K. J. SUNDSTROM.

GAS PRODUCER.

APPLICATION FILED SEPT. 19, 1910.

989,661.

Patented Apr. 18, 1911.

Fig. 1.

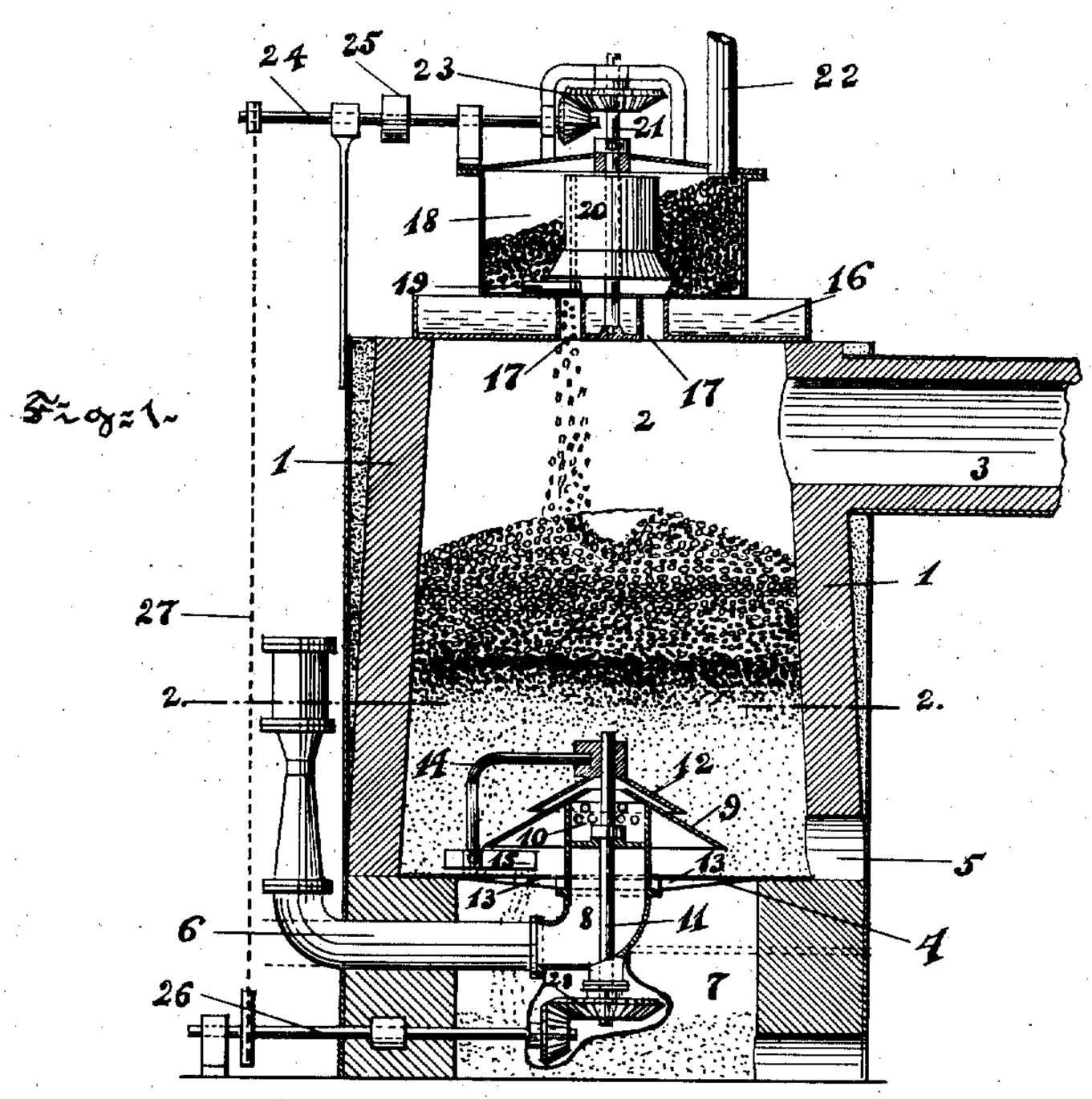


Fig. 2.

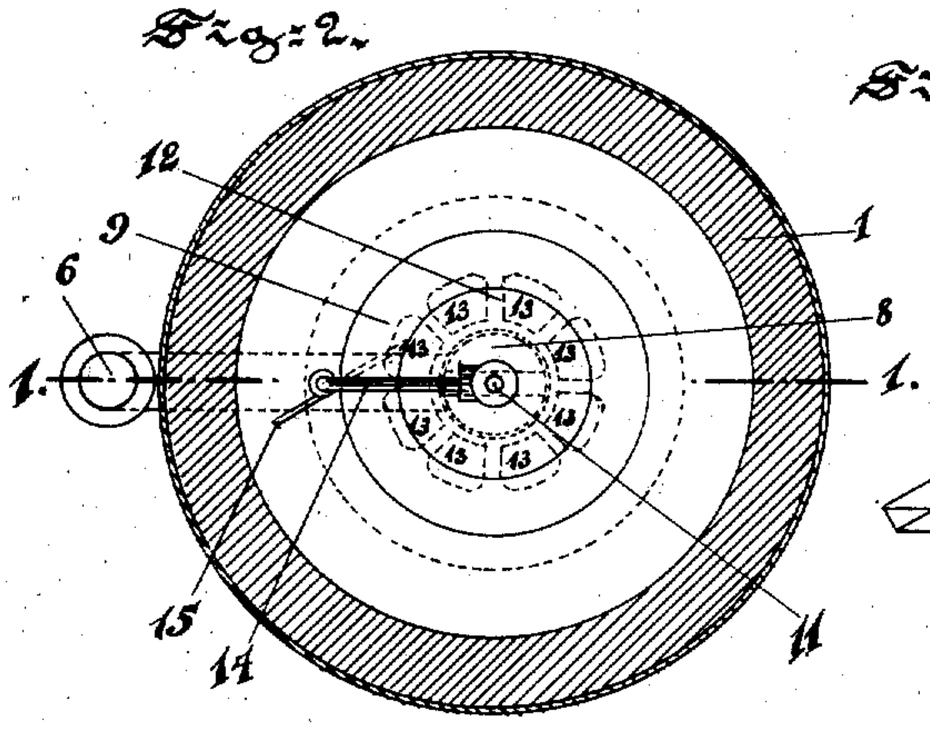
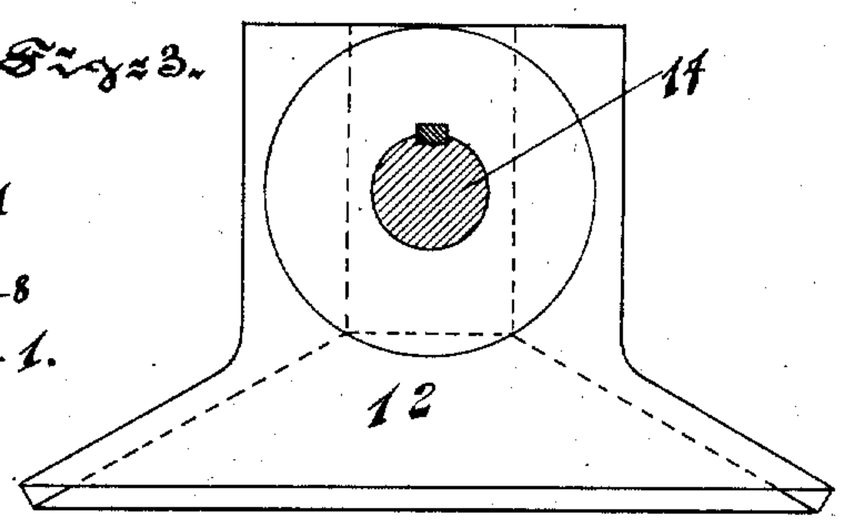


Fig. 3.



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UNITED STATES PATENT OFFICE.

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GAS-PRODUCER.

989,661. Specification of Letters Patent. Patented Apr. 18, 1911.

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To all whom it may concern:

Be it known that I, KARL J. SUNDSTROM, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Gas-Producers, of which the following is a specification.

In the operating of gas producers, it is found that the variation in the quantity and quality of the gas produced is caused to a great extent by the formation of clinkers in the fuel bed, which clinkers cause air passages to form through the bed; and it is therefore an object of this invention to prevent the formation of clinkers by providing means for constantly stirring the lower part of the fuel bed or residue of the fuel.

A further object of the invention is to provide means for maintaining an even, uniform fuel bed at a certain height, to further insure the production of gas of uniform quality by automatically feeding a regulated quantity of coal into the producer and providing means for removing the ash and residue from the bottom of the producer in exact proportion to the amount of coal fed in.

It is also an object of the invention to provide a construction which is especially adapted to deliver a continuous even flow of gas of a uniform quality and temperature directly to a furnace for consumption therein, and to provide certain new and useful features in the construction and arrangement of parts all as hereinafter more fully described, reference being had to the accompanying drawing in which—

Figure 1 is a vertical section on the line 1—1 of Fig. 2 through a gas producer embodying the invention; Fig. 2 is a horizontal section of the same on the line 2—2 of Fig. 1, and Fig. 3 is an enlarged detail of a rotatable cap.

As shown in the drawing, the body 1 of the producer is constructed of fire brick in the usual manner and forms a combustion chamber 2 from the upper end of which leads a gas discharge pipe 3. A bottom 4 is provided for the fire chamber upon which the bed of fuel is supported within said chamber and opening through the wall of the fire chamber is a series of holes 5 adjacent to the bottom 4 through which clinkers or other residue from the fuel may be removed. A supply pipe 6 for air under pressure, or air and steam, extends through the wall of the producer into the ash pit 7 below the bottom 4 and is provided with an enlarged head or twyer pipe 8 extending upward through the bottom 4 in the axis of the fire chamber. The open upper end of this pipe 8 is partially closed by means of a conical hood 9 which is fixed to the upper end of the pipe 8 and is formed with an opening at its apex. A series of small openings 10 are provided in the upper end of the twyer pipe beneath the hood to permit the escape of air laterally beneath said hood. A vertical shaft 11 extends in the axis of the twyer pipe and upward through the opening in the top of the hood where it is provided upon its upper end with a conical cap 12 secured thereto to turn therewith, said cap being spaced a short distance from the hood 9 to permit the escape of air between into the bed of fuel above. Said cap and hood by their arrangement over the upper end of the twyer pipe prevent the ash and residue from the fuel from entering said pipe.

In the bottom 4 around the twyer pipe 8 is a series of concentric discharge openings 13 through which the residue of fuel falls into the ash pit below. On the cap 12 is a laterally extending fixed arm 14 which is bent downward at one side of the hood 9 and provided at its lower end with a sweep 15, extending in a horizontal position adjacent to the bottom 4 and in an angular position relative to its radially extending supporting arm 14. The inner end of the sweep projects beneath the edge of the hood and over the openings 13 in the bottom so that when the shaft 11 is turned, revolving the cap 12 and carrying the sweep around the twyer pipe, said sweep will move the ash and residue resting upon the bottom, inward beneath the hood where it will drop through the openings. The removal of ash is thus regulated by the speed at which the shaft is turned and the movement of the arm 14 through the bed of ash and fuel around the twyer pipe will keep said bed constantly agitated and prevent the formation of clinkers and consequent air passages therein.

The upper end of the fire chamber 2 is closed by a water cooled head 16 of any preferred construction, having openings 17 through which fuel is fed from a suitable magazine 18 in a continuous stream of constant volume, by any suitable means such as an arm 19 carried by a head 20 secured to a vertical shaft 21 mounted to turn in the

axis of the magazine and extending outward through the top thereof. Coal is supplied to the magazine through a pipe 22 and the shaft 21 is turned by means of a beveled gear 23 secured thereon in mesh with a beveled pinion upon a drive shaft 24 which is driven in any suitable manner, as by a pulley 25 secured thereon.

It is desirable that the quantity of ash removed from the bottom of the fuel bed be in proportion to the amount of fuel fed in, in order that the fuel may be maintained at a certain level, and the shaft 11 is therefore preferably driven from the same driving shaft 24 which actuates the coal feed. Motion is transmitted from the shaft 24 to a shaft 26 extending horizontally into the ash pit 7, by any suitable means such as a sprocket chain 27, and a pinion on the inner end of said shaft 26 engages a gear 28 on the lower end of the shaft 11 to turn said shaft.

A regulated discharge of ash which varies in proportion to the fuel fed in, is maintained and the fuel bed continuously agitated, thus effectually preventing the formation of clinkers and making it possible to use a low grade of coal and secure therefrom an even flow of gas of uniform quantity and quality. The continuous feed and constant discharge of ash also permits of the maintaining of a shallow bed of fuel of uniform density, and thus a very hot gas may be produced which is especially adapted for consumption within a boiler furnace to which it is directly delivered from the producer.

Having thus fully described my invention what I claim is:—

1. In a gas producer the combination with a combustion chamber, of a twyer pipe in the bottom of said chamber, a member rotatable about the twyer, and means within the twyer for rotating said member.

2. In a gas producer, the combination with a combustion chamber, of a twyer extending vertically upward within the lower end of said chamber, a shaft extending vertically through said twyer, and an arm on the upper end of the shaft rotatable therewith.

3. In a gas producer, the combination with a combustion chamber, of a twyer pipe extending upward within the bottom of said chamber and having lateral openings near its upper end, a conical hood upon the upper end of said pipe, a vertical shaft in the axis of said pipe extending upward through said hood, a cap secured upon the upper end of said shaft, and means for turning the shaft.

4. In a gas producer the combination with a combustion chamber, of a bottom for said chamber having discharge openings, a twyer pipe extending upward through the bottom, a shaft in the axis of said pipe, an arm secured to the upper end of the shaft and extending laterally therefrom, a sweep secured to the shaft to sweep the ash upon said bottom through said openings, and means for actuating the shaft.

5. In a gas producer the combination of a combustion chamber, a twyer pipe extending upward within the bottom of said chamber, a conical hood secured to the upper end of said pipe and formed with an opening at its apex, a shaft within the pipe extending through the opening in the hood, a conical cap on the upper end of the shaft spaced from the hood, an arm on the cap, and means for turning the shaft.

6. In a gas producer the combination with a combustion chamber, of a bottom for said chamber, a twyer pipe extending upward through said bottom, said bottom being provided with a series of openings around said pipe, a conical hood secured to the upper end of said pipe, a vertical shaft in the axis of said pipe extending through the hood, a conical cap secured to the upper end of the shaft and spaced from the hood, an arm on the cap extending laterally therefrom and provided with a downwardly extending outer end, a sweep on the lower end of said arm adjacent to said bottom and extending at an angle to the radially extending portion of said arm with its inner end projecting beneath said hood and sweeping the openings in said bottom, and means for turning said shaft.

In testimony whereof I have affixed my signature in presence of two witnesses.

KARL J. SUNDSTROM.

Witnesses:
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