

D. F. LEPLY.
COKE DISCHARGING APPARATUS.
APPLICATION FILED MAY 23, 1909.

1,025,815.

Patented May 7, 1912.

3 SHEETS-SHEET 1.

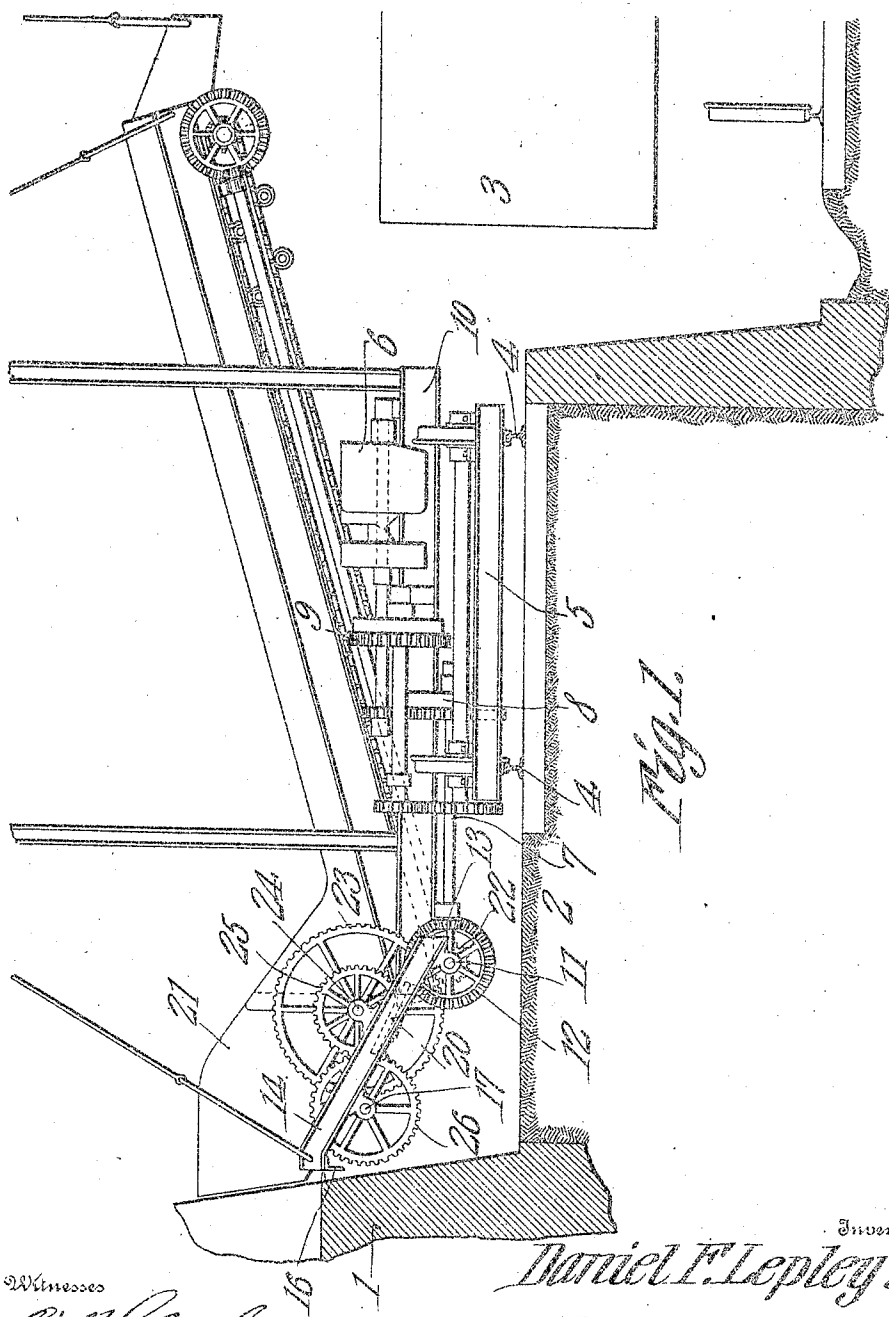


Fig. 1.

Witnesses

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Daniel F. Lepley.

By

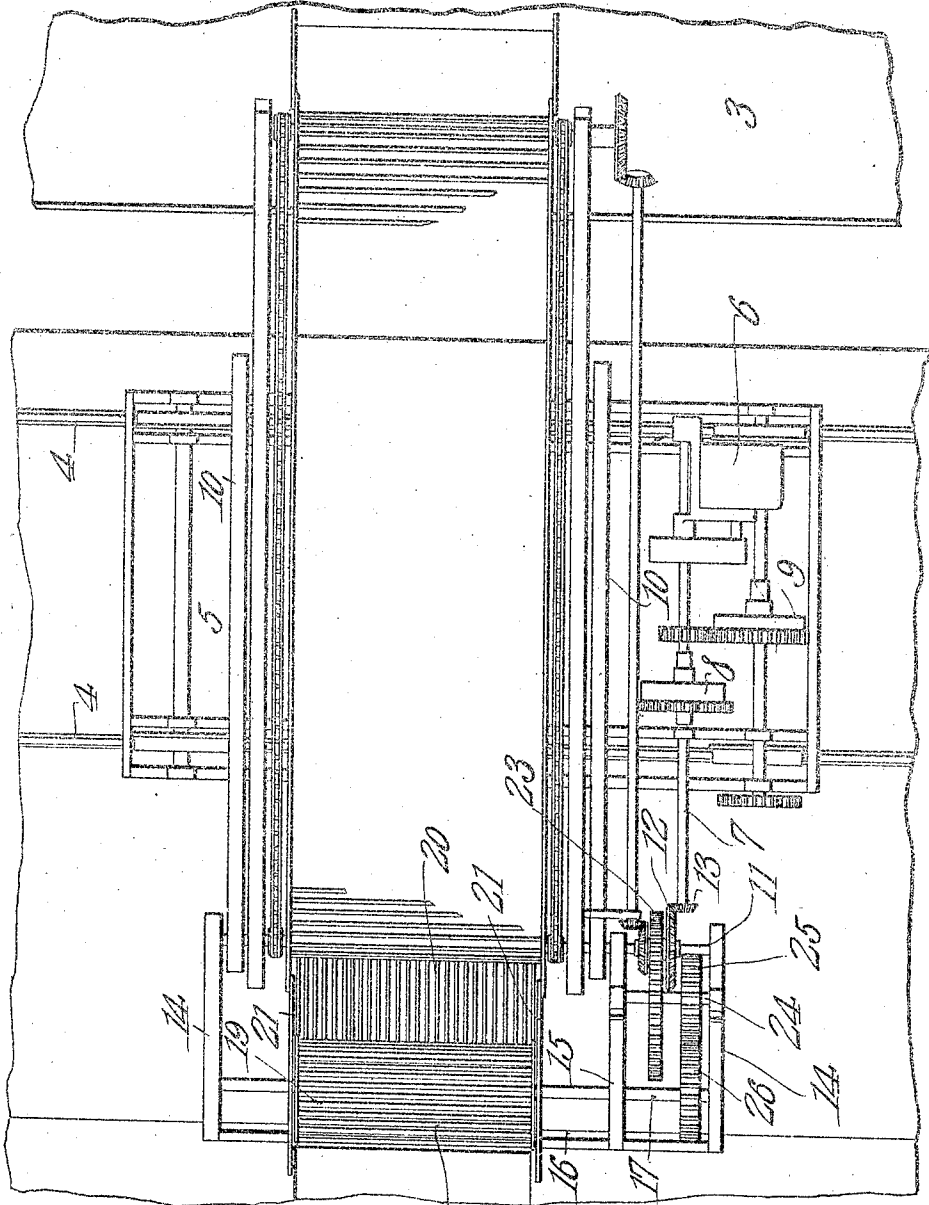
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D. F. LEPLEY.
 COKE DISCHARGING APPARATUS.
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 3 SHEETS-SHEET 2.



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Fig. 2.

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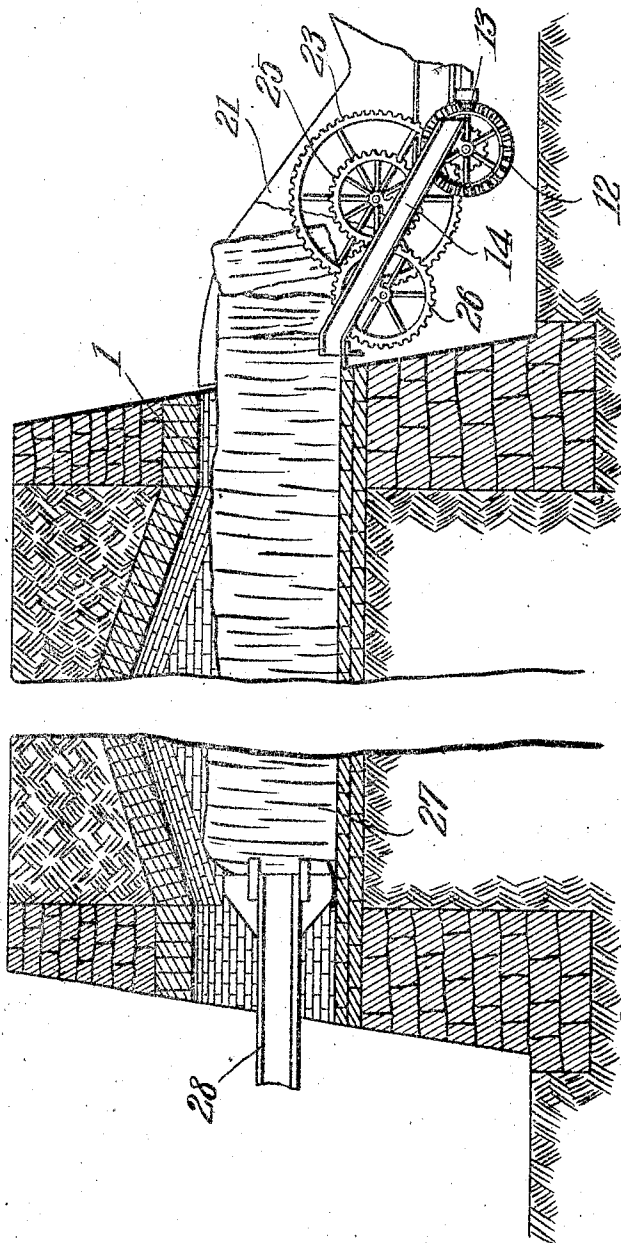
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3 SHEETS-SHEET 3.

Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

DANIEL F. LEPLY, OF CONNELLSVILLE, PENNSYLVANIA.

COKE-DISCHARGING APPARATUS.

1,025,815.

Specification of Letters Patent.

Patented May 7, 1912.

Application filed May 28, 1909. Serial No. 498,870.

To all whom it may concern:

Be it known that I, DANIEL F. LEPLY, a citizen of the United States, residing at Connellsville, in the county of Fayette and State of Pennsylvania, have invented a new and useful Coke-Discharging Apparatus, of which the following is a specification.

This invention has reference to improvements in coke discharging apparatus and is designed to provide a means for breaking up the coke block as it is discharged from a coke oven, into large pieces and at the same time free it from coke dust and ashes.

It is customary to provide coke ovens in long series and along the series of ovens is a ledge or embankment for a track designed to carry a truck upon which is mounted a suitable conveyer for receiving the coke as it is discharged from the ovens and for conveying it to cars which in turn are supported upon a track at the outer edge of the bank or ledge.

In accordance with the present invention the coke, as it is discharged from an oven by means of a pusher entering the oven from the remote end, is engaged by an accelerator tending to lift the block of coke and at the same time increase the movement of the lower surface of the block, thus causing a portion of the block to break off and at the same time cause more or less disintegration of the hard skin which forms on the bottom of the coke block. The lifting of the broken off portion also tends to cause the gravitation of coke dust and ash, which accumulate on the top of the block, from the same. The accelerator is in the form of a slatted drum and adjacent thereto there is provided a grating upon which the broken off portions of the coke block fall so that the disintegrated scale and the ashes and coke dust find escape through both the accelerator drum and the grating to a suitable point of deposit while the broken coke is carried by a conveyer to a suitable point and is there deposited in cars or other suitable containers.

The invention is designed for use particularly with coke ovens where the coke is discharged from one end of the oven in the form of a solid mass or core and by this invention the breaking up of the core and the proper screening thereof is effected, at the oven end of the machine so that the ash and

dirt from the coke is deposited near the oven front.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a side elevation of the structure for receiving the coke as discharged from the oven, as viewed from the power end of the sustaining truck which latter is shown in end elevation. Fig. 2 is a plan view of the structure shown in Fig. 1. Fig. 3 is a longitudinal section of a coke oven showing the oven end of the coke receiving apparatus and an indicative representation of a coke pusher, at the respective ends of the coke oven.

In Fig. 1 there is shown more or less diagrammatically one end of a coke oven 1 with the adjacent ledge or embankment 2 extending to near a car track upon which it is assumed that cars are run and the body 3 of one of these cars is simply indicated in this figure. Mounted upon the ledge 2 parallel with the face of the ovens 1 it being understood that the ovens are arranged in long series, are rails 4—4 the inner one of which may be located about midway between the mouth of the oven and the outer edge of the ledge or embankment 2. Upon the rails 4 there is mounted a truck 5 which may be of any suitable construction and consequently need not be described in detail herein. Near one end of the truck there is mounted a prime mover preferably in the form of an electric motor 6 connected by means of suitable gearing which need not be described in detail, to a shaft 7, and also through other gearing to one of the axles of the truck, clutches 8—9 being interposed at appropriate points so that the motor may be coupled to the shaft 7 or to the truck axle at will. The truck carries at such points as may be necessary cross beams 10 of suitable length and disposition to support certain structures to be hereinafter described.

Mounted in suitable bearings carried by appropriate ones of the cross beams 10 is an arbor 11 parallel with the longitudinal axis of the truck and located between the truck and the coke ovens. The arbor 11 carries a miter gear 12 in mesh with a miter pinion 13 on the shaft 7 so that when mo-

tion is imparted to the shaft 7 this motion will be transmitted to the gear 12 and the latter will rotate at a speed commensurate with the proportionate sizes of the gearing between it and the motor 6. Pivottally mounted on the arbor 11 are end beams 14 and such intermediate beams 15 as may be necessary, and these beams 14 and 15 are joined by another beam 16 parallel with the arbor, 11. Journaled in suitable bearings on the beams 14 and 15 is a shaft 17 parallel with the arbor 11 and near the outer ends of the beams 14 and 15. This shaft 17 carries a drum 18 having its periphery formed of spaced slat-like members 19 disposed longitudinally of the drum 18 and spaced apart a short distance. These slats may be made of metal pipe suitably supported at the ends and at such intermediate points as may be necessary, or they may be made of metal bars as may be desired. It will, of course, be understood that a perforated drum instead of a slatted drum may be used, or, under some circumstances, an imperforate drum or roller may be employed.

The frame composed of the members 14, 15 and 16 also serves as a support for a screen 20 of about the same width as the length of the drum 18 and both the drum and screen are flanked by side plates 21 extending for a suitable distance above the drum and screen and so shaped that when brought into close relation to an oven the side plates 21 prevent material ejected from the oven from moving laterally off either the drum 18 or the screen 20. The frame made up of the members 14, 15 and 16 and the parts carried thereby is capable of movement about the arbor 11 as an axis so that the end of this frame remote from the arbor 11 may be elevated or lowered as may be desired. The beam 16 may be made of angle iron as indicated in Fig. 1 and is so positioned with relation to the drum 18 that when the pivoted frame carrying the drum 18 is properly adjusted, the top of the beam 16 will be on a level with the floor line of the coke oven while the upper portion of the drum 18 will project above such floor line.

Let it be assumed that the charge in the oven has been properly coked and that it is desired to discharge the oven, then the coke charge or core, indicated at 27 in Fig. 3, is pushed out of the oven by means of a pusher 28 introduced into the end of the oven remote from the end with which the device designed to receive the core, as pushed out from the oven, is brought into coincidence. The core is pushed from the oven in substantially one piece and on reaching the drum 18 the end of the core is elevated because the drum 18 projects above the floor line of the oven. The drum 18 is

driven by means of a pinion 22 on a sleeve loose on the arbor 11 and driven by the gear 12, the said pinion 22 meshing with a gear wheel 23 upon a countershaft 24 mounted on the beams 14 and 15 at one end of the structure, and this shaft 24 carries a gear wheel 25 meshing with another gear wheel 26 on the shaft 17. The drum 18 rotates in a direction which will carry its upper surface in the same direction as the travel of the discharging core of coke but the speed is such that the drum 18 travels at a higher peripheral rate of speed than does the discharging core under the impulse of the pusher at the other end thereof. The action of the drum 18 upon the bottom surface of the coke core is to break away and disintegrate the hard skin which forms on the bottom of the core and this is so broken up as to find ready escape through the spaces between the pipes or rods 19. At the same time the higher speed of movement of the periphery of the drum 18 over and above the progressive movement of the coke core, together with the elevation of the end of the coke core causes the latter to fracture on a substantially vertical plane because there is a certain vertical stratification of the core that is characteristic of coke. The lower surface of the broken off portion then travels faster than the top so that the broken off portion of the block is tilted toward the main body and the base is carried away therefrom and any ashes or coke dust on the top of the broken section will tend to gravitate toward the main portion of the core and find escape between the broken off portion and the main core and ultimately will fall upon the drum 18 and through the latter, after which the broken off portion of the core is carried by the drum away from the main portion of the core, and is ultimately deposited upon the screen 20 butt foremost and any fine particles or other waste will gravitate through the screen.

It frequently happens that the outer faces of the coke ovens, or some of them become warped or bulged by the action of the great heat within them and also the doors used to close the coke oven openings, and also their hinges, project for a considerable distance beyond the faces of the ovens. Under these conditions there is a liability of the coke oven end of the device becoming jammed against the faces of the bulged ovens or against the doors or their hinges. With the present device this cannot occur since it is an easy matter to lift the coke oven end of the frame carrying the drum 18 and the sides 21 so that they are readily adjusted to any coke oven no matter what the condition of the discharge end thereof may be, and furthermore, this facilitates the movement of the truck from oven to oven since such movement need not be interfered with by

any want of alinement of the coke oven faces or parallelism between the same and the track 4.

What is claimed is:—

5 1. In a coke discharging apparatus, means for imparting progressive movement to a coke block or core in a direction out of the discharge end of a coke oven, and an accelerator for the discharging end of the coke
10 core imparting to a portion of the core engaged by the accelerator a greater speed of travel than that of the remainder of said core.

2. In a coke discharging apparatus, means
15 for imparting a progressive movement to the coke block or core in a substantially horizontal direction out of the discharge end of a coke oven, and an accelerator for the bottom of the coke core being discharged for
20 imparting to the portion of the core engaged by the accelerator a greater speed than the rate of travel of the remainder of the core.

3. In a coke discharging apparatus, means for imparting progressive movement to a
25 coke block or core in a substantially horizontal direction out of the discharge end of a coke oven, and an accelerator and elevating means for the coke core being discharged for imparting to the end of the core engaged by
30 the accelerator a greater speed of travel than that of the remainder of the core and at the same time lifting the end engaged by the accelerator.

4. In an apparatus of the class described,
35 a drum in the path of a coke core discharging from a coke oven, said drum projecting above the bottom of the oncoming coke core and having its periphery composed of a continuous series of spaced members each extending in a direction transverse to the line
40 of travel of said coke core, and means for causing the progressive movement of the coke core in a substantially horizontal direction toward said drum.

5. In an apparatus of the class described,
45 a suitable truck, a drum carried thereby in position to project above the plane of the bottom of the coke core being discharged from a coke oven in a substantially horizontal direction, and a screen or grating carried
50 by the truck on the side of the drum remote from the coke oven side.

6. In an apparatus of the class described,
55 a suitable truck, a rotatable drum carried by said truck in position to project above

the plane of the bottom of a coke core being discharged from a coke oven in a substantially horizontal direction, and a screen carried by the truck on the side of the drum remote from the coke oven side and inclined
60 in a direction downward from said drum.

7. In an apparatus of the class described, a carrier or support movable into and out of operative relation to the discharge end of a coke oven, and a revoluble drum on said
65 carrier movable into and out of the path of a discharging coke core coming from the oven, the axis of rotation of the drum being substantially at right angles to the direction of travel of the core. 70

8. In an apparatus of the class described, a carrier or support movable into and out of operative relation to the discharge end of a coke oven, and a drum on said support
75 movable with the latter into the path of the discharging end of a coke core coming from the oven, said drum having its periphery provided with passages for waste material dislodged from the coke core.

9. In an apparatus of the class described,
80 a suitable truck movable into and out of operative relation to the discharge end of a coke oven, a drum carried by the truck in position to project above the plane of the bottom of a coke core being discharged from
85 a coke oven in a substantially horizontal direction, said drum having passages through its periphery for waste material dislodged from the coke core, and a screen or grating carried by the truck on the side of the drum
90 remote from the coke-oven side thereof.

10. An apparatus for use in connection with coke ovens comprising an accelerator for imparting to the bottom of the coke core, at the point of discharge, a greater speed of
95 travel than the mass movement of the core.

11. An apparatus for use in connection with coke ovens, comprising a combined accelerator and elevating means, for lifting the discharging end of the coke core and
100 at the same time imparting to the bottom of said lifted portion a greater speed of travel than the mass movement of the core.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses. 105

DANIEL F. LEPLEY.

Witnesses:

WILLIAM H. SOISSON,
GUSTAV E. T. WAGNER.