

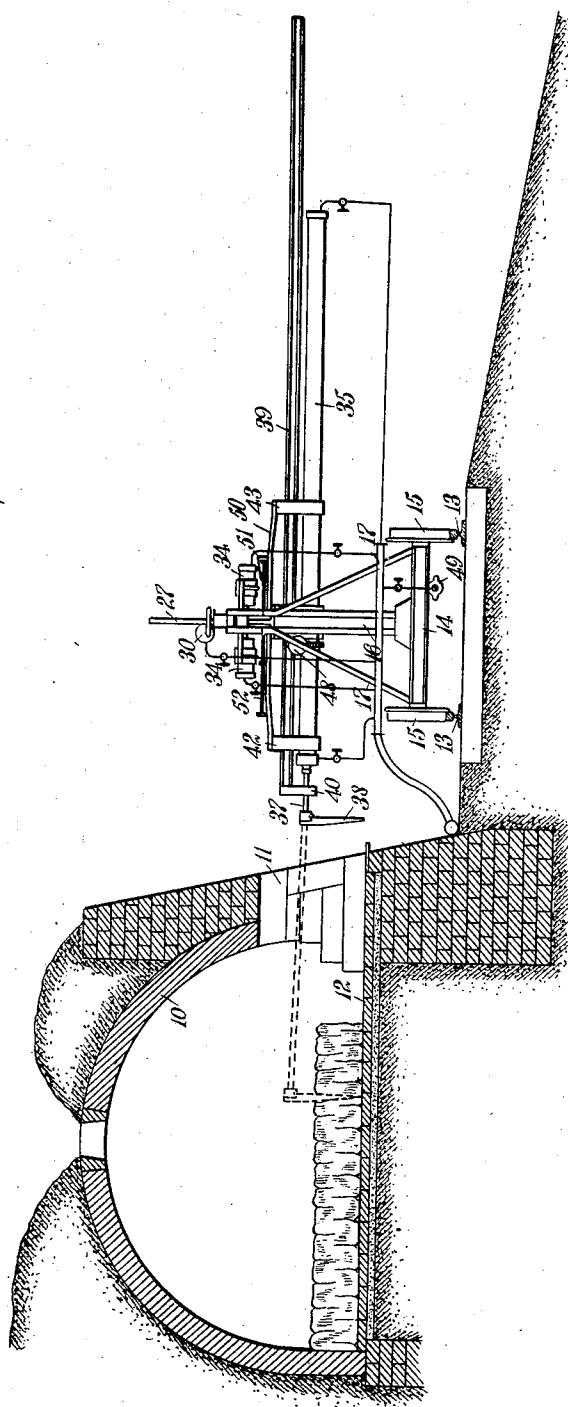
1,021,710.

D. B. STAUFF.
COKE DRAWING MACHINE.
APPLICATION FILED FEB. 18, 1910.

Patented Mar. 26, 1912.

2 SHEETS-SHEET 1.

FIG. 1.



WITNESSES:
G. Robert Thomas
G. J. Fairbank

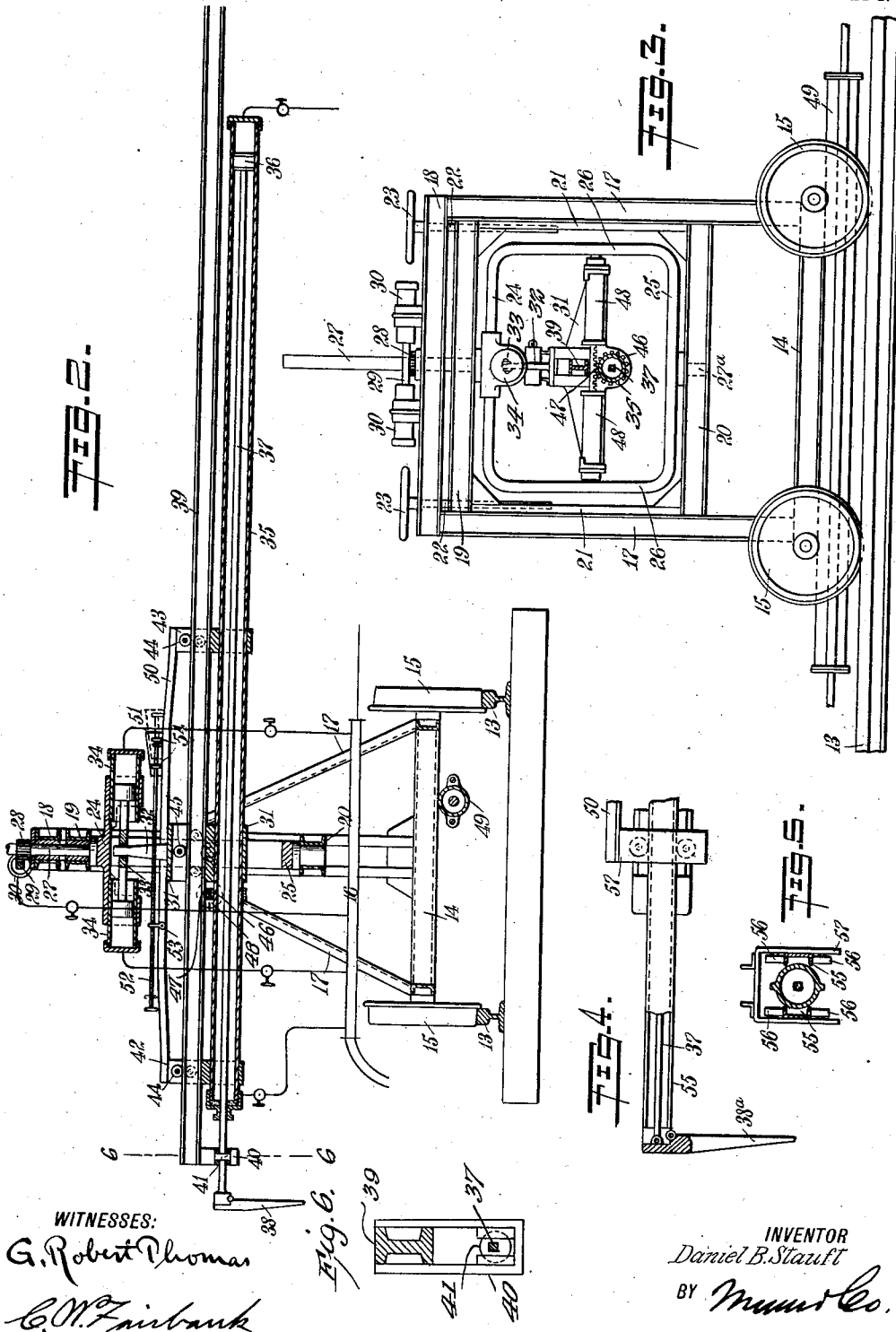
INVENTOR
Daniel B. Stauff
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UNITED STATES PATENT OFFICE.

DANIEL B. STAUFF, OF SCOTTDALÉ, PENNSYLVANIA.

COKE-DRAWING MACHINE.

1,021,710.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed February 18, 1910. Serial No. 544,664.

To all whom it may concern:

Be it known that I, DANIEL B. STAUFF, a citizen of the United States, and a resident of Scottdale, in the county of Westmoreland and State of Pennsylvania, have invented a new and Improved Coke-Drawing Machine; of which the following is a full, clear, and exact description.

This invention relates to certain improvements in coke-drawing apparatus, and more particularly to improved means for manipulating and controlling the scraper.

My improved machine is preferably mounted upon a suitable carriage, so that it may be moved along a track and stopped adjacent the entrance opening to any one of a series of separate ovens. The scraper is attached to a piston, which may be reciprocated to project the scraper into the oven or withdraw it therefrom, and the cylinder containing said piston is so mounted that it may be swung in a horizontal or a vertical plane, and may be rotated about its own axis or may be bodily raised or lowered. By means of this mechanism, I may project the scraper into any desired portion of the oven, and move it in any desired direction, to withdraw the coke.

The invention involves various salient features of construction, whereby I secure important advantages in my machine. These features will be particularly defined in the claims, and one form which the machine may assume will be hereinafter particularly described.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a side elevation of a machine constructed in accordance with my invention, the coke oven being shown in vertical section; Fig. 2 is a longitudinal section through the machine; Fig. 3 is an end view, the cylinder and piston rod of the scraper being shown in section. Fig. 4 is a side elevation of a slightly modified form of scraper-operating mechanism, a portion thereof being shown in section; Fig. 5 is a transverse section through the parts shown

in Fig. 4; and Fig. 6 is an enlarged, transverse section on the line 6—6 of Fig. 2.

My improved machine is adapted for use in withdrawing coke from various different forms of coke ovens, but is particularly adapted for use in connection with the "bee-hive" type of oven. In Fig. 1, I have illustrated such a "bee-hive" oven 10, having an entrance opening 11 in one side thereof and a substantially level bottom or floor 12, flush with the lower side of the entrance opening 11. Adjacent the entrance opening but on a lower level, are provided tracks 13, 13, along which my improved machine may travel.

The machine includes a truck or frame 14, formed in any suitable manner, and having wheels 15 movable along the said tracks. Extending upwardly from adjacent the front and rear ends of the base frame-work 14, I provide two uprights 16, 16, which are held in their erect position by diagonal braces 17. The uprights are connected together at their upper ends by one or more transverse members 18, which hold the uprights at the desired distance apart and rigid in respect to each other. The two uprights constitute guides within which a frame may move vertically. This frame includes upper and lower transverse members 19 and 20, connected together by vertical side members 21, 21. The exact construction of the guides and the vertically sliding frame is not important, as various changes may be made in the details of construction. The frame is mounted to reciprocate vertically within the guides or uprights 16, and any suitable means may be provided for bringing about this adjustment of the frame and for holding the frame in its adjusted position. As shown, two screws 22, 22 extend vertically through the upper transverse member 18 into the upper transverse member 19 of the sliding frame. The upper ends of these screws may be provided with hand wheels 23, and the screws may be freely rotatable in said member 18 and may have threaded engagement in the member 19 or in the side members 21. By turning the hand wheels, the sliding frame may be raised or lowered at will.

Within the sliding frame and carried thereby, I provide a second frame which is capable of rotation about an axis within said sliding frame. This second frame has
 5 upper and lower transverse members 24 and 25 and side members 26, all rigidly connected together or formed integral. The lower member 25 has a downwardly-extending pivot 27^a, which fits into a corresponding
 10 socket in the lower member 20 of the sliding frame. Diametrically opposite to the pivot 27^a and in alinement therewith, I provide a vertically-extending rod 27, which constitutes a pivot and which extends
 15 up through not only the upper member 19 of the sliding frame, but also through the upper member 18 of the main or stationary frame. This rod is rigid in respect to the inner or rotatable frame and by turning the
 20 rod, the inner frame may be caused to rotate about the vertical axis formed by said rod 27 and the pivot 27^a. As the rod 27 extends through the member 18, it is evident that the raising or lowering of the
 25 sliding frame will not affect the freedom of the rotating or oscillating frame. For rotating or oscillating said frame, various different means may be provided, but, preferably I provide the rod 27 with a pinion 28,
 30 resting upon the upper member 18 of the main frame, and having sliding but non-rotatable engagement with said rod. A rack bar 29 has engagement with this pinion, whereby upon the reciprocation of the
 35 rack bar, the pinion 28, the rod 27 and the inner frame are caused to rotate or oscillate. The end portions of the rack bar 29 may constitute piston rods, and may be provided with pistons disposed within station-
 40 ary cylinders 30, rigidly mounted on the upper member 18. By admitting compressed air, steam or other motive fluid to these cylinders, the rack bar may be reciprocated to gain the desired results. I have not
 45 shown any pipe or valve connections for these cylinders, as such connections constitute no portion of my invention, and any suitable supplying and controlling means common in the art, may be provided for
 50 causing the desired movements of the pistons in the cylinders 30.

Within the frame, which is formed of the members 24, 25, 26, 26, I mount a transversely-extending member 31, the ends of
 55 which are journaled in the side members 26 of said frame, so as to permit the member 31 to oscillate upon a horizontal axis. As the member 31 oscillates on a horizontal axis, and is carried by a frame which oscillates on a vertical axis, and as this last-mentioned frame is carried by a vertically-sliding
 60 frame, and as the vertically sliding frame is carried on a truck, which may move along a track in the direction of the
 65 plane of said sliding frame, it is evident

that the member 31 has universal movement. For oscillating the member 31 about its axis, any suitable means may be provided, but preferably said member is provided with an upwardly-extending arm or
 70 lever 32, which is connected to a piston rod 33, intermediate the ends of the latter. The ends of the piston rod 33 are provided with pistons mounted to reciprocate within stationary cylinders 34, rigidly mounted upon
 75 the upper transverse member 24 of the oscillating frame. By supplying a motive fluid, for instance, compressed air, steam or water, to the cylinders 34, and by properly controlling this supply in any manner common
 80 in the art but not shown in the accompanying drawings, the pistons may be caused to reciprocate and to move the upper end of the lever 32, so as to rock or tilt the member
 85 31 about its horizontal axis.

The transverse member 31 carries in its lower portion a long cylinder 35, normally extending substantially at right angles to the planes of the sliding and oscillating
 90 frames. This cylinder has a piston 36 therein, and to one end of the piston rod 37 there is connected the scraper 38. This scraper is preferably hinged to the piston rod and depends therefrom, so that it normally extends
 95 substantially at right angles to the piston rod or may swing in one direction toward the right. The hinge is such that the scraper cannot swing in the opposite direction beyond the position illustrated. With the cylinder 35 stationary and a motive
 100 fluid introduced in any suitable manner, not shown, at either end of the cylinder, the piston may be caused to travel lengthwise of the cylinder, and the piston rod may be projected lengthwise through an opening
 105 in the coke oven, to carry the scraper into the latter.

In order to support the scraper and the outer end of the piston rod, when the latter is projected out of the cylinder to any considerable
 110 extent, I preferably provide a carrier which may assume the form of a longitudinally-movable beam 39. This beam is disposed parallel to the cylinder and directly thereabove, and is freely movable longitudinally through the member 31. At one
 115 end, it has a depending arm 40, through which the piston rod extends and which serves to support said piston rod. The piston rod may have a collar 41, which
 120 permits the rod to rotate in respect to the arm 40, but prevents their relative longitudinal movement. The cylinder is provided with two upwardly-extending brackets 42 and 43, which have rollers 44
 125 for engaging with and supporting the beam 39, so as to facilitate the free lengthwise travel of said beam. The member 31 may also have rollers 45 which engage with and additionally support the beam. The beam
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is of somewhat greater length than the cylinder, and is of such form that when projected outwardly from the brackets to the maximum extent, its outer end will not materially sag or drop under its own weight, and will at the same time serve to support the scraper end of the piston rod.

The cylinder 35 is held against longitudinal movement through the member 31, but is preferably so mounted as to rotate in respect thereto. For accomplishing the desired rotation, the cylinder may be provided with a gear wheel 46 in engagement with a transversely-extending rack bar 47. This rack bar constitutes a piston rod and has at opposite ends, pistons mounted in two cylinders 48, 48, rigidly carried by the member 31. By supplying a motive fluid to these cylinders and properly controlling said fluid, the rack bar 47 may be moved in either direction to rotate the cylinder. The piston rod may be made square in cross section or may have a keyway, or may be constructed in any other suitable manner, so that its engagement with the cylinder head will prevent the rotation of the piston rod in respect to the cylinder. Thus, when the cylinder is rotated, the piston rod will also be rotated and the scraper may be brought at one side of the rod or above the same, so as to scrape the side walls or the roof of the oven, instead of operating merely on the floor.

By means of the mechanism above described, it is possible to bring the scraper into almost any conceivable part of the oven, and to cause it to travel along the inner surface of the wall of the oven to scrape the latter. By the use of the screws 22, 22, the entire scraper and its cylinder may be bodily raised or lowered. By rotating the rod 27, the scraper may be swung horizontally, and by swinging the lever 32, the scraper may be swung vertically. By rotating the cylinder, the operating edge of the scraper may be brought above, below or at either side of the piston rod.

In order to prevent the scraper from pressing down too hard upon the bottom of the oven or for limiting the downward movement, I preferably provide an adjustable stop shown particularly in Figs. 1 and 2. As here illustrated, the two cylinder brackets 42 and 43 are connected by two angle bar braces 50. On top of these angle braces and immediately below the rear of the cylinder 34, is slidably mounted a wedge-shaped adjusting block 51, which may be moved lengthwise of the angle braces by screw mechanism. As shown, this mechanism includes a rod 52 having a hand wheel at its outer end and having threaded engagement with a transverse member 53 carried by the angle braces, and having engagement with collars 54 on the block, so

that the block will be moved longitudinally with the screw rod but will not rotate with the latter. As the long cylinder 35 tilts, the block 51 is brought toward and from the lower end of the adjacent cylinders 34, and thus by varying the position of said block, the downward movements of the scraper blade may be varied. The engagement of the block with the corresponding cylinder 34 serves to limit the tilting movement of the cylinder 35.

Instead of supporting the piston rod 37 from an overhead channel, I may employ side channels, as illustrated in Figs. 4 and 5. In this form, the scraper 38^a is pivoted to the outer ends of two oppositely-disposed channels 55 which extend lengthwise of the cylinder. The channels are supported by rollers 56 mounted in brackets 57, similar to the rollers 44 and bracket 42. The piston rod 37 is mounted between these channels and is also hinged to the scraper. The channels serve to support the scraper in somewhat the same way as does the channel 39 shown in Figs. 1 and 2.

If desired, I may use a piston and cylinder mechanism for moving the carriage lengthwise along the track, instead of providing an engine or other prime mover. As illustrated, I provide the base of the truck or carriage with a cylinder 49, extending substantially parallel to the track. This cylinder may be made somewhat longer than the truck, and may have a piston therein. The piston may be connected to a piston rod extending lengthwise of the track and adapted to be securely held at any desired point. With the end of the piston rod held, the carriage may be moved a limited distance along the track by delivering a motive fluid to the cylinder 49.

Instead of using the screws 22 and the hand wheels 23 for raising and lowering the inner frame 26, I may, if desired, form the shaft 27^a as a screw and extend it down through the lower base portion 14. In this case, such screw would serve not only for raising and lowering the two sliding frames, but would permit the free rotation of the inner one. Instead of using the cylinders 30, the rack bar 29 and the pinion 28, it is of course evident that a simple lever might be employed, or a lever might be fastened to the rod 27 and to the piston rod 29, so as to form the same kind of connection as is formed by the lever 32 and the piston rod 33.

Various other changes may be made in the construction and arrangement of the parts illustrated and without departing in any way from the spirit of my invention.

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

1. A coke drawing machine having a cylinder, a piston therein, a piston rod con-

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nected with said piston, a scraper carried by said piston rod, and a beam movable freely lengthwise of the cylinder for supporting said scraper and the end of the piston rod adjacent thereto, said piston rod being rotatable about a longitudinal axis at its connection with said beam.

2. A coke drawing machine having a cylinder, a piston therein, a piston rod connected to said piston, a scraper carried by said piston rod, and a beam movable lengthwise of the cylinder for supporting said scraper and the end of the piston rod adjacent thereto, said piston rod and said beam being constrained to move together longitudinally, said piston rod being rotatable about its longitudinal axis.

3. A coke drawing machine having a cylinder, a piston mounted thereon, a scraper, a piston rod connecting said piston and scraper, a beam slidably supported above said cylinder and movable lengthwise thereof, and means connecting said beam and one end of said piston rod, said means permitting said piston rod to be rotated.

4. A coke drawing machine having a frame, a member extending transversely thereof, a longitudinally movable piston rod extending substantially at right angles to said transverse member and supported thereby, an arm extending upwardly from said member, and horizontally movable means in engagement with the outer end of said arm for swinging the latter to oscillate said member.

5. A coke drawing machine having a main frame, an open rectangular frame disposed therein and movable vertically in respect thereto, a scraper, a rod for operating said scraper and extending through said second-mentioned frame and substantially at right angles thereto, and means for tilting said rod within said second-mentioned frame about a horizontal axis and also about a vertical axis.

6. A coke drawing machine having a main frame, a tilting frame having upwardly and downwardly extending pivots, one of said pivots extending through said main frame, means in engagement with said pivot for oscillating said second-mentioned frame, and means for bodily raising and lowering said second-mentioned frame in respect to the first-mentioned frame.

7. A coke drawing machine having a truck or carriage, uprights carried thereby, a frame mounted between said uprights and adapted to turn on a vertical axis, a member extending across said frame and adapted to rock upon a horizontal axis, a longitudinally-movable rod carried by said transverse member, a scraper carried by said rod, and means for preventing over-travel in rocking movement.

8. In a machine of the type specified, a

pivottally-mounted beam, mechanism for swinging said beam, and mechanism for bodily raising and lowering said beam and supporting the same in adjusted position; in combination with mechanism for reciprocating said beam.

9. In a machine of the type specified, a pivottally-mounted beam, independent mechanisms for swinging said beam in vertical and horizontal planes, and additional mechanism for bodily raising and lowering said beam; in combination with mechanism for reciprocating said beam.

10. In a machine of the type specified, a pivottally-mounted beam, independent fluid-actuated mechanisms for swinging the beam in vertical and horizontal planes, and mechanism for bodily raising and lowering said beam; in combination with mechanism for reciprocating said beam.

11. A coke drawing machine having a frame, a piston rod carried thereby and having a scraper, a pivottally mounted guide beam associated with said piston rod, mechanism for swinging said beam and said piston rod, mechanism for bodily raising and lowering said beam and said piston rod and supporting the same in adjusted positions, and mechanism reciprocating said piston rod and said beam.

12. A coke drawing machine, having a frame, a scraper-carrying member mounted upon said frame, a guide beam associated with said scraper-carrying member and movable in the direction of its length with said member, said beam and said member being pivottally mounted, independent mechanisms for swinging said beam and said member in vertical and horizontal planes, additional mechanism for bodily raising and lowering said member and said beam, and means for reciprocating said member and said beam.

13. A coke drawing machine, having a frame, a scraper-carrying member mounted upon said frame, a guide beam associated with said scraper-carrying member and movable in the direction of its length with said member, said beam and said member being pivottally mounted, independent mechanisms for swinging said beam and said member in vertical and horizontal planes, additional mechanism for bodily raising and lowering said member and said beam, and means for reciprocating said member and said beam, said frame constituting a truck, said scraper-carrying member being rotatable about a longitudinal axis.

14. A coke drawing machine having a frame, a pivottally mounted beam, a member carrying a scraper and associated with said beam, said beam constituting a guiding support for said member, independent fluid-actuated mechanism for swinging said mem-

ber and said beam in vertical and horizontal
planes, mechanism for bodily raising and
lowering said scraper and said beam, and
mechanism for reciprocating said member
5 whereby said beam is also reciprocated as
said member is reciprocated.

In testimony whereof I have signed my

name to this specification in the presence of
two subscribing witnesses.

DANIEL B. STAFT.

Witnesses:

JOHN C. BRYSON,
J. J. MCINTYRE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."