

G. W. THOMPSON.
COKE OVEN.

APPLICATION FILED MAR. 16, 1907.

924,293.

Patented June 8, 1909.

4 SHEETS—SHEET 1.

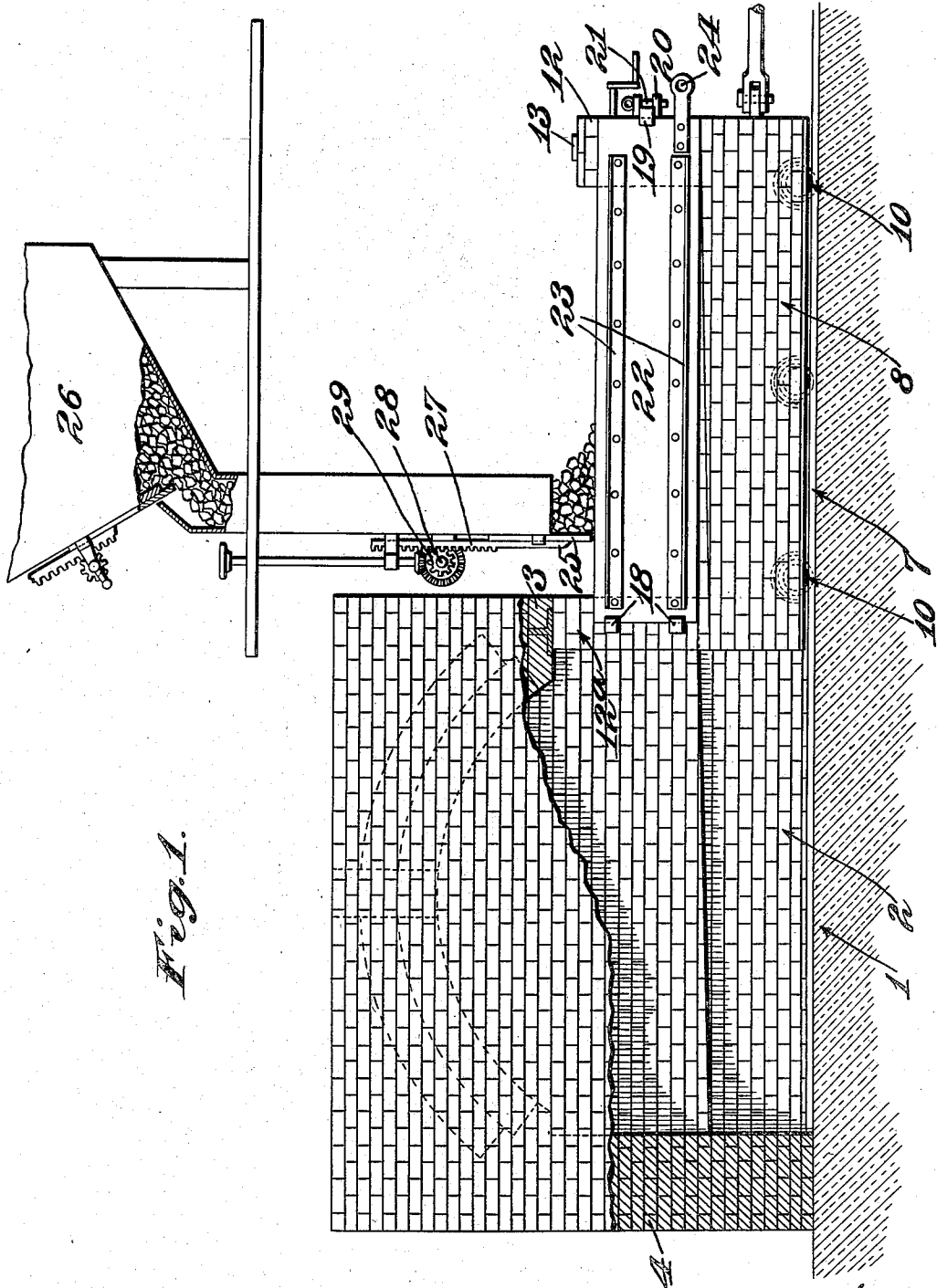


Fig. 1.

Witnesses:
G. A. Pennington
J. B. Megown

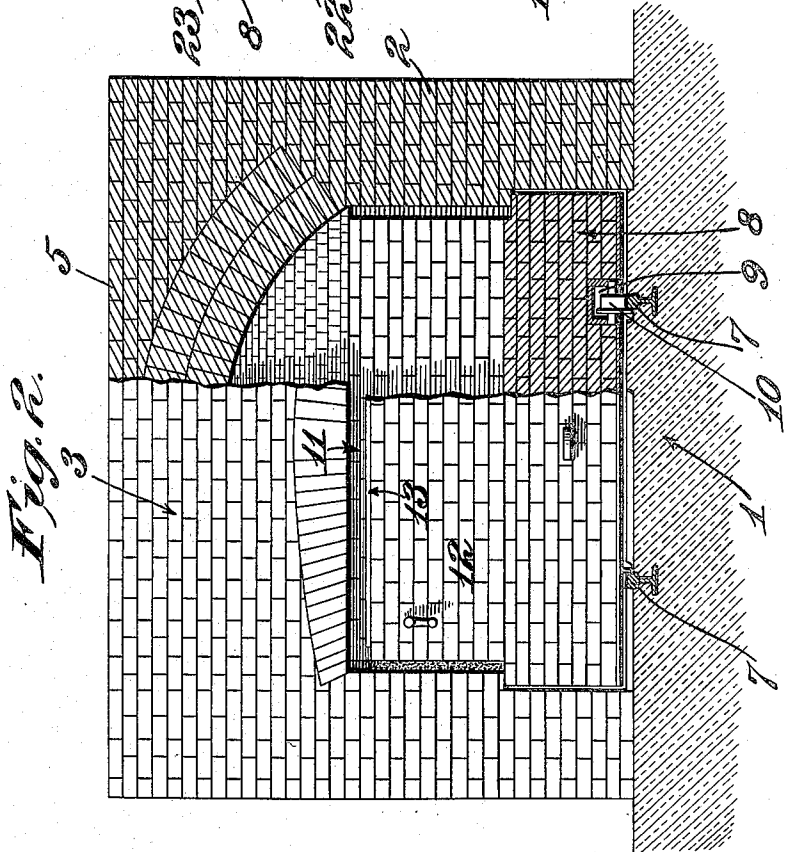
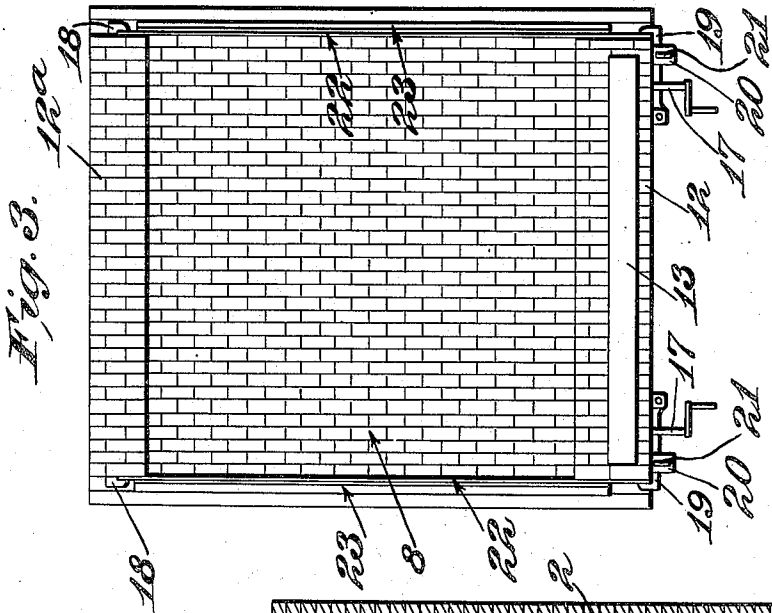
Inventor:
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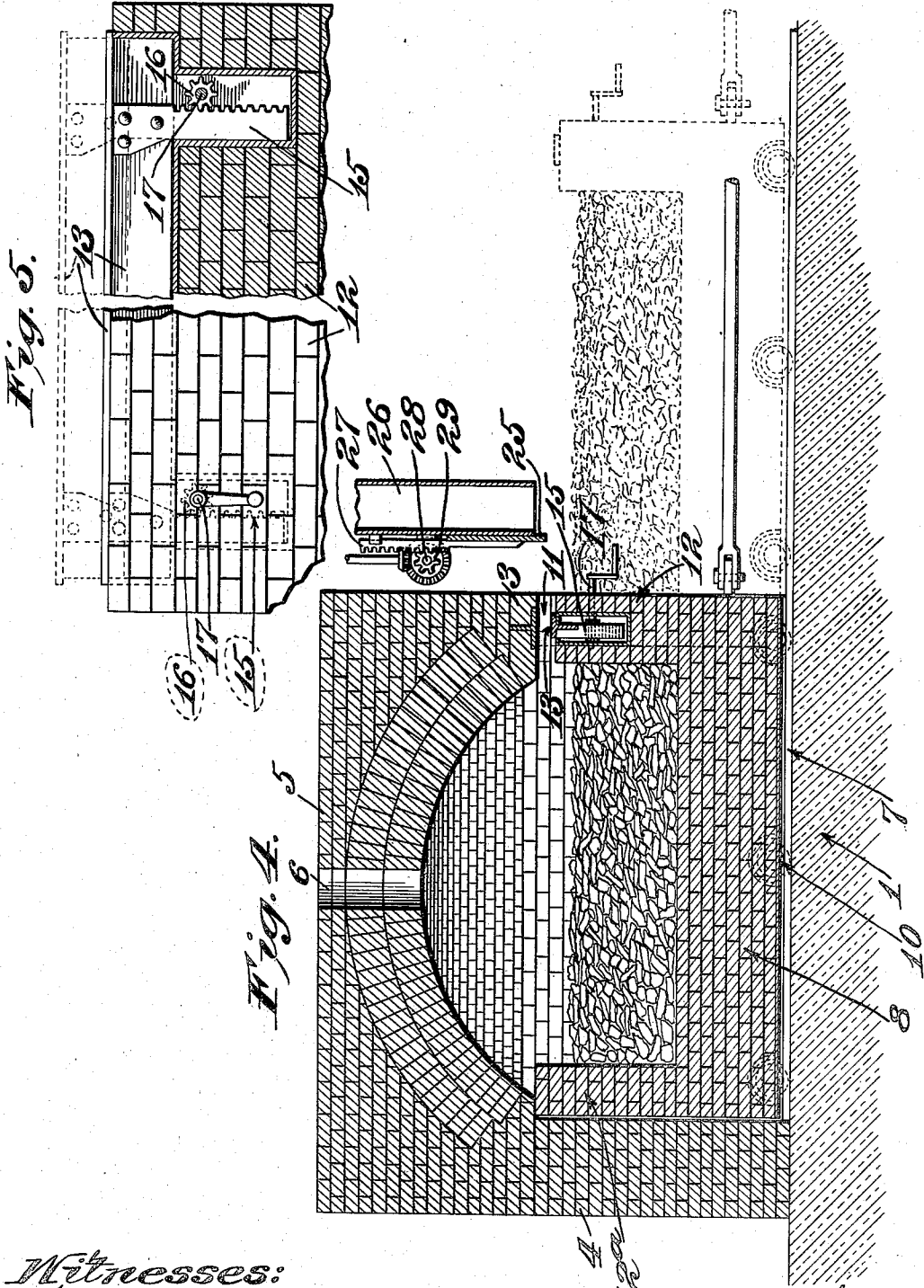
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4 SHEETS—SHEET 3.



Witnesses:
G. A. Remington
J. B. Megown.

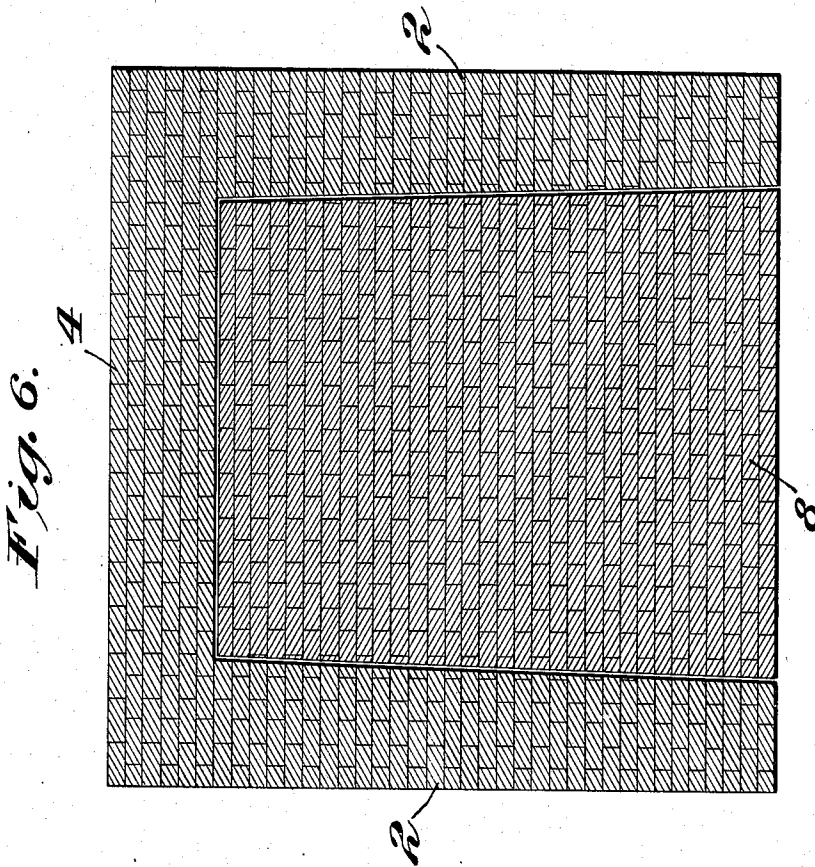
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4 SHEETS—SHEET 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE W. THOMPSON, OF COLLINSVILLE, ILLINOIS.

COKE-OVEN.

No. 924,293.

Specification of Letters Patent.

Patented June 8, 1909.

Application filed March 16, 1907. Serial No. 362,880.

To all whom it may concern:

Be it known that I, GEORGE W. THOMPSON, a citizen of the United States, and a resident of Collinsville, county of St. Clair, and State of Illinois, have invented a new and useful Improvement in Coke-Ovens, of which the following is a specification.

My invention relates to coke ovens and has for its principal objects to economize and utilize the heat absorbed by the walls of the oven during the operation of coking; to control the draft, to avoid loss of material and to facilitate and expedite the operations of charging and discharging the oven and the various minor operations connected with the working thereof.

It consists principally in a platform for the coal mounted so as to be movable into and out of the oven.

It also consists in means whereby the main opening into the oven is automatically closed to a sufficient extent by the insertion and removal of the platform.

It also consists in means for leveling the coal.

It also consists in means whereby the draft is distributed and regulated.

It also consists in other combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, which form part of this specification, and wherein like symbols refer to like parts wherever they occur, Figure 1 is a side view of my device partly in section; Fig. 2 is partly a front elevation and partly a vertical section thereof; Fig. 3 is a plan view of the movable truck; Fig. 4 is a vertical longitudinal section; Fig. 5 is a detail view of the draft regulator; and Fig. 6 is a horizontal section through the lower portion of the oven and body of the wheeled truck therein.

In its general construction, my oven is of the type known as a beehive oven. Usually such ovens are built of fire brick or other refractory material and are arranged in series. They comprise a closed bottom 1, side walls 2, front and rear walls 3, 4, and a dome-shaped top or cover 5 having a central outlet opening or draft flue 6 therein; and in all of these respects my oven is similar thereto. The side and rear walls are im-

perforate, but the front wall has an opening therein. In the ordinary type of beehive oven, the charge of coal is fed onto the floor of the oven through the flue 6 in the top thereof and the coke is raked out therefrom through an opening in the front thereof. Every time such an oven is charged, the opening in its front wall must be bricked up; and the brick must be removed therefrom before the coke can be withdrawn. On account of the heat absorbed by the walls of the oven, the manual operation of removing the coke from the ordinary beehive oven cannot be begun until the oven is cooled. The common method of cooling such an oven is by directing a stream of water into it and this operation usually requires several hours. In the common beehive oven, the opening in the front wall is comparatively small and the draft therethrough is not uniformly distributed throughout the oven, in consequence of which the coking operation proceeds unevenly in different portions of the oven. My invention overcomes these objectionable features to a great extent.

In my oven, the bottom 1, which is preferably of concrete, is solid or imperforate and has tracks or rails 7 embedded therein whose upper surface is substantially flush with the surface of such bottom. On these tracks is mounted a wheeled truck or platform 8. The main body portion of this truck or platform is preferably made of a metallic framework thoroughly protected by fire brick. In order that the platform may be as close as practicable to the bottom of the oven and thereby minimize the draft at this point, pockets 9 are formed in its lower side for the supporting wheels 10, whose axles are preferably embedded in the fire brick or other refractory material. Preferably, the side walls of the oven are inclined slightly toward one another at the rear portion of the oven, and the sides of the truck or platform likewise converge slightly and are of proper dimensions to fit against the side walls of the oven when the truck or platform is in the rearmost or innermost position. This convergence or inclination produces a clearance or relief between the platform and the side walls and thereby makes it easy to move the platform in and

out. For the same purpose, the lower portion of the kiln is slightly wider than the upper portion thereof, and, as illustrated in Fig. 1, the shoulder or offset thereby formed
 5 inclines downwardly at a slight inclination from the front to the rear of said kiln. In like manner, the top of the body portion of the truck inclines downwardly at the same inclination so as to fit against said shoulder
 10 when the truck reaches the innermost position.

The lower portion of the front of my oven is open, as shown at 11, while the upper portion of the front is closed by a front wall 3
 15 which is supported by a bottom or girder supported by the side walls thereof. Upon the front end of the truck or movable platform is mounted a wall 12 of fire brick or other suitable material of the same shape as
 20 the opening 11 in the front wall but of less height. This wall 12 is mounted in such position on the truck or platform as to be vertically in line with the front wall 3 of the oven when the truck or platform is in
 25 working position therein and thereby constitute a closure for said space. On or in the top of this front closure wall 12 is mounted a vertically movable plate 13 adapted to close the open space 11 above said wall and
 30 thereby constitute a draft regulator. A suitable means of mounting this draft regulator is illustrated in Fig. 5. As there shown, the plate is mounted on downwardly projecting rack bars 15 which are vertically movable
 35 in sockets provided therefor in the front closure wall 12 of the truck or platform. Suitably mounted on the front closure wall are pinions 16 whose shafts 17 project through the front of the wall and are squared to permit their manipulation by suitable
 40 keys. By the manipulation of such pinions, the draft regulator may be raised and lowered as desired.

Upon the rear end of the truck or platform is mounted a wall 12^a of fire brick or other refractory material of substantially the same height as the opening 11 in the front wall of the oven, so that, when the truck or platform is pulled out of the oven
 50 into position to be discharged, the rear wall thereon will practically close the opening in the front wall of the oven and thereby prevent unnecessary waste of heat.

The ends of the rear closure wall 12^a of the truck or platform are provided with forwardly turned hooks or angular members 18. The front closure wall 12 is provided on its face with similar hooks or angular members 19 which are pivotally mounted to overlap
 60 the ends of the front closure wall a slight distance and these hooks have their angular portions turned rearwardly. Each of these pivotal members 19 is intended to constitute a latch and is adapted to cooperate with a

forked member 20 provided with a hole 65 through which passes a pin or bolt 21 for locking said latch.

Mounted on each side of the truck or platform is a movable side plate 22 made preferably of metal stiffened by angle bars 23. 70 The ends of each side plate are inserted between the angular members and the ends of the front and rear walls, respectively, so as to be held in position thereby. These side plates are intended for use only while the truck or platform is being charged and during the initial stage of the coking operation; but they are intended to be withdrawn at an early stage of such operation. In order to withdraw them, it is only necessary to remove the bolt 21 which locks the removable latch on the front wall, and then the side member may be easily withdrawn by means of a hook engaging an eye 24 provided therefor on the front end of said side member. 85

Preferably a series of ovens will be provided with a mechanism for charging them mechanically, such, for instance, as a traveling hopper. Whether a traveling hopper is used or not, it is desirable to have means 90 for leveling the charge of coal on the platform. For this purpose, a horizontal plate or scraper 25 is mounted so as to be vertically adjustable in the path of the truck or movable platform 8. When a traveling hopper 26 is used, it is preferable to mount said vertically movable scraper on the lower portion thereof; but obviously such scraper may be mounted upon any suitable support. Preferably, the scraper comprises a horizontal 100 member extending transversely of the line of travel of the movable truck and having rack bars 27 fixed thereto. The supporting frame is provided with a shaft or axle 28 on which are pinions 29 which are arranged to engage with said rack bars. The shaft or axle 28 is squared to cooperate with a key or is provided with a hand crank whereby it may be manipulated to raise and lower the scraper. In the practical operation of this leveling 110 device, the scraper is adjusted horizontally at an elevation above the rear portion of the bed of the platform or movable truck equal to the desired thickness of the bed of coal. The desired amount of coal is then piled 115 onto the truck, and, as the truck is shoved back into the oven, the scraper levels the coal thereon. It will be understood, of course, that the scraper is to be elevated out of the way of the front closure wall, before the truck reaches its innermost position. 120

The operation of my device is as follows: Assuming that a charge of coal has been properly coked, the entire charge is withdrawn from the oven by pulling out the removable truck. This is easily done, because the oven widens toward its front and because the coal naturally shrinks away from 125

the walls in coking so that there is only slight friction to overcome. As the sides of the truck were removed early in the operation, the coke can be quickly removed side-
 5 wise from the truck, as, for instance, by mechanical scrapers provided therefor. Thereupon, the side plates are mounted on the truck, the leveling scraper is adjusted to its proper position and the charge of coal is
 10 delivered onto the truck or platform by means of a hopper or otherwise. During these operations of discharging and recharging the truck, the rear closure wall of the truck practically closes the front of the oven
 15 so as to retain the heat therein, and the rapidity with which these operations can be effected prevents the cooling of the truck. Before the truck has reached its innermost position, the leveling scraper is raised to
 20 allow the front closure wall to clear it. When the truck reaches its innermost position, there is an open space above the front wall of the oven and a slight opening at each end thereof. The heat from the former charge
 25 is sufficient to vaporize a portion of the hydrocarbons in the coal and the draft through said openings is sufficient for the combustion of such vapors. As the coking operation proceeds the draft opening is decreased progressively by means of the regulator and the
 30 openings at the ends are daubed with mud. On account of the great amount of heat in the walls of the oven at the beginning of this operation, the coking operation is materially shortened and the oven remains in
 35 continuous service instead of going out of service with every charge, as heretofore. In fact, a considerable portion of the volatile hydrocarbons is not needed for the purpose
 40 of coking, and I contemplate collecting and saving the same as they issue from the draft opening at the top. By reason of the opening extending across the entire front of the oven, the draft is distributed much better than
 45 was possible heretofore, and consequently the operation of coking is more uniformly effected. This is a considerable advantage over the old process in which part of the coke first formed is consumed before the coking
 50 of the other portions has been completed. Obviously, the construction hereinbefore described admits of considerable modification, and I do not wish to be restricted to said construction. For instance, the top
 55 portion of the oven may be made removable after the manner of the removable truck hereinbefore described, the important feature being that the portion which supports the charge and the inclosing portion shall
 60 be relatively movable to permit rapid charging and discharging without cooling the oven.

What I claim as my invention and desire to secure by Letters Patent is:

1. A coke oven of the beehive type having 65 a solid floor and imperforate side and end walls, said oven having an opening in the top thereof and an opening in the front thereof, and a truck movable through said front opening and having a closure wall on
 70 its front end of less height than said opening but otherwise arranged to close the same.

2. A coke oven having an opening in the front thereof and a truck movable through said opening, the bottom of said oven being 75 closed and said truck having a closure wall on its front end of less height than said opening and having a draft regulator at its top.

3. A coke oven having an opening in the front thereof and a truck movable through 80 said opening, the bottom of said oven being closed and said truck having a closure wall on its front end of less height than said opening and having a vertically adjustable draft regulator thereon. 85

4. A coke oven having an opening in the front wall thereof, and a truck movable through said opening, said truck having a closure wall on its front end of less height than said opening and a closure wall on its 90 rear end adapted to close said opening when the truck is in its forward position.

5. A coke oven of the beehive type having an opening in its front end and having its side walls slightly converging rearwardly, 95 and a wheeled truck movable through said opening and shaped to fit between said walls and thereby cut off the air from the burning chamber.

6. A coke oven of the beehive type having 100 a solid floor and imperforate side and end walls, said oven having an opening in the top thereof and an opening in the front thereof, a truck movable through said opening and a leveling device comprising a member ar- 105 ranged horizontally outside of said opening above the path of said truck.

7. A coke oven of the beehive type having a solid floor and imperforate side and end walls, said oven having an opening in the 110 top thereof and an opening in the front thereof, a truck movable through said opening, and a leveling device comprising a vertically adjustable member arranged horizontally outside of said opening above the path 115 of said truck.

8. A coke oven having an opening in its front and having a closed bottom, a track extending through said opening and substantially flush with said bottom, a truck mov- 120 able on said track and having a wall thereon adapted to close said opening, and a leveling device arranged above said track outside of said oven and comprising a vertically adjustable member arranged to level the charge 125 on said truck.

9. A coke oven of the beehive type having an opening in its front and having side walls

which are provided with shoulders inclined slightly downwardly toward the rear, and a truck movable through said opening and having the top of its side portions inclined
5 to cooperate with said shoulders.

In testimony whereof I have signed my name to this specification in the presence of

two subscribing witnesses, at St. Louis, Missouri, this 7th day of March, 1907.

GEORGE W. THOMPSON.

Witnesses:

CARL D. SMITH,
EDWARD SCHMID.