Nov. 19, 1935. C. M. BUCK 2,021,171

PULVERIZED FUEL FEEDER

Filed Nov. 12, 1930

Fig. 1.

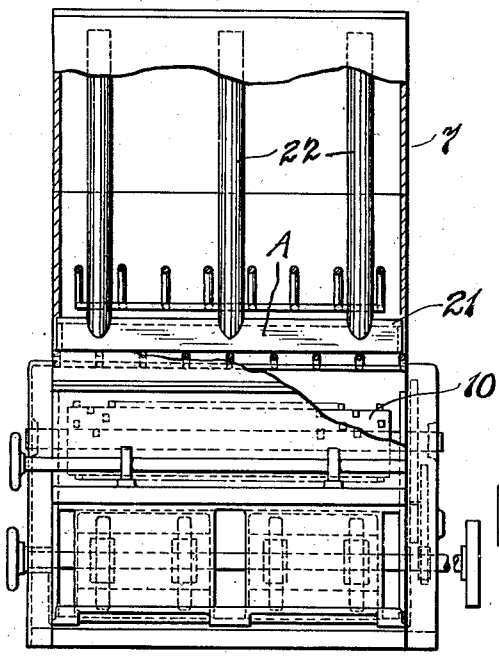


Fig. 2.

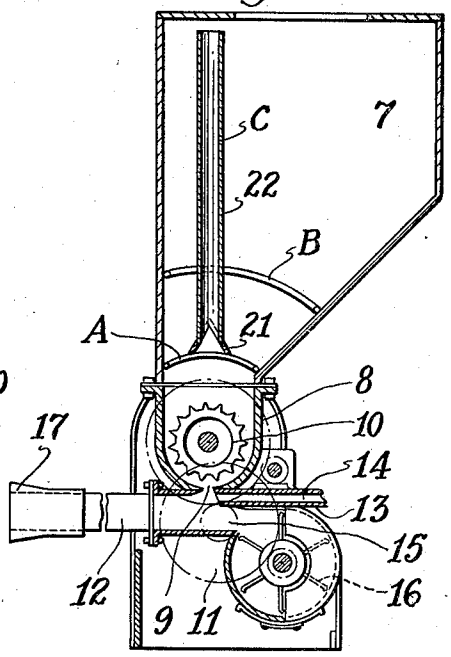


Fig. 3.

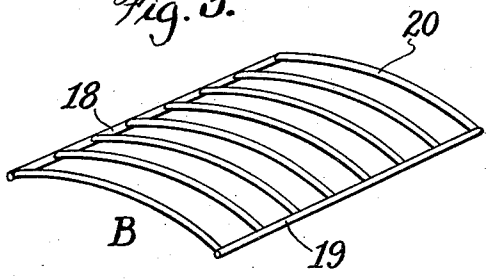
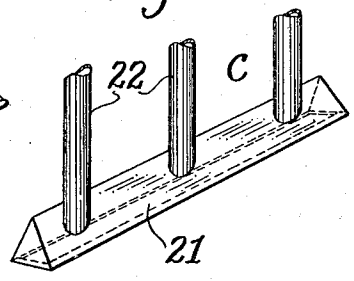


Fig. 4.



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PULVERIZED FUEL FEEDER

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Application November 12, 1930, Serial No. 495,006

2 Claims. (Cl. 302—36)

This invention relates to the feeding of pulverized material such, for example, as pulverized coal to a burner.

One of the primary objects of the invention is to produce uniformity of feed.

More specifically it is an object of the invention to overcome the conditions in apparatus of this general character which tend to interrupt and to produce non-uniformity of feed.

With respect to burners it is an object of the invention to obtain uniformity of feed with thorough admixture of the coal and air so that the coal remains in suspension while being delivered to the burner nozzle and stratification is avoided.

Other and more specific objects and advantages will appear hereinafter in the description of the preferred embodiment of my invention which I have illustrated in the accompanying drawing wherein—

Fig. 1 is an end elevation of the apparatus partially broken out.

Fig. 2 is a vertical section through the device of Fig. 1.

Fig. 3 is a perspective view illustrating a detail of the invention, and

Fig. 4 is a fragmentary perspective view of another detail of the invention.

Referring now to the drawing the reference numeral 7 indicates a hopper adapted to receive a charge of pulverized material such as coal. It has a discharge throat 8 into the bottom of which is a narrow slot 9 of considerable length, such slot constituting the discharge orifice from the throat. Immediately above the discharge orifice I provide a toothed roller 10 which is of a length substantially corresponding to that of the discharge orifice 9 and slightly less than the longitudinal length of the discharge throat. The toothed roller 10 is rotated by any preferred means such as the gearing 11 diagrammatically indicated.

Immediately below the orifice is a laterally extending conduit 12 which is in the form of a flattened tube, corresponding in width with the length of the orifice. This conduit has a division wall 13 which terminates approximately in line with the leading edge of the discharge orifice and which provides a shallow but wide channel or passage 14 through which air is induced, as will further appear. The division wall also provides in conjunction with other parts an intake channel or passage 15 to the conduit 12 for pressure air which is supplied by the fan 16.

With the fan in operation there is a blast of air delivered to the conduit 12 in the lower portion thereof. This blast of air produces a low pressure area adjacent the orifice and the inner end of the channel 14, in consequence of which the coal is drawn through the discharge orifice and there is also drawn a stream of inducted air through the channel 14, the intake end of which is open to the atmosphere. The induced air, of course, travels at lower velocity than the blast air, in consequence of which eddies are set up which produce thorough admixture of the coal and air and maintain the coal in suspension so that stratification does not take place and the coal is delivered to the nozzle 17 in thoroughly admixed condition, notwithstanding that relatively low pressures may be employed for the blast air. The nozzle delivers the mixture in the form of a wide sheet.

There is a tendency of the coal to pack, particularly in the lower portion of the hopper because the weight of the coal particles tends to squeeze out the air present. This condition is emphasized by reason of sucking out of air through the discharge orifice of the throat. Due to packing, arching occurs and the feed of coal may be interrupted entirely or may otherwise become ununiform.

I overcome these difficulties by placing two screens A and B in the hopper, the former being preferably located immediately above the discharge throat and the latter some distance thereabove. These screens comprise two end rods 18 and 19 with cross rods 20 as shown in Fig. 3 which illustrates the upper screen B. The rods 20 are preferably curved. The screen thus presents a series of parallel openings. I have found this form of screen much better than a screen in which there are, in addition to the rods 20, other cross rods paralleling the rods 18 and 19. The screens function to support some of the weight of the coal so that the entire head of the coal is not effective in the lower portion of the hopper to produce packing.

In addition I support, upon the lower screen, an aerating device C which comprises a bottom portion 21 open at its lower face and the pipes 22, of which there are any desired number, which rise thereabove and communicate at their lower ends with the interior of the bottom portion 21 and at their upper ends with the interior of the hopper. The pipes 22 extend upwardly sufficiently so that their upper ends are above the normal level of coal in the hopper. The suction at the discharge orifice 9 hereinbefore referred to tends to cause a slight flow of air downward through the pipes 22, in consequence of which there is an air supply to the upper end of the

discharge throat which results in maintaining the coal in that region aerated.

In consequence I find that I am enabled to maintain uniformity of feed.

The invention is particularly useful in connection with burners in which all or substantially all of the air for combustion is supplied through the burner. In the embodiment shown the fan 16 and the induced air inlet 14 provides such combustion air. The device may be considered as a combined feeder and burner when a burner is associated therewith.

The aerating device also serves to equalize pressure at the throat, and makes it possible to dispense with the induced air passage 14.

I claim:—

1. In equipment for handling pulverized fuel, a bin adapted to receive a charge of pulverized fuel, the bin having a discharge opening in the lower part thereof, conveyor means adjacent said opening for carrying away pulverized fuel discharged through the opening and for ultimate delivery of the fuel to a fuel burner, and means for reducing arching or packing of the pulverized fuel in the bin at a point above said opening, including a plurality of bars extending across the bin at a point spaced materially above said opening, and an air supply conduit projecting into the charge of fuel in the bin and having an air discharge opening at a point within the bin spaced materially above said opening.

2. In equipment for handling pulverized material, a bin adapted to receive a charge of pulverized material, the bin having a discharge opening in the lower part thereof, conveyor means adjacent said opening for carrying away pulverized material discharged through the opening, and means for reducing arching or packing of the pulverized material in the bin at a point above said opening which combines grid elements extending across the bin in the region of the discharge opening, whereby to give support to the pulverized material in an upper portion of the bin and to break up the mass as it falls to replace the material withdrawn from the bin, and an air supply conduit projecting into the pulverized material in the bin and having an air discharge opening at a point adjacent to the grid members, whereby to provide air for mixture with the coal as its mass breaks up in falling through the grid members.

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