T. A. COOKE.

MECHANICAL STOKER.

APPLICATION FILED JUNE 18, 1915.

1,219,256. Patented Mar. 13, 1917.

Fig. 1.

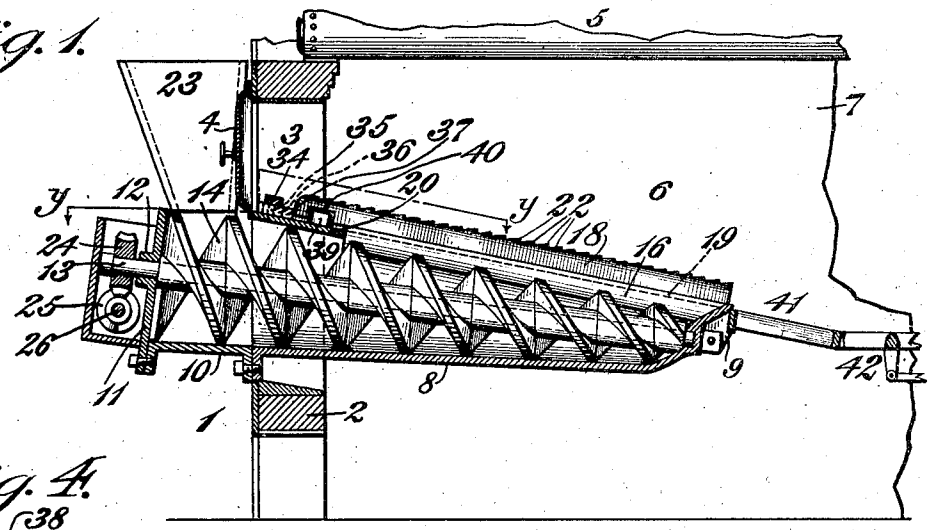


Fig. 4.

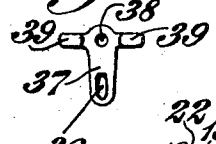


Fig. 5.

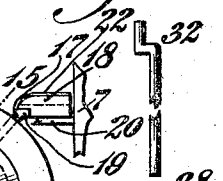


Fig. 3.

Fig. 2.

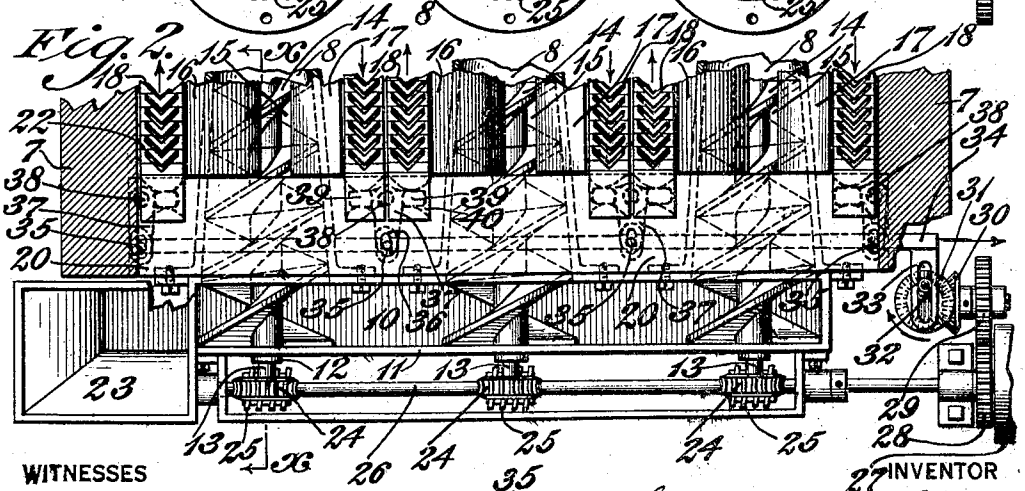
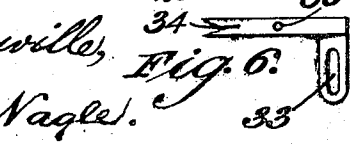


Fig. 6.



WITNESSES

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MECHANICAL STOKER.

1,219,256. Specification of Letters Patent. Patented Mar. 13, 1917.

Application filed June 18, 1915. Serial No. 34,782.

To all whom it may concern:

Be it known that I, THOMAS ANDREW COOKE, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Mechanical Stoker, of which the following is a specification.

My invention relates to a new and useful mechanical or automatic stoker, and consists of means for feeding the fuel at spaced intervals upon the grate bars with means for longitudinally reciprocating the grate bars, whereby a natural draft may be employed and the gases and products of combustion will be consumed, the construction providing a natural draft to be employed.

It further consists of other novel features of construction, all as will be hereinafter set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawings, one form thereof which is at present preferred by me, since the same will be found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 is a vertical sectional view on line *x*—*x* Fig. 2, of a mechanical stoker embodying my invention, with portions of the furnace and boiler partly broken away.

Fig. 2 is a horizontal sectional view on line *y*—*y* Fig. 1, with parts broken away.

Fig. 3 is a front elevation of a portion of the device in detached position, and certain parts omitted for the sake of clearness.

Fig. 4 is a detail view of a bell crank lever employed.

Fig. 5 is an elevation of a crank arm employed, broken away.

Fig. 6 is a detail view of a portion of a reciprocating rod employed.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings:

1 designates the furnace of any suitable or desired construction, having an outer wall 2, provided with any suitable number of fuel openings 3 and a door 4 therefor, it being understood that any number of these doors or openings may be employed.

5 designates a portion of a boiler suitably supported above the fire box 6 of the furnace, it being further understood that all the parts necessary to form a suitable furnace may be employed, and that in Fig. 2, I have shown the side walls 7, which may be of any suitable or desired construction.

8 designates a tapered case or casing, here shown as three in number, which extend longitudinally of the furnace beneath the fire box and supported in any suitable or desired manner. In the present instance, I have shown the same supported at their outer portions by the front wall 2 of the furnace and their inner ends as carried by a laterally extending supporting member 9 which may be suitably mounted in the side walls 7 of the furnace.

10 designates a bottom plate suitably connected exterior of the front wall 2, to which is bolted or otherwise secured a front plate 11, having a bearing 12 at suitable points thereon and in suitable relation to the casings 8.

Suitably mounted within each casing, is a feeding device, here shown as a feed screw, consisting of a shaft 13, each of which is journaled in a bearing 12 in the front plate 11, and the opposite end of which is rotatably mounted in the wall of the casing 8.

As here shown, the screw threads 14 are formed in sections, mounted upon and connected with the shaft 13 in suitable relation to each other, in order to form continuous threads, it being evident that by reason of the sectional formation of the threads, that any section may be removed and replaced.

As will be more clearly understood from Fig. 3, the walls of the casing curve or extend over the said screw, and terminate at a suitable distance from each other above the screw, in order to form an outlet opening 15 in the form of a narrow slot extending longitudinally of the casing and of the screw, and being of less circumferential extent than the diameter of the screw thread, and one of the walls of the casing extending beyond the central vertical plane therethrough or beyond the center of the screw, in order that the slot or outlet opening will be at one side of the upper portion of the casing.

Extending upwardly and outwardly from

each side of the slot of each casing are the guide members or flanges 16 and 17 and situated adjacent the upper edge of each guide member or flange is a grate bar 18 mounted for longitudinal reciprocating movement. As here shown, I have formed an ear 19 on the upper portion of the flanges 16 and 17 upon which rests a suitable portion of their respective grate bars 18 which will serve to support and assist in guiding the said grate bars in their movements.

20 designates a dead plate carried by the front wall 2 and extending laterally across the furnace and upon which the outer end of each of the grate bars rests and moves. I preferably desire to curve the face 21 of each grate bar adjacent its flange in order to permit of the proper feeding of the fuel from the feed screws to the grate bars and I also provide the upper face of the grate bars with serrations or teeth 22 which will assist in forcing the fuel downwardly by the movement of the grate bars.

It will be seen also from Fig. 2 that the bottom plate 10 and front plate 11 form a trough in which the outer ends of the feed screw are situated and I provide a hopper 23 preferably at one side of the furnace and in communication with the trough in order that the fuel fed therefrom will be delivered across the trough to each of the feed screws. Suitable means for rotating the screws are provided and, as here shown I have mounted a gear 24 on each shaft 13 each of which is in mesh with a worm 25 mounted on a suitably mounted shaft 26 to which motion is imparted by the pulley 27.

Suitable means is provided for imparting a longitudinal reciprocating movement to the grate bars, and as here shown, I have mounted a gear 28 on the shaft 26 which meshes with a gear 29 which imparts movement to a bevel gear 30 which is in mesh with a bevel gear 31 which carries a crank arm 32. The end of the crank arm is movably mounted in a slot 33 carried by a rod 34 which, as here shown, is mounted upon the bed plate 20 and extends laterally across the furnace and is provided at intervals with pins 35. Each pin is moved in the slot 36 in a bell crank lever 37 each of which is pivotally mounted at 38 to the bed plate 20 and which is provided with projections 39 seated in suitable recesses 40 in the grate bars.

By reason of the arrangement of the bell crank levers, when the rod 34 is reciprocated, a longitudinally reciprocating movement will be imparted to the grate bars, the same being in reverse direction with respect to adjacent bars. Any suitable construction may be employed at the inner end of the feed screws and grate bars, and as here shown, I have provided the stationary bridge 41, suitably supported, as by the side walls 7, and at the inner end of the stationary grate I have shown a shaking grate construction 42 any suitable means being provided for actuating the same.

The operation of the device is as follows:—

Fuel is placed in the hopper 23 and the mechanism having been started the feed screw will be rotated by the operation of the shaft 26, the worms 25 and the gears 24. The fuel from the hopper will be fed across the trough to the different feed screws by the action of the same and will be carried downwardly in the casings 8 and forced upwardly through the outlet slots 15, and as the said slots are at one side of the center the fuel will be caused to pass therethrough and will be prevented from choking and by reason of the slot and action of the screws it will be properly ground or broken up. After passing from the outlet of the casing the fuel will be directed by the flanges 16 and 17 outwardly and upwardly and upon the upper faces of the grate bars 18. In the meantime by the action of the crank arm 32 the rod 34 will be reciprocated which will actuate the bell crank lever 37. When the bar is moving in the direction indicated by the arrow in Fig. 2, the ends of the lever connected therewith will be moved in this direction so that the first grate bar at the right in Fig. 2 will move in the direction indicated by its arrow while the second bar will be moved in the opposite direction, as indicated by its arrow, that is, a reverse reciprocating motion with respect to adjacent bars will be imparted thereto. By reason of this reciprocation of the bars and the projections or teeth thereon the coal or fuel will be fed downwardly in the same direction as the feed caused by the screw and by mounting the bars as shown a level bed of fire is obtained and the spaces between the grate bars permit of a natural draft thus overcoming the necessity of forced draft. By reason of this the gases formed pass slowly through the bed of fuel and will be entirely consumed as will be the products of combustion. The curved faces of the grate bars adjacent their respective flanges form substantially no obstructions or abutments against which the fuel can lodge so that the same can be easily and properly fed and directed upwardly upon the grate bars by the flanges 16 and 17 and the curved faces of the grate bars. While I have shown in the drawings three cases and three feed screws, it will be evident any desired number may be employed in order to accomplish the desired purpose.

It will now be apparent that I have devised a novel and useful construction of a mechanical stoker which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the

present instance, shown and described a preferred embodiment thereof which will be found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

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

1. A mechanical stoker, comprising a plurality of casings, each having an opening longitudinally extending along its top and each provided with flanges oppositely diverging from said openings and inclining upwardly, a feed screw in each of said casings, grate bars slidably mounted above said casings and guided by said flanges, an actuating shaft intergeared with said feed screws, a crank arm intergeared with said shaft, a rod reciprocated by said crank arm, and connections from said rod to said grate bars, whereby adjacent grate bars will reciprocate coincidently in opposite directions.

2. A mechanical stoker, comprising a plurality of casings, each having an opening longitudinally extending along its top and each provided with flanges oppositely diverging from said openings and inclining upwardly, a feed screw in each of said casings, grate bars slidably mounted above said casings and guided by said flanges, and having their side walls overhanging said flanges and forming a continuation of the upper faces thereof, an actuating shaft intergeared with said feed screws, a crank arm intergeared with said shaft, a rod reciprocated by said crank arm, and connections from said rod to said grate bars, whereby adjacent grate bars will reciprocate coincidently in opposite directions.

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Witnesses:

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