Nov. 1, 1949. D. J. MOSSHART ET AL 2,486,570

SPREADER STOKER FUEL FEEDING MECHANISM

Filed Oct. 18, 1946

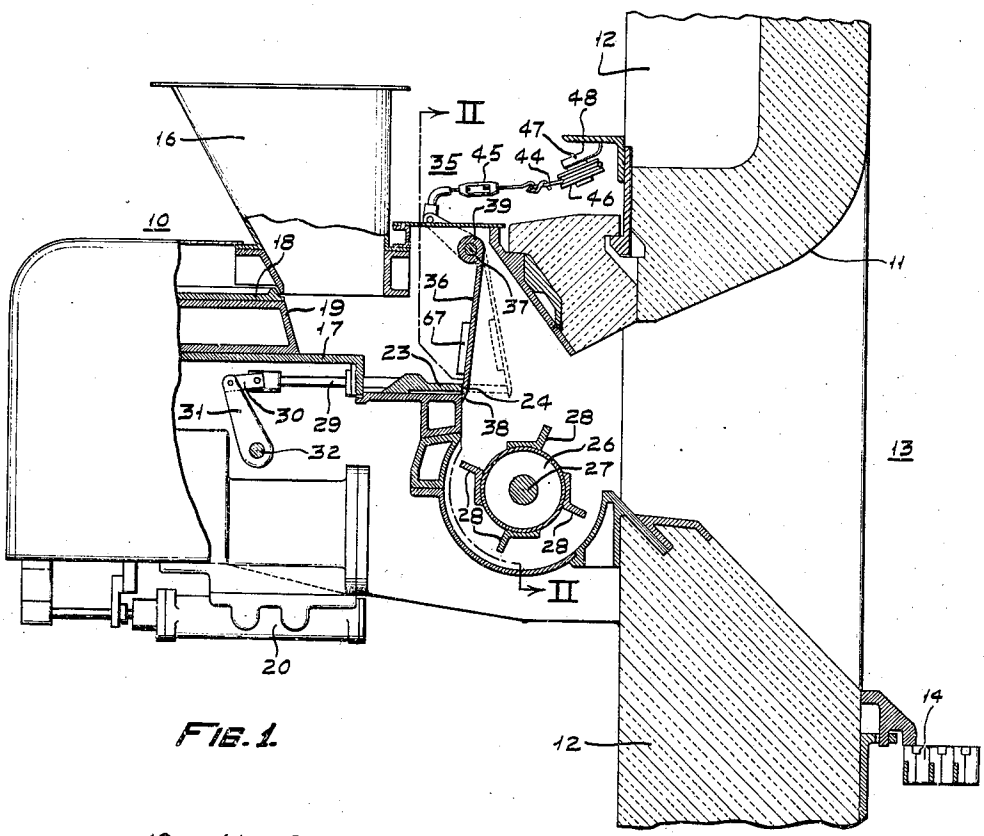


FIG. 1.

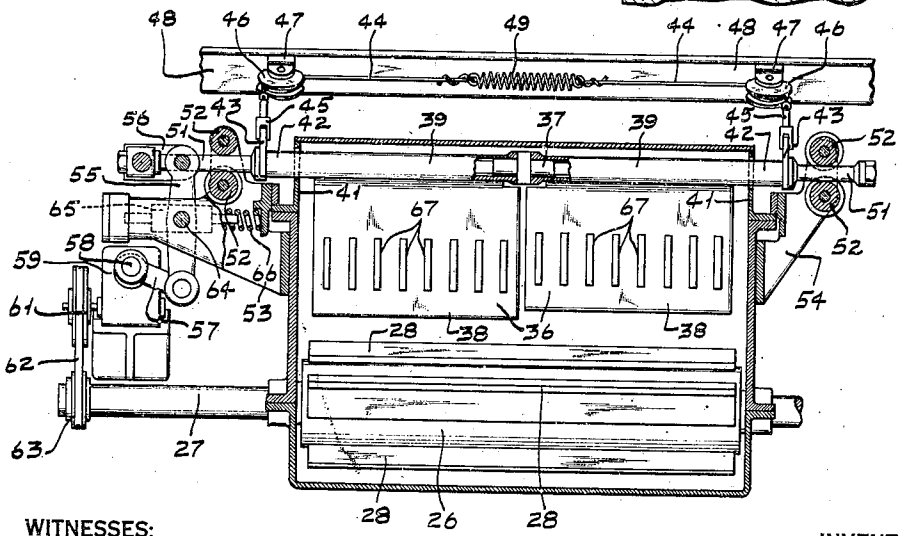


FIG. 2.

WITNESSES:
E. H. Lutz.
H. B. Brown.

INVENTORS:
DONALD J. MOSSHART.
JOHN S. HERWICK.
BY
Ralph T. Bench
ATTORNEY

Patented Nov. 1, 1949

2,486,570

UNITED STATES PATENT OFFICE

2,486,570

SPREADER STOKER FUEL FEEDING MECHANISM

Donald J. Mosshart, Ardmore, and John S. Herwick, Philadelphia, Pa., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application October 18, 1946, Serial No. 704,160

4 Claims. (Cl. 110—115)

1

This invention relates to stokers, more particularly to those of the "spreader" or "sprinkler" type, and has for an object to provide improved apparatus of this character.

In spreader stoker apparatus, where the fuel is fed rearwardly over the discharge end of a spill plate, for gravitational feed to impeller mechanism, the fuel so fed frequently falls in large masses or chunks from the rear end of the spill plate to the impeller therebelow. This condition is aggravated when the fuel is wet, and even with dry fuel the fuel falls from the spill plate in sufficiently uneven quantities and at such uneven rates that the feeding thereof by the impeller to the interior of the furnace is generally erratic. Where the fuel falls uniformly from the spill plate to the impeller, the impact between the impeller and the fuel is substantially uniform, but where the fuel falls in irregular or small masses there is a cushioning effect resulting in non-uniform distribution of the fuel by the impeller.

In copending application, Serial No. 504,395, for "Spreader stoker mechanism," filed September 30, 1943, now Patent No. 2,423,110 granted July 1, 1947, and assigned to the assignee of the present invention, there is disclosed apparatus for overcoming this difficulty and which apparatus involves a corrugated plate extending transversely of the spreader mechanism, with the corrugations extending vertically, the plate being so disposed that reciprocation thereof causes the ribs of the corrugations to rub upon the fuel as the latter approaches the discharge end of the spill plate, thereby reducing the size of the mass of fuel by a grating or shredding action, the grated or shredded particles of fuel falling uniformly to the impeller therebelow.

It has been found that, under certain conditions, this equalizing plate, which is mounted for pivotal movement about a horizontal axis so that the lower edge thereof may be forced away from the spill plate rear discharge edge by the fuel pushing thereagainst, is sometimes pushed away from the spill plate by a large lump of coal or foreign matter which opens a gap between the equalizer plate and rear discharge edge through which an excessive quantity of fuel may cascade to the impeller therebelow. Also, where a plurality of rams or equivalent structures are operating out of phase to push fuel rearwardly over the spill plate and against the equalizing plate, the action of the rearmost ram may swing the equalizing plate away from the rear discharge edge of the spill plate thereby opening an excessive gap all along the spill plate rear edge, resulting in an undesirable cascading of fuel to the impeller.

2

The present invention eliminates this difficulty by providing an equalizing plate structure in which a plurality of plate elements are mounted on a horizontal axis for independent pivotal movement thereabout so that any one plate element can move away from the rear spill plate discharge edge and the remaining plate sections remain adjacent thereto. Preferably, the plate elements correspond in transverse location to the fuel-pushing rams, paddle wheels or other mechanisms for feeding the fuel from the hopper to the rear spill plate discharge edge.

Accordingly, another object of the invention is to provide, in spreader stoker apparatus, means for effecting a uniform feed of fuel to the impelling structure.

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 longitudinal sectional view through spreader stoker apparatus embodying the principles of the present invention; and,

Fig. 2 is a transverse sectional view taken along the line II—II of Fig. 1, looking in the direction indicated by the arrows.

Referring now to the drawing more in detail, the reference character 10 indicates, in its entirety, spreader mechanism for feeding fuel rearwardly through the opening 11 in the front wall 12 of the furnace 13, for distribution thereof on the grate structure 14, at the bottom of the furnace. Fuel is fed by gravity from the hopper 16 to the bottom plate 17 of the ram box structure 18 where a pair of rams 19, disposed in side-by-side relation, push the fuel rearwardly. The rams 19 may be reciprocated by any suitable mechanism (not shown) and which derives its power from the engine 20 (Fig. 1). Preferably, the ram-reciprocating mechanism is so arranged that the two rams 19 operate out of phase by approximately 180 degrees with the result that while one ram is moving rearward the other ram is moving forward.

Reciprocation of the rams 19 pushes the fuel from the hopper 16 rearwardly over the spill plate 23 for gravitational discharge over the rear edge 24 thereof to the rotary impeller 26 positioned therebelow. The impeller 26 is mounted on a horizontal shaft 27 and carries a plurality of blades 28 adapted to strike the fuel falling from

the rear discharge edge of the spill plate and to project it rearwardly through the furnace wall opening 11 to the grate structure 14.

In order to vary the trajectories of the fuel leaving the rotary impeller 26, the spill plate preferably is arranged for longitudinal reciprocation, such movement being imparted thereto by rods 29, links 30 and cranks 31, the latter being fixed on the shaft 32 which may be oscillated in any desired manner, one such means being fully disclosed in copending application, Serial No. 549,848, filed August 17, 1944 and assigned to the assignee of the present application.

The equalizing mechanism, indicated in its entirety by the reference character 35, for preventing cascading of large quantities of fuel from the rear discharge edge 24 of the spill plate, includes a pair of plate members 36 pivotally mounted at their upper edges on a horizontal transversely-extending shaft 37 with the lower edges 36 of the plates disposed close to the spill plate rear discharge edge 24. The hollow beads 39 at the upper edge of the plates 36, through which the shaft 37 passes, project laterally beyond the side walls 41 of the spreader casing, as at 42, with arms 43 rigidly secured to the projecting portions 42.

A pair of wires 44 are connected at one end, through turn-buckle structures 45, with the free ends of the arms 43, these wires 44 passing around a pair of pulleys 46 carried by brackets 47 secured to the angle iron 48 on the furnace front wall 12. The other ends of the wires 44 are secured to opposite ends of the tension spring 49 which results in forces being applied to the two plate sections 36 which forces urge the plate lower edges 38 into contact with the rear discharge edge 24 of the spill plate 23.

It will be apparent that, if either plate section 36 is swung rearwardly due to the pushing action thereagainst of fuel moved rearwardly by the ram aligned therewith, the corresponding end of the wire 44 will be pulled forwardly through the turn-buckle mechanism 45, thereby increasing the tension in the spring 49 which in turn will increase the force upon the other plate section 36 urging it even more firmly into engagement with the rear discharge edge 24 of the spill plate, thereby preventing accidental cascading of excessive quantities of fuel past the other plate section 36 upon rearward movement of the first plate section.

As in the construction disclosed in the first-mentioned copending application, means are provided for transversely reciprocating the equalizing plate structure to impart a shredding or grating action to the fuel pushed thereagainst by the rams. In the present construction, this reciprocating mechanism comprises extensions 51 on the horizontal shaft 37 which supports the equalizer plate sections 36. These extensions 51 are supported by pairs of vertically-spaced rollers 52 carried by brackets 53 and 54. Limited reciprocating movement of the shaft 37 is effected by lever 55 and links 56 and 57, the link 56 connecting the upper end of the lever 55 to one end of the shaft 37 and link 57 connecting the lower end of the lever 55 to an eccentric 58 carried by the output shaft of a gear box 59 whose input shaft pulley 61 is driven by the belt 62, through the pulley 63 on the rotary impeller shaft 27, which may be driven from any suitable source (not shown).

To avoid any possibility of breakage of the reciprocating mechanism due to jamming of the

spill plate sections 36, the pivot 64 of the lever 55 is carried by a support 65 which floats between a pair of opposed coil springs 66, as shown at the left of Fig. 2.

Preferably, vertical ribs 67 are provided on the forward face of the equalizer plate sections 36 to increase the grating action of the reciprocating plate sections on the fuel pushed thereagainst by the rams 19.

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. Spreader stoker mechanism comprising an impeller; fuel-supporting structure having a rear discharge edge positioned for gravity feed of fuel therefrom to said impeller; means for feeding fuel rearwardly along the fuel-supporting structure to the rear discharge edge thereof; a pair of plates disposed adjacent the fuel-supporting structure rear discharge edge and adapted for pivotal movement relative to a horizontal axis parallel to said rear discharge edge; and means biasing said plates towards engagement with said rear discharge edge, said last-mentioned means including mechanism for increasing the biasing force on either of said plates when the other plate is moved against its biasing force.

2. Spreader stoker mechanism comprising a fuel impeller; structure providing a fuel-supporting surface having a rear discharge edge positioned for gravitational feed of fuel therefrom to said impeller; means for feeding fuel rearwardly along said fuel-supporting surface to said rear discharge edge; wall structure including a pair of vertically-extending sections mounted for independent pivotal movement about an axis above and approximately parallel to said rear discharge edge; and an energy-storing device connected with both of said wall sections for continuously exerting on said sections forces tending to pivot the latter into positions retarding gravitational discharge of fuel from the fuel-supporting surface rear discharge edge, movement of either section away from discharge-retarding position effecting increase in the force exerted on the other section by the energy-storing device.

3. Structure as specified in claim 2, wherein the energy-storing device includes a tensioned spring with opposite ends connected to the two wall sections whereby movement of either of the wall sections away from fuel-discharge-retarding position effects increase in the tension of the spring with consequent increase in the force exerted on the other section by said spring.

4. Spreader stoker mechanism comprising a fuel impeller; structure providing a fuel-supporting surface having a rear discharge edge positioned for gravitational feed of fuel therefrom to said impeller; a pair of first members for feeding fuel rearwardly along said fuel-supporting surface in a pair of parallel paths with one of said first members lagging the other in fuel-feeding action; a pair of barrier members each mounted for movement independent of the other toward and away from said rear discharge edge within predetermined limits in response to pushing action of the respective streams of fuel thereagainst, said barrier members normally being positioned in close proximity to said rear discharge edge and across the parallel paths of fuel feed, and means responsive to movement of either of the barrier members away from the fuel-support-

ing surface rear discharge edge for producing a force urging the other of said barrier members towards said rear discharge edge, whereby too rapid discharge of fuel from the fuel-supporting rear discharge edge is prevented.

DONALD J. MOSSHART.
JOHN S. HERWICK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,163,825	Bros	June 27, 1939
2,423,110	Mosshart	July 1, 1947