Nov. 5, 1935. E. P. GILLETTE 2,019,963

MATERIAL DISCHARGE APPARATUS

Original Filed May 17, 1934

Fig. 1

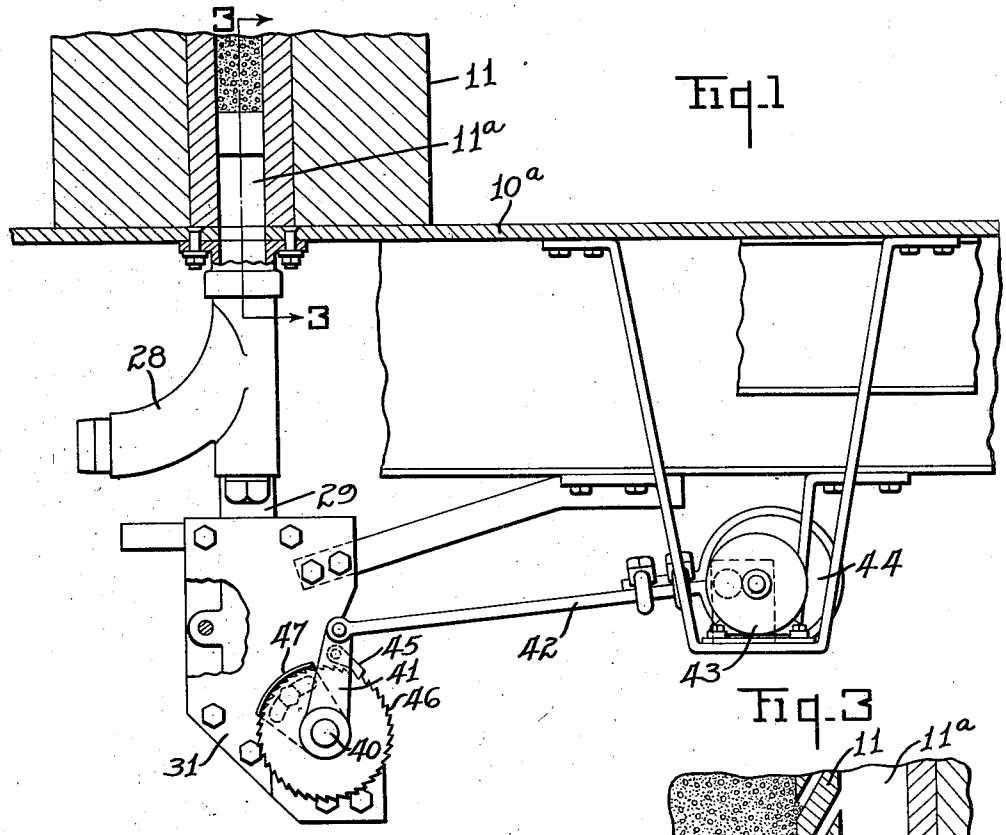


Fig. 3

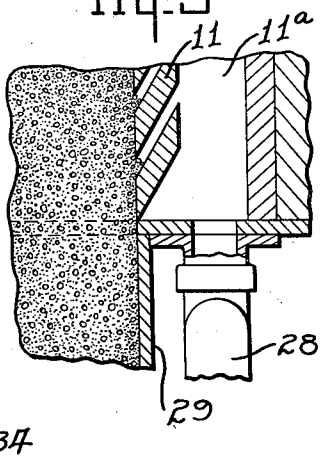
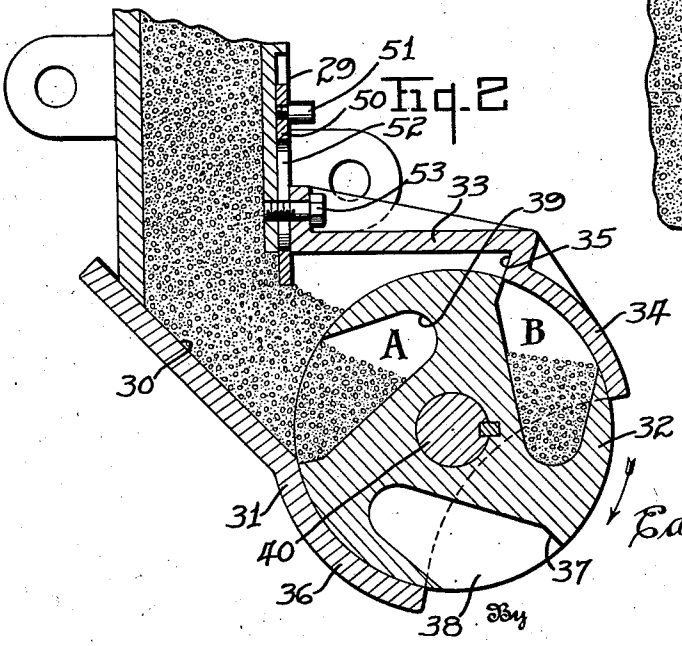


Fig. 2



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2,019,963

MATERIAL DISCHARGE APPARATUS

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Original application May 17, 1934, Serial No. 726,097. Divided and this application November 8, 1934, Serial No. 752,181

1 Claim. (Cl. 214—35)

This invention relates to discharge devices for retorts, such as retorts designed for calcining calcium carbonates and recovering carbon dioxide dissociated therefrom, and an object is to produce a simple and efficient device for discharging materials from a vertically disposed retort in such manner as to militate against the ingress of outside air to the insides of the retort and enable actuation of the device with a small amount of power.

In one aspect the invention comprises a discharge member for a container having a downwardly directed discharge opening, the member being formed with a pocket which is alternately moved by the member to receiving position with its mouth in register with the discharge opening, and to discharge position with its mouth directed downwardly. The discharge member is disposed within a housing which covers the mouth of the pocket as it moves from receiving to discharging position. One wall of the pocket is undercut to provide a space out of line of flow of the material into the pocket so that the material flows away from the mouth of the pocket as the member moves from receiving position to discharging position.

For purposes of illustration, but not of limitation, an embodiment of the invention is shown on the accompanying drawing, in which:

Figure 1 is a vertical sectional elevation of the lower end portion of a retort and the discharge apparatus therefor;

Figure 2 is an enlarged wheel and housing; and

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 1.

This application constitutes a division of copending application Serial No. 726,097, filed May 17th, 1934, and entitled "Gas generator".

The drawing shows a retort 11 which is vertically disposed and through which passes material, such as limestone, in granular or pulverulent state. Opposite sides, which are preferably of silicon carbide, are heated in any suitable manner to a sufficiently high degree so that the material within the retort is of the proper temperature that dissociation of gas, such as carbon dioxide from limestone, takes place. The upper end of the retort may be suitably sealed against escape of the gas, which is drawn off laterally of the stream of material and delivered to a collecting chamber 11a, from which leads a pipe 28 leading to any suitable receptacle, compressor, etc., a suction fan or pump being utilized, if desired, to accelerate the flow of gas. Further details of this apparatus are not described because they form no part of the present invention, and the above is given to enable a clear understanding thereof.

The retort 11 is mounted on a platform 10a and secured thereto and registering with the opening at the lower end of each retort 11 is a tube 29 through which the material is adapted to flow, and from the tube 29 leads the above-mentioned tube 28, from which the gas is drawn off. The tube 29 extends downwardly below the tube 28 and has a downwardly and laterally inclined bottom wall 30 to divert the flow of material laterally to a discharge apparatus housing 31 in which is disposed a rotary discharge wheel 32. Covering the upper portion of the wheel 32 and forming a part of the housing 31 is a laterally extending portion 33, which extends at substantially right angles from the tube 29 slightly above the lower end. Connected to the outer end of the portion 33 is a downwardly curved apron 34 which snugly fits with a few thousandths of an inch clearance the upper portion of the wheel 32, an internal shoulder 35 being provided between these portions which is rearwardly inclined, as indicated in Figure 2. It will also be noted that the bottom wall 36 of the housing 31 is shaped snugly to embrace the lower portion of the discharge wheel 32, leaving a very slight clearance with the wheel.

Formed in the wheel or rotor 32 is a plurality of pockets 37 which extend horizontally across the face of the rotor, in this instance three pockets being provided. The pockets 37 are relatively deep with the sides thereof tapering slightly and with the mouth 38 of each pocket facing in a direction opposite to the direction of rotation of the rotor 32 and the bottom 39 thereof inclined upwardly when the pocket is disposed in material-receiving position. The purpose of this arrangement is to enable each pocket to be partially filled when in receiving position, such as the pocket A in Figure 2. As the rotor turns in a clockwise direction (Figure 2), some of the material in the pocket drops therefrom so that when the pocket is in position to pass the shoulder 35 with the pocket moving toward a vertically disposed position the material can drop into the bottom portion of the pocket, leaving the mouth free of material, as indicated in the pocket B of Figure 2.

This is found to be of outstanding importance in that it militates against material wedging between the rotor and housing and interfering with the free turning movement thereof and enabling the use of a less powerful motor to drive the ro-

tor. By obviating the shearing action of the material between the housing and rotor, it makes possible the use of much lighter material and greatly reduces the wear of the parts. It will be apparent that a rotor of this character is not only of importance in enabling the use of a relatively simple motor to operate, but, in addition, an effective seal is provided by the material to prevent to a large extent the ingress of air into the retorts. It is obvious that the admission of air to the retorts is objectionable in that it would prevent the obtaining of gas of the desired purity.

In order to regulate the amount of material delivered to the rotor **32**, a gate **50** having a knob **51** slides vertically alongside of the tube **29** and has its lower end projecting beyond the lateral wall **33**. An elongate slot **52** formed in the gate permits the insertion of a stud **53**, which cooperates in holding the wall **33** in place. By raising or lowering the gate **50**, the amount of material fed to the pockets **37** may be increased or diminished respectively. It is desirable that adjustment be effected to accommodate different sizes of material, as for example, in the burning or calcining of oyster shells, the gate **50** must be raised to enable sufficient number of them to be fed to the rotor.

Each rotor is mounted on a shaft **40** on which an arm **41** is free to oscillate. The arm **41** is connected by a rod **42** to an eccentric **43**, which is driven by a motor **44** to impart rocking movements to the arm **41**. On the arm **41** is a pawl **45**, which recurrently meshes with teeth **46** on a ratchet wheel fixed for rotation with the rotor **32**. In this manner it is apparent that turning movement is imparted positively to the rotors **32** at a relatively slow speed accurately controlled by an adjustable sleeve **47**, which controls the number of teeth engaged by the pawl **45**.

Although the embodiment of the invention, which is herein shown and described, is concerned with the burning or heating of limestone and the dissociation of carbon dioxide, the invention is not limited thereto because the generator can be used to advantage in treating other material and recovering other gases which are given off. Furthermore, the apparatus can be used for heating or drying materials where it is disadvantageous to have them contact directly with the furnace flame and fuel gases. For example, limestone can be calcined and the calcium oxide recovered without collecting the gas, if desired, and this would be desirable as compared with many methods for burning comminuted or granular limestone which cannot be readily burned in the ordinary vertical kiln in view of objectionable caking or fusing at high temperatures tending to clog and shut off the draft.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention, especially as defined in the appended claim.

What I claim as new and desire to secure by Letters Patent is:

Apparatus of the character described comprising a container having a downwardly directed discharge opening, a discharge member having a pocket therein and movable to carry the pocket alternately to receiving position with its mouth in register with said opening and to discharge position with its mouth directed downward, a housing for said member covering the mouth of said pocket as it moves from receiving to discharging position, one wall of said pocket being undercut and providing a space out of the line of flow of material into the pocket when it is in receiving position, the movement of the member from receiving position towards discharging position lowering said space so that material flows away from the mouth of the pocket into said space, an inwardly and downwardly inclined shoulder on said housing disposed intermediate the receiving and discharging positions of said discharge member and in engagement therewith thereby to cause material adhering to the outside of the discharge member to pile up on said shoulder until the arrival of the next succeeding pocket into which it falls, and means adjacent said member to control the amount of material delivered thereto.

EDWARD P. GILLETTE.