J. VAN VLECK.

MECHANICAL STOKER.

APPLICATION FILED FEB. 20, 1915.

1,151,138. Patented Aug. 24, 1915.

Fig. 1.

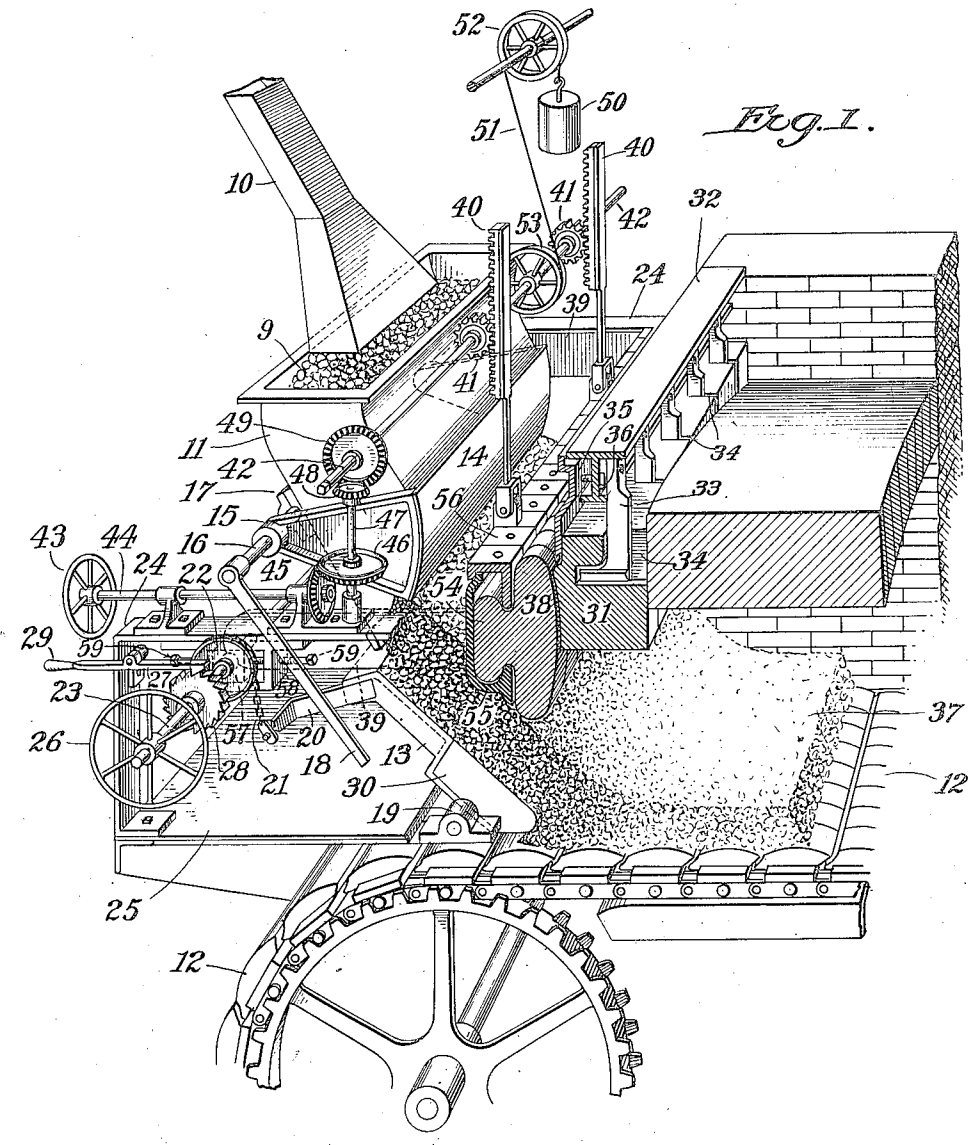
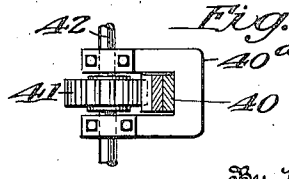


Fig. 2.



Witnesses:

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MECHANICAL STOKER.

1,151,138. Specification of Letters Patent. Patented Aug. 24, 1915.

Application filed February 20, 1915. Serial No. 9,482.

To all whom it may concern:

Be it known that I, JOHN VAN VLECK, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Mechanical Stokers, of which the following is a full, clear, and exact description.

This invention relates to fuel-feeding and controlling mechanism for so-called mechanical stokers, and its chief object is, in general, to provide improved mechanism for the purpose, whereby the supply of fresh fuel to the grate (usually of the traveling type) can be accurately controlled and the thickness of the fire or bed of burning fuel can be accurately regulated.

A further object is to afford quick and convenient access to the fire for slicing, raking, and other manual operations when desired.

Still another object is to improve certain details of the mechanism in the direction of greater durability and easier operation.

To these and other ends the invention consists in the novel features of construction and combinations of elements hereinafter desired.

Upon reading the subjoined description and claims it will be seen by persons skilled in the art that the invention can be embodied in a considerable variety of structures. Of these I have deemed it sufficient to illustrate and describe only one, selecting for the purpose the embodiment which at the present time is considered to exhibit the invention in the most convenient and effective form. This embodiment is shown in the accompanying drawing, in which—

Figure 1 is a perspective view, and Fig. 2 is a detail of part of the mechanism for raising and lowering the gate which controls or determines the thickness of the bed of fuel on the grate.

The fuel, usually fine anthracite or bituminous coal, is supplied in any convenient manner, as by means of a chute 10, to a transverse hopper 11 arranged in front of the furnace mouth and having a width substantially co-extensive with the traveling grate 12. The hopper discharges upon a pivotally mounted apron 13 (more fully described hereinafter) and is provided with a pivotal valve or gate 14. The latter is carried at its ends on two segment-shaped arms, one of which is shown at 15, fixed on a transverse rock-shaft 16 and mounted in suitable bearings 17 on the front of the hopper 11. As indicated, the contour of the gate, in vertical section, follows the arc of a circle whose center is the axis of the shaft 16, as do also the ends of the hopper at the discharge mouth thereof, so that a close fit without undue friction can be maintained between the parts when the gate is opened, closed or adjusted by suitable means provided for the purpose, as, for instance, a hand-lever 18 fixed to the end of the shaft 16. I have not shown means for positively holding the gate in an adjusted position, as devices for such purpose can readily be supplied should they be found necessary.

The apron 13, over which the fuel flows to the grate 12, is pivoted transversely at its lower edge, as indicated at 19. The inclination of the apron materially affects the rate of flow of the fuel, and for the purpose of varying this inclination the apron is provided at each side with an arm 20 connected by a chain 21 to a winding pulley 22, fixed on a transverse shaft 23, which is mounted in bearings on the supports 24 rising from the sides of the platform 25. Suitable means, as for example a handwheel 26, is provided to actuate or control the shaft so that the apron can be arranged at any desired angle or can be lowered to give access to the interior of the furnace. A pawl 27, mounted on one of the supports 24 and engaging a ratchet 28 on the shaft 23, is provided to hold the apron in position, and is equipped with a handle 29 for convenient release when the apron is to be lowered. The front portion of the apron, next to the fire, is to be faced with brick or other suitable refractory material 30, preferably in flat blocks or slabs, and can be renewed when necessary or desirable, any convenient means (not shown) being employed to fasten the blocks or slabs in place.

The top of the furnace mouth is formed by an arch or lintel 31, of refractory material, for example firebrick, which is suspended from a transverse T-beam 32 by means of L-shaped hangers 33 engaging the undercut slots 34. A face plate 35, removably fastened to the beam 32, as by means of bolts 36, serves to hold the arch or lintel on the hangers and prevent forward displacement. The arch or lintel can be made

in a single piece or in the form of blocks arranged side by side, as may be most convenient.

The thickness of the fuel 37 on the traveling grate 12 depends, at least in part, upon the position of the fuel-controlling or regulating gate 38 relative to the apron 13, that is, upon the space between the said gate and the apron. For the purpose of raising and lowering this gate it is carried on the ends of two arms 39 fulcrumed or pivoted loosely on the shaft 23, already described, and is suspended on the ends of the vertical racks 40 meshing with pinions 41 fixed on the transverse shaft 42, which is mounted in suitable bearings, not shown. The shaft is preferably rotated manually, as for example by means of a handwheel 43 on a shaft 44 mounted in bearings on one of the supports 24 and having a bevel pinion 45 in mesh with a bevel gear 46 on a short vertical shaft 47, provided at its upper end with a bevel pinion 48 meshing with a bevel gear 49 on the aforesaid shaft 42. Suitable devices, as for example yokes such as 40ª, Fig. 2, embracing the racks and pivotally mounted on the shaft 42, are of course provided to hold the racks 40 in mesh with their pinions and permit such rocking movement of the former as may occur when the gate is raised or lowered. A counterweight 50, attached to a cable or chain 51 running over a pulley 52 to a winding pulley 53 on shaft 42 serves as an effective counterbalance for the gate.

As indicated in the drawing, the face of the fuel-controlling or regulating gate 38 is convex, its curvature being on an arc whose center is the axis of shaft 23 about which the gate swings, and the coöperating face of the lintel or arch 31 is concave and of about the same radius of curvature. This is an important feature of the invention, as is also the pivotal movement of the gate in an arc of fixed radius as the gate is raised or lowered, since they enable an accurate fit to be obtained at all positions of the gate and permit the latter to move freely and easily without undue wear or stress on gate or lintel.

The bearings 57 for the shaft 23, on which the arms 39 are pivoted, are mounted in yokes 58 underneath the supports 24 and can be adjusted forwardly or rearwardly by means of screws 59 to regulate the space between the gate 38 and the lintel or arch 31. Only one of the bearings is shown, but it will be understood that both ends of the shaft are equipped alike.

The gate 38, made of fire brick or other refractory material, is preferably composed of blocks arranged side by side across the furnace, as shown, and each is provided at its rear with an undercut boss 54 to interlock with the carrier 55 to which the arms 39 are attached. The blocks can then be slid laterally out of the carrier for removal and replacement, as will be readily understood, or the carrier-top 56, composed of sections bolted to the lower portion, can be removed, and the gate-sections lifted out vertically. It will be observed that the upper and lower portions of the gate-sections are alike, that is, the gate is symmetrical with respect to the central horizontal plane. This is a valuable feature, for the reason that when the lower portion or edge becomes so badly worn as to require renewal, the gate, or the individual sections composing it, can be reversed in the carrier, thereby turning the unworn edge downwardly and the worn or useless edge upwardly. In this way the effective life of the gate is practically doubled.

As hereinbefore stated, the invention is not limited to the structure herein specifically illustrated and described, but can be embodied in other forms without departure from its spirit.

What I claim is:

1. In a mechanical stoker, the combination with a furnace having a grate and a mouth for the supply of fuel to the grate, of a fuel-delivery hopper, an inclined apron arranged to receive fuel from the hopper and deliver the same to the furnace mouth and pivoted at its lower edge adjacent to the grate, and means for varying the inclination of the apron.

2. In a mechanical stoker, the combination of a grate, a fuel-delivery hopper, an inclined apron extending between the hopper and the grate to deliver fuel to the latter from the former, pivotal supporting means for the apron at the lower edge thereof adjacent to the grate, and mechanism for raising and lowering the apron on said pivotal supporting means to vary the inclination of the apron.

3. In a mechanical stoker, the combination with a furnace having a grate and a mouth for the supply of fuel to the grate, of a transverse apron extending forwardly and downwardly to the furnace mouth for supplying fuel thereto and pivotally supported at its lower edge adjacent to the furnace mouth, whereby the inclination of the apron and in consequence the rate of delivery of the fuel to the grate can be varied, a transverse shaft in rear of the apron, winding pulleys on the shaft, chains wound on the pulleys and connected with the apron, means to rotate the shaft, a ratchet on the shaft, and a manually releasable pawl engaging the ratchet to hold the shaft and the apron stationary.

4. In a mechanical stoker, the combination with a furnace having a grate and a mouth for the supply of fuel to the grate, of an inclined apron arranged to deliver fuel to the furnace mouth and pivotally mounted near its lower edge, a fuel hopper having an out-

let to discharge fuel upon the apron, means operable at will to close the hopper outlet, a pivotally mounted gate extending across the furnace mouth, and devices for raising the gate and lowering the apron on their pivotal supports to give access to the grate.

5. In a mechanical stoker, the combination with a furnace having a grate and a mouth for the supply of fuel to the grate, of an inclined apron arranged to deliver fuel to the furnace mouth and pivotally mounted near its lower edge, a pivotally mounted gate extending across the furnace mouth above the apron, and devices for raising the gate and lowering the apron on their pivoted supports to give access to the grate.

6. In a mechanical stoker, the combination with a furnace having a mouth, and a traveling grate moving from the mouth, of an inclined apron extending across the furnace mouth, projecting over the grate, to deliver fuel thereto and pivoted at its lower edge, means for varying the inclination of the apron to vary the rate of flow of the fuel to the furnace mouth, a swinging gate extending across the furnace mouth above the apron, and means to raise and lower the gate to vary the fuel-admitting area between the apron and the gate.

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

JOHN VAN VLECK.

Witnesses:
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FRANK J. NEWMAN.