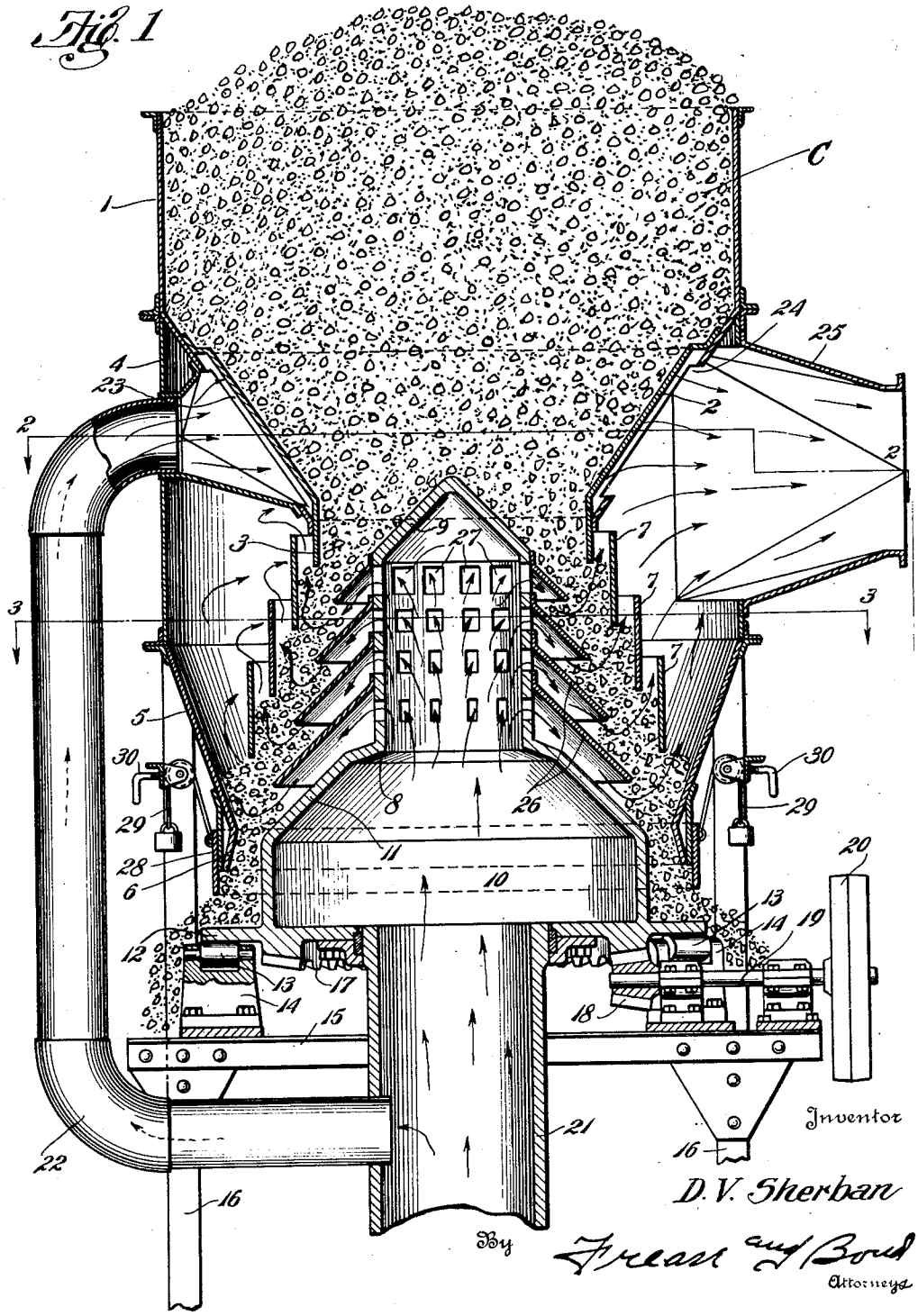
Oct. 20, 1925. 1,558,119

D. V. SHERBAN

DRYING APPARATUS

Filed Nov. 6, 1924 2 Sheets-Sheet 1

Fig. 1



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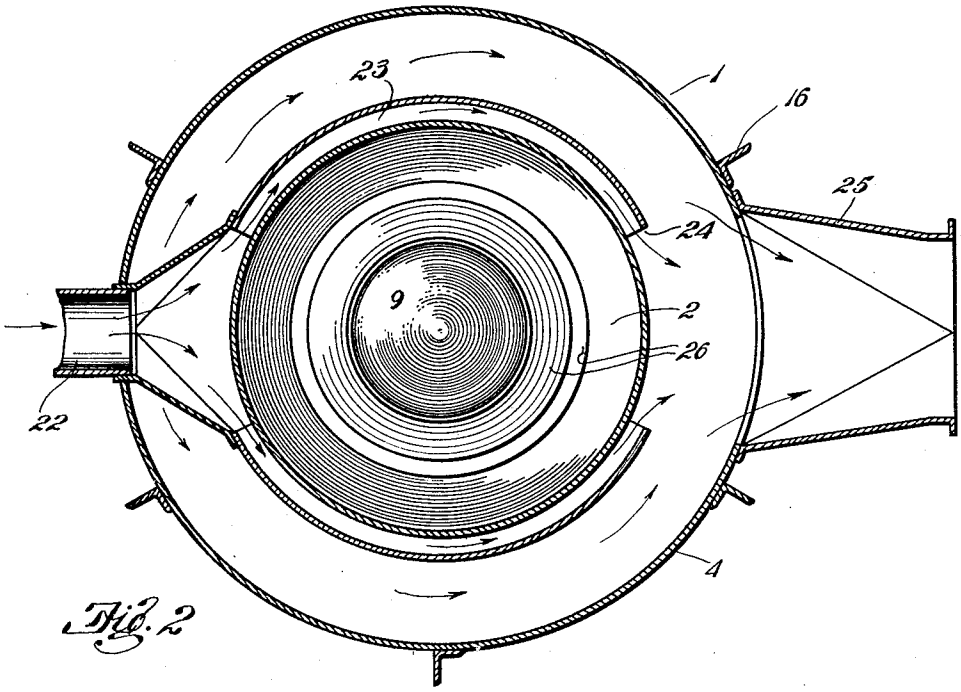

Fig. 2

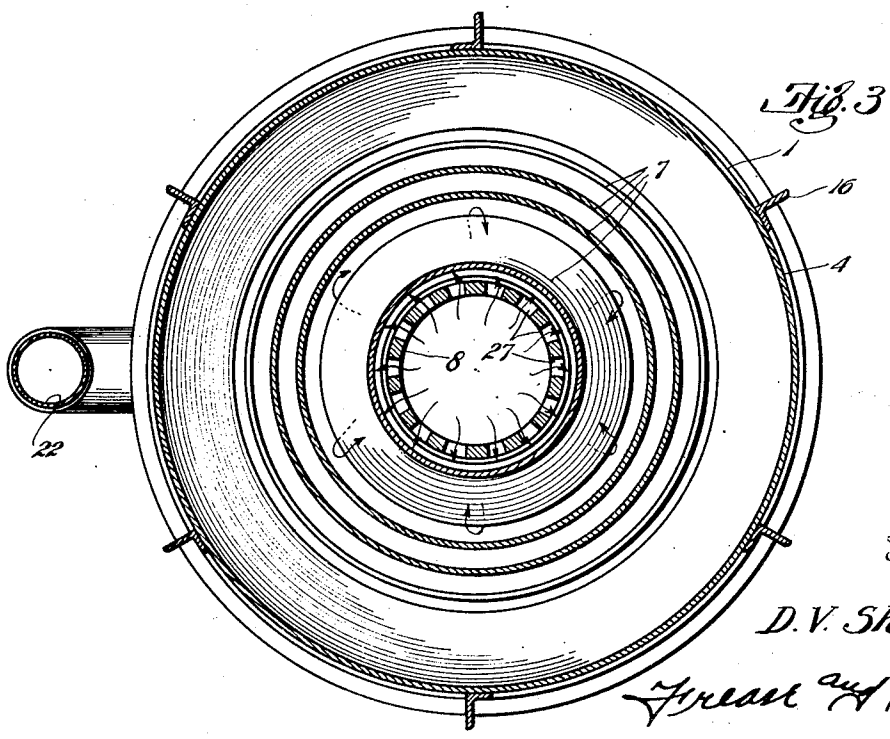

Fig. 3

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UNITED STATES PATENT OFFICE.

DANIEL V. SHERBAN, OF CANTON, OHIO, ASSIGNOR TO THE BONNOT COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

DRYING APPARATUS.

Application filed November 6, 1924. Serial No. 748,099.

To all whom it may concern:

Be it known that I, DANIEL V. SHERBAN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Drying Apparatus, of which the following is a specification.

This invention relates to apparatus for drying wet coal and other materials, and the objects of the improvement are to provide a drying apparatus through which the coal is continuously passed and agitated as by centrifugal action, hot gases being passed through the body of the material as it is agitated to remove the moisture therefrom, the coal being continuously discharged from the apparatus as it is dried.

The above and other objects may be attained by providing a receiving hopper provided with a frusto-conical bottom portion, beneath which is located a plurality of spaced ring plates arranged in echelon, a rotatable, hollow cylinder being concentrically located beneath the hopper and provided with a series of conical plates extending outward toward the ring plates, a hot gas inlet communicating with said cylinder, a multiplicity of apertures being provided in the cylinder between the conical plates, a gas outlet being provided above the ring plates whereby the rotation of the hollow cylinder and conical plates thereon causes a centrifugal agitation of the wet coal, as it passes downward from the hopper, the hot gases being drawn off through the apertures of the hollow cylinder between the conical plates and outward between the ring plates, passing through the coal as it is agitated, producing a quick and even drying of the coal.

An embodiment of the invention is illustrated in the accompanying drawings, in which—

Fig. 1 is a vertical, sectional view through the drying apparatus;

Fig. 2, a section on the line 2—2, Fig. 1; and

Fig. 3, a section on the line 3—3, Fig. 1.

Similar numerals refer to similar parts throughout the drawings.

The coal receiving hopper 1 is preferably provided with the frusto-conical bottom portion 2, terminating in the restricted discharge mouth 3, and is preferably superposed upon the cylindrical casing 4 which is also provided with the frusto-conical bottom portion 5 terminating in the annular discharge mouth 6.

A series of ring plates 7 is located within the housing 4 beneath the discharge mouth of the hopper, these plates increasing uniformly in diameter from top to bottom and being arranged in echelon, any suitable means being provided for mounting the ring plates in stationary condition.

The hot gas cylinder 8 extends concentrically through the ring plates into the mouth of the hopper, being preferably provided with the closed conical top 9.

The enlarged gas chamber 10 is formed at the lower end of the cylinder 8 and preferably provided with the frusto conical portion 11. The annular flange 12 is provided upon the bottom of the gas chamber 10 and rests upon the anti-friction rollers 13, supported in brackets 14 mounted upon the platform 15, which may be supported at any desired height above the floor, as by the uprights 16 upon which the housing 4 is also mounted.

A large gear 17 may be provided upon the under side of the gas chamber 10 and in engagement with the pinion 18 mounted upon the drive shaft 19, which may be rotated by connection of the drive pulley 20 with any suitable source of power.

A pipe 21, which may lead from the outlet flue of a boiler or similar source of hot gases, is extended into the lower end of the gas chamber 10, and for the purpose of preventing condensation of the moisture in the gases which have passed through the coal, a by-pass 22 communicates with the pipe 21 and with an annular chamber 23 around the lower portion of the feed hopper, said annular chamber having an opening at the opposite side indicated at 24, adjacent to the gas outlet 25, to which a fan or other means may be provided for drawing the gases from the housing 4.

A plurality of conical plates 26 are provided around the hot gas cylinder 8, a multiplicity of apertures 27 being formed in the gas cylinder between said plates.

For the purpose of adjusting the device to contact coal or other material having various degrees of moisture, an annular plate 28 is adjustably mounted at the lower or discharge end of the housing 4 and arranged

to be fixed at any desired height above the flange 12, by means of the weighted cables 29 and the locking screws 30.

It will be seen that by raising the plate 28, the coal may pass more quickly through the drying apparatus, while by lowering the plate the discharge outlet is choked, causing the coal to remain a greater length of time in the area through which the hot gases are passing.

The operation of the device is obvious; the moist coal, as indicated at C, or other material to be dried, is placed in the receiving hopper 1 and the hot gas cylinder 8 is rotated as above described, the rotation of the conical plates continually agitating the coal and causing it to find its way downward between the ring plates, preventing the accumulation of any masses of coal at any particular point.

This agitation also serves to keep the articles of the coal loosened, so as to permit the passing of the hot gases through the descending tubular column of the coal, as said gases are drawn from the gas cylinder between the conical plates and ring plates and through the agitated column of coal.

The hot gas from the by-pass 22 is continually passing around the lower portion of the hopper, heating the contents thereof and not only assisting in drying the coal, but also preventing the condensation of moisture in the gases which have passed upward through the coal and which would otherwise drop downward into the coal as it passes between the conical plates and ring plates.

I claim:—

1. A drying apparatus including a receiving hopper, spaced ring plates beneath said hopper, a series of conical plates spaced from the ring plates, means for rotating the conical plates and means for passing hot gases between the conical plates and ring plates.

2. A drying apparatus including a receiving hopper, spaced ring plates beneath said hopper, a series of conical plates spaced from the ring plates, means for rotating the conical plates, and means for passing hot gases around the lower portion of the hopper.

3. A drying apparatus including a receiving hopper, spaced ring plates beneath said hopper, a series of conical plates spaced from the ring plates, means for rotating the conical plates, means for passing hot gases between the conical plates and ring plates, and a rotatable distributing disc below said conical plates.

4. A drying apparatus including a receiving hopper, spaced ring plates beneath said hopper, a hollow perforated gas cylinder concentrically mounted within the ring plates, conical plates carried by the cylinder, a hot gas inlet communicating with the gas cylinder and means for rotating the cylinder.

5. A drying apparatus including a receiving hopper, spaced ring plates beneath said hopper, a hollow perforated gas cylinder concentrically mounted within the ring plates, conical plates carried by the cylinder, a hot gas inlet communicating with the gas cylinder, means for rotating the cylinder, a casing surrounding the ring plates and a gas outlet in said casing.

6. A drying apparatus including a receiving hopper, spaced ring plates beneath said hopper, a hollow perforated gas cylinder concentrically mounted within the ring plates, conical plates carried by the cylinder, a hot gas inlet communicating with the gas cylinder, means for rotating the cylinder, a casing surrounding the plates and a distributing disc carried by the gas cylinder and spaced from the lower end of said casing.

7. A drying apparatus including a receiving hopper, spaced ring plates beneath said hopper, a hollow perforated gas cylinder concentrically mounted within the ring plates, conical plates carried by the cylinder, a hot gas inlet communicating with the gas cylinder, means for rotating the cylinder, a casing surrounding the plates, a distributing disc carried by the gas cylinder and spaced from the lower end of said casing, and means for changing the distance between the casing and disc.

In testimony that I claim the above, I have hereunto subscribed my name.

DANIEL V. SHERBAN.