July 1, 1947. D. J. MOSSHART 2,423,110

SPREADER STOKER APPARATUS

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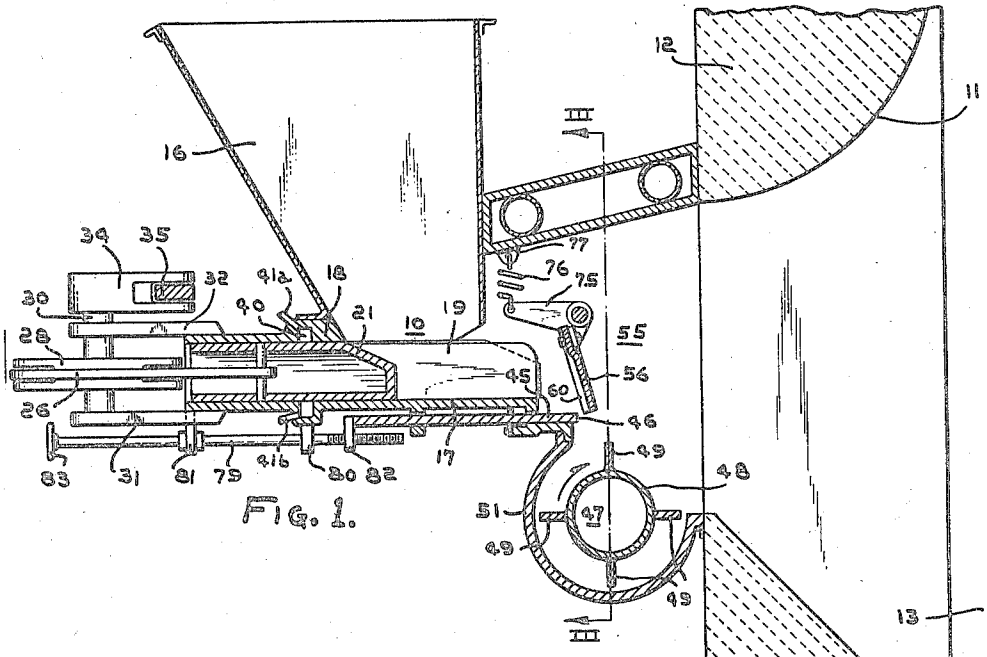


FIG. 1.

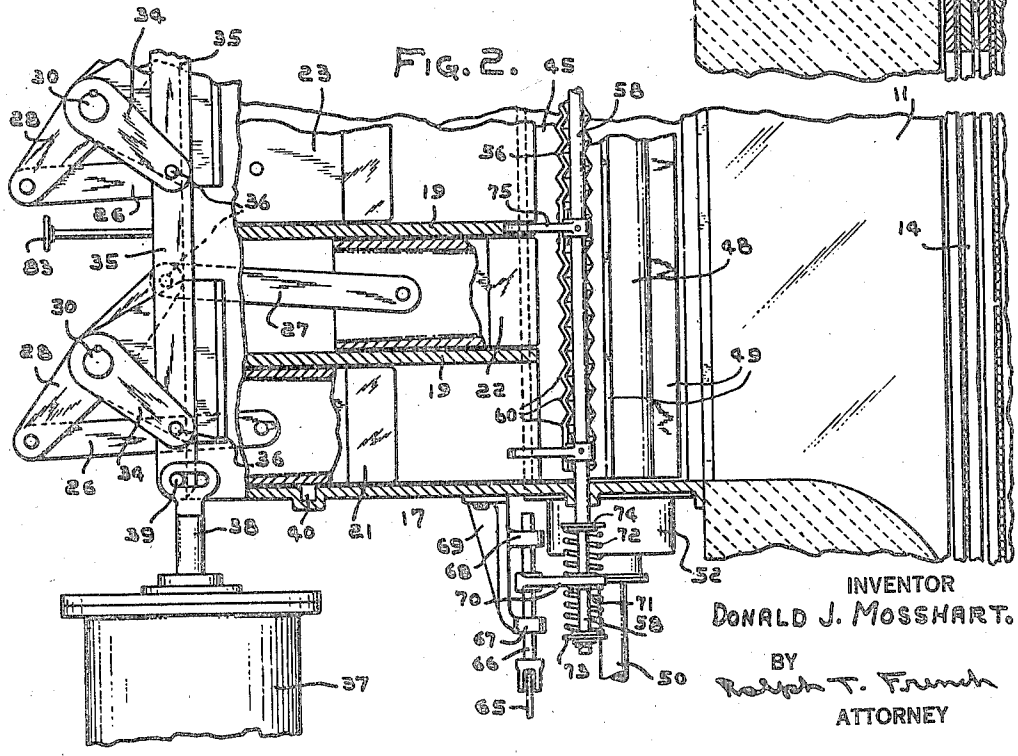


FIG. 2.

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FIG. 3.

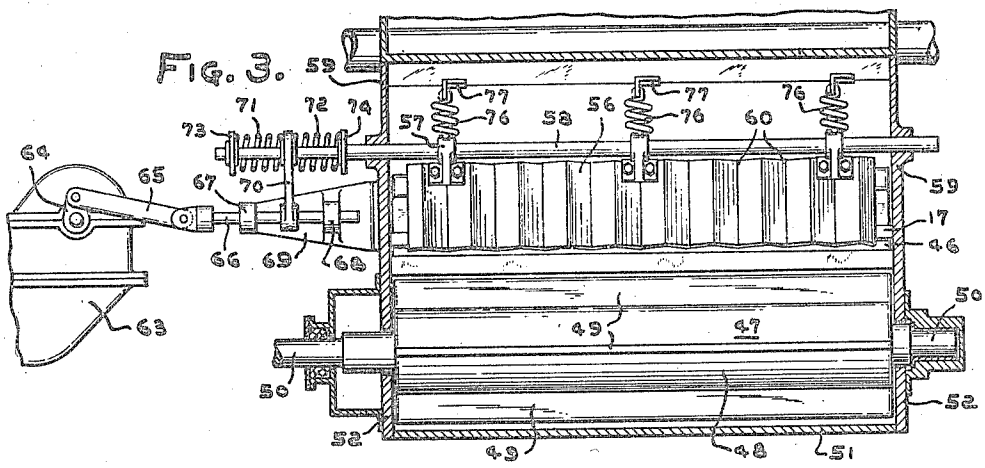


FIG. 4.

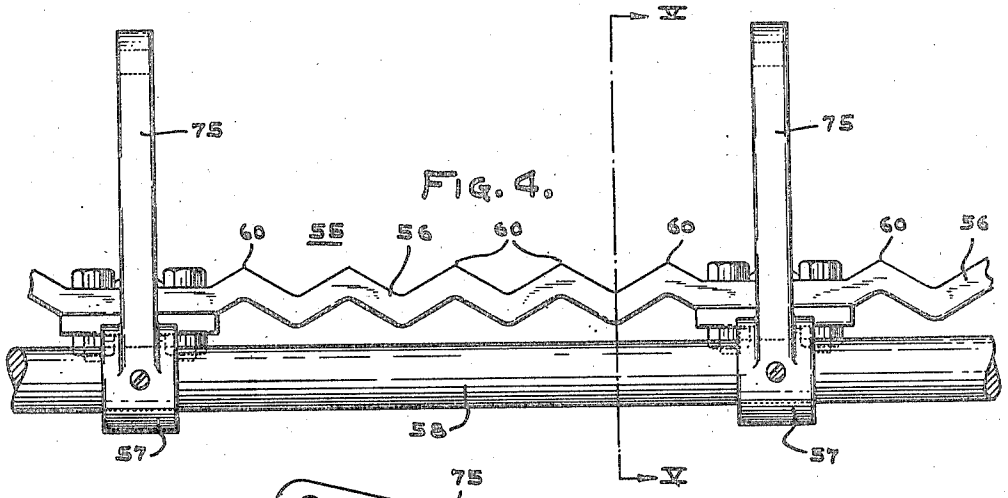
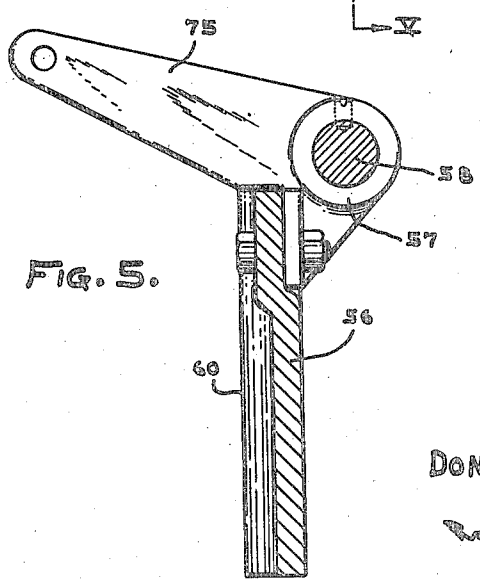


FIG. 5.



WITNESSES:

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SPREADER STOKER APPARATUS

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9 Claims. (Cl. 110—115)

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

In spreader stoker apparatus, where the fuel is pushed rearwardly over the discharge end of a spill plate by reciprocating rams, the fuel so fed frequently falls in large bodies or chunks from the rear end of the spill plate to the rotary 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 rotary impeller to the interior of the furnace is generally erratic. Where the fuel falls uniformly from the spill plate to the rotary impeller, the impact between the impeller blades and the fuel is substantially uniform, but where the fuel falls in irregular and large masses, there is a cushioning effect resulting in non-uniform distribution of the fuel by the rotary impeller.

The present invention provides means for effecting uniform feed of the fuel from the rear discharge end of the spill plate to the rotary impeller. This apparatus involves a corrugated plate extending transversely of the spreader mechanism, together with means for reciprocating the same, the transversely-extending plate being corrugated vertically and being so positioned that reciprocation thereof causes the ribs of the corrugations to rub upon the fuel as it 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 rotary impeller therebelow.

Therefore, another object of the invention is to provide, in spreader stoker apparatus, means for effecting uniform feed of fuel to the rotary impeller.

Yet another object of the invention is to provide means for reducing to uniform size, masses of fuel of irregular size, prior to delivery thereof to the impeller.

Another object of the invention is to provide, in a spreader stoker, transverse reciprocable mechanism for grating or shredding the fuel to uniform size immediately prior to its delivery from the hopper to the rotary impeller.

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

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Fig. 1 is a transverse sectional view through spreader stoker mechanism embodying the principles of the present invention;

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

Fig. 3 is a sectional view taken along the line III—III of Fig. 1, looking in the direction indicated by the arrows;

Fig. 4 is an enlarged plan view of a portion of the apparatus shown in Figs. 1 to 3; and,

Fig. 5 is a sectional view taken along the line V—V of Fig. 4, looking in the direction indicated by the arrows.

Referring now to the drawings more in detail, and particularly to Figs. 1 and 2, the reference character 10 indicates, in its entirety, spreader mechanism for delivering fuel through the opening 11 in the front wall 12 of the furnace 13, to the grate structure 14 within the latter.

The spreader mechanism comprises a hopper 16 from which fuel discharges by gravity to the bottom plate 17 of the ram box 18. As best indicated in Fig. 2, the ram box is provided with a plurality of vertical partitions 19 extending from front to rear thereof and serving to space the series of rams 21, 22 and 23.

Reciprocatory motion is imparted to the rams through a linkage arrangement comprising links 26 or 27 connected at one end to a ram and at the other end to one end of a bar 28, fixedly secured on the vertical shaft 30, which shaft is journaled for limited rotary motion in the lower and upper support plates 31 and 32, respectively, carried by the ram box structure 18. Extending rearwardly from each vertical shaft 30 is a lever arm 34, disposed at right angles to the arm 28 and having their free ends pivotally connected to the transversely-extending shaft or bar 35 by pins 36. Transverse reciprocatory motion is imparted to the bar 35 by suitable means, such as the engine 37, operating through the link 38, having a slot and pin connection 39 with the bar 35.

In order to prevent clogging of the ram structure by fuel siftings working forwardly into the ram box, the latter is provided with an interior groove or recess 40 having inlet and outlet connections 41a and 41b, respectively, whereby air or liquid may be continuously passed through the groove 40 to remove siftings finding their way thereto through the joints between the rams and the ram box structure.

Fuel from the hopper 16 is fed rearwardly by the rams over the bottom plate 17 of the ram box

to the spill plate 45 and rearwardly therealong to the discharge edge 46 thereof, where it falls to the rotary impeller, indicated in its entirety by the reference character 47. This rotary impeller comprises a hollow body member or drum 48 having a plurality of blades 49 extending radially therefrom, the body member 48 being mounted upon a shaft 50 disposed within the housing formed by the cylindrical wall 51 and the end walls 52, the cylindrical wall 51 being disposed in close proximity of the paths of travel of the outer ends of the blades 49 of the rotary impeller 47.

In order to break up large masses of fuel pushed to the discharge edge of the spill plate 46 by the reciprocating rams, there is provided an equalizer mechanism now to be described and indicated in its entirety by the reference character 55. This equalizer comprises a plurality of sections, or a single long section, of plate 56 extending transversely of the spreader mechanism and secured by supports 57 to the transversely-extending rod or shaft 58, supported by the spreader side walls 59 (Fig. 3). The plates 56 are provided with vertically extending corrugations forming forwardly-directed vertical ribs 60 which, when the equalizer is reciprocated, serve to scrape fuel from the face of the mass thereof as it is pushed rearwardly by the rams, the fine particles of fuel scraped or shredded, falling to the rotary impeller 47 therebelow.

Such transverse reciprocation of the equalizer is secured by means of the engine 63, operating through the crank 64 and link 65 to reciprocate the rod 66. This rod is disposed in parallel relation to the rod 58 to which the equalizer plates are secured, the rod 66 being slidably supported by bearings 67 and 68 carried by the bearing bracket 69, secured to the side wall 52 of the spreader housing. A link 70 is rigidly secured to the rod 66 and is connected to the rod or shaft 58 by the springs 71 and 72 disposed at opposite sides of the link 70 and having their outer ends abutting against the collars 73 and 74, respectively, rigidly secured to the shaft or rod 58.

In order to maintain the equalizer plates 56 in contact with the fuel adjacent the discharge end of the spill plate 45, regardless of the position of the latter with respect to the vertical center line of the rotary impeller 47, the equalizer plate supports 57 are provided with extensions 75, connected by springs 76 to fixed supports 77 thereabove, the extensions 75 of the supports 57 extending at an angle to the general plane of the equalizer plates 56, whereby the tension in the springs 76 urges the equalizer plates against the fuel as it is fed to the discharge end of the spill plate 45.

It will be noted that the spill plate may be adjusted forwardly or rearwardly with respect to the vertical center line of the rotary impeller 47 by suitable means, such as the shaft 79 mounted in bearings 80 and 81 and having threaded engagement with the depending lug 82, carried by the forward end of the spill plate 45. The rod 79 may be provided at its forward end with suitable means for rotating the same, for example, the hand wheel 83.

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, and it is desired, therefore that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What is claimed is:

1. Spreader stoker mechanism comprising a hopper, a rotary impeller, a spill plate adapted to receive fuel from the hopper and to discharge it to the rotary impeller, means for feeding fuel rearwardly over the spill plate from the hopper to the rotary impeller, elongated plate structure extending transversely of the spreader mechanism adjacent the rear discharge edge of the spill plate, means mounting said plate structure for reciprocable transverse movement, means providing a plurality of projections on the forward face of the plate structure, and means for imparting transverse reciprocatory motion to said plate structure, whereby the projections on the face of the plate structure break up the mass of fuel fed to the rear discharge edge of the spill plate.

2. Structure as specified in claim 1, including means urging the forward face of the plate structure against the fuel as the latter reaches the rear discharge edge of the spill plate.

3. Spreader stoker mechanism comprising a hopper; a rotary impeller; a spill plate positioned with its rear discharge edge overlying the rotary impeller; means for feeding fuel rearwardly from the hopper to the rear discharge edge of the spill plate; a shaft extending transversely of the spreader mechanism above said spill plate discharge rear edge; bearings supporting said shaft for axial reciprocation; plate structure carried by said shaft and extending downwardly therefrom in substantially parallel relation thereto, said plate structure being corrugated vertically; means urging the corrugated front face of the plate structure against the fuel as the latter reaches the rear discharge edge of the spill plate, and means for imparting reciprocatory motion to the shaft and its associated plate structure.

4. Spreader stoker mechanism comprising an impeller, a spill plate having its rear discharge edge disposed in overlying relation to the impeller, means for feeding fuel rearwardly along the spill plate to the rear edge thereof, and means reciprocable in directions parallel to said spill plate rear edge and in contact with the fuel as the latter reaches said rear edge for equalizing the feed of fuel from the spill plate to the impeller.

5. Spreader stoker mechanism comprising a hopper, a rotary impeller positioned rearwardly of the hopper, a spill plate having its rear discharge edge disposed in overlying relation to the rotary impeller, means for feeding fuel rearwardly from the hopper along the spill plate to the rear edge thereof, means reciprocable in directions parallel to said spill plate rear edge and in contact with the fuel as the latter reaches said rear edge for equalizing the feed of fuel from the spill plate to the impeller, and means for imparting reciprocatory motion to said equalizing means.

6. Spreader stoker mechanism comprising a hopper, an impeller, a spill plate having its rear discharge edge disposed in overlying relation to the impeller, means for feeding fuel from the hopper to the rear discharge edge of the spill plate, and continuously movable means adjacent the rear discharge edge of the spill plate for engaging the fuel as it reaches said rear discharge edge of the spill plate and for scraping it off continuously in uniformly small quantities for gravitational discharge to the impeller therebeneath.

7. Spreader stoker mechanism comprising a hopper, an impeller, a spill plate having its rear

discharge edge disposed in horizontal overlying relation to the impeller, means for feeding fuel from the hopper to the discharge edge of the spill plate, and horizontally reciprocable means adjacent said spill plate rear discharge edge for rubbing the mass of fuel as it reaches the discharge edge of the spill plate to reduce the fuel to relatively small quantities prior to its engagement by the impeller therebelow.

8. Spreader stoker mechanism comprising a hopper; an impeller; a spill plate having its rear discharge edge disposed in overlying relation to the impeller; ram mechanism for pushing fuel rearwardly over the spill plate for discharge therefrom to the impeller; and a member transversely reciprocable in directions parallel to the spill plate rear edge and in close proximity thereto, said member having a roughened surface adapted to engage the fuel as it reaches the discharge edge of the spill plate, transverse movement of the roughened surface against the fuel being adapted to scrape off the latter in small quantities and to distribute it laterally for gravitational discharge to the impeller.

9. Spreader stoker mechanism comprising a fuel impeller, fuel-supporting structure having a rear discharge edge disposed in overlying relation to said fuel impeller, means for feeding fuel rearwardly along said fuel-supporting structure

to the rear discharge edge thereof, and continuously movable means adjacent said rear discharge edge for engaging the fuel as it reaches said edge and for scraping it off continuously in uniformly small quantities for gravitational discharge to the impeller therebeneath.

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