

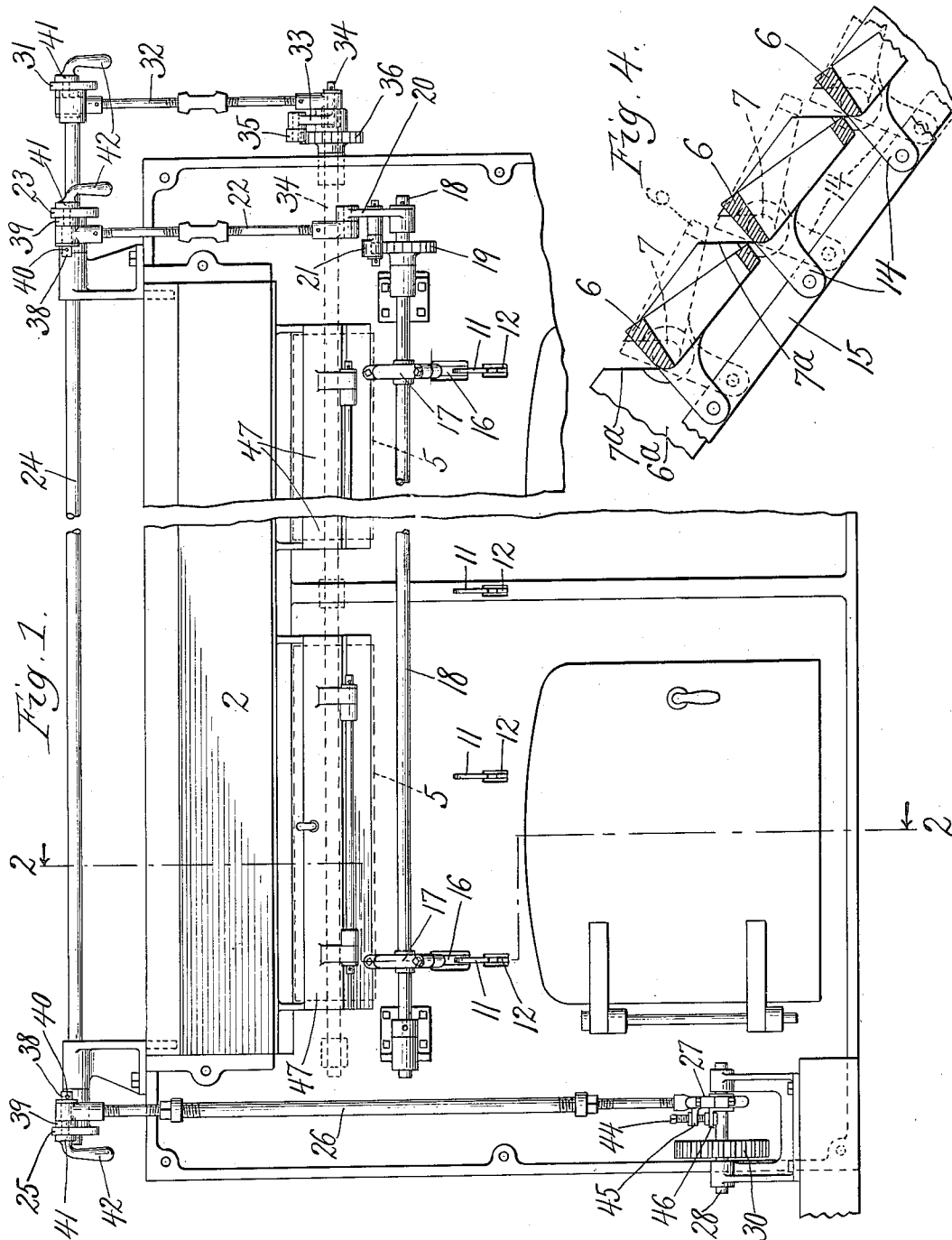
O. WUNDRACK.
MECHANICAL STOKER.

APPLICATION FILED APR. 27, 1912.

Patented Jan. 18, 1916.

3 SHEETS—SHEET 1.

1,168,367.



Witnesses.
Edward T. Wray.
Minnie M. Lundenay,

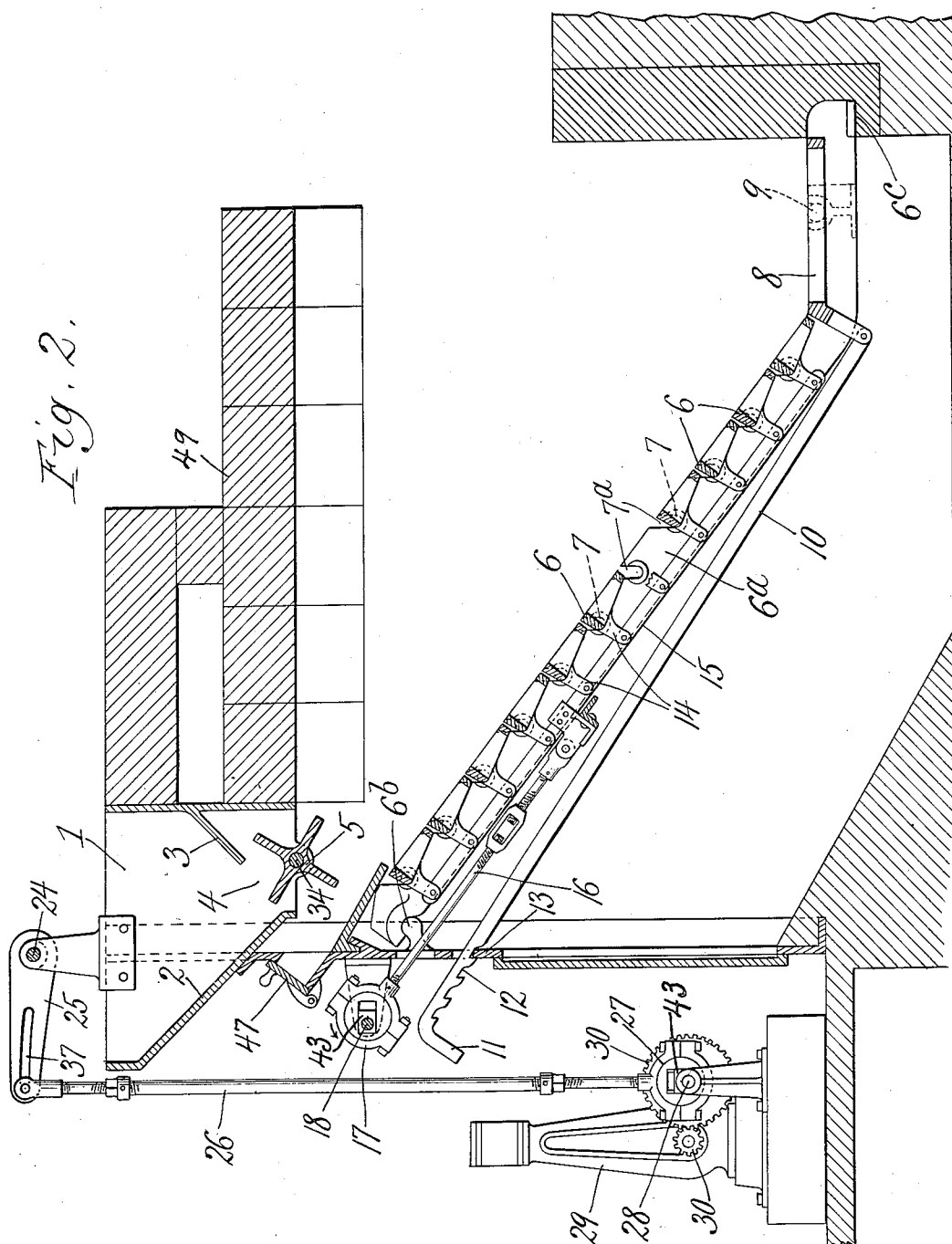
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3 SHEETS—SHEET 2.

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3 SHEETS—SHEET 3.

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Fig. 5.

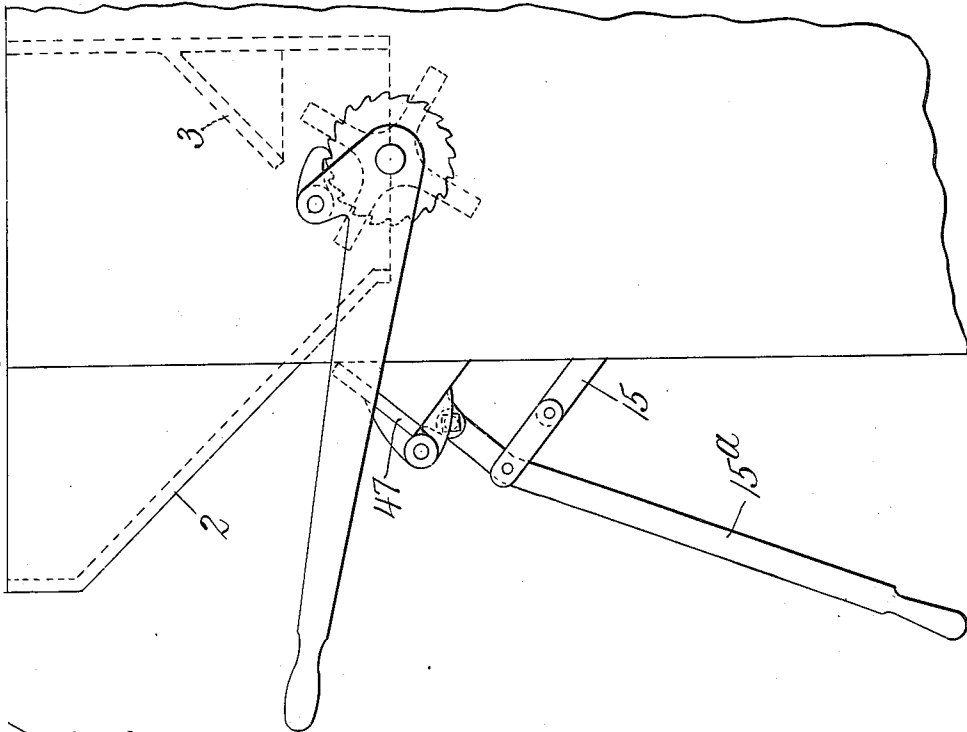
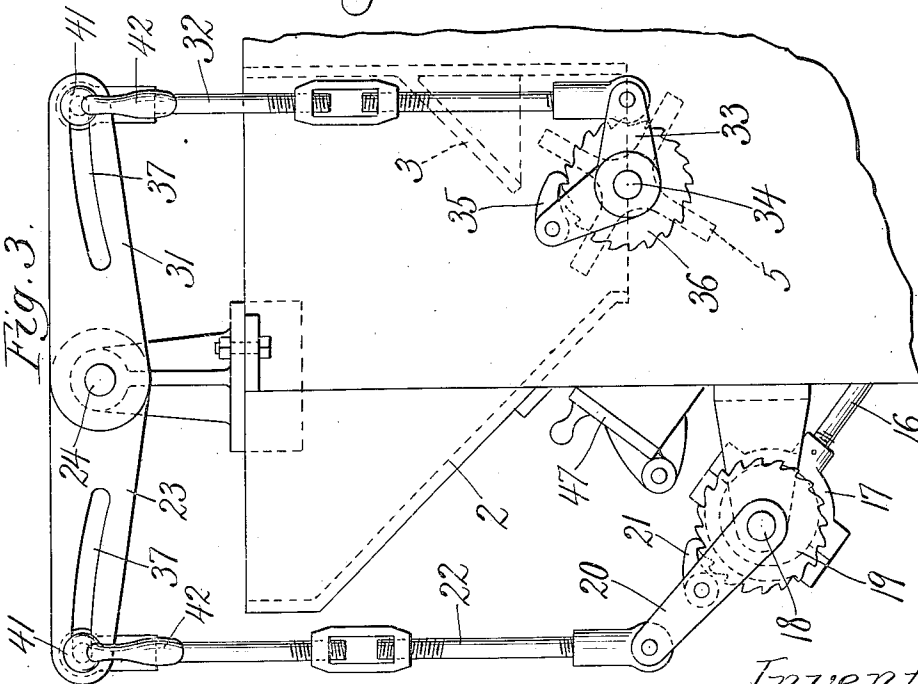


Fig. 3.



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UNITED STATES PATENT OFFICE.

OTTO WUNDRACK, OF MAYWOOD, ILLINOIS.

MECHANICAL STOKER.

1,168,367.

Specification of Letters Patent.

Patented Jan. 18, 1916.

Application filed April 27, 1912. Serial No. 693,555.

To all whom it may concern:

Be it known that I, OTTO WUNDRACK, a citizen of the United States, residing at Maywood, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mechanical Stokers, of which the following is a specification.

This invention relates to mechanical stokers, and has for its object to provide a new and improved device of this description. The invention is illustrated in the accompanying drawing wherein—

Figure 1 is a front view with parts broken away of a furnace supplied with a stoker; Fig. 2 is a sectional view taken on line 2—2 of Fig. 1; Fig. 3 is an enlarged side view of the upper part of the front end of the boiler shown in Fig. 1; Fig. 4 is an enlarged sectional view showing the grate bars; Fig. 5 is a view similar to Fig. 3 showing a hand operating device.

Like numerals refer to like parts throughout the several figures.

As illustrated in the accompanying drawings, the device is applied to an ordinary steam boiler furnace for feeding fuel thereto.

The fuel is placed in the receptacle or hopper 1 extending along the front of the boiler. As shown in Fig. 1 this hopper is provided with inclined bottom pieces 2 and 3, having between them a discharge opening 4. Associated with this discharge opening is a feeding wheel 5 provided with pockets for receiving the fuel and adapted when rotated to feed the fuel regularly and uniformly. Beneath the feeding wheel is an inclined grate made up of a series of grate bars 6. These bars are pivotally supported at their upper edges by means of the pivots 7. These bars extend downwardly in an inclined direction as illustrated in Fig. 2 to the lower dump grate 8. The grate bars are supported upon the side supporting pieces 6^a which are carried at their upper ends by the supports 6^b. The side supporting pieces 6^a are bent horizontally at their lower ends and are supported on the wall 6^c. These side supporting pieces are provided with slots 7^a into which the pivots 7 of the bars are received. The dump grate 8 is pivotally supported upon the pivots 9 carried by the side supporting pieces 6^a, and is provided with some suitable means for dumping it, as for example, the operating pieces 10 which extend up to the front of the door and are provided with handle pieces 11 and

notches 12, said notches adapted to engage the holding piece 13 so that the grate may be held in any desired position. The grate bars 6 are provided with some suitable means for moving them about their pivotal points. As herein shown, each grate bar is provided with a projection 14. These projections are pivotally connected with a controlling bar 15 which extends along beneath the grate bars. This bar may be controlled by hand as shown in Fig. 5 by means of the pivoted lever 15^a. I prefer, however, to have it automatically controlled as shown in Figs. 1, 2 and 3. In this construction, a reciprocating part 16 is connected with the bar 15 and to an eccentric 17 on a shaft 18. This shaft 18 passes along the front of the boiler and is provided with a ratchet wheel 19 (see Figs. 1 and 3). Mounted upon the shaft 18 is an arm 20 carrying an operating pawl 21 which engages the teeth of the ratchet wheel 19 when the arm is moved in one direction so as to rotate the shaft 18. This pawl becomes disengaged from the teeth when the arm is moved in an opposite direction. The arm 20 is connected by a rod 22 with an arm 23 on a shaft 24. The shaft 24 is a rock shaft and is actuated in any desired manner. As shown in Figs. 1 and 2, this shaft 24 is rocked by means of an arm 25 fastened thereto which arm is engaged by a rod 26 connected with an eccentric 27 on a rotating shaft 28 which may be rotated in any desired manner as by means of a motor 29 operatively connected thereto by gears 30. It will be seen that when the shaft 24 is rocked, the rod 22 is reciprocated so as to move the arm 20 back and forth, thus causing the pawl 21 to gradually and intermittently actuate the ratchet wheel 19 of the shaft 18. I prefer also to operate the feeding wheel from the shaft 24. As shown in Fig. 3, an arm 31 is connected with the shaft 24, said arm being connected by a rod 32 with an arm 33 mounted on a shaft 34 of the feeding wheel. This arm has a pawl 35 which engages the teeth of a ratchet wheel 36 on the shaft 34. The rods 26, 22 and 32 are preferably all made adjustable so that their lengths may be varied. These rods are preferably adjustably connected with the arms on the shaft 24 so that the length of the stroke may be varied. As herein shown, each of said arms is provided with a slot 37 (see Figs. 2 and 3) arranged so that the connection

between the rod and the arm may be moved along said slot to vary the length of the arm, and hence the stroke.

Referring now to Fig. 1, it will be noted that the rod 26 is provided at its end with a hole through which passes a bolt 38 having a head 39, the rod 26 being kept in place by means of this head and the pin 40. The head 39 is provided with a screw threaded opening into which is received a screw having a head 41. This head engages one side of the arm 25 and passes through a hole therein and into the threaded opening in the bolt 38. A handle 42 is connected with the head 41 of said screw so that it may be easily controlled. It will be seen that by moving the handle 42 so as to loosen the screw, the parts may be moved along the slot 37 and held in any desired position by again moving the handle 42 to tighten the screw. The eccentrics 17 and 27 are preferably made adjustable so that the stroke may be varied. The form of these eccentrics may be seen by referring to eccentric 27 shown in Figs. 1 and 2. In this construction, the shafts 18 and 28 of the eccentrics are mounted in a sliding block 43 adapted to be slid toward and from the center of the eccentric so as to vary the eccentricity of said shaft. This sliding block is controlled by a screw 44 which has a screw-threaded engagement with a part 45 fastened to the eccentric, the other end of said screw being rotatably attached to the projection 46 on the sliding block 43. It will be seen that by rotating the screw the block may be moved in either direction to vary the eccentricity and that this variation may be exceedingly small if desired thus giving a great range of regulation in the operation of the device. The rods 16 and 25 are made adjustable so that they may be easily adjusted when the eccentricity of the eccentric is varied. The door 47 is located at the top of the grate so that the operation of the grate may be seen. This door also gives access to the grate and the lower end of the hopper and the feeding wheel. The arch 49 may, of course, be of any desired construction.

The use and operation of my invention are as follows: The device may be used in connection with a series of furnaces in which event the various shafts would run the entire length of the series so that the feeding devices can all be controlled by a single motor or driving shaft. The coal or other fuel is placed in the hopper 1 and is fed in equal or measured quantities by means of the feeding wheel 5 to the grate bars. The coal then slides along the grate bars and is burned thereon and on the dump grate 8. The grate bars 6 are gradually rocked about their pivotal points by means of the rod 16 and eccentric 17 on the shaft 18. This shaft

is slowly and intermittently moved by the pawl 21 and the ratchet 19, said pawl being moved by the rock shaft 24 which in turn receives its motion from the driving shaft 28 through the eccentric 27. These grate bars are gradually moved from the position in full lines shown in Fig. 4 to the position shown in dotted lines in said figure and then back again. It will be noted that when the bars are in position as shown in full lines, the rear part of each bar projects above the front part of the bar behind it, thus forming a pocket into which the fuel is received. As the front bar is moved upwardly, the fuel is pushed out of this pocket and passes on to the next grate bar and is then moved down to the pocket produced by it, and thus gradually travels along the grate. It will be seen that the speed of movement of the grate bars may be varied at will by varying the throw of the eccentrics or either of them. These eccentrics may be regulated so as to vary their throw a very small amount, as for example, two one-thousandth of an inch, and hence exceedingly close regulation may be secured. It will also be seen that by regulating the eccentric 17, each grate may be regulated independent of the others. In this construction, very little space is required in front of the boilers. A greater combustion chamber is also secured because of the construction and the inclined position of the grate. This combustion chamber may be made five or six feet at the bottom of the grate. The power required to operate the apparatus is particularly small and the gradual feeding of the coal from pocket to pocket insures its proper consumption and results in a great saving of fuel. The device can be easily and quickly installed or dismantled. In view of the regulation of the feed, it will be seen that the device is independent of the driving shaft or motor. By giving the eccentric a long stroke, the coal may be fed rapidly and by giving it a short stroke, it may be fed slowly. The agitation of the fuel in the hopper due to the feeding wheel prevents it from caking and permits the feeding of just the desired amount to the grate. This grate is air cooled as the air passes through the grate between the bars and through the slots in the bars and there are no clinkers produced.

I claim:

1. A device for feeding fuel to furnaces comprising a grate consisting of a plurality of members each pivotally mounted contiguous to one edge and adapted to provide a continuous inclined fuel supporting surface or a stepped supporting surface, a reciprocable member connected with all of said grate bars for moving the same alternately to said respective positions, a crank-

shaft for actuating said member, a ratchet wheel for actuating said crank-shaft, a hopper for fuel adapted to discharge upon the upper end of said grate, a rotatable fuel feeding device in the discharge end of said hopper, a shaft therefor carrying a ratchet wheel, rocking arms equipped with dogs engaging said respective ratchet wheels, and a walking beam connected at opposite ends with said rocking arms.

2. A device for feeding fuel to furnaces comprising a grate consisting of a plurality of members each pivotally mounted contiguous to one edge and adapted to provide a continuous inclined fuel supporting surface or a stepped supporting surface, a reciprocable member connected with all of said grate bars for moving the same alternately to said respective positions, a crank-shaft for actuating said reciprocable member, a

ratchet wheel for actuating said crank-shaft, a hopper for fuel adapted to discharge upon the upper end of said grate, a rotatable fuel feeding device in the discharge end of said hopper, a shaft therefor carrying a ratchet wheel, rocking arms equipped with dogs engaging said respective ratchet wheels, a walking beam having longitudinal slots in its opposite end portions, and pitmen adjustably engaged at one end in said respective slots in said walking-beam and operatively engaged at their other ends with said rocking arms.

Signed at Chicago, Illinois, this 6th day of April 1912.

OTTO WUNDRACK.

Witnesses:

MINNIE M. LINDENAU,
DENIE A. WALTER.