

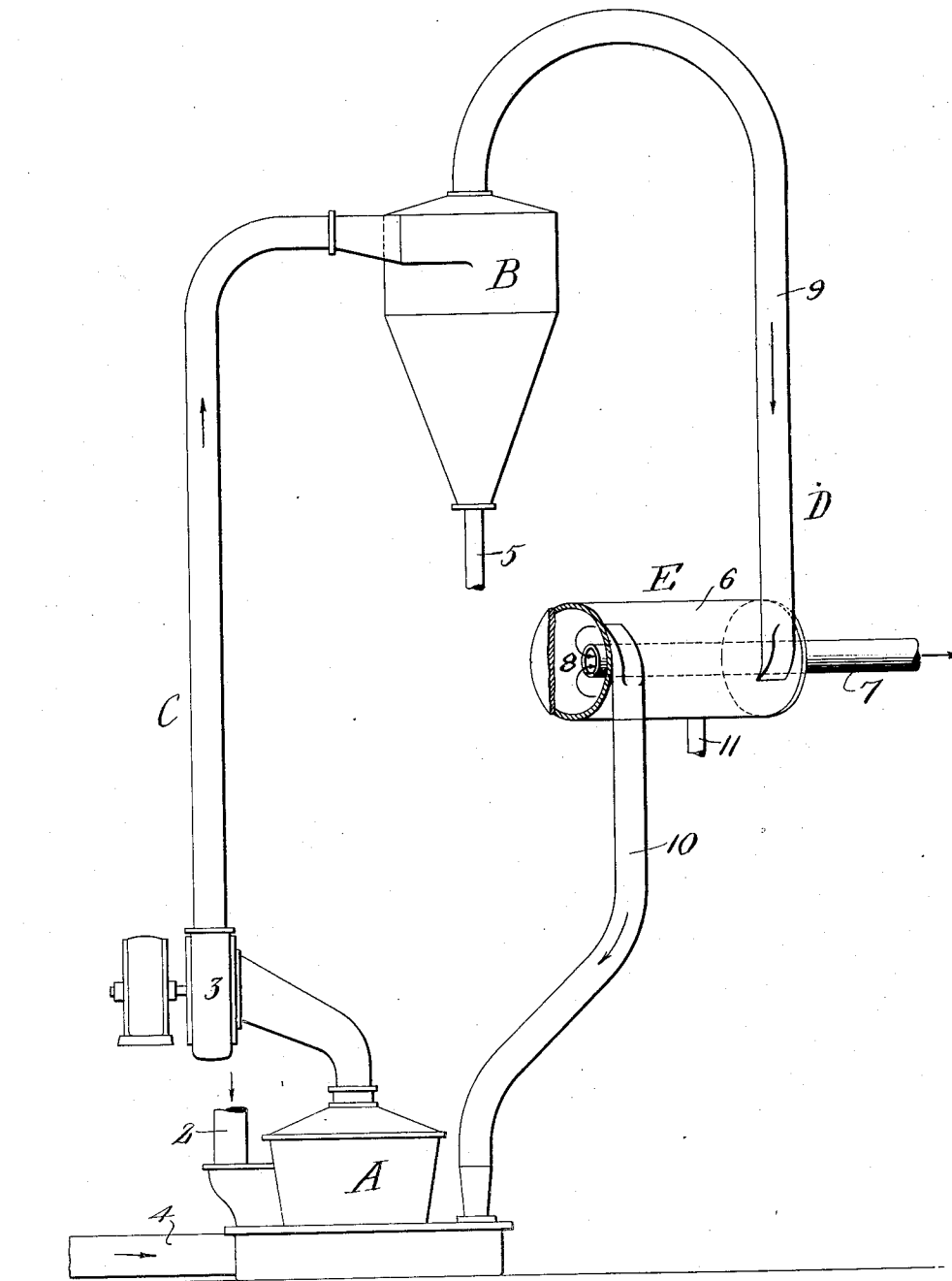
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FUEL PULVERIZING SYSTEM

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FUEL-PULVERIZING SYSTEM

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This invention relates to the pulverization of fuel in the so-called closed type of pulverizing system comprising, in general, an air lift pulverizer, a separator, and suitable pipe leading from the pulverizer to the separator and from the separator to the pulverizer.

It has been proposed in such systems to introduce a certain amount of dry air or gas to prevent the system from becoming moisture laden, an equal quantity of gas being abstracted from the system to make the arrangement effective.

It has also been proposed to dispense with a dryer by making the mill function as a dryer, to which end an appreciable quantity of adequate hot air or hot gas is introduced into the system through the mill and a corresponding amount of gas in the system withdrawn therefrom.

In either case, difficulty has been encountered because of the carrying off of pulverized material in the gas so withdrawn, this being especially so when the mill functions as a dryer when the gas in the system is relatively dry, under which condition the separator, I have discovered, does not function as effectively as it does with some of the moisture laden gas.

The primary object of my invention is to enable the gas to be withdrawn from the system without this difficulty by simple and effective mechanism.

How the foregoing, together with such other objects and advantages as may hereinafter appear, or are incident to my invention, are realized is illustrated in preferred form in the accompanying drawings wherein:—

The figure is a side elevation of a system embodying my invention.

Referring to the drawing, it will be seen that the system comprises, in general, a pulverizer mill A, a separator B, suitable connection C between the mill and separator, and suitable return connection D between the separator and mill.

Coal to be crushed in the mill A is conducted thereto by means of the pipe 2 which leads from any suitable source of supply of raw coal. A fan 3 is located in the connection or conduit C for setting up a gas current through the system. In order to prevent the system from becoming moisture laden, a portion of the return air or gas is

discharged from the system through the pipe 7, and a corresponding quantity of dryer air or gas is introduced into the system through the mill by means of the pipe 4. Similarly, if the mill is to function as a dryer, sufficiently hot air or hot gas is introduced into the system by means of the conduit 4 which may be connected, for example, with a furnace flue so as to conduct hot flue gas to the pulverizer mill.

The coal, after being pulverized in the mill, is conducted by the current of gas to the cyclone separator B where the coal and air are separated. The separated coal is discharged from the separator at the bottom through the pipe 5 which may lead to a desired point, as to a storage bin. The circulating gas, together with any coal particles not separated, is returned to the mill by means of the return connection or conduit D.

In order to reduce the amount of pulverized material carried off from the system with the gas withdrawn as above described, I have provided means indicated at E in the return connection for withdrawing or exhausting gas in an amount corresponding to the amount of gas introduced into the system. The device E is so constructed as to separate the coal particles from the gas to be discharged, and, in this instance, comprises a drum-like portion 6 in the return line D which is preferably horizontally disposed, and the coaxial gas outlet pipe 7 extending into the drum-like portion and terminating short of an end of the drum as indicated at 8. The pipe 9 or the line D leads from the cyclone separator B to the periphery of the drum 6 at one end thereof, and discharges its contents tangentially into the drum. The pipe 10 of the line D leads from the periphery of the drum 6 at the other end thereof to the pulverizer mill A.

The coal particles and gas entering, as they do, tangentially, are swirled about in the drum, which causes the coal particles to be centrifugally separated from the air, and, finally, are discharged into the pipe 10 for return to the mill. Any accumulation of coal particles within the drum may be led off through the pipe 11 to any desired point, as to a storage bin, to which the pipe 5 may also lead. Having thus centrifugally separated the coal particles, it will be observed that gas clear of coal enters the open

end of the pipe 7 at 8 as indicated by the arrows and exhausts from the system. In fact, I am enabled to separate in the drum E about ninety percent or more of the material in suspension in the returning gas, which makes it possible to have the pipe 7 discharge into the room if so desired.

From the foregoing it will be seen that I have provided simple and effective means whereby I can abstract the required amount of gas from the system without carrying off pulverized material.

Although I have shown the pipe 7 as leading from the separator E, it is obvious that it need not be so located.

I claim:—

1. In a pulverizing system, a mill, a separator, a pipe between the mill and separator, a return pipe from the separator to the mill, means for setting up a current of a gas through the system, means for exhausting a portion of the gas in the system from the return side thereof, a centrifugal separator in the return line and from which said gas to be exhausted is withdrawn, means for introducing a relatively dry gas into the system in an amount corresponding to the amount of gas withdrawn.

2. In a pulverized system, a mill, a separator, a pipe between the mill and separator, a return line from the separator to the mill, means for setting up a current of a gas through the system, said return line including a separator and means for exhausting a portion of the gas separated thereby from the system, and means for introducing a relatively dry gas into the system in an amount corresponding to the amount of gas exhausted.

3. In a pulverizing system, a mill; a separator; a connection between the mill and separator; a return connection from the separator to the mill; means for setting up a current of a gas through the system; said return connection including a drum tangentially receiving the gas and fuel particles delivered from said separator into said return line, tangentially delivering gas and fuel particles therefrom to the mill, and radially exhausting a portion of the gas from the system; and means for introducing

a relatively dry gas into the system in an amount corresponding to the amount of gas exhausted.

4. In a pulverizing system, a mill; a separator; a connection between the mill and separator; a return connection from the separator to the mill; means for setting up a current of gas through the system; said return connection including a horizontally disposed drum-like portion adapted to centrifugally separate fuel particles from the gas being passed through said connection and an axially disposed pipe extending into said drum-like portion and terminating short of an end thereof for discharging a portion of the gas from the system; and means for introducing gas into the system in an amount corresponding to that discharged.

5. A fuel pulverizing system including a mill having an inlet for fuel to be pulverized, a separator, a delivery conduit between the mill and separator, a return connection between the separator and the mill, means for admitting fluid to the system, a fan in said delivery conduit for setting up a fluid current in the system, said return connection comprising a drum, a pipe leading from the separator to the drum arranged to tangentially discharge its contents into said drum, and a pipe leading from the drum to the mill arranged to tangentially receive its contents from the drum, and means for discharging a predetermined amount of fluid from said drum.

6. The combination in a pulverizing system of the so-called closed type and employing a mill, a separator, a pipe from mill to separator, a return pipe from separator to mill, and means for setting up a current of gas through the system, of means for introducing a gas into the system through the mill sufficiently hot to cause the mill to function as a drier as well as a pulverizer, a second separator in the return line for separating pulverized material from the returning air not separated in the first separator, and an outlet for discharging air from the system separated by said second separator.

In testimony whereof I have hereunto signed my name.

WILFRED R. WOOD.