

IM2

FIG. 1.

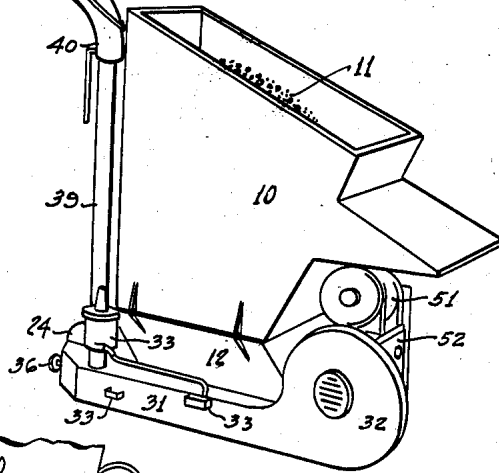


FIG. 2.

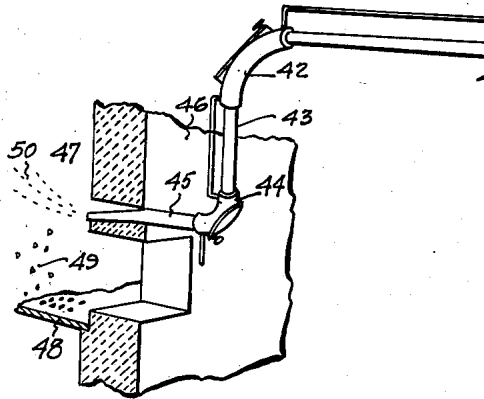


FIG. 4.

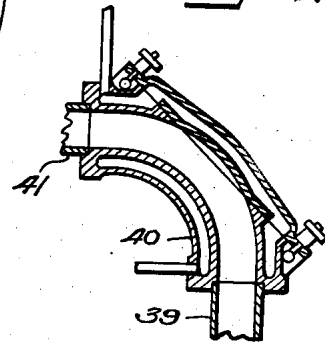
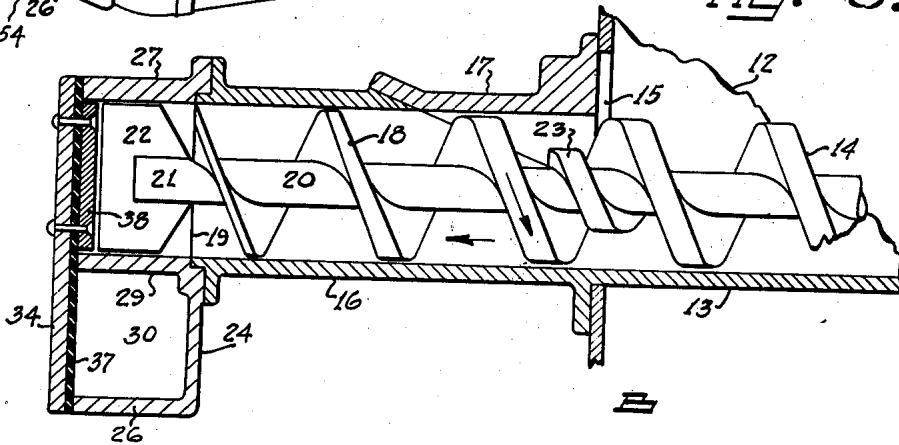
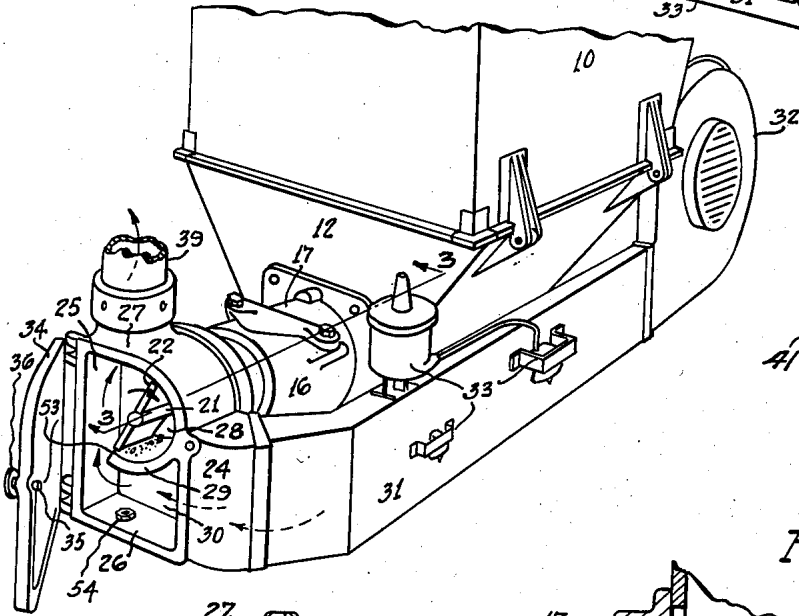


FIG. 3.



This invention relates generally to stokers of the spreader type in which fuel in a wide range of sizes is pneumatically conveyed to a combustion chamber where the fines are burned in suspension and the coarser particles are burned upon grates. The invention relates primarily to the class described including an improved form of transfer housing and a means for crushing the coarser pieces and for limiting the size of the fuel delivered to the combustion chamber including a special means for pneumatically conveying such fuel.

The main object of this invention is the provision of an improved form of fuel delivery device for stokers of the spreader type which includes a means for reducing the lumps to dimensions below a maximum dimension and then delivering the sized fuel to the action of a pneumatic conveyor in a manner that foreign substances, such as metal or rock, may be removed from the passing fuel stream before it enters the combustion chamber.

The second object is to so unite the fuel and air streams that the air will not only separate the fuel from the foreign substances, such as tramp metal and stone, but also will serve to draw air in with the fuel due to an injector action which is set up thereby.

I accomplish these and other objects in the manner set forth in the following specification as illustrated in the accompanying drawing, in which:

Fig. 1 is a perspective view of the device showing its relation to a furnace, the front of which is partly broken away in section.

Fig. 2 is a fragmentary perspective view showing the fuel conveying pipe broken away and the door of the transfer housing open.

Fig. 3 is a vertical section taken approximately along the line 3—3 in Fig. 2.

Fig. 4 is a section through one of the heated elbows.

Similar numbers of reference refer to similar parts throughout the several views.

Referring in detail to the drawing, there is shown a hopper 10 in which is placed fuel 11. The hopper 10 is placed directly over a hopper base 12 within whose trough shaped bottom 13 is disposed a fuel feeding worm 14 which extends through an opening 15 in the hopper base 12. Communicating with the opening 15 is a fuel duct 16 on whose upper side is preferably placed a clean out cover 17 by means of which tramp material may be removed from the junction of the hopper base 12 and the fuel duct 16.

The fuel feeding worm 14 extends through the fuel feeding duct 16 and it is desirable to taper the thickness of the flight portion 18 toward the end 19 of the duct 16. The core 20 of the worm 14 extends beyond the end 19 and has secured to its end 21 an agitator vane 22. Surrounding the core 20 between adjacent portions of the worm 14 is a sizing and crushing worm 23. This is substantially at the junction of the members 12 and 16.

Secured to the fuel feed duct 16 is a transfer housing 24 whose side 25 is substantially vertical and whose bottom 26 is horizontal as is its top side 27. At one side of the top side 27 is formed a semi-cylindrical cavity 28 which is coaxial with the worm core 20. The agitator vane 22 extends into the cavity 28 and is rotatable therein. The portion 29 of the housing 24, which forms the bottom of the cavity 28 extends toward the wall 25 but is spaced therefrom.

Underneath the portion 29 is formed an air inlet compartment 30 which communicates by means of the duct 31 with a fan (not shown) disposed within the casing 32. Air control devices 33 are provided for the duct 31 and their positions are indicated although they will not be particularly described since they form no part of the present invention. A door 34 is hinged to the front of the housing 24 and provided with a latch 35 which is operable by a knob 36.

It is desirable to provide a gasket 37 against the inner side of the door 34 and also a striker plate 38 against which incoming fuel can be projected. Attached to the top side 27 and communicating with the interior of the housing 24 is a vertical fuel feed pipe 39 on whose upper end is attached a heated elbow 40 which communicates by means of a horizontal fuel feed pipe 41 with a second steam heated elbow 42 from which extends the downturned fuel feed pipe 43 which communicates with the steam heated elbow 44 from which the nozzle 45 extends horizontally through the furnace front 46 into the combustion chamber 47.

There is also indicated the position of the perforated grate 48 upon which the coarser particles 49 may be burned while the fines 50 are burned in suspension. Rotation is supplied to the worm 14 by means of a motor 51 through a transmission such as is now in common use and which is contained within the casing 52.

The operation of the device is as follows: Assuming that a supply of fuel 11 is placed within the hopper 10 and that the worm 14 is rotated by the motor 51 in response to its controls and that air is being delivered by the fan within the

casing 32 to the duct 31, it follows that as the fuel 11 is carried by the worm 14 through the opening 15, it must be first reduced to a size which will pass the worm 23 and that it will thereafter move freely along the fuel feed duct 16. When the fuel 11 enters the cavity 28 it is carried by the agitator 22 over the edge 53 of the portion 29 of the housing 24 where it is caught by the incoming air stream and carried upwardly through the pipe 39 and intermediate connections to the nozzle 45.

It will be noted that the first portion of travel is vertical and that any metal or stone which may be in the fuel will be too heavy to be carried upwardly past the elbow 40 but will fall down into the air inlet compartment 30, which is also a clean out box from which tramp metal 54 may be removed by merely opening the door 34.

It will be seen that the fuel having been first sized is then freed from its metallic and mineral foreign matter and is delivered pneumatically through the various connections to the nozzle 45 from which it is discharged into the combustion chamber 47.

By this construction all tendency to pack is eliminated especially when wet, fine and dirty fuel is being fed. Also its feeding is uniform and positive which adapts this device especially to use in better type of stokers.

I claim:

A fuel delivery device having in combination a vertical pneumatic conveyor, a worm conveyor adapted to convey fuel horizontally into said pneumatic conveyor, a paddle on the end of said worm conveyor adapted to throw small quantities of fuel from said worm conveyor into said pneumatic conveyor, a metal collecting trap at the lower end of said pneumatic conveyor, means for delivering air to said metal trap and means for providing ready access to said trap, said trap and pneumatic conveyor affording a straight line, vertical passageway for air adapted to carry the fuel upwardly and to permit the metal to fall downwardly into said trap.