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SPREADER STOKER APPARATUS

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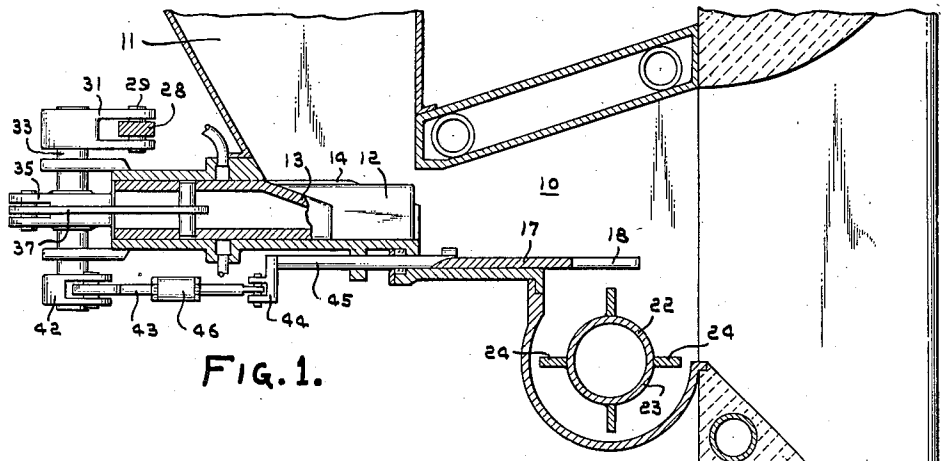


FIG. 1.

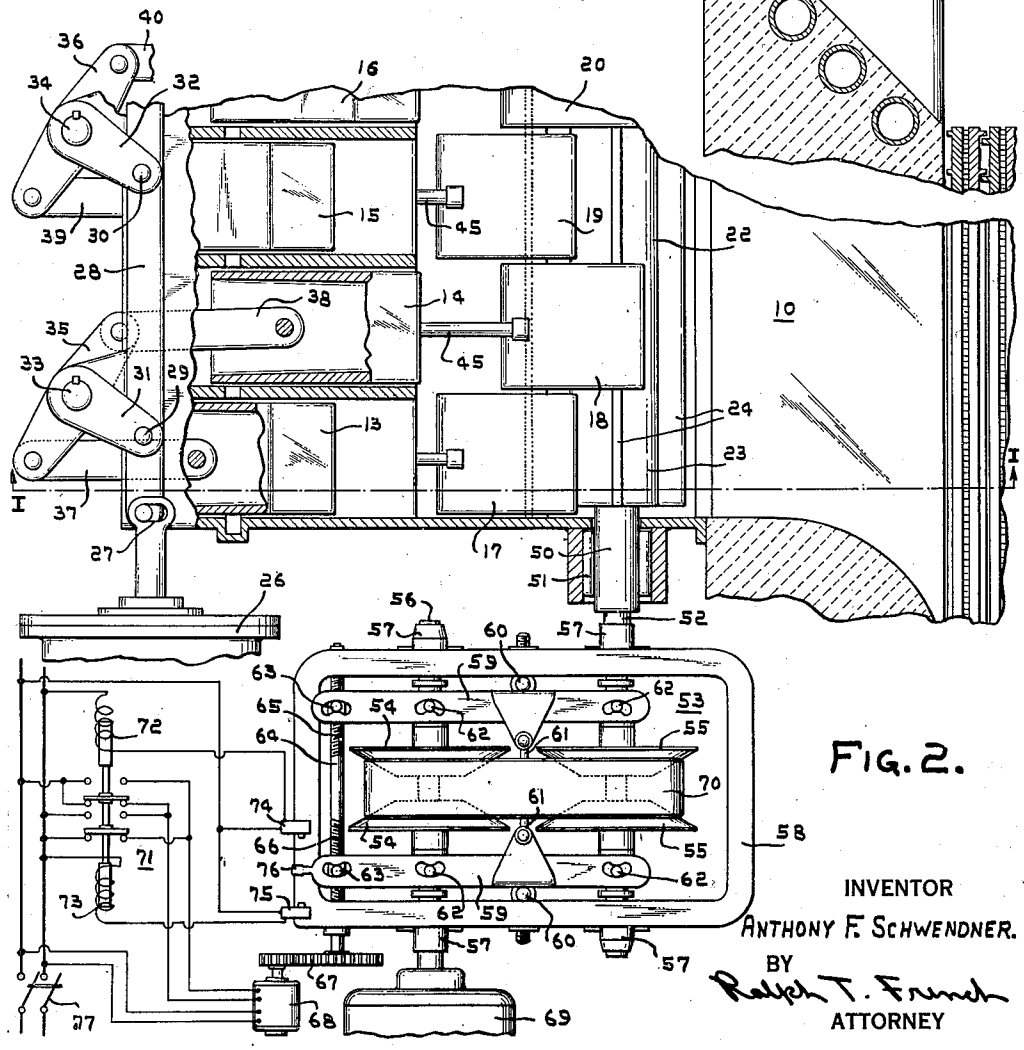


FIG. 2.

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SPREADER STOKER APPARATUS

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4 Claims. (Cl. 110—115)

This invention relates to stokers, more particularly to those of the "sprinkler" or "spreader" type wherein fuel fed to a rotary member is impelled by such rotary member to the fuel-supporting surface of a furnace grate, and has for an object to provide novel means for varying the trajectories of the fuel in traveling from the rotary impeller to the grate surface whereby the location of the area on which the fuel is deposited is correspondingly varied.

Another object of the invention is to provide, in a spreader stoker having a rotary impeller for sprinkling fuel onto a furnace grate through the atmosphere thereabove, means for automatically varying the rotative speed of the rotary impeller, whereby the trajectories of the fuel impelled thereby to the furnace grate are varied to deposit the fuel on different portions of said grate.

A further object of the invention is to provide, in a spreader stoker having a rotary impeller adapted to sprinkle fuel on a furnace grate through the atmosphere above the latter, a novel driving connection between the rotor and its driving motor, which connection includes means for continuously varying the rotative speed of the impeller.

These and other objects are effected by the invention as will be apparent from the following description and claims taken in connection with the accompanying drawing, forming a part of this application, in which:

Fig. 1 is a vertical sectional view taken along the line I—I of Fig. 2, looking in the direction indicated by the arrows; and,

Fig. 2 is a plan view of the structure shown in Fig. 1, portions thereof being broken away for the sake of clearness.

Referring now to the drawing more in detail, the reference character 10 indicates, in its entirety, a stoker of the "spreader" or "sprinkler" type comprising a hopper 11 from which fuel is fed to the ram box 12, from which ram box the fuel is pushed rearwardly by the rams 13, 14, 15 and 16 along the upper surface of a plurality of spill plates 17, 18, 19 and 20, to the rear discharge edges of the latter, for gravitational discharge therefrom to the rotary impeller 22, disposed therebeneath. Preferably, the rotary impeller 22 comprises a hollow drum or body portion 23 carrying a plurality of radially-extending fuel-impelling blades 24, adapted to project the fuel rearwardly through an opening in the front wall of a furnace to the grate structure therein.

Any suitable means may be provided for imparting reciprocatory motion not only to the rams 13, 14, 15 and 16, but also, if desired, to the spill plates 17, 18, 19 and 20. The motion for the rams is derived from a suitable reciprocating engine 26, having a connection, at 27, with a reciprocable bar or rod 28, the latter being pivotally connected at 29 and 30 with the free ends of the crank arms 31 and 32, these crank arms being keyed, or otherwise secured, to vertical shafts 33 and 34. Each of these vertical shafts carries a double crank arm, 35 and 36, the free ends thereof being connected by links 37, 38, 39 and 40 to the rams 13, 14, 15 and 16, respectively. It will be obvious that, as the engine 26 reciprocates the bar or rod 28, oscillatory motion will be imparted to the vertical shafts 33 and 34, with consequent reciprocation of the links 37, 38, 39 and 40 and similarly of the rams 13, 14, 15 and 16 connected thereto.

Similar mechanism may be provided for imparting reciprocatory motion to the spill plates 17, 18, 19 and 20, such mechanism including double crank arms 42 carried by the lower ends of the vertical shafts 33 and 34 and connected at their free ends by links 43, having pivotal connections 44, with rods 45 secured to the various spill plates. Preferably, each link 43 is provided, intermediate its terminal portions, with suitable stroke-adjusting mechanism 46, whereby the length of the reciprocatory stroke of each spill plate may be adjusted to suit the particular operating conditions encountered.

Considering again the rotary impeller 22, the hollow drum or body portion 23 thereof is supported by stub shafts 50 in bearings 51. One of the stub shafts 50 is connected by suitable coupling means (not shown) with the driven shaft 52 of a conventional variable speed drive, indicated in its entirety by the reference character 53.

In the construction herein illustrated, the variable speed drive or transmission mechanism 53 comprises a pair of aligned pulleys having opposed flanges 54, 54 and 55, 55, provided with conical traction surfaces; "conical" being used in the sense of a suitable convergent surface of revolution. The flanges are keyed to and slidable longitudinally on shafts 56 and 52, respectively, which are journaled in bearings 57 secured to a frame 58.

A pair of double levers 59 are pivotally connected intermediate their ends, as at 60, to a rod or shaft 61 extending transversely of the frame, and located midway of the shafts 56 and 52. These levers are connected to the pulleys 54 and 55, at 62, whereby pivoting of the levers about their fulcrums 60 effects longitudinal sliding

movement of the pulley flanges on their respective shafts.

The levers 59 are threadedly connected, as at 63, to a shaft 64 having right-hand and left-hand threads 65 and 66, respectively, and carrying at one end a gear 67, driven by a motor 68, by which the shaft may be rotated to effect pivotal movement of the levers.

Upon rotation of the shaft 64 by the motor 68, the levers will be pivoted about their fulcrums 61 with the result that the pulley flanges 54 will be moved away from each other and the flanges 55 moved toward each other a corresponding distance, or vice versa, depending upon the direction of rotation of the shaft 64. Power is transmitted to the shaft 56 from the main motor 69 and from the flanges 54 to the flanges 55 by a suitable belt 70, in a well-known manner.

A reversing relay, indicated in its entirety by the reference character 71, operates to periodically reverse the motor 68 when the shaft 64 has reached either limit of its rotation, whereby the drive ratio of the driving and driven pulleys is continuously varied. The reversing relay 71 includes the usual relays 72 and 73 controlled by the snap switches 74 and 75, respectively, for reversing the field of the motor 68 with respect to its armature, assuming that the motor 68 is of the D. C. type. The snap switches 74 and 75 are operated in response to movement of the levers 59 by suitable means, such as the lug or finger 76, carried by one of these levers and positioned so as to engage the snap switch 74 at one limit of its movement and to engage the snap switch 75 at the other limit of its movement. A main switch 77 is provided in the power line for starting and stopping the reversing relay mechanism 71 and the motor 68.

It is believed that the operation of the mechanism herein described will be obvious to those skilled in the art, but it is pointed out that, with the shaft 64 of the variable speed transmission mechanism 53 being continuously operated by the motor 68 and its reversing relay 71, the speed of the rotary impeller 52 will be continuously varied through cycles with the result that the trajectories of the fuel impelled rearwardly thereby to the grate structure of the furnace will vary, due to the change in speed of the rotor, and the consequent change in impact of the blades 24 with the fuel, such changes in the trajectories of the fuel resulting in corresponding variations in the point of deposit of fuel with respect to the front-to-rear dimensions of the grate structure. In other words, when the impeller 22 is rotating at its maximum speed, the fuel will receive relatively heavy impacts tending to throw it to the rearmost portion of the grate, while, when the rotary impeller speed is at its lowest, the impact of the blades against the fuel will be lighter, resulting in depositing of the fuel adjacent the front portion of the grate. Obviously, the intermediate speeds will result in depositing fuel at intermediate portions of the grate surface.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. In a stoker of the "sprinkler" or "spreader" type, an impeller rotatable about a horizontal axis; a spill plate positioned with its rear discharge edge overlying said rotary impeller; means for feeding fuel rearwardly along said spill plate for discharge over the rear edge thereof to the rotary impeller therebeneath; a constant speed motor for rotating the impeller; and means acting between the motor and the impeller for automatically varying the speed of rotation of said impeller in cycles, whereby the trajectories of fuel leaving the impeller vary with consequent change in point of deposit of said fuel.

2. In a stoker, a rotary impeller; a spill plate positioned with its rear discharge edge overlying said rotary impeller; means for feeding fuel rearwardly over said spill plate for discharge from the rear edge thereof to the rotary impeller therebeneath; a motor for continuously driving the impeller; and mechanism acting between the motor and the impeller for automatically and continuously varying the rotative speed of the latter.

3. In a stoker, a rotary impeller; a spill plate positioned with its rear discharge edge overlying said rotary impeller; means for feeding fuel rearwardly along said spill plate for discharge from the rear edge thereof to the rotary impeller therebeneath; a motor for driving said rotary impeller; variable speed mechanism providing a driving connection between said motor and the rotary impeller; and automatic means for continuously changing the setting of the variable speed mechanism, whereby the impeller speed is continuously varied with consequent changes in the trajectories of fuel leaving the impeller.

4. In a stoker, a rotary impeller; a spill plate positioned with its rear discharge edge overlying said rotary impeller; means for feeding fuel rearwardly along said spill plate for discharge from the rear edge thereof to the rotary impeller therebeneath; a driving motor for said rotary impeller; and means providing a driving connection between said motor and the rotary impeller, said last-mentioned means including mechanism providing continuous variation in the speed of the rotary impeller.

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