

No. 820,184.

PATENTED MAY 8, 1906.

P. J. DUFFY.

STOKER.

APPLICATION FILED APR. 20, 1905

2 SHEETS—SHEET 1

Fig. 1.

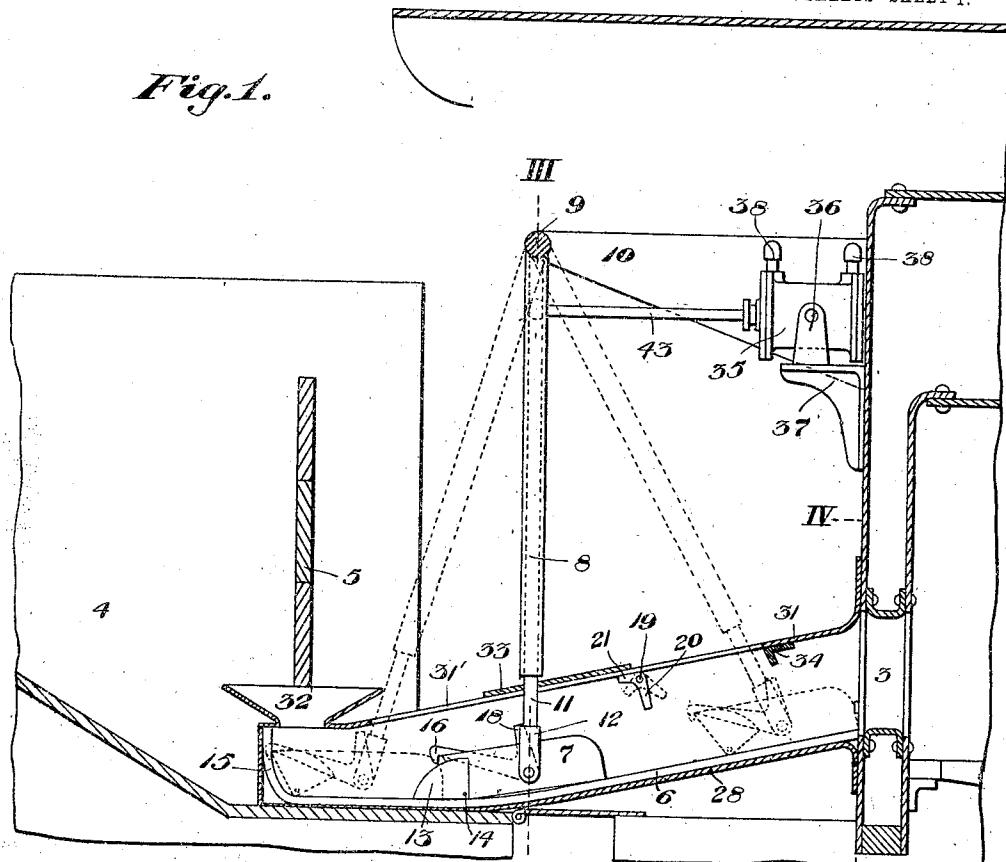
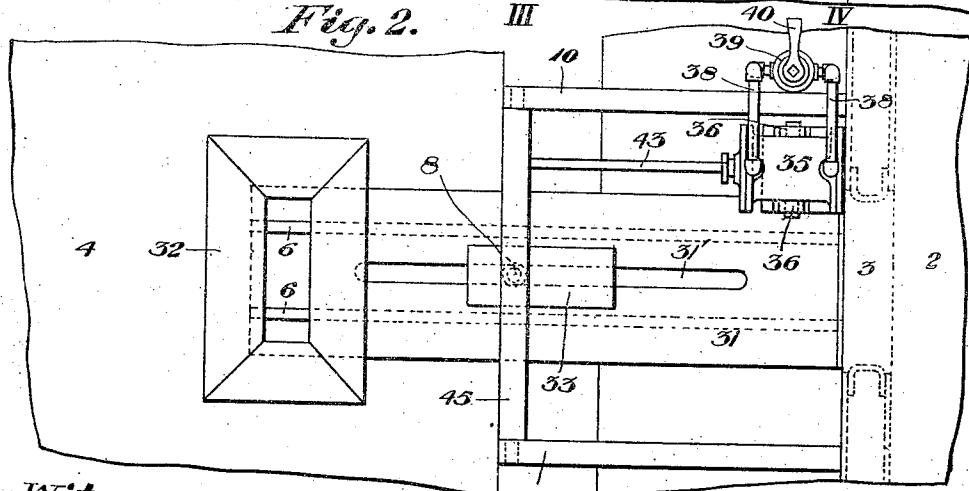


Fig. 2.



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2 SHEETS-SHEET 2

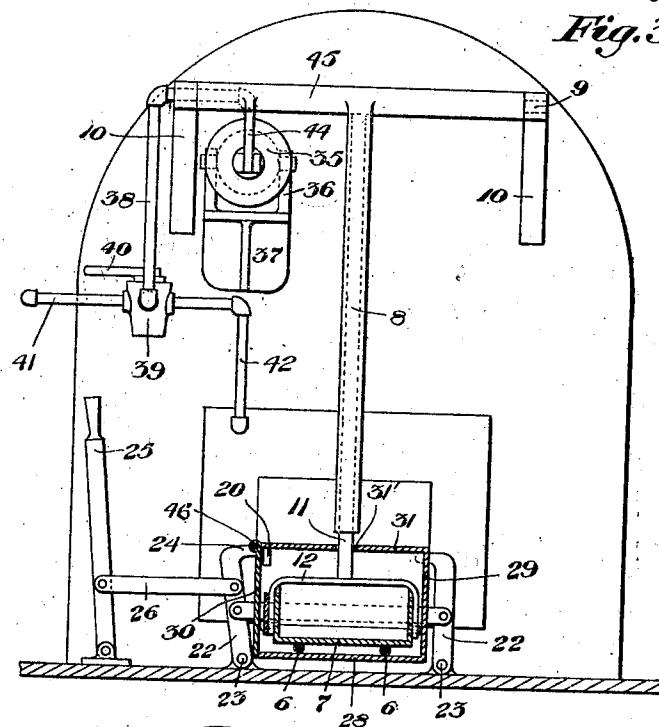


Fig. 3.

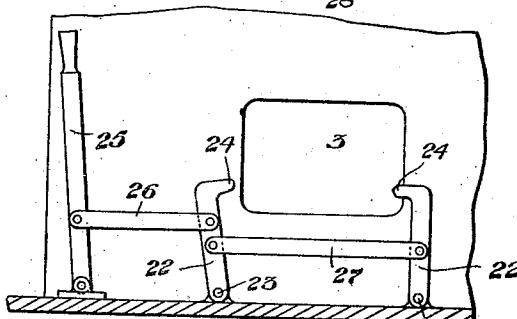


Fig. 4.

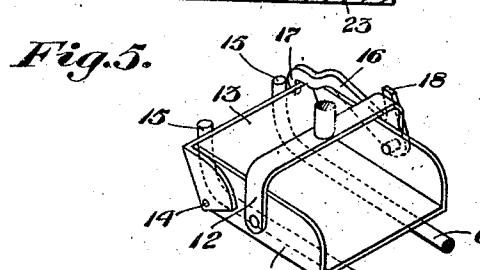


Fig. 5.

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UNITED STATES PATENT OFFICE.

PATRICK J. DUFFY, OF FREEDOM, PENNSYLVANIA.

STOKER.

No. 820,184.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed April 20, 1905. Serial No. 256,849.

To all whom it may concern:

Be it known that I, PATRICK J. DUFFY, a citizen of the United States, residing at Freedom, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Stokers, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents the longitudinal sectional view of portions of the locomotive-boiler and tender provided with my improved stoking apparatus. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is a vertical sectional view indicated by the line III-III of Fig. 1. Fig. 4 is a similar section on the line IV-IV of Fig. 1, showing the deflecting-points. Fig. 5 is a perspective view 20 of the scoop detached and portions of its supporting-rails.

My invention refers to improvements in apparatus for charging coal into a furnace, and is particularly adapted and designed for incorporation with the fire-box of a locomotive-boiler.

The invention is designed to provide means for receiving the coal from the hopper or bunker of the tender and for projecting it 30 into the furnace, either directly or at different angles, so as to distribute the coal evenly over the grate-bars, means being provided for inclosing the operative mechanism to prevent entrance of cold air, together with 35 means for automatically operating and closing the rear end of the scoop, means for actuating the scoop by means under control of the fireman, together with other features of construction and operation, as shall be more 40 fully hereinafter set forth.

Referring now to the drawings, 2 is the furnace-chamber of the boiler, having the usual door-opening 3, while 4 is the coal-bunker of the tender connected with the locomotive by the usual coupling and provided 45 with a front closing-wall 5 of any suitable construction. 6 6 represent rails of a track leading from the bottom of the coal-bunker forwardly and upwardly, terminating immediately back of the furnace-door opening, upon which track is slidingly mounted a shaft 50 upon which track is slidingly mounted a shifting-scoop 7. The scoop is actuated forwardly and backwardly by means of a long swinging bar or arm 8, pivoted at 9 in a suitable supporting-frame 10 and provided 55 with a telescoping extension 11, having ter-

minals 12, pivotally connected to the scoop at each side, as clearly shown. The extension 11 may be normally pressed downwardly by an interior spring, if desired, although ordinarily the weight of the scoop and its attached mechanism will be sufficient to hold it downwardly in place. The scoop is provided with a rear door 13, pivoted at the lower back edge at 14, the back portion of 60 the scoop preferably sloping upwardly and backwardly, as shown, so that when released the back 13 will fall by gravity, or, if preferred, a pressure-spring may be employed for the same purpose. The track-rails 6 are 70 turned upwardly at the back, as shown at 15, so that when the scoop is thrown backwardly, as indicated in dotted lines in Fig. 1, the end-gate 13 will be thrown upwardly into position by contact with the upwardly-turned rail extremities, and for the purpose of holding the gate closed I have provided a latch 16, having a hooked extremity 17, adapted to engage over the upper edge of the end-gate 13 at one side, as shown in Fig. 5. Latch 16 is 80 pivoted to the side of the scoop conveniently upon one of the pivoting-pins attaching the extremities 12, as shown, and is provided with an upwardly-extending tripping-arm 18.

Pivoted at 19 is a tripping-latch, the one 85 arm 20 of which extends downwardly into the path of arm 18, the latch having a backwardly-extending bearing-lug 21, adapted to rigidly hold the arm 20 against movement backwardly, but to permit it to freely move 90 forwardly, as indicated in dotted lines in Fig. 1, arm 20 normally depending by gravity in the position shown in full lines. By this device, in the forward travel of the scoop 7 its holding-arm 16 passes freely under latch 95 20 without being affected, retaining the end-gate closed until the scoop has arrived at the limit of its forward travel and has delivered the coal into the furnace. Upon the back travel of the scoop, however, the arm 20, engaging arm 18, raises latch 16, releasing the end-gate, which then falls downwardly upon the track and in the backward movement of the scoop will slide underneath the coal distributed downwardly into the path of the 105 scoop from the hopper 4, being automatically closed again by coming into contact with the curved terminals 15.

For the purpose of deflecting the scoop to the right or the left I have provided the construction shown in Fig. 4, consisting of shifting-arms 22, pivoted at 23, and provided with up-

per inwardly-extending terminals 24, adapted to engage one or the other of the side edges at the front of the scoop and to suddenly turn it sidewise as the coal is delivered into the furnace. The terminals 24 are capable of lateral adjustment to either side simultaneously, so that but one of them will engage the one edge of the scoop either at the right or left side, while in the intermediate position the points 24 are so arranged that the scoop will pass inwardly without interference and will deliver the coal directly into the furnace in a direction longitudinal of the furnace. The deflecting-points are set to the desired position by an operating-lever 25, connected by link 26, which may engage both arms 22, or they may be connected by a supplemental link 27, as shown.

For the purpose of completely inclosing the trackway for the scoop and of preventing as far as possible entrance of air into the furnace, as well as to confine and protect the apparatus, I have inclosed the trackway in a box-like conduit consisting of a floor 28, having upwardly-extending sides 29 30 and a top 31, provided with a longitudinal slot 31', through which the extension 11 extends, the slot being of sufficient length to permit of the full range movement. A sliding cover-plate 33 is preferably employed, connected with extension 11 and adapted to cover the slot during forward and back travel of the apparatus. The back portion of the conduit is provided with a hopper 32, into which the coal is delivered by gravity from bunker 4, and as thus constructed it will be seen that as the scoop 7 is thrown back it will receive a charge of coal and as thrown forward it will deliver it into the furnace-chamber, the extension 11 coming into abutting contact with the end of the slot 31', or with a reinforced interfering-abutment 34, or with any other suitable device adapted to suddenly check the travel, so as to facilitate the discharge of the contents.

For the purpose of actuating the swinging frame and scoop I have provided a steam-cylinder 35, preferably mounted on trunnion-bearings 36, projecting upwardly from a suitable bracket 37, mounted on the end of the boiler and connected by pipes 38, preferably flexibly, with a valve 39, having an operating-handle 40 and connected by supply-pipe 41 with the boiler, with a suitable exhaust-pipe 42 leading into the furnace-chamber or elsewhere. The cylinder 35 is provided with a piston having an outwardly extending rod 43, engaging arm 44 of the top cross-arm 45 of swinging frame 8, said cross-arm being pivotally mounted in suitable brackets 10, as shown. By this construction, pressure being applied to one end or other of the cylinder, the frame may be thrown forwardly or back, as desired, and the speed or amount of force of its travel may be delicately varied or

regulated by the operator, so as to deliver the coal either to the far side of the furnace-chamber or immediately in front or at any intermediate point, while the engagement of the coal by the lowered end-gate of the scoop, depending upon the amount or quality of the coal in the conduit, may be also regulated by valve manipulation.

For the purpose of examining the interior of the conduit, if desired for any reason, or for introducing a firing-bar into the furnace-chamber one side of the scoop-conduit, as the side 30, may be hinged, as indicated at 46, whereby it may be thrown upwardly for such purpose.

The operation of the device will be readily understood from the foregoing description, and while it is particularly adapted to incorporation with locomotive-boilers I do not wish to confine it thereto, but to adapt it where desirable to stationary furnace constructions.

Having described my invention, what I claim is—

1. A fuel-supply apparatus for furnaces consisting of a downwardly-depending swinging frame provided with a telescoping extension, a scoop connected with said extension, a guiding-track for the scoop, and means for actuating the swinging frame, substantially as set forth.

2. A fuel-supply apparatus for furnaces consisting of a downwardly-depending swinging frame provided with a telescoping extension, a scoop connected with said extension having a hinged end-gate, a guiding-track for the scoop, and means for actuating the swinging frame, substantially as set forth.

3. In a fuel-feeding apparatus, a reciprocating scoop provided with a hinged end-gate, a locking-latch for the end-gate, means for automatically detaching said latch, bearing-tracks having upwardly-turned extremities adapted to engage and close the gate, and means for propelling the scoop forwardly and backwardly, substantially as set forth.

4. In a fuel-feeding apparatus, a reciprocating scoop provided with a hinged end-gate, a locking-latch for the end-gate, means for automatically detaching said latch, bearing-tracks having upwardly-turned extremities adapted to engage and close the gate, means for propelling the scoop forwardly and backwardly, and an inclosing conduit surrounding the trackway and scoop, said conduit having a coal-receiving opening, substantially as set forth.

5. In a fuel-feeding apparatus, a reciprocating scoop provided with a hinged end-gate, a locking-latch for the end-gate, means for automatically detaching said latch, bearing-tracks having upwardly-turned extremities adapted to engage and close the gate, means for propelling the scoop forwardly and backwardly, and an inclosing conduit surround-

ing the trackway and scoop, said conduit having a coal-receiving opening, the top of said conduit also having a clearance-slot for a portion of the actuating mechanism, substantially as set forth.

6. In a fuel-feeding apparatus, the combination with scoop-supporting tracks, a downwardly-depending swinging frame provided with a telescoping extension and a coal-scoop connected with said extension; of a cylinder having a piston connected with said frame, supply and exhaust connections for said cylinder, and a controlling-valve, substantially as set forth.

7. The combination with a furnace, tracks leading thereto, a coal-delivery scoop, and operating means therefor; of interfering devices adapted to engage one or the other edge of the scoop to deflect it to one side or the other, substantially as set forth.

8. In a fuel-feeding apparatus, the combination with a swinging frame having a telescoping extension, a coal-scoop actuated thereby, means for actuating the frame, and a trackway for the scoop; of adjustable deflecting devices adapted to engage one or the other edge of the scoop to deflect it to one side or the other or to be located in an inoperative position to provide for delivery directly in line with the trackway, substantially as set forth.

9. In an apparatus of the class described the combination with a furnace-chamber, of inclined tracks leading thereto provided with upwardly-turned back extremities in the path

of the closing door of the scoop, an inclosing conduit having a receiving-opening, a traveling scoop mounted therein upon said tracks and provided with an opening and closing door adapted to make contact with said track 40 extremities, a shifting-frame having a portion extending into the said conduit and engaging the scoop, a steam-cylinder and a piston connected with said frame, and valve mechanism for controlling the supply thereto, 45 substantially as set forth.

10. In an apparatus of the class described, the combination with a furnace-chamber, of inclined tracks leading thereto provided with upwardly-turned back extremities in the 50 path of the closing door of the scoop, an inclosing conduit having a receiving-opening, a traveling scoop mounted therein upon said tracks and provided with an opening and closing door adapted to make contact with 55 said track extremities, a shifting-frame having a portion extending into the said conduit and engaging the scoop, a steam-cylinder and a piston connected with said frame, valve mechanism for controlling the supply thereto, 60 and means for deflecting the scoop to the right or left respectively, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

PATRICK J. DUFFY.

Witnesses:

JOSEPH GLADDEN,
FREDERICK G. DUERR.