

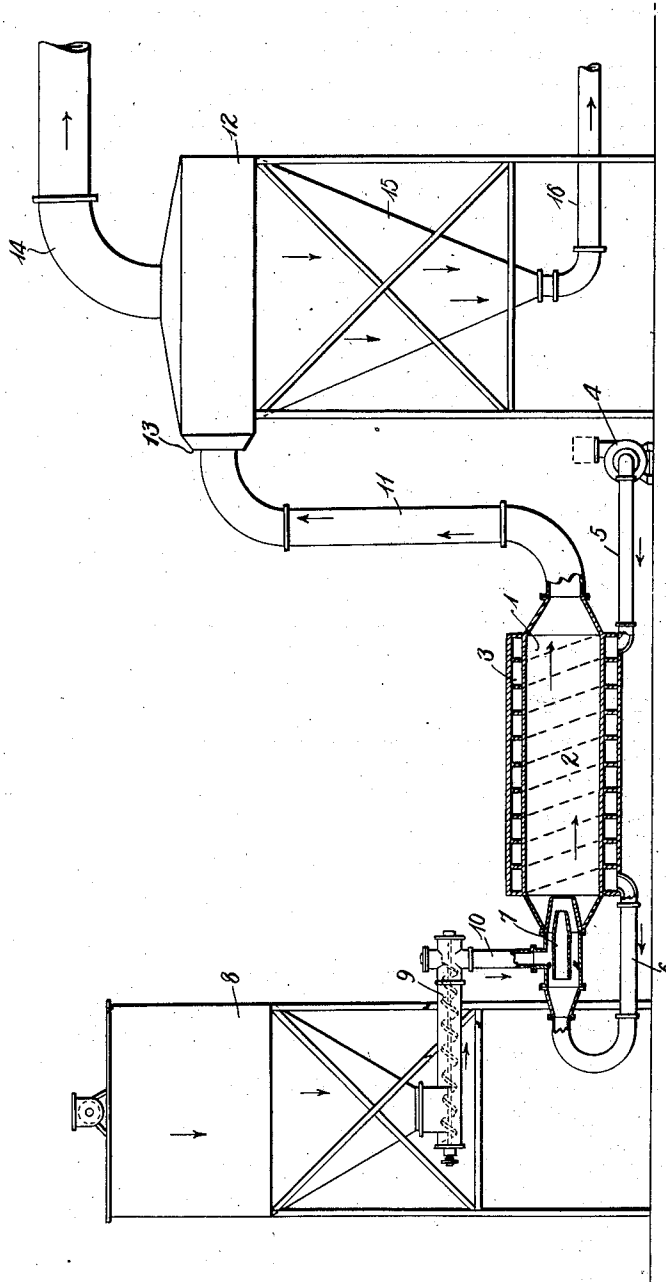
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PROCESS FOR DISTILLING COALS

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PROCESS FOR DISTILLING COALS

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The invention relates to a process for distilling comminuted coals and like hydrocarbon materials.

The process can be carried out in various types of apparatus, but in the figure of the drawings I have shown diagrammatically one type of apparatus, which I have successfully employed.

Referring now more particularly to the drawings, the numeral 1 designates a combustion chamber which is shown as being horizontally disposed having the interior combustion area 2 surrounded by a spiral passageway 3 to which cold air is introduced from a blower 4 through the line 5. This blower is operated at variable speeds, depending upon what velocity it is desired that the air pass through the spiral passageway 3. From the spiral passageway 3 the air passes through a line 6 to a burner 7. Here the air mixes with finely pulverized coal discharging from the feed bin 8 through the screw conveyor 9 into the downwardly extending pipe 10. This coal may be of any desired mesh, ranging from 100 to 200 meshes per linear inch. The air is so regulated that that degree of combustion occurs in the combustion chamber to produce sufficient heat to drive the volatiles from the bulk of the finely divided coal and to carbonize these particles. This distillation occurs during the passage of the material through the distilling zone 2 of the combustion chamber. It will be understood that the air is under a substantial velocity which is, of course, increased by the jet in the burner 7 and that this velocity serves to carry the finely carbonized particles with the gases from the combustion chamber 3 through the line 11 to the separator 12.

This separator has an inlet 13 at its upper end into which the gases carrying carbonized particles are discharged. The velocity of these gases is so regulated by the blower that when entering the separator a certain percentage of finely carbonized particles pass out through the line 14 to a boiler for consumption as a fuel, while the remaining portion of the carbonized materials settles in the lower part 15 of the separator and is withdrawn through the line 16 for consumption or for further treatment to provide a composite fuel.

In carrying out the process I may treat

The invention aims more particularly to provide a process wherein finely pulverized coal is distilled to remove volatile matter therefrom in which a regulated quantity of the finer particles of the coal become associated with the volatiles and are consumed therewith while the remaining portion of the carbonized particles are separated from the gases or volatiles and collected to be used as a fuel or to be combined with other materials for use as a fuel.

In the prior art I am aware that it has been the practice to drop pulverized coal over ascending gases to retard their passage for a period of time sufficient to permit carbonization to take place. In these processes, however, it is intended that the coal particles should substantially all settle in the bottom of the distilling chamber to be used as a carbonized fuel. The escaping gases thus are substantially free of finely divided carbonized particles.

In accordance with my invention, I regulate the velocity of the gases passing through the distilling chamber and the size of the comminuted coal particles so that a determined percentage of the finely divided coal particles are carried from the chamber with the gases or vapors producing a composite fuel for ultimate consumption, while the remaining particles in a carbonized form settle and are removed for use as a solid fuel or for admixture with other substances to provide a composite fuel.

The invention is particularly applicable for the treatment of low volatile coals which have little by-product oil. With such coals the gases and volatile matter driven out carry a large percentage of the fine carbonized coal particles and may thus be conveyed to a boiler plant for consumption, while the remaining part of the comminuted material settles out of the gases and is collected. By thus carrying away in the gases a definite percentage of the fine carbonized material a boiler fuel of great value can be produced with low volatile coals.

coals of varying characters. The process, however, is highly applicable for the treatment of coals having a low volatile content, such as Pocahontas, New River and other semi-anthracites, permitting the simultaneous production of an efficient boiler fuel and a mass of solid carbonaceous material for any desired use. The percentage of carbonized material passing with the gases to the boiler may vary. This percentage is dependent upon the velocity of the gases passing through the combustion chamber. I may at times discharge from the separator in the gases approximately 30 percent of the fuel, while the remaining portion of the charge is cleanly separated in the separator or dust collector from the gases and is collected as carbonized coal for use or further treatment. This proportion that travels with the gases may vary, depending upon the character of the fuel needed for the boiler plant. For instance, I have found it often to be desirable to use half of the fuel in the form of gases, vapors and carbonized particles as a boiler fuel, while the remaining portion of the fuel is recovered as solid carbonized particles. In treating the coal in the combustion chamber a temperature of from 500° F. to 1500° F. may be maintained. This temperature will vary, depending upon the type of coal used and the quantity of volatiles it contains.

It will furthermore be understood that various types of apparatus can be used for carrying out this process. In lieu of the horizontal chamber, as shown in the drawings, I can drop the finely divided coal into a vertically moving current of gas, the velocity of which is so regulated that a given portion of carbonized particles may be carried from the distilling chamber in the gas, while the remaining portion thereof settles and is removed from the chamber as a carbonized product. Regardless of the apparatus used in carrying out the process, it is apparent that I do simultaneously produce a boiler fuel, consisting of vaporous gases, carrying a given quantity of carbonized particles and a fuel consisting of carbonized coal particles which is separated cleanly from the gases.

50 Having thus described my invention, what I claim is:

1. In a distillation process comprising introducing finely comminuted coal to a moving stream of combustion supporting gas, in effecting a sufficient partial combustion of said coal in the gas to generate sufficient heat to remove volatiles from and carbonize the comminuted coal, in separating the carbonized coal particles by discharging a portion of the lighter carbonized particles in suspension in the gas stream and withdrawing the remaining portion of such carbonized particles substantially undiluted by gas.

2. A distillation process consisting in effecting a sufficient partial combustion of

finely divided coal in a combustion supporting stream of gas to generate sufficient heat to remove volatiles from the coal and leave the same in the form of carbonized particles, in effecting a separation of a portion of the carbonized particles from the remainder thereof by discharging a substantial quantity of the lighter carbonized particles in suspension in the stream of gas while separately removing the remaining portion of carbonized particles substantially undiluted by said gases.

3. A fuel producing process which comprises introducing finely divided coal to a heating zone and heating the same therein sufficiently to cause combustion of the amount of coal necessary to remove volatiles therefrom and to carbonize the coal, discharging the carbonized coal from said zone in suspension with the volatiles, separating only a portion of the carbonized coal from the suspension, and collecting the separated carbonized coal substantially free of volatiles.

4. A fuel producing process which comprises passing finely divided coal thru a heating zone under sufficient velocity to maintain the same in suspension in said zone and subjecting the coal therein to distillation and carbonization conditions by combustion of a portion of the finely divided coal thereby forming volatiles and carbonized coal particles, discharging the volatiles and carbonized coal particles from said zone under sufficient velocity to maintain the latter in suspension, separating only a portion of said particles from the suspension, and collecting the separated particles substantially free of volatiles.

5. A fuel producing process which comprises forcing finely pulverized coal and combustion-supporting gas thru a heating zone under sufficient velocity to maintain the coal particles in suspension in the gas, substantially devolatilizing and carbonizing the coal by heat obtained from combustion of a portion thereof, separating only a portion of the carbonized particles from the suspension, and collecting the separated particles substantially free of gas.

6. A fuel producing process which comprises forcing finely pulverized coal and combustion-supporting gas thru a heating zone under sufficient velocity to maintain the coal particles in suspension in the gas, burning a sufficient portion of the suspended coal in said zone to effect substantial carbonization of the remaining suspended coal, separating only a portion of the carbonized particles from the suspension, and collecting the separated particles substantially free of gas.

In testimony whereof I affix my signature.

WALTER EDWIN TRENT.