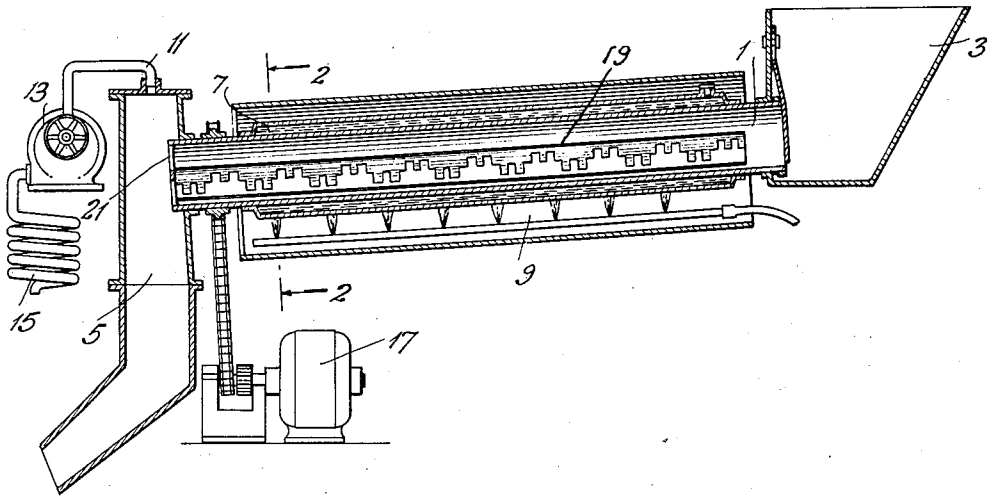
Nov. 1, 1927. 1,647,273

K. E. CLAYTON-KENNEDY

APPARATUS FOR EXTRACTING VOLATILE MATTER

Filed May 26, 1926

Fig. 1.



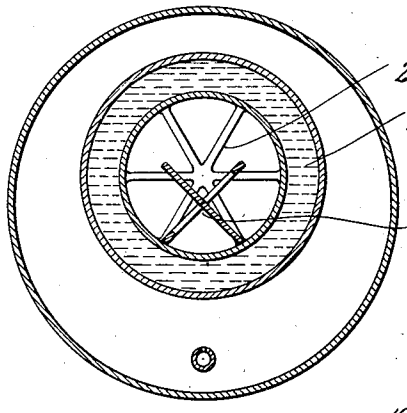


Fig. 2.

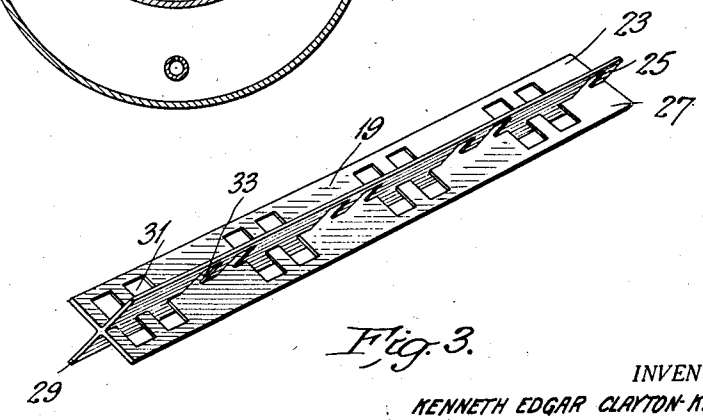


Fig. 3.

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UNITED STATES PATENT OFFICE.

KENNETH EDGAR CLAYTON-KENNEDY, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN HYDROCARBON CO. INC., A CORPORATION OF DELAWARE.

APPARATUS FOR EXTRACTING VOLATILE MATTER.

Application filed May 26, 1926. Serial No. 111,712.

My invention pertains generally to apparatus for extracting volatile elements from solid materials and more particularly to arrangements for extracting oils in their volatile form from oil bearing shale, coal or other carbonaceous material. Still more specifically my invention relates to a simple improvement or device to be added to a machine utilized in accomplishing the results above mentioned.

It is the purpose of my invention to prevent caking caused by heating the particles of finely divided coal or other material used thereby assuring a more even and uniform heating of the material than heretofore obtained and create a machine of greater capacity and efficiency. Other objects will be apparent from the development of the construction and description.

In accordance with my invention I place in the heated cylinder containing the carbonaceous material a tumbler or agitator which will agitate and disturb, as well as fall upon and break up any agglomerated lumps of material. The advantages of such a device will be obvious when it is considered that heretofore only disturbing baffles or fins secured to the cylinder have been used.

Further features of my invention will appear from the following description taken in consideration with the drawings and the appended claims:

Figure 1 is a side elevation of a machine embodying my invention.

Figure 2 is a sectional view taken along 2—2 of Figure 1.

Figure 3 is a perspective view of the tumbler or agitator.

I have illustrated my invention as applied to the conventional apparatus as indicated in Figure 1 wherein 1 is the inclined rotating cylinder in which material to be treated is heated. The material is fed into the cylinder through the hopper 3 where it travels gradually down the length of the cylinder by the action of gravity aided by rotation of the cylinder until the volatile substances have been driven out due to application of heat. The spent material passes through the discharge end 5 while the gases pass out through discharge 11 by means of a pump 13, are condensed in the condenser 15 and thereafter collected in suitable containers.

Heating may be accomplished through the medium of molten lead 7 which is kept in a molten state by means of burners 9 or by any other suitable means. The usual driving motor is indicated at 17 for rotating cylinder 1. It is understood of course that the cylinder and discharge ends are sealed against entry of oxygen by sealing the ends from the outside atmosphere.

The above brief description merely outlines the conventional apparatus and it has been found that there is a strong tendency for the particles of material to adhere, agglomerate and cake when heated in these machines thereby destroying the ideal conditions necessary to assure uniform and rapid heating of all the particles of material.

To overcome this caking I find it convenient to place in the cylinder a tumbler or agitator 19. This tumbler is substantially the same length as the cylinder but smaller in diameter so that it is capable of tumbling around in the cylinder. This tumbler is merely placed within the cylinder without securing it in any manner except to prevent the tumbler from sliding axially out of the cylinder by placing a spider 21 in the discharge end of the cylinder or by holding with a chain from the upper end.

As a preferred form I have shown this tumbler in Figure 3 as being formed of four vanes 23, 25, 27, 29, substantially at right angles to each other intersecting at and extending from a common axis. Within these vanes I have cut openings 31, 33 arranged in relatively staggered position for the purpose of allowing any material picked up by the vanes to sift through to the bottom of the cylinder.

The design of the tumbler may be varied to meet the demands of a particular material to be broken up, for instance, there may be three vanes or of star formation, or the edges of the respective vanes may have irregular contours such as sharp teeth or the vanes may be formed of a corrugated material. The tumbler is preferably of some heavy material such as iron or steel in order to have sufficient mass to crush the carbonaceous material and also to withstand the operating temperatures.

In operation the machine functions in the following manner. The cylinder containing the carbonaceous material and the tumbler is caused to rotate by means of motor 17. Due

to the friction between the vanes, the material and the inner periphery of cylinder 1, tumbler 19 is carried up with the wall of the rotating cylinder until a certain level is reached whereupon the tumbler will drop upon the material and break up any caked portions. During the movement of the tumbler, the vanes will also carry some of the material upon their surfaces and this material will sift through openings 31, 33 and be re-distributed throughout the cylinder. Each time the tumbler reaches a certain level it will drop down upon the material and so the cycles will be repeated maintaining the material in a finely divided and distributed state.

I claim:

1. A tumbler for a machine of the class described comprising a plurality of vanes angularly disposed relative to each other, said vanes having openings therein arranged in staggered relationship.

2. A tumbler for a machine of the class described having a plurality of planar vanes arranged at right angles to each other and intersecting in a common axis, said vanes having openings therein arranged in staggered relationship.

In witness whereof, I hereunto subscribe my signature.

KENNETH E. CLAYTON-KENNEDY.