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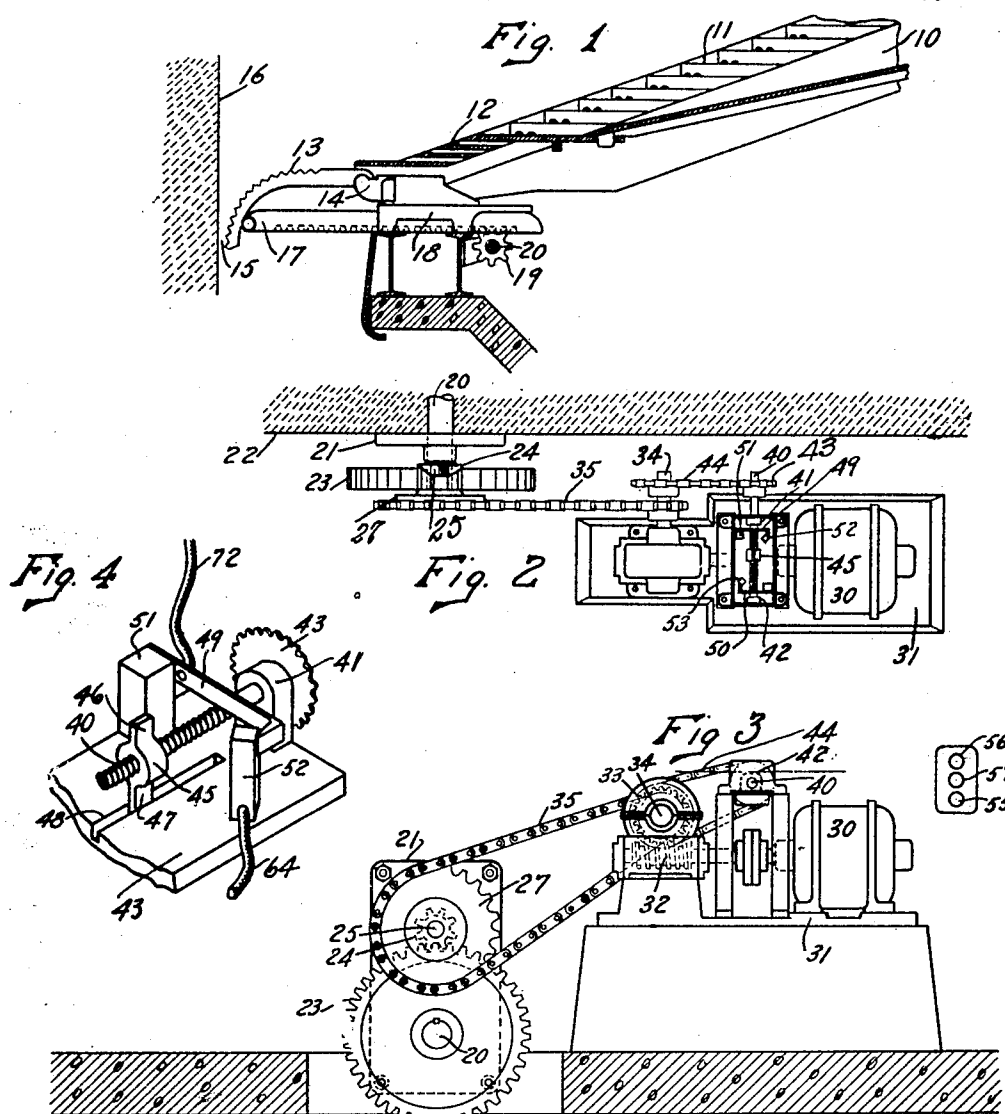
1,651,484

I. A. TAYLOR ET AL

ASH DISCHARGE MECHANISM FOR MECHANICAL STOKERS

Filed April 26, 1922

2 Sheets-Sheet 1



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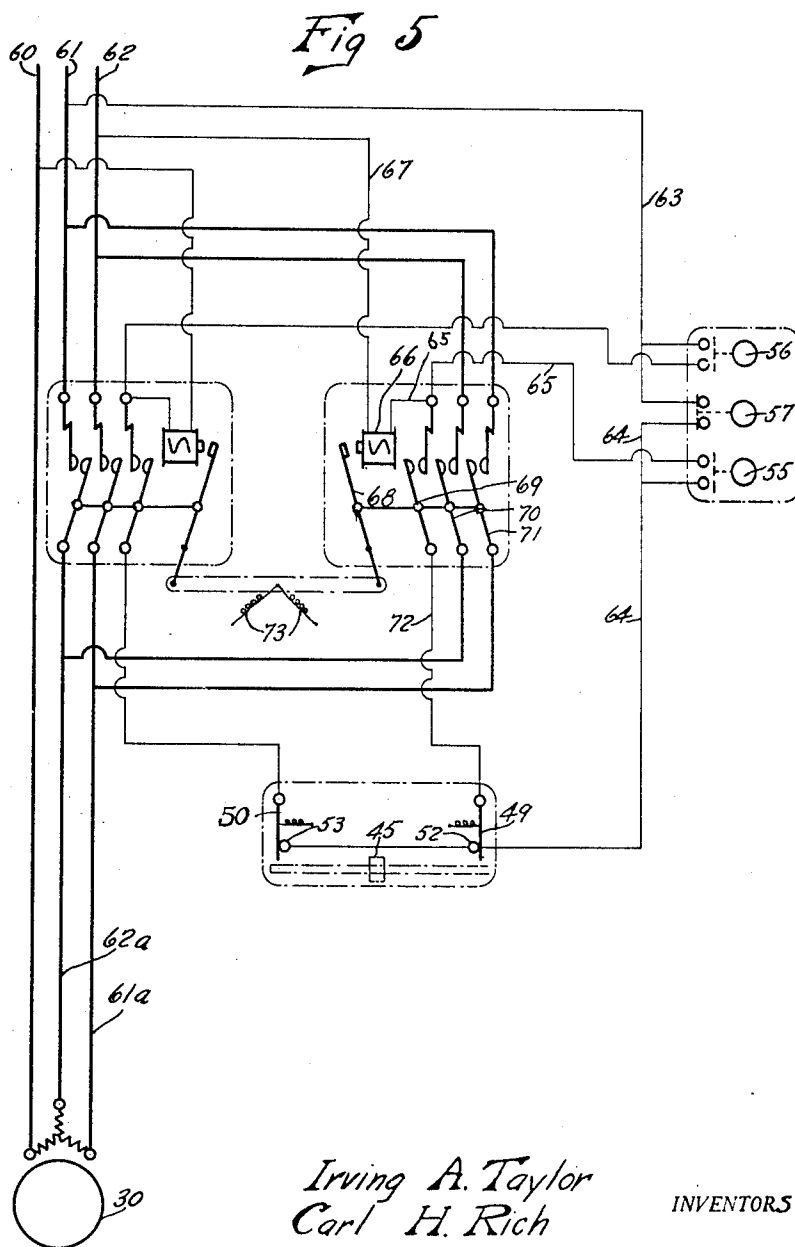
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UNITED STATES PATENT OFFICE.

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TO RILEY STOKER CORPORATION, OF WORCESTER, MASSACHUSETTS, A CORPORATION
OF MASSACHUSETTS.

ASH-DISCHARGE MECHANISM FOR MECHANICAL STOKERS.

Application filed April 26, 1922. Serial No. 556,780.

This invention relates to mechanical stokers and particularly to improved devices for removing ash and refuse therefrom. Such stokers are now built in very large units having many retorts, and power actuated mechanism is frequently provided for raising and lowering the ash discharge or dumping plates, as the weight and load have become excessive for manual operation.

These ash discharge plates are, however, concealed under the burning material within the furnace, so that the exact position of the plates is difficult to determine. Under these conditions, it not infrequently happens that the power actuating mechanism is allowed to over-run in one direction or the other, with consequent liability of injury or misplacement of parts.

It is the general object of our invention to provide power mechanism for moving the ash discharge plates in a mechanical stoker, in combination with controlling devices which will limit the extent of movement thereof, preferably in both directions. As shown in the drawings, this control is accomplished through electrical connections to a driving motor. Our invention is not limited however in its broader applications to the use of any particular form of driving mechanism or controlling devices therefor.

A further object of our invention is to provide additional manual control of the actuating mechanism, by which the mechanism may be stopped in any desired intermediate position.

Our invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of our invention is shown in the drawings in which

Fig. 1 is a vertical longitudinal section of certain parts of an underfeed stoker of a commercial type;

Fig. 2 is a plan view of our improved actuating and controlling mechanism for moving the ash discharge plates;

Fig. 3 is a side elevation of the parts shown in Fig. 2;

Fig. 4 is an enlarged detail perspective view of parts of the controlling mechanism; and

Fig. 5 is a diagrammatic view of a system of electrical connections for the driving motor.

Referring particularly to Fig. 1, we have indicated certain parts of an underfeed stoker comprising a retort having side walls 10 supporting tuyere blocks 11, an overfeed grate 12 at the rear of the retort, and ash discharge plates 13 pivotally supported on brackets 14 connected to the movable side walls 10 at the rear end thereof. An opening 15 is left between the discharge plates 13 and the rear wall 16 of the furnace.

The plates 13 are supported near their lower ends by rack bars 17 slidable in fixed guide-ways in the stoker frame 18 and having rack teeth on their lower faces meshing with pinions 19 on a shaft 20. The shaft 20 extends transversely under the several retorts and is provided with a separate pinion 19 for each rack bar 17.

The parts thus far described are of a usual commercial type and in themselves form no part of our invention. For a further description of the construction and operation thereof, reference is made to the prior patent to R. Sanford Riley, No. 1,322,822, issued November 25, 1919.

As shown in Figs. 2 and 3, the shaft 20 extends through a bearing plate 21 on the outside of the furnace side wall 22 and is provided with a gear 23 meshing with a pinion 24 mounted on a stud 25 fixed in the plate 21, the pinion having a sprocket wheel 27 rotatable therewith.

A driving motor 30 is suitably mounted on a base 31 and rotates a screw 32 (Fig. 3) which drives a worm wheel 33 on a cross shaft 34. The shaft 34 is provided with a sprocket wheel which is connected through a chain 35 with the sprocket wheel 27 previously described. The motor 30 is thus connected through the worm and worm wheel, the chain and sprocket wheel and the spur gearing to rotate the shaft 20 at a

greatly reduced speed. The motor is of the reversing type and may be caused to rotate in either direction to raise or lower the plates 13.

We will now describe the devices by which the extent of operation of the motor is limited and controlled. A threaded shaft 40 is rotatable in bearings 41 and 42 on a slate base 43 secured to the base 31 of the motor 30 between the motor and the cross shaft 34. The shaft 40 is provided with a sprocket wheel 43 connected by a chain 44 to a driving sprocket wheel on the cross shaft 34. By these connections, the shaft 40 is rotated in one direction or the other whenever the motor 30 is in operation.

A nut 45 (Fig. 4) is threaded on the shaft 40 and is provided with upward and downward projections 46 and 47. The downward projection 47 extends into a slot or groove 48 which prevents rotation of the nut but permits axial movement thereof by the threaded shaft 40. The upward projection 46 is positioned to engage contact arms 49 and 50 at the opposite ends of its path of movement.

The arm 49 is mounted on a post 51 on the non-conducting base 43 and normally engages a post 52 also fixed in the base 43. The circuit through which the motor is driven in one direction is closed through the arm 49 and the post 52. Whenever the arm is separated from the post, this circuit is broken and the motor is stopped. The arm 50 similarly engages a post 53 in the other circuit and the rotation of the motor in the opposite direction is stopped by breaking the circuit through these parts.

Whenever the motor is started in either direction, it will continue to rotate until the travelling nut 45 engages one or the other of the arms 49 or 50, depending on the direction of rotation of the motor, and thereby breaks the corresponding circuit. By suitably proportioning and positioning the parts, the number of revolutions of the motor necessary to move the nut from one end to the other of its path of travel may be made to exactly correspond to the required number of revolutions of the shaft 20 to slide the rack bars and move the dumping plates from raised to lowered position and vice-versa.

In Fig. 5, we have shown illustrative connections through which the motor may be started and stopped. Push buttons 55 and 56 are provided for starting the motor in either desired direction and a third push button 57 may be used to break the circuit and stop the motor at any desired intermediate point. The electrical connections as diagrammatically shown in Fig. 5 are as follows:—

The motor 30 receives power through a power circuit comprising the wires 60, 61

and 62. The main wire 61 is connected through the wire 63 to the normally open switch or button 56 and to the normally closed switch or button 57. This switch 57 is connected by a wire 64 to the normally open switch 55 and also to the contact posts 52 and 53.

Assuming that the arm 49 engages the post 52 when the switch 55 is momentarily closed, a circuit is then completed through the wire 63, the switch 57, a portion of the wire 64, the switch 55 and a wire 65, to a solenoid 66 which in turn is connected by a wire 67 to the main wire 62. The solenoid attracts a lever 68 which closes a series of switches 69, 70 and 71. The switch 69 controls a parallel connection through the post 52, arm 49, wire 72 and a portion of the wire 65 to the solenoid 66. This latter connection remains closed after the switch 55 is released and thus keeps the motor in operation. The switches 70 and 71 close the circuits through the main wires 61 and 62 and connections 61^a and 62^a to the motor 30, the wire 60 being permanently connected thereto.

When the travelling nut 45 breaks the solenoid circuit by moving the arm 49, the lever 68 is released and is returned to normal open position by springs 73 and the motor is immediately stopped. If at any time the switch 57 is opened, the same effect will be produced as is produced by movement of the arm 49, the solenoid circuit will be broken, and the motor will be stopped.

The operation of the remaining parts of the control mechanism under the control of the switch 56 is identical, with the exception that the wires 61 and 62 will be reversely connected to the wires 62^a and 61^a and that the motor 30 will be rotated in the opposite direction.

The connections above described are illustrative only and in themselves form no part of our invention. Any other suitable and convenient controlling devices may be substituted for those herein shown.

It will appear from the foregoing description that the convenience and certainty of operation of the ash discharge mechanism is greatly improved by the invention herein described, as the stoker operator needs merely to push the button 55 when he desires to move the dumping plates 13 to lowered position and the mechanism will proceed to accomplish this act without further attention, stopping when the plates have reached their lowest position. Similarly by pushing the button 56, the plates may be restored to normal raised position, also without further attention by the operator.

The position of the travelling nut in itself forms a convenient indication of the position of the dumping plates 13 or the nut may

obviously be very readily connected to any suitable indicating device for giving any other desired visual indication of the position of the plates 13.

5 Having thus described our invention and the advantages thereof, we do not wish to be limited to the details herein disclosed otherwise than as set forth in the claims, but what we claim is:—

10 1. In a stoker, an ash discharge device mounted for discharging and restoring movements, power means for driving said device, control means effective to automatically stop one of said movements and bring
15 the device to rest at a pre-determined point, and means to start the movement of said device at the will of the operator.

2. In a stoker, pivoted rocking ash discharge plates mounted for discharging and
20 restoring movement, power means for lowering said plates, and control means effective to render said power means inoperative, and bring said plates to rest at a pre-determined point in the lowering movement of
25 said plates.

3. In a stoker, ash discharge plates, power driven means to give said plates a movement to discharge ashes therefrom and a movement to restore said plates to normal posi-

tion, and controlling means effective to render said power driven means inoperative and bring said plates to rest at a pre-determined point in each of the discharging and restoring movements of said plates. 30

4. In a stoker, ash discharge plates, power
35 driven means to give said plates a movement to discharge ashes therefrom and a movement to restore said plates to normal position, and controlling means effective to render said power driven means inoperative and
40 bring said plates to rest at a pre-determined point in each of the discharging and restoring movements of said plates between the limits of each movement.

5. In a stoker, an ash discharge plate, one
45 end of which is positioned in a plane above the other end, and pivoted near its upper end, a rack bar supporting said plate near the lower end thereof, a motor, a pinion driven thereby and engaging said bar to move said
50 bar forward and rearward in said stoker and thereby lower and raise said plate, and means to stop said motor at pre-determined points in the movement of said bar.

In testimony whereof we have hereunto
55 affixed our signatures.

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