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AGITATOR FOR MECHANICAL STOKERS

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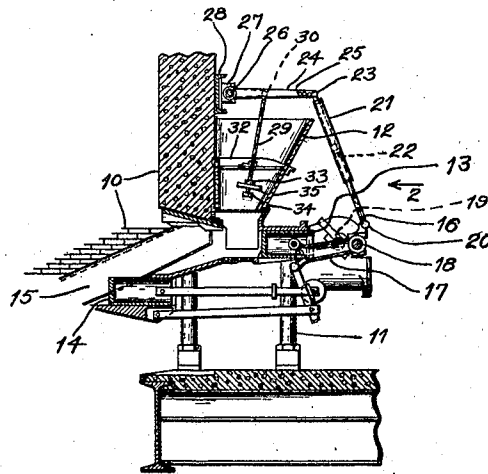


Fig. 1

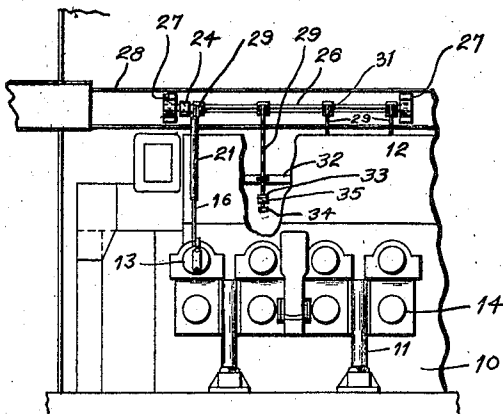


Fig. 2

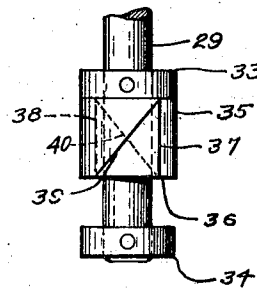


Fig. 4

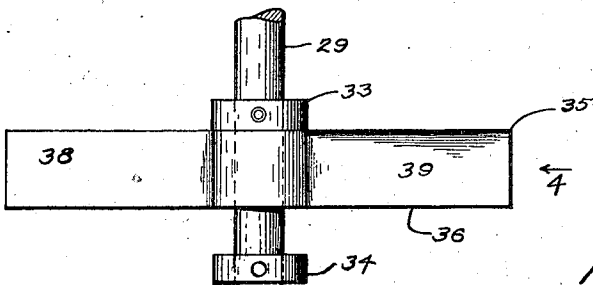


Fig. 3

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AGITATOR FOR MECHANICAL STOKERS.

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To all whom it may concern:

Be it known that I, HAROLD G. BURRILL, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Agitators for Mechanical Stokers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to agitators for mechanical stokers.

Among the objects of my invention are:—

To provide means for agitating the fuel in the hopper of a mechanical stoker so that the fuel will be fed continuously to the mechanism that delivers it to the grate.

To provide means for agitating the fuel in the hopper of a mechanical stoker which can be readily attached to stokers now in use without requiring any changes in their construction.

To provide means for agitating the fuel in the hopper of a mechanical stoker which shall be so arranged that it will agitate the fuel more in the direction in which it is to be fed towards the combustion chamber than in the direction opposite thereto so that the forces acting contrary to the force of gravity or other force which is inducing the movement of the fuel towards said chamber will be minimized.

These and other objects of my invention will become apparent in the following specification, reference being had to the accompanying drawings, and the means by which said objects are effectuated will be definitely pointed out in the claims.

In the drawings:—

Figure 1 is an end view of part of a furnace and a mechanical stoker having my improved agitator combined therewith, some of the parts being shown in section.

Fig. 2 is a partial view of a battery of stokers having my improved agitator applied thereto, when viewed in the direction of the arrow 2 in Fig. 1.

Fig. 3 is a side view of the propeller used in my improved agitator, together with the thrust shaft supporting same.

Fig. 4 is a view of the parts shown in Fig. 3 looking in the direction of the arrow 4 in said figure.

In the drawings:—

10 represents part of the brick wall of a

furnace to which the stoker 11 is applied.

The stoker 11 may be of any approved design having a hopper 12 and upper and lower rams 13 and 14, respectively, for feeding fuel to the channel 15 which conveys it to the combustion chamber of the furnace.

All of the foregoing parts may be of any usual or approved construction and they are merely illustrated as representative of means for feeding and delivering fuel to a channel which conveys it to the combustion chamber of a furnace when said furnace is part of a boiler setting or used for other purposes.

No matter what type of mechanism is employed for feeding the fuel from the hopper 12 to the channel 15, there are to be means for reciprocating the rod 16 in the direction of its length and said means may be connected with and operated by said mechanism, or said rod may be reciprocated by independent means.

In the present construction, the ram is reciprocated by the connecting rod 17, the latter being connected to the crank pin 18 forming a part of the shaft 19 and said shaft is revolved in any approved manner.

The rod 16 is pivotally connected at 20 to the connecting rod 17, and the upper end of said rod is mounted within the tube 21, a pin 22 serving to prevent relative longitudinal displacement of said rod and tube. The pin 22 is used to connect the rod 16 and tube 21 in order to provide a member having a definite shearing strength which by its shearing will prevent damage to more expensive parts should large lumps of coal or pieces of rock become wedged within the hopper 12, as hereinafter explained.

The upper end of the tube 21 is connected by the pivot 23 to the lever 24 and said pivot may be introduced into anyone of a series of holes such as 25 in said lever whereby the angular movement of said lever may be varied as desired.

The lever 24 is secured to the square shaft 26, the extremities of which are cylindrical and revolvably mounted in bearings 27—27 secured to the channel iron 28, and the latter is supported by the furnace setting 12 or any other approved way.

Thrust shafts such as 29 are pivotally connected as at 30 to the ends of levers such as 31, the other ends of said levers being secured upon the shaft 26. Guides such as 32 are secured within the hopper 12 and the

thrust shafts 29 are slidably mounted in holes provided therein.

Collars such as 33 and 34 are secured upon the thrust shaft 29 and the propeller 35 is slidably mounted upon said shaft so that it can have a limited sliding movement between said collars.

The propeller 35 is formed with a flat bottom 36; a side 37 which is to the right of the shaft 29 in Fig. 3 and is at right angles to said bottom; a side 38 to the left of the shaft 29 in Fig. 3, which is also at right angles to said bottom; a beveled edge 39 which is to the right of the shaft 29 in Fig. 3; and a beveled edge 40 shown dotted in Fig. 4 which is to the left of the shaft 29 when the propeller 35 is in the position shown in Fig. 3.

The operation of my improved agitator is as follows:—

The rod 16 and tube 21 being reciprocated in the direction of their lengths in any approved manner, as for instance, by the motion of the connecting rod 17, the lever 24 will be given a vibratory motion which will communicate a reciprocatory motion to the thrust shaft 29 in the direction of its length. When the thrust shaft 29 moves downwardly from the position shown in Fig. 1, the collar 33 will press against the top of the propeller 35 and the flat bottom 36 will force the coal within the hopper 12 towards the ram 13. When the shaft 29 is moved upwardly it slides within the propeller 35 until the collar 34 strikes the bottom 36. The propeller 35 is then moved upwardly and, owing to the beveled edges 39 and 40, it will revolve upon the shaft 29 while it is moved upwardly so that when the shaft 29 is again moved downwardly, the bottom 36 will strike a fresh portion of coal.

By making flat the bottom 36 of the propeller 35 and providing the beveled edges 39 and 40, I insure that the propeller will not turn during its downward movement but will only turn during its upward movement; consequently, it has a thrusting action upon the coal downwardly and when moving upwardly, it simply revolves through the coal without producing any considerable upward thrust thereupon.

By this construction of the propeller 35, I am enabled to obtain a considerable downward thrust with a minimum upward thrust; and furthermore, by the turning of the propeller the angular position thereof upon the shaft 29 is continuously varied.

The ram box 15 may be considered as a fuel casing to which the coal passes by gravity from the hopper, and the ram 13 may be considered as a means working in such casing to feed the coal into the throat of the furnace. A common power driven part actuates both the ram and agitating member 35, and this part may be the crank shaft 18.

The connections 20, 16, 22, 21, 23, 24, 26, 30 and 29 are operated from the crank shaft for methodically actuating the agitator in the hopper. One of these connections, the shear pin 22, constitutes an easily accessible and easily replaceable safety breaking piece adapted to break easily and thus prevent damage to other parts when coal or foreign material in the hopper blocks the agitator movement. It will be noted that the safety device is so arranged that when it breaks and renders the agitator inoperative, this does not affect the continued operation of the ram.

Thus, it will be seen that I provide a simple, cheap and effective mechanism for preventing compacting of the coal in the lower region of the hopper 12 and thereby insure a continuous delivery of fuel to the mechanism for delivering it to the combustion chamber of a furnace.

While I have shown one embodiment of my invention, it is to be understood that unless specifically pointed out in the claims, I do not desire to be limited to said construction, for many changes may be made therein and many equivalents may be used in lieu of the elements which I illustrate without departing from the spirit of my invention.

I claim:—

1. The combination with a fuel hopper, of means for positively moving fuel from said hopper, said means comprising a thrust shaft reciprocating in the direction of movement of said fuel from said hopper and in the opposite direction, and means on said shaft shaped to move said fuel when said shaft is moved in said first named direction and to cut through said fuel when said shaft is moved in the opposite direction.

2. The combination with a furnace comprising a combustion chamber and a stoker comprising a fuel hopper, of means for positively moving fuel from said hopper, said means comprising a thrust shaft reciprocating in the direction of movement of said fuel from said hopper and in the opposite direction, a propeller loosely mounted on said shaft and shaped to move said fuel without revolving when said shaft is moved in the first named direction and to revolve while moving through said fuel when said shaft is moved in the opposite direction, means for reciprocating said shaft, and means for moving said fuel to said combustion chamber from said hopper.

3. The combination with a furnace comprising a combustion chamber and a stoker comprising a fuel hopper, of means for positively moving fuel from said hopper, said means comprising a thrust shaft reciprocating in the direction of movement of said fuel from said hopper and in the opposite direction, a propeller loosely mounted on said shaft and shaped to move said fuel without

revolving when said shaft is moved in the first named direction and to revolve while moving through said fuel when said shaft is moved in the opposite direction, means for reciprocating said shaft, means for moving said fuel to said combustion chamber from said hopper and collars on said shaft permitting relative axial movement of said propeller thereon.

4. The combination with a fuel hopper, of means for positively moving fuel from said hopper, said means comprising a thrust shaft reciprocating in the direction of movement of said fuel from said hopper and in the opposite direction, means on said shaft shaped to move said fuel when said shaft is moved in said first named direction and to cut through said fuel when said shaft is moved in the opposite direction, means for moving said shaft and a breaking piece in said last named means adapted to fracture when said fuel presents undue resistance to said first named means.

5. Mechanism for feeding coal to a furnace comprising a coal hopper, a casing to which coal passes from the hopper by gravity, means working in the casing to feed coal from the casing into the throat of the furnace, a power driven part for driving said

means, a movable member within the hopper adapted and arranged to agitate the coal therein to assist its descent into said casing, and connections from said power driven part form methodically actuating the agitating member within the hopper, said connections comprising an easily accessible and replaceable safety breaking piece adapted easily to fracture, and thus prevent damage to other parts when coal or foreign material in the hopper blocks the movement of said agitating member, and so arranged that the agitating member is thus rendered inoperative without interrupting the actuation of said feeding means.

6. The combination with a furnace comprising a combustion chamber and a stoker comprising a fuel hopper, of means for agitating the fuel in said hopper to aid its movement therefrom, means for moving said fuel to said combustion chamber from said hopper, independent power operated mechanisms actuating each of said means, and a breaking piece in the mechanism for actuating said first named means adapted to fracture when said first named means meets an undue resistance.

In testimony whereof, I affix my signature.
HAROLD G. BURRILL.