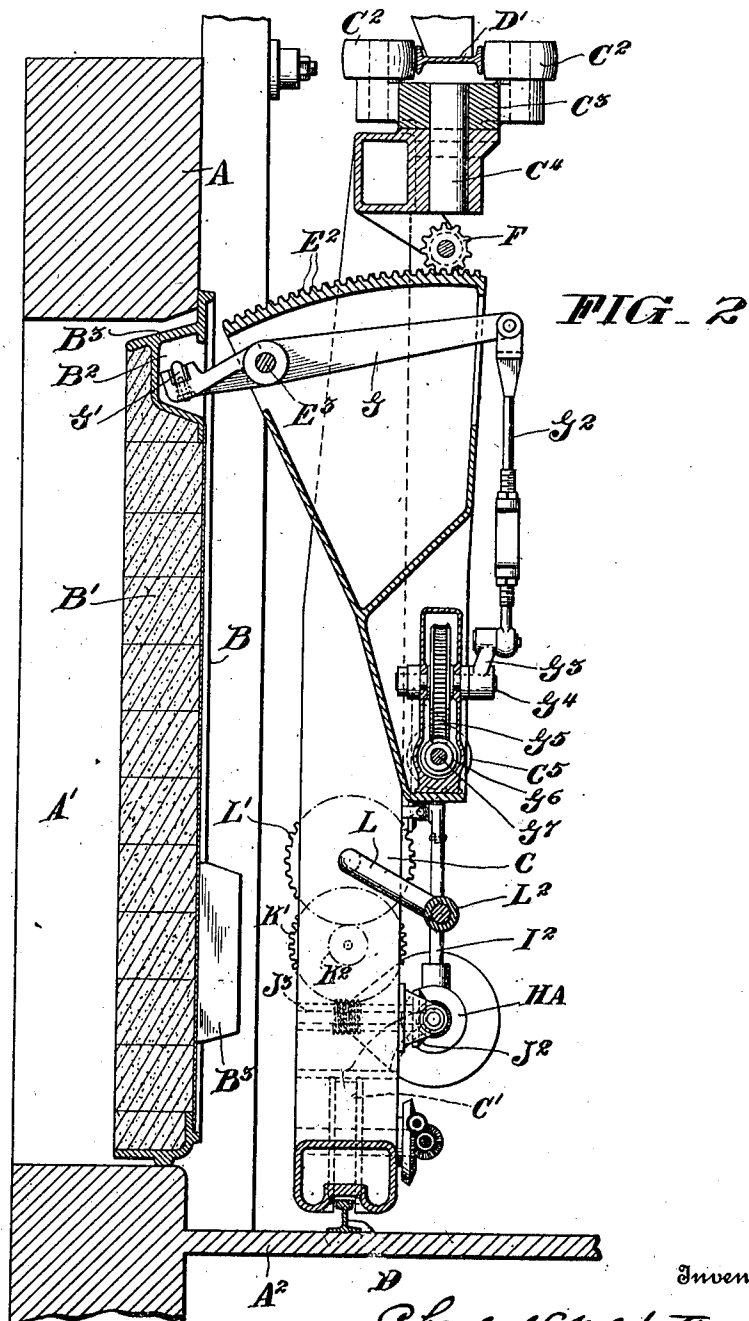
By Frank T. Chamber
his Attorney

1,292,622.

C. V. McINTIRE.
DOOR HANDLING MECHANISM.
APPLICATION FILED JAN. 3, 1917.

Patented Jan. 28, 1919.

3 SHEETS—SHEET 2.



Witness
Daniel Webster Jr.

Inventor
Charles V. McIntire
By James T. Chambers
Attorney

1,292,622.

3 SHEETS--SHEET 3.

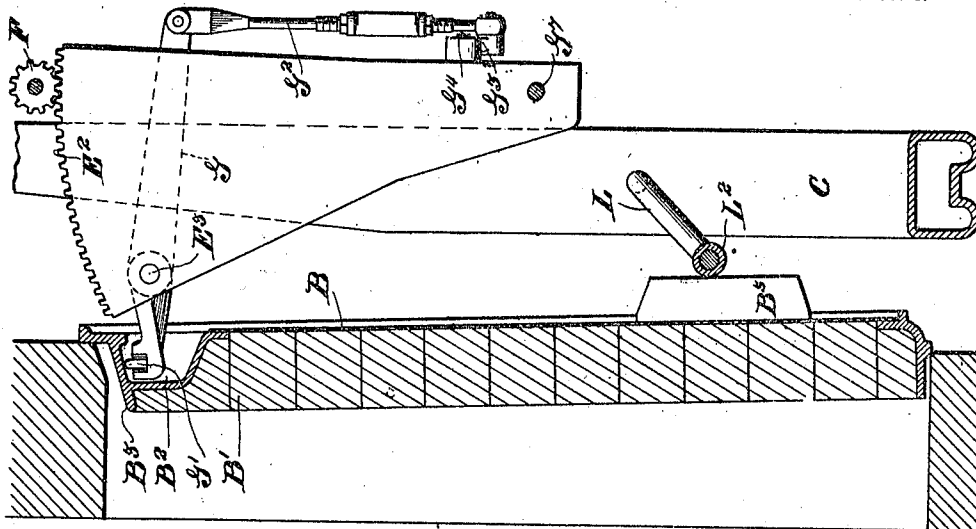
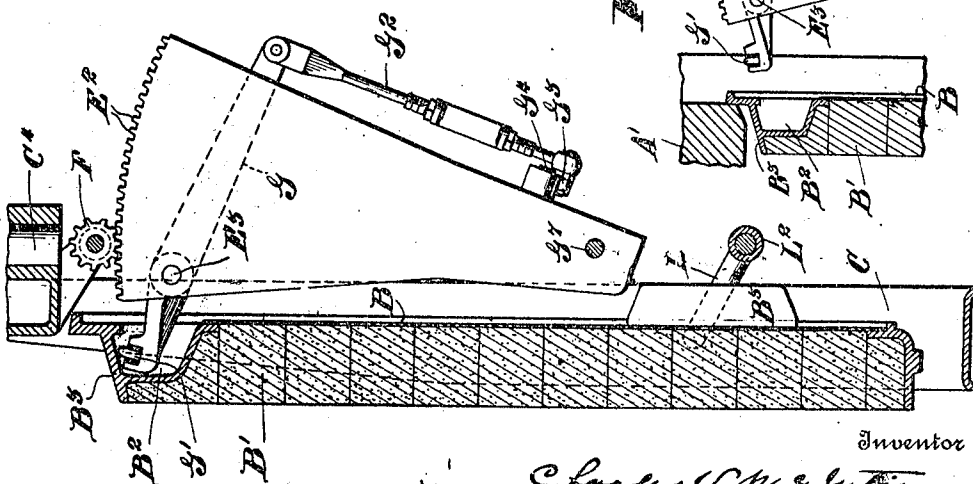


FIG 4



FILED

Witness
Daniel Webster Jr.

FILED

Inventor
Charles V. McIntire
By Frederic T. Chambers
his Attorney

UNITED STATES PATENT OFFICE.

CHARLES V. MCINTIRE, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-THIRD TO LOUIS WILPUTTE AND TWO-THIRDS TO ALICE A. WILPUTTE, BOTH OF NEW ROCHELLE, NEW YORK.

DOOR-HANDLING MECHANISM.

1,292,622.

Specification of Letters Patent.

Patented Jan. 28, 1919.

Application filed January 3, 1917. Serial No. 140,356.

To all whom it may concern:

Be it known that I, CHARLES V. MCINTIRE, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Door-Handling Mechanism, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My present invention relates to door-handling mechanism and particularly to mechanism for manipulating the doors of horizontal retort coke ovens. The general object of my invention is to provide improved means for the general purpose described and the particular object of my invention is to provide a simple and effective mechanism for manipulating coke oven doors characterized by a certain flexibility in operation which minimizes any tendency of the parts to jam or bind but adapted to insure the positive and accurate return of the doors to their normal sealing positions, notwithstanding such warping of the doors and coke oven structure as may be expected to occur in normal operation; a further specific object of the invention is to provide a door-handling carriage adapted to run along track rails located in front of the oven structure and above the discharge bench and to take up a relatively small amount of space.

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 a front elevation of a portion of a coke oven provided with my improved door-handling mechanism;

Fig. 2 is a partial section taken on the line 2-2 of Fig. 1;

Fig. 3 and Fig. 4 are views taken similarly to Fig. 2, illustrating different positions of apparatus shown in Fig. 2; and Fig. 5 is also a view taken similarly to Fig. 2 but showing a portion only of the apparatus shown in Fig. 2 and with parts in different relative positions.

In the drawings, A represents the coke oven structure; A' one of the doorways therein. B represents the door normally closing the doorway A' and is formed, as shown, with a metallic framework, and a body portion B' of firebrick or other refractory material. At its upper end, each door is formed with a pocket or recess B² adapted to be entered by the hook or door-engaging end of the door-handling lever G hereinafter described. Adjacent its lower end, the door frame is formed with a central rib or projection B³ for a purpose hereinafter described.

The door-handling mechanism is mounted on a carriage C, having lower flanged wheels C' running on a track rail D mounted on the oven bench A². The carriage C is in guided connection at its upper end with a suspended track rail D' by means of guide rolls or wheels C² of which, in the construction shown, there are four, arranged in two opposed pairs. The wheels C² are journaled on an equalizer C³ which is pivotally connected by the stud C⁴ to the upper end of the frame of the carriage C. The carriage C supports an oscillating door-handling element E, provided, adjacent its lower ends, with trunnions E' mounted in bearings C⁵ formed on the body of the carriage C. The axis of the trunnions E' is horizontal and parallel to the planes of the doors to be handled. The member is provided at its upper end, with a gear segment E², the teeth of which are in mesh with a gear F carried by a shaft F' journaled in bearings C⁶ provided on the frame of the carriage C. The shaft F' is connected by beveled gears F², the shaft section F³ beveled gears F⁴, shaft F⁵ and the speed-reducing gearing M¹⁰ to the shaft of a motor M which is operated

through a suitable controller m , mounted on the carriage C. The upper portion of the member E is made hollow and has journaled therein the door-engaging lever G, which is mounted on the fulcrum stud or shaft E³ carried by the member E and having its axis parallel to the axis of the trunnions E'. The lever G is advantageously provided at its door-engaging end with an adjustable door-engaging block G' through which the lever G engages the surface B³ of the wall of the pocket B² of the door being manipulated. The outer or front end of the lever G is connected by a link G² to a crank arm G³ carried by a shaft G⁴ which is journaled in the member E and has secured to it a worm-wheel G⁵, which is in mesh with the worm G⁶ carried by a shaft G⁷ passing through one of the trunnions E' which is made hollow for the purpose. A clutch H forms a means for connecting and disconnecting the shaft G⁷ to a shaft I. The latter is connected by beveled gears I', shaft I², and beveled gears I³ to a shaft I⁴. The latter is connected through speed-reducing gearing I⁵ to the armature of a motor M', the operation of which is controlled by a controller m' . The clutch H is manipulated through suitable operating mechanism which includes, as shown, beveled gears II', a rock shaft H² and an operating lever H³. A clutch HA serves to connect the shaft I⁴ to and disconnect it from a shaft J. The clutch HA is manipulated through parts comprising bevel gears H¹⁰, a rock shaft H²⁰, and an operating lever H³⁰. The shaft J carries a beveled gear J' in mesh with the beveled gear J² carried by a shaft J³ which also carries a worm in mesh with a wormwheel K'. The latter is secured to a shaft which also has secured to it a spur gear K² in mesh with a spur gear L' secured to one end of a crank shaft L journaled in the frame of the carriage C and located below the member E. The crank portion of the crank shaft L is provided with a roller L² adapted to engage the raised portion B³ of the coke oven door being handled under certain conditions as herein-after explained. The wheels C' are secured to shafts or spindles which carry bevel gears C¹⁰, and are connected together by gears in mesh with the gears C¹⁰ and carried by a shaft O. The latter also has secured to it a beveled gear O' through which the shaft O is connected to a shaft P. The latter is connected by bevel gears to a wormwheel Q in mesh with a worm carried by the shaft of a motor M², the movements of which are regulated by a suitable controller m^2 .

With the construction described, it will be observed that the controllers m , m' and m^2 and the two clutch-actuating levers H³ and H³⁰ are located in convenient proximity to

one another, so that a single attendant may readily operate first one and then another of the controllers and clutch levers, as conditions may make desirable.

In operation, the carriage C is moved along the track rails D and D' into the position in which the door engaging end of the lever G may be moved into the pocket B² of the door to be operated on. The lever G is moved into the pocket B² by operating the motor M to swing the member E from the position shown in Fig. 5 into the position shown in Fig. 2. The controller m' and clutch lever H³ are next manipulated to cause the motor M' to tilt the lever G from position shown in Fig. 2 into the position shown in Fig. 4. This transfers the weight of the door from the doorway of the oven structure to the carriage C. After this, the controller m is again manipulated to swing the member E from the position shown in Fig. 2 to that shown in Fig. 3. It should be explained that advantageously the parts are so proportional and adjusted that the block G' of lever G engages the wall B³ of the pocket B² at a point approximately straight above the center of gravity of the door. In consequence, the door tends to move in parallelism with itself, as it is swung from the position shown in Fig. 1 into the position shown in Fig. 3. In Fig. 3 the door is clear of the coke oven structure proper and may be moved transversely of the doorway to which it pertains by the carriage C, as the latter runs along the rails D and D'.

The door is returned into place by motions which are the reverse of those described for moving it out of place. Should the door stick in the doorway in the general position indicated in Fig. 4, when it is attempted to return the door, this difficulty may be overcome by a suitable rotation of the crank shaft L brought about by the manipulation of the controller m' and clutch lever H³. For this purpose, the crank shaft L is swung from its normal position shown in Fig. 3 to first bring the roller L² on the crank shaft L into engagement with the door portion B³, and then, as the rotation of the crank shaft continues, to ram the lower portion of the door back into its proper place in the doorway.

Among the obvious advantages of the construction illustrated are its comparative simplicity and positiveness of action, coupled with the facts that the door-handling mechanism proper is not apt to jam or bind in operation, and may be readily adjusted and manipulated to properly engage and disengage that door handled by it, notwithstanding any ordinary warping of the latter or of the oven structure. The carriage construction employed is desirable in that it com-

prises convenient and effective power means for effecting the movements of itself and the door manipulating instrumentalities carried by it, and also because it takes up comparatively little room on the discharge bench.

While in accordance with the provisions of the statutes, I have illustrated and described the best forms of my invention now known to me, it will be apparent to those skilled in the art that changes can be made in the form of my invention without departing from its spirit and some features can be changed without a corresponding change of other features.

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

1. A coke oven door-handling device comprising in combination a movable support, an oscillating element mounted on said support and movable with respect thereto about a horizontal axis, and a door-engaging lever journaled on said oscillating element to turn with respect thereto about a second horizontal axis parallel to the first-mentioned axis.

2. The combination of a coke oven door-handling carriage adapted to run along a track in front of a series of vertical oven doorways normally closed by removable doors, an oscillating element mounted on said carriage to swing about a horizontal axis toward and away from the doorways and a door-engaging lever mounted on said element to turn with respect thereto about a horizontal axis.

3. A door-handling device comprising in combination a movable support, an oscillating element mounted on and hinge-connected to said support to turn about an axis fixed with respect to said carriage, means for adjusting said member about its hinge-axis relative to said support and maintaining it in any desired adjustment, a door-engaging lever pivotally mounted on said member, and means for adjusting said lever about its pivotal axis relative to said member and maintaining it in any desired adjustment.

4. A door-handling device comprising a carriage, an element hinge-connected to said carriage to turn about an axis fixed with respect to said carriage, gearing connecting said carriage and element for turning the latter about said axis, a door-engaging lever pivotally mounted on said element at a point above the hinge axis of the latter and gearing for adjusting said lever about its pivotal axis relative to said member.

5. A door-handling device comprising a carriage, an element hinge-connected to said carriage, gearing connecting said carriage and element for turning the latter about the axis of its hinge connection to the carriage,

a door-engaging lever pivotally mounted on said element at a point above the hinge axis of the latter and gearing including an element axially disposed with reference to said hinge axis connecting said lever and carriage and forming a means for adjusting said lever about its pivotal axis relative to said member.

6. A coke oven door-handling device comprising in combination a carriage provided with upper and lower track-engaging wheels, an oscillating element hinge-connected adjacent its lower end to said carriage to turn with respect thereto about a horizontal axis parallel with the direction of movement of the carriage, mechanism mounted on the carriage connecting the latter to said member for turning the latter about its hinge axis, and a door-engaging lever pivotally mounted on said member above said hinge axis to turn with respect thereto about an axis parallel to the first-mentioned axis and means for adjusting said lever about its pivotal axis.

7. A coke oven door-handling device comprising in combination a carriage, an oscillating element hinge-connected adjacent its lower end to said carriage to turn with respect thereto about a horizontal axis, mechanism mounted on the carriage connecting the latter to said member for turning the latter about its hinge axis, a door-engaging lever pivotally mounted on said member above said hinge axis to turn with respect thereto about an axis parallel to the first-mentioned axis, and means for adjusting said lever about its pivotal axis, and an independently-movable door-engaging device mounted on said carriage.

8. A coke oven door-handling device comprising in combination a movable support, an oscillating element mounted on said support and movable with respect thereto about a horizontal axis, a door-engaging lever journaled on said oscillating element to turn with respect thereto about a second horizontal axis parallel to the first-mentioned axis, and a second door-engaging element mounted on said support and movable independently of said lever.

9. A door-handling device comprising a carriage, an element hinge-connected to said carriage to turn about an axis fixed with respect to said carriage, a lever pivotally mounted on said element and provided with a door-engaging hook, and an independently-movable door-engaging device mounted on said carriage independent of said element.

10. A door-handling device comprising a carriage, an element hinge-connected to said carriage, a lever pivotally mounted on said element and provided with a door-engaging hook, an independently-movable door-engaging device mounted on said carriage, and

a motor mounted on said carriage and separate clutch mechanism for connecting said lever and device to said motor.

11. A door-handling device comprising a carriage, an element hinge-connected to said carriage, a lever pivotally mounted on said element and provided with a door-engaging hook, an independently-movable door-engaging device mounted on said carriage, a motor mounted on said carriage and separate clutch mechanism for connecting said lever

and device to said motor, and a separate motor for giving said element its turning movement about its hinge axis.

12. A door-handling device comprising in combination a movable support, an element hinge-connected thereto, and a lever pivotally connected to said element and provided with an adjustable door-engaging hook at one end.

CHARLES V. McINTIRE.