

July 30, 1946.

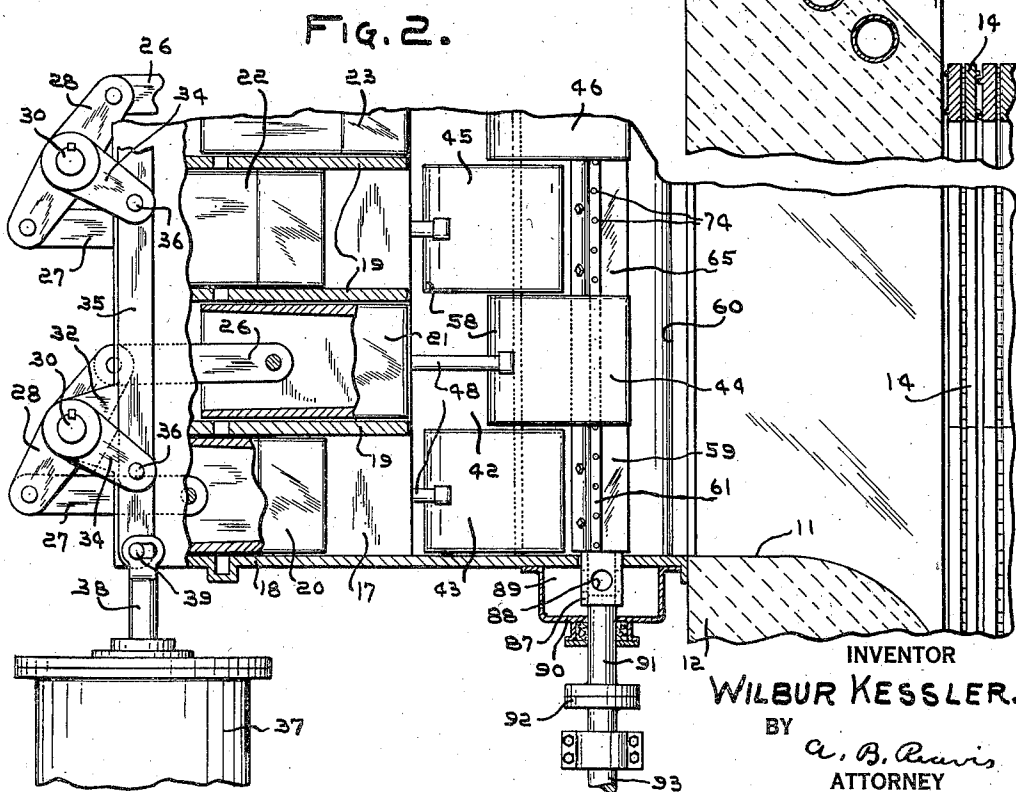
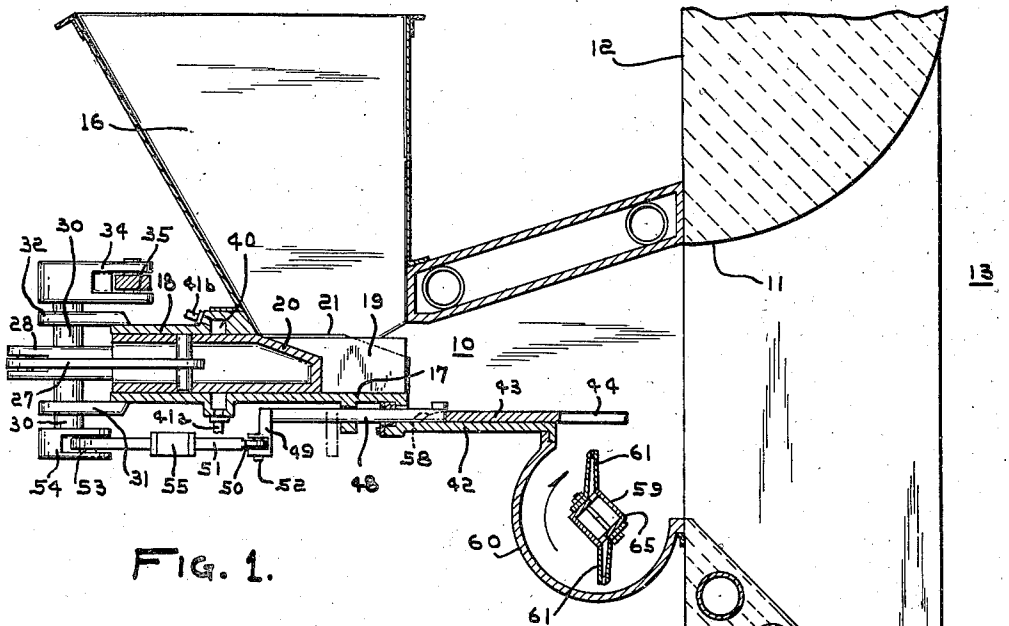
W. KESSLER

2,404,847

SPREADER STOKER APPARATUS

Filed Aug. 3, 1943

2 Sheets-Sheet 1



INVENTOR
WILBUR KESSLER.
BY
a. B. Davis
ATTORNEY

July 30, 1946.

W. KESSLER

2,404,847

SPREADER STOKER APPARATUS

Filed Aug. 3, 1943

2 Sheets-Sheet 2

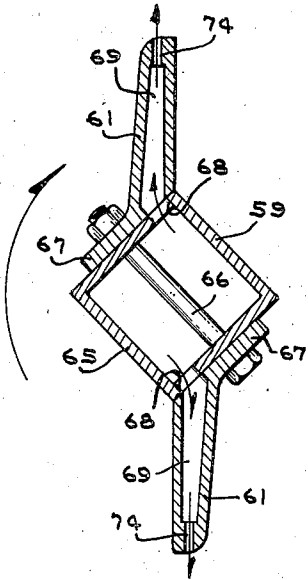


FIG. 3.

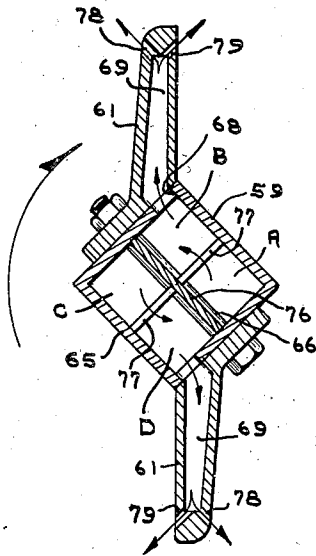


FIG. 4.

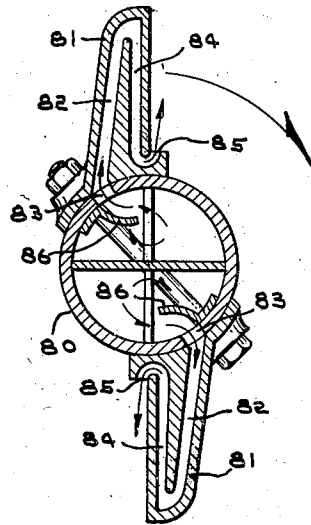


FIG. 5.

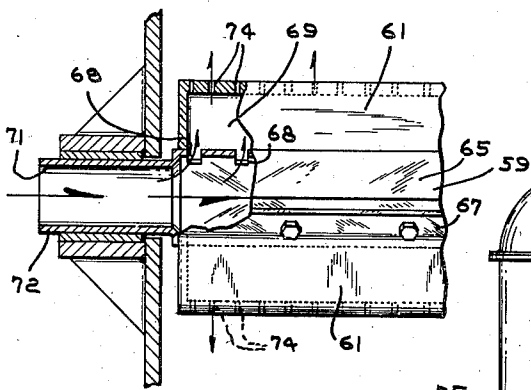


FIG. 6.

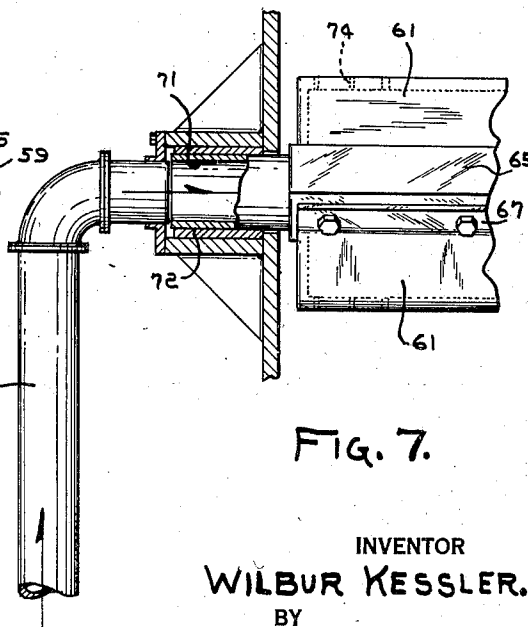


FIG. 7.

WITNESSES:

J. K. Mosser

INVENTOR

WILBUR KESSLER.

BY

A. B. Bauris
ATTORNEY

UNITED STATES PATENT OFFICE

2,404,847

SPREADER STOKER APPARATUS

Wilbur Kessler, Newtown Square, Pa., assignor to
Westinghouse Electric Corporation, East Pitts-
burgh, Pa., a corporation of Pennsylvania

Application August 3, 1943, Serial No. 497,162

5 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 the provision of novel fuel spreading mechanism.

Another object of the invention is to provide improved cooling means for spreader rotors.

A further object of the invention is to provide improved means for cooling the fuel-propelling portion of spreader rotors.

Still another object of the invention is the provision, in a spreader stoker, of a hollow fuel-propelling blade member, together with means for passing cooling medium therethrough.

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 drawings, forming a part of this application, in which:

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

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

Figs. 3, 4 and 5 are enlarged fragmentary views of various rotor constructions for use with the apparatus illustrated in Figs. 1 and 2;

Fig. 6 is an enlarged fragmentary sectional view showing one construction of rotor bearing with means for admitting air therethrough to the rotor; and

Fig. 7 is a view similar to Fig. 6, illustrating a modified construction of rotor bearing.

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 rambox 18. As best indicated in Fig. 2, the rambox is provided with a plurality of vertical partitions 19 extending from front to rear thereof and serving to space the series of rams 20, 21, 22 and 23.

Reciprocatory motion is imparted to the rams through a linkage arrangement comprising links 26 and 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 rambox structure 18. Extending rearwardly from each vertical shaft 30 is a lever

2

arm 34, disposed at right angles to the arm 28 and having its free end 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 rambox, 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 rambox structure.

Fuel, pushed rearwardly from the bottom plate of the rambox structure by reciprocation of the rams, moves over the supporting plate 42, upon which a plurality of spill plates 43, 44, 45 and 46 are adapted to reciprocate.

As best illustrated in Fig. 2, the number of spill plates preferably coincides with the number of rams, and the corresponding spill plates and rams are arranged to reciprocate in phase, that is, when ram 20 moves rearwardly its corresponding spill plate 43 likewise moves rearwardly. Also, it will be noted that alternate spill plates and rams (20, 43 and 22, 45) reciprocate in one direction when the remaining spill plates and rams (21, 44 and 23, 46) reciprocate in the opposite direction, this arrangement providing for more uniform feed of fuel than would be possible if all of the rams were advanced and retracted in unison. However, it will be apparent that corresponding spill plates and rams may be reciprocated out of phase and that all spill plates and/or all rams may reciprocate in unison or in any desired manner.

The means herein illustrated for reciprocating each spill plate comprises a rod 48 connected at its rearward end to the forward portion of the spill plate and having at its forward end a depending lug 49, which is bifurcated to receive the rearward end 50 of a connecting link 51, the end 50 being secured within the bifurcation of the depending lug 49 by the pin 52, for pivotal movement. The forward end of the link 51 is secured by pin 53 between the arms of the bifurcated lever 54, which is fixedly secured to the lower portion of the vertical shaft 30. Preferably, each member 54 is of double arm construction, and has attached to the other arm linkage similar to that just described, for operating the

3

adjacent spill plate. Preferably, there is included in each link 51, suitable stroke adjusting mechanism, indicated at 55. Inasmuch as the stroke adjusting mechanism comprises no part of the present invention, it is indicated only schematically in the accompanying drawings.

In order that the spill plates may reciprocate freely beneath the fuel being fed rearwardly thereover, the plates are tapered at their forward edges, as at 58, with the result that they may easily slide beneath the fuel deposited upon the supporting plate 42. It will be apparent that reciprocation of the spill plates provides for feeding of fuel to the impeller or rotor mechanism 59, from points varying from rearwardly of the vertical centerline of the rotor to forwardly thereof, with the result that the fuel is projected through angles varying from the horizontal, thereby providing improved distribution of fuel lengthwise of the grate structure 14.

The rotor 59 is enclosed by housing 60 closely fitting the path of travel of the tips of the rotor blades 61. Referring now to Sheet 2 of the drawings, there is shown, in Fig. 3, a rotor blade construction comprising a hollow body member 65 of square cross section, on opposite sides of which are secured the blade members 61, by the bolt 66 passing through said opposed walls and the securing portions 67 of the blade members. The hollow body member 65 is provided with a plurality of openings 68 (Fig. 6) for passage of cooling medium from the body member 65 to the hollow interior 69 of the blades 61.

Cooling medium may be supplied to the hollow body member 65 through the open end 71 of the rotor shaft 72, the centrifugal pumping effect of the rapidly rotating blades drawing the cooling medium in through said open end 71 and discharging the same through the openings 74 formed at or near the tips of the blades and serving to cool the casing 60 as well as the blades and rotor.

In the alternative arrangement of Fig. 7, air is supplied to the rotor interior under pressure through the conduit 75.

In Fig. 4, there is illustrated a modification of the structure of Fig. 3, differing therefrom in that the hollow body member 65 is provided with a pair of partitions 76 and 77 disposed substantially at right angles to each other and dividing the interior of the body member into quadrants A, B, C and D. The partition 76 extends the full length of the rotor, while the partition 77 terminates short of the end of the rotor opposite to the inlet opening 71, this partition arrangement providing for entry of cooling medium through and along the quadrants A and C, for flow around the end of the partition 77 to the quadrants B and D, from which the cooling medium is discharged through the opening 68 to the hollow interior 69 of the blades 61, where it discharges through a plurality of openings 78 and 79 disposed near the tips of the blades.

The construction of Fig. 5 differs from those previously described, in that the body member 80 is of circular cross section and the blade passage is of U shape with the bend near the tip of the blade, with leg 82 in communication with the openings 83 in the wall of the body member 80, and the leg 84 discharging through the outlets 85, the latter being so positioned that the cooling medium discharged there-through sweeps the fuel-impacting face of the blade.

4

If desired, the interior of the body member 80 may be provided with "suroco" type blades 86, positioned rearwardly of the inlets to legs 82, to increase the air flow therethrough. (Fig. 5.)

In Fig. 2, there is shown an arrangement for admitting cooling medium to the hollow rotor structure 59, comprising a hollow rotor shaft 87 extending through the side wall of the housing and provided with a plurality of radial openings 88, through which cooling medium at superatmospheric pressure is admitted from the chamber 89 provided within the housing 90. Preferably, the hollow rotor shaft 87 is provided with a solid extension 91, connected by the coupling 92 to the shaft 93 of suitable driving means, such as an electric motor (not shown).

While the invention has been shown in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other 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. In a stoker, fuel-feeding means comprising a hollow rotatable body member elongated axially; means for admitting cooling medium to the hollow interior thereof; a hollow blade member carried by the body member and being of substantially the same axial length as the latter with its hollow interior in communication with the hollow interior of the body member, said blade member having a plurality of discharge openings extending through its tip edge for discharge of the cooling medium from the hollow body member.

2. Structure as specified in claim 1, including means for supplying cooling medium under pressure to the hollow interior of the body member.

3. In a stoker, fuel-feeding means comprising a hollow rotatable body member elongated axially; a hollow fuel-impelling blade carried by the body member and being of substantially the same axial length as the latter with its hollow interior in communication with the hollow interior of the body member, the fuel-impelling face of the blade lying substantially in a plane containing the axis of rotation of the body member; and means for admitting air to said hollow interior of the body member, said blade having a series of openings through its tip edge, whereby air supplied to the hollow body member may be discharged through the hollow blade member.

4. In a stoker, fuel-feeding means comprising a hollow rotatable body member of greater axial than radial extent, means for admitting air to the interior of said hollow body member, a hollow blade member carried by the body member and likewise having greater axial than radial extent, means providing for communication between the hollow interiors of the body member and the blade member, a curved casing extending parallel to the axis of rotation of the body member in close proximity to the path of travel of the tip of the blade member, and a plurality of discharge openings in the blade tip, whereby rotation of the body member and blade will produce flow of air from the hollow interior of the body member and through the hollow blade for discharge from the tip thereof against the casing to cool the latter.

5. Structure as specified in claim 4, including means for supplying cooling air under pressure to the hollow interior of the body member.

WILBUR KESSLER.