

(No Model.)

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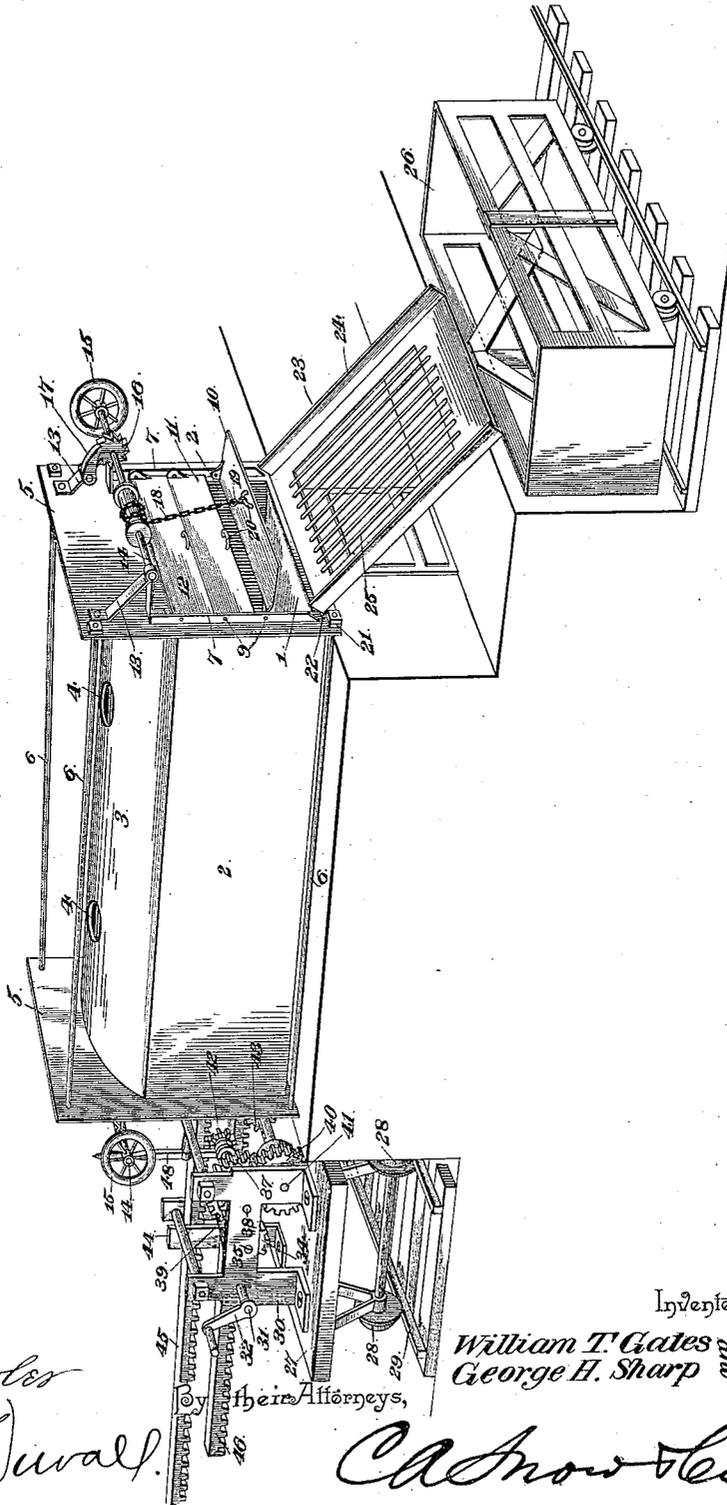
W. T. GATES & G. H. SHARP.

COKE OVEN.

No. 472,115.

Patented Apr. 5, 1892.

Fig. 1.



Witnesses:

M. E. Fowler
W. J. Duval

Inventors

William T. Gates
George H. Sharp

by their Attorneys,

C. Snow & Co.

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Fig. 2.

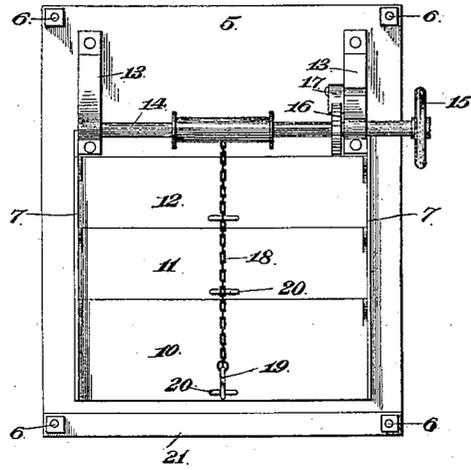


Fig. 4.

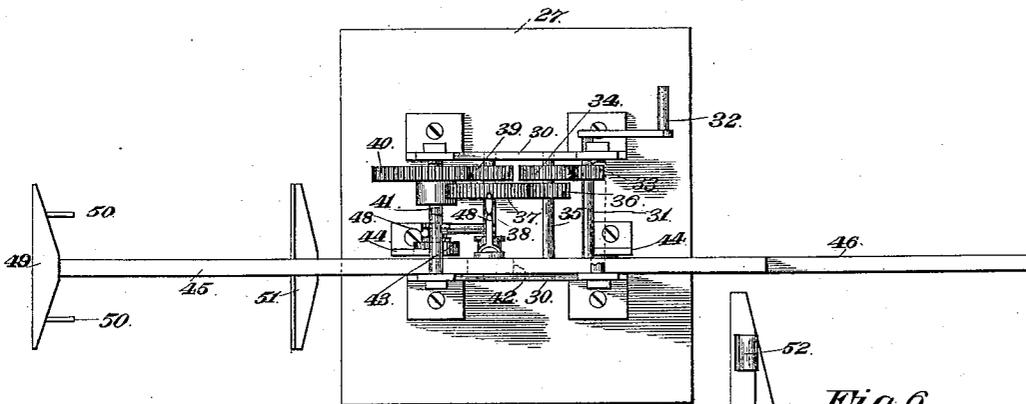


Fig. 6.

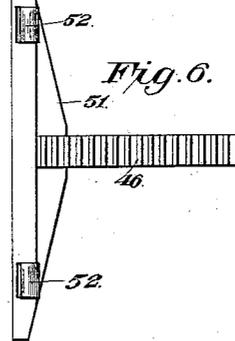
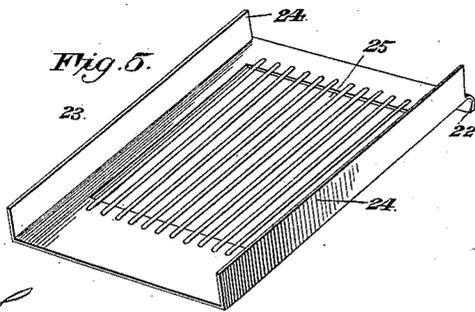


Fig. 5.



Witnesses:

M. Fowler
W. S. Duval

By their Attorneys,

Inventors
William T. Gates
George H. Sharp

C. Snow & Co.

(No Model.)

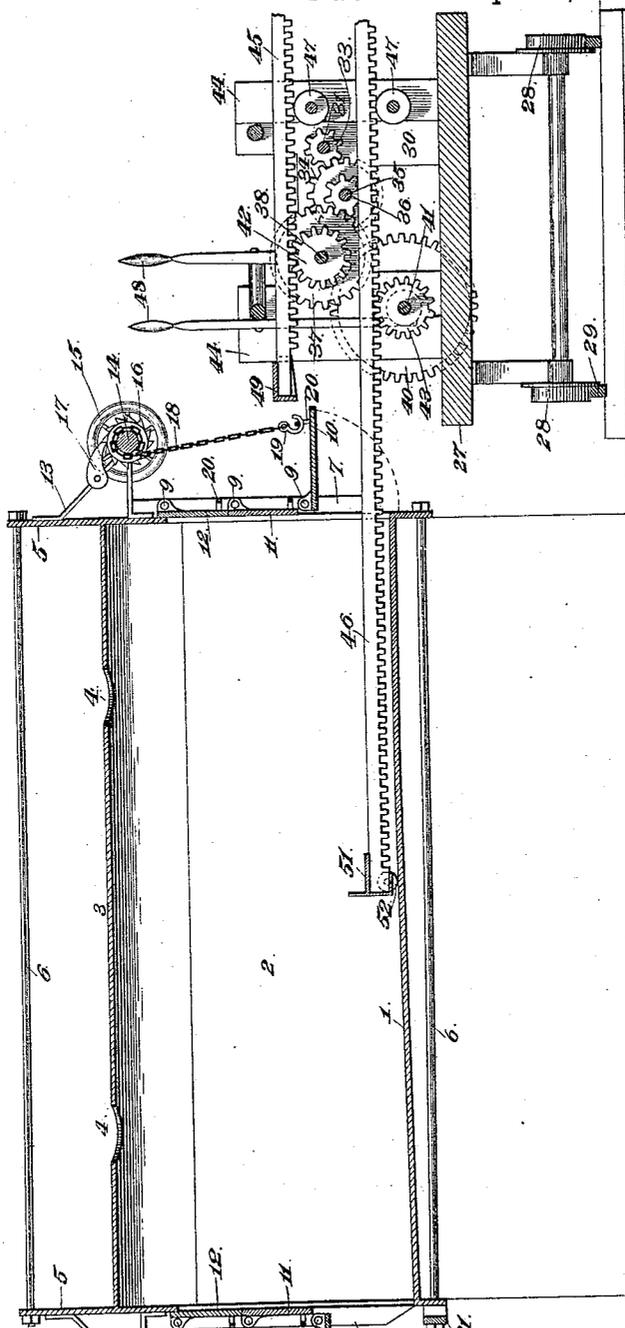
3 Sheets—Sheet 3.

W. T. GATES & G. H. SHARP. COKE OVEN.

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Fig. 3



Witnesses:

M. C. Fowler
M. J. Duval

By their Attorneys,

C. A. Snow & Co.

Inventors

William T. Gates
George H. Sharp

UNITED STATES PATENT OFFICE.

WILLIAM T. GATES AND GEORGE H. SHARP, OF FAIRCHANCE, PENNSYLVANIA.

COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 472,115, dated April 5, 1892.

Application filed July 14, 1891. Serial No. 399,493. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM T. GATES and GEORGE H. SHARP, citizens of the United States, residing at Fairchance, in the county of Fayette and State of Pennsylvania, have invented a new and useful Coke-Oven, of which the following is a specification.

This invention relates to improvements in coke-ovens; and the objects in view are to provide means for spreading or leveling the coal within the oven, for removing the coke from the oven, for separating the coke from the ashes, and for loading the coke into cars for shipment.

With the above objects in view the invention consists in certain features of construction hereinafter specified, and particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective of a coke-oven constructed in accordance with our invention and the mechanical appliance adapted to operate in connection with the same. Fig. 2 is a front elevation of the oven. Fig. 3 is a vertical longitudinal section through the oven and the mechanical appliance. Fig. 4 is a detail of the mechanical appliance. Fig. 5 is a detail in perspective of the screen. Fig. 6 is a detail in inverted plan of the head of one of the plungers.

Like numerals of reference indicate like parts in all the figures of the drawings.

In practicing our invention we form the oven with the bottom 1, which is flat and plain, the opposite longitudinal side walls 2, which are surmounted by the arched roof 3, having the usual outlets 4, and at the opposite ends of the oven locate the end walls 5, which are rectangular and extend beyond the wall 2 and arch 3 and are connected outside of the same by a series of tie-rods 6, which prevent expansion by heat.

At the front and rear ends of the oven the walls 5 are provided with opposite vertical flanges 7, which flanges are provided with opposite bearings 8, in which are journaled the pintles 9 of a series of doors. 10 designates the lower pair of doors, 11 the intermediate pair, and 12 the upper pair of doors, the doors

of one wall being in longitudinal alignment with those of the opposite wall, and, being hinged at their upper edges, will when not otherwise influenced be closed.

Pairs of bearing-brackets 13 are located upon the end walls near their upper ends, and in each pair of brackets is journaled a drum-shaft 14, terminating at its outer end in a crank-wheel 15 and provided with a ratchet-wheel 16, designed to be engaged by the free end of a pawl 17, pivoted to one of the brackets and serving as a means for locking the drum-shaft against retrograde movement. A chain 18 is wound upon each of the drum-shafts and at its lower end terminates in a hook 19, designed to removably engage the staple 20 of any one of the doors 10, 11, and 12, and hence when in such engagement a few rotations of the drum-shaft will serve to elevate and maintain the door in such elevation.

A transverse strip or flange 21 is located at the front or discharge end of the oven, which oven, it will be observed, is tapered slightly toward said end, and the strip receives the downwardly-bent lip 22, formed at the upper end of a rectangular screen-frame 23, which frame comprises opposite vertical side flanges 24 and a central series of wires 25. The screen-frame is inclined, as shown, to a point below the oven, which latter is preferably mounted upon some suitable support, and below the end of the frame is located the track-rails of the coke-transporting system, so that the cars 26 of said system may be run under the lower end of the frame and receive the discharge of coke from the oven, which is directed by the frame to the cars. The passage of the coke from the oven over the open frame or screen serves to eradicate from the coke the ashes, so that clean coke is discharged into the car, while the refuse or residuum of the baking passes through the screen-frame to the ground or other receptacle to be in any manner removed.

27 designates a truck or platform, the wheels of which are mounted upon the track-rails 29, which rails, it will be understood, pass in rear of an indefinite number of coke-ovens,

such as we have heretofore described. Upon the platform or truck opposite frames 30 are mounted and are connected by suitable tie bolts or rods serving to strengthen and maintain the same in relative position. A crank or power shaft 31 is journaled in the opposite frames and is provided with a crank 32 for operating the same. A small gear 33 is mounted on the power-shaft and the same engages with and operates a larger gear 34, mounted upon a second shaft located in front of the power-shaft and designated as 35. The shaft 35 also carries a small pinion 36, which engages with and drives a large gear 37, mounted upon a third shaft 38, carrying at one end a small gear 39, which engages with and operates a large gear 40, mounted upon the fourth shaft 41. Upon the outer end of the shaft 38 a gear 42 is located, and a corresponding gear 43 is located upon the corresponding end of the fourth shaft 41. A pair of standards 44 rises from the truck adjacent to the inner surfaces of the outer side frame 30 and combine with said frame to form intermediate spaces. Mounted between the standards 44 and the adjacent side frame is an upper plunger or ram 45 and a lower plunger or ram 46, each of which has its under side toothed, as shown, the upper ram or plunger engaging the teeth of the upper gear-wheel 42, while the lower ram or plunger engages the gear-wheel 43—that is, when the gears are thrown into such engagement. These plungers or rams rest upon small rollers 47, journaled between the standards 44 and the side frame, and may be operated by the rotations of their gears when desired by simply shifting the gears into engagement with the plungers, which we accomplish through the medium of a pair of hand-levers 48. The upper plunger or ram terminates in a transverse head 49, which at its rear side is provided with rearwardly-disposed wings 50, disposed parallel to each other and located at opposite sides of the plunger, while the lower plunger or ram is provided with a transverse head 51 and has journaled in its lower edge small friction-rollers 52.

This completes the construction of the oven and its mechanical appliance, and the operation of the same is as follows: The coal having been burned or baked and reduced to coke, the chains of the drum-shafts are connected at their free ends with the lower doors and said shafts operated so as to elevate the doors. The truck 27 is now run to the rear end of the oven and the lower plunger 46 introduced through the rear door into the oven. The crank of the power-shaft 31 is now rotated and by reason of the power-increasing gearing readily forces the lower plunger from the rear to the front end of the oven. The head of the plunger, serving to force the coke from the oven out of the discharge end of the same, where it passes down the screen

or chute, is separated from its ashes and is finally discharged into the car awaiting its reception. After the coke has been discharged the doors 10 are closed and the doors 11 opened. The oven is now recharged with coal and the lower plunger thrown out of operative connection with its gear and the upper plunger thrown into operative connection with its gear. The power-shaft 31 is now operated in first one direction and then the other, so as to reciprocate the upper plunger and its head back and forth over the bed of coal until the latter is all leveled off in the oven, and hence results in a uniform baking. When thus leveled, the truck is moved by hand or other means to the next oven and the operation repeated, and so on throughout the series of ovens.

From the foregoing description it will be seen that we have provided a mechanical means for leveling and discharging the contents of a series of ovens, which means are of simple and economical construction, may be readily operated, and will facilitate the operations both by a reduction of time required and labor employed, thus rendering the production of coke cheaper.

Having described our invention, what we claim is—

1. The combination, with an oven open at one end, of a plunger terminating at one end in a transverse head provided at its rear side with rearwardly-disposed wings arranged parallel to each other and at opposite sides of the plunger, and means for reciprocating the plunger, substantially as specified.

2. The combination, with the oven provided with upper and lower doors, of a gear system located at one end of the oven, an upper and a lower plunger adapted to be operated by the gear system, and means for throwing the gear into operative connection with either one of the plungers, substantially as specified.

3. The combination, with the coke-oven having the upper and lower doors at its ends, the truck, the opposite frames mounted on the truck, the shaft 30, having the crank and journaled in the frames, the gear on the shaft, the shaft 35, the large gear thereon engaging the pinion, the small pinion mounted on the shaft 35, the shaft 38, having the large gear engaging the pinion and the small pinion, the shaft 41, having the large gear engaging the pinion of the shaft 38, the opposite standards 44, located near one of the side frames, the rollers journaled between the standards and frame, the loose gears mounted on the shafts 38 and 41, and the pivoted levers for shifting the same, of the toothed plungers 45 and 46, located upon the rollers and engaged each by one of the loose gears, each of said plungers terminating at its front end in a head, substantially as specified.

4. The combination, with the oven provided at its ends with upper and lower openings,

hinged doors for the same, and means for
opening them, of a gear system located at
one end of the oven, an upper and a lower
plunger adapted to be operated by the gear
5 system, and means for throwing the gear into
operative connection with either one of the
plungers, substantially as specified.

In testimony that we claim the foregoing as

our own we have hereto affixed our signa-
tures in presence of two witnesses.

WM. T. GATES.
GEORGE H. SHARP.

Witnesses:

JOHN M. FREELAND,
W. T. WHITE.