

952,237.

Patented Mar. 15, 1910.
2 SHEETS—SHEET 1.

Fig. 1.

Fig. 2.

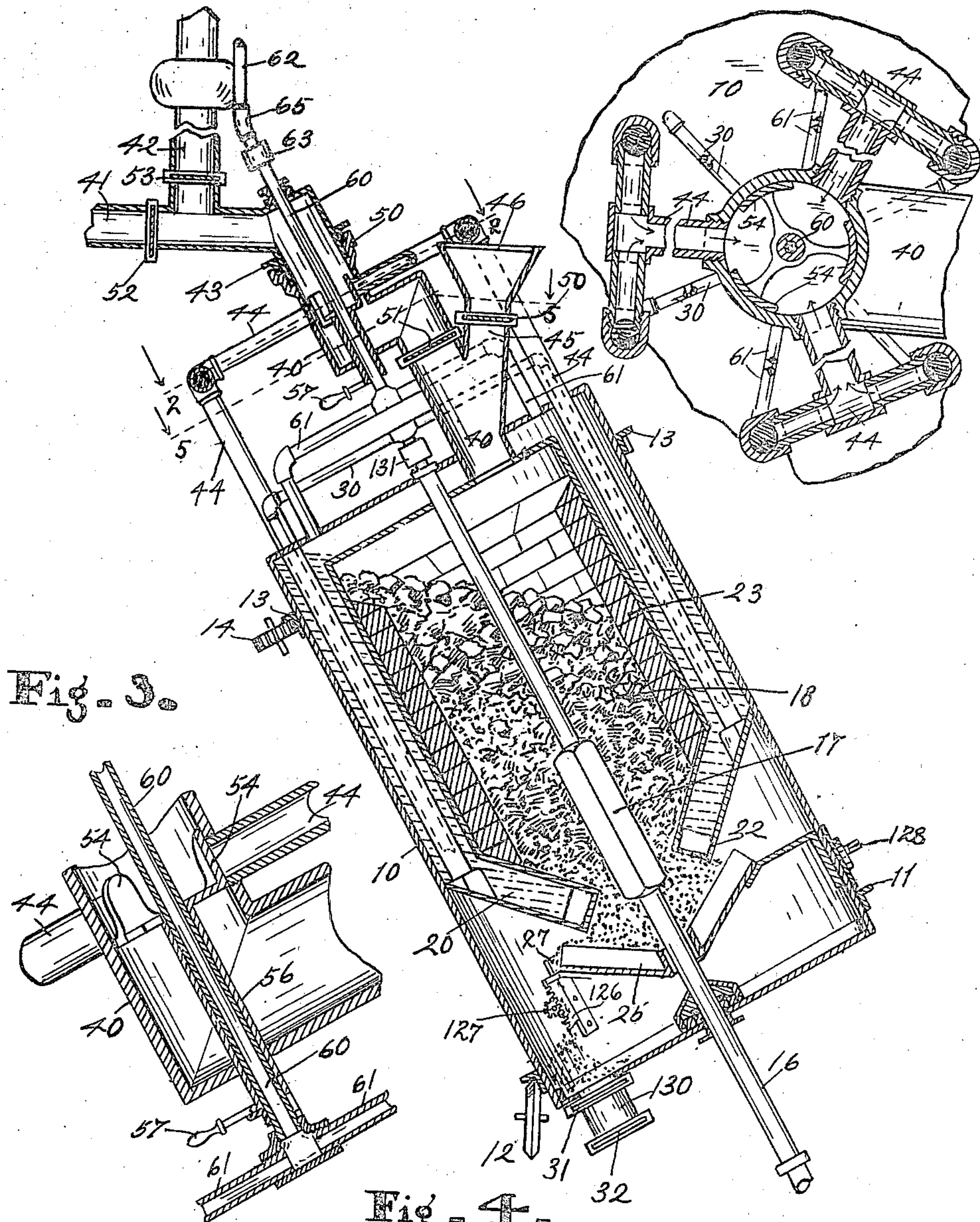
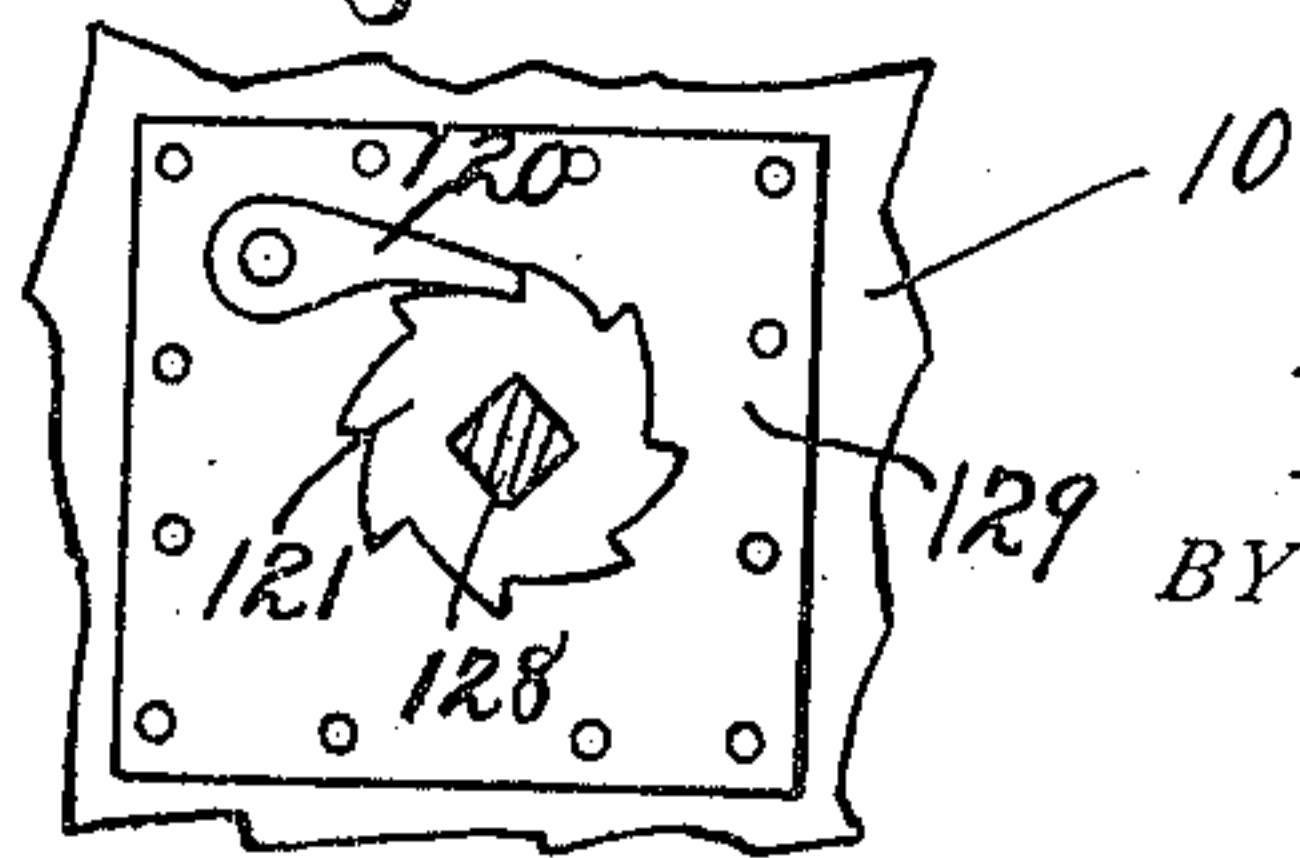


Fig. 3.

Fig. 4.

WITNESSES:

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GAS-PRODUCER.

952,237.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed January 2, 1909. Serial No. 470,351.

To all whom it may concern:

Be it known that I, MELVIN E. CROWELL, of Franklin, county of Johnson, and State of Indiana, have invented a certain new and useful Gas-Producer; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

The object of this invention is to improve the construction of gas producers and is an improvement on that shown in Letters Patent No. 894,877 granted to me on August 4, 1908.

One feature of this invention consists in so constructing the lower portion of the device as to render the separation and collection of the ash satisfactory. To that end the lower portion of the fuel chamber is tapering and below it a vertically adjustable ash pan is mounted for supporting the fuel and permitting the ash to drop over the edge thereof during the revolution of the device and accumulate in the lower corner of the casing, which is provided with a double valve closed outlet for the removal of the ash.

Another feature of the invention consists in combining with a tubular stationary stirrer, through which water is introduced, pipes leading from the upper end of said stirrer to the lower end of the water jacket, so that the water jacket will be charged with water at the lower end thereof.

Another feature of the invention consists in providing an outlet at the upper end of the water-jacket for carrying off steam.

Another feature of the invention consists in providing means for removing the gas, which means extends through the water-jacket so that the gas will be thereby cooled and to some extent the device will have a self-contained economizer.

Another feature of the invention consists in providing a conduit from the upper end of the producer-shell provided with a suitable valve whereby the gas may be conveyed from said conduit while the valves are in one condition, or by changing the valves the conduit may be converted into a flue for purging purposes, and with the valves in another condition the fuel may be introduced through said conduit into the producer-shell. Likewise the steam-removing pipe passes through said conduit.

The full nature of the improvements will be understood from the accompanying drawings and the following description and claims.

In the drawings Figure 1 is a central vertical section through the device, showing it charged with coal and in operation. Fig. 2 is a section on the line 2—2 of Fig. 1, showing a portion of the upper part of the device in section. Fig. 3 is an enlarged view of a portion of the upper part of what appears in Fig. 1. Fig. 4 is a side elevation of a portion of the lower part of the shell. Fig. 5 is a section on the line 5—5 of Fig. 1. Fig. 6 is the same as a part of the lower portion of Fig. 1 with the fuel removed and appearing on a larger scale.

In detail there is in the drawings forming a part of this device a gas producer shell 10 in an inclined position at an angle of less than 45 degrees from a vertical line. It is revolubly mounted, the means therefor not being herein fully shown. There however appears an annular flange or track 11 on the shell which is supported on vertically disposed wheels 12 only one of which is shown. There is also an annular rack 13 on the shell which is revolved by gear 14. But I do not want to be limited to any particular means for revolving the shell, as that is not material to the present invention herein shown. The producer shell revolves about a stirrer 16 that extends centrally therethrough and is stationary or anchored at its lower end by means not herein shown. It has an angular portion 17 that stirs the fuel 18 as the fuel and producer shell revolve. A water jacket 20 lines the upper two-thirds of the shell and is contracted at its lower end, so as to be partially conical and terminates in an annular ring 22 at the lower end of the fuel chamber. Said fuel chamber is also lined with fire-brick 23, or the like.

A conical ash pan 25 is mounted below the outlet opening from the fuel chamber through the ring 22 so as to be vertically adjustable toward and away from said outlet and ring. The ash pan is supported by arms 26 extending out radially to the shell and being vertically slidable along the guide bars 27, which are secured vertically to the shell. A rack bar 126 extends down from the outer end of each arm 26 and adjacent said guide 27 and is vertically adjusted by a

pinion 127 secured on the inner end of a shaft 128 which extends through the shell and a reinforcing plate 129. The outer end of the shaft 128 is squared to receive a wrench or handle 28, whereby the shaft is actuated. The shaft and ash pan are held in position after adjustment by the pawl 120, which is pivoted to the plate 129 and engages a ratchet wheel 121 that is secured to the shaft 128. The ash pan is preferably formed of a plate of metal upon which fire-brick material is secured with sufficient thickness to keep the metal plate from being burned out. As the shell revolves, the ash accumulates in said pan and further protects it from the heat and then the ash falls over the lower edge of the pan into the ash-accumulating chamber in the lower end of the shell. The ash is removed from the shell through the pipe 130, which is closed by two gates 31 and 32. Assuming both gates closed, which is the normal condition, the ash is removed by first opening the upper gate 31 and permitting the ash to drop down upon gate 32. Then gate 31 is closed and gate 32 opened, whereupon the ash falls out of tube 130. The gate 32 is then closed. Thus the ash is removed while the producer shell is revolving and by means that prevents air entering the producer shell and commingling with the gas.

Water enters at the lower end of the stirrer 16 and passes through the same upwardly into branching pipes 30 leading therefrom and extending downwardly into the water jacket almost to the end thereof. For this purpose the pipe 30 is connected with the stirrer 16 by a stuffing box 31. This arrangement causes the discharge of the water initially at the hottest part of the water jacket, and utilizes the water that keeps the stirrer cool and from burning out. There may be any desired number of pipes 30.

A conduit 40 extends from the upper end of the gas producer shell, the portion thereof adjacent to the shell being out of alignment with the axis of the shell and a remote portion of the conduit being in alignment with said axis, and a still further portion leading off from said coaxial portion to a gas pipe 41. From said last portion of the conduit 40, a flue 42 extends for use in purging the fire. The coaxial portion of the conduit 40 is composed of two parts, the lower revoluble with the shell and the upper stationary, the two being joined by a stuffing box 43.

A number of gas pipes 44 lead from the chamber in the shell below the water-jacket and furnace chamber, through the water jacket and communicate with the revoluble part of the coaxial portion of the conduit 40, whereby the gas formed by the down draft producer is conveyed to the gas outlet pipe

41 which runs to a gas engine reservoir or the like.

The fuel charging tube 45 enters the conduit 40 near the shell, and it has a funnel 46 on its upper end. The fuel charging tube has a gate 50. Also the portion of the conduit 40 between tube 45 and the junction of the tubes 44 has a gate 51. A gate 52 controls the entrance to the gas outlet pipe 41 to the engine and a gate 53 controls the flue 42. Likewise there are dampers 54 for closing the gas tubes 44, said damper being mounted on arms from the upper end of sleeve 56 surrounding the steam tube 60 and having a handle 57, whereby said sleeve and dampers may be turned so as to close or open the gas pipes.

A steam tube 60 extends centrally through the coaxial portion of the conduit 40 and has branch tubes 61 from its lower end that communicate with the water jacket, whereby any steam formed therein may be removed for some use. The pipe 60 turns and is therefore connected with a stationary pipe 62 by a stuffing box 63.

When starting the fire, the gates 31 and 32 are open and the fire started in the lower part of the fuel chamber. The gates 51 and 53 are open while the gate 52 is closed. This will afford a draft, and after the coal has been fired sufficiently the gates 31 and 32, 51 and 53 are closed, while the gates 50 and 52 are opened, so that air enters through the fuel hopper 46, and gas is generated and flows through the down-draft into the fuel. The gas passes out through the opening in the ring 22 into the chamber below the furnace chamber; thence it passes upwardly through pipes 44 and the conduit 40 and out through the gas line pipe 41. When the gas is passing out thus, dampers 51 and 53 are closed and damper 52 is open. When it is desired to stimulate the fire, the dampers 50 and 52 are closed, while the dampers 51 and 53 are open, so as to make a direct passage-way or flue from the furnace chamber out through the pipe 40 and flue pipe 42. This changes the draft from a down-draft to an up-draft, and for that purpose an exhaust means, not shown, may be connected with the pipe 42. When there is an up-draft, gate 54 is closed and gates 31 and 32 opened.

It is thus seen that the ash and cinders are removable as the shell revolves, and the gas passes through the water jacket, which thus serves as an economizer for reducing its temperature, the cooling water passing through the apparatus in such a way that by varying the rate of this flow it may pass off as hot water to be used for heating purposes, or it may be converted entirely into steam at any desired pressure. It is also seen that this apparatus will make from ordinary bituminous coal a gas of the

quality suitable for a gas engine in a moderate sized plant without the use of auxiliary apparatus, and at the same time convert the large amount of heat, usually wasted in cooling and scrubbing, into suitable form for heating or power purposes.

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

1. A gas producer including a revoluble shell, means for revolving said shell, a fuel chamber in the upper portion thereof, a gas accumulating chamber in the lower portion thereof, a water jacket surrounding the fuel chamber, a conduit associated and revoluble with said shell disposed coaxially therewith, a plurality of pipes leading from the gas accumulating chamber through the water jacket to said revoluble conduit, and a stationary conduit in communication with said revoluble conduit for conveying the gas therefrom.

2. A gas producer including a revoluble shell, means for revolving said shell, a fuel chamber in the upper portion thereof, a hollow water jacket surrounding said chamber, a stationary stirrer extending centrally through the shell and adapted to receive water at its lower end, and pipes revolubly connected with the upper end of said stirrer for discharging the water therefrom at the lower portion of the water jacket.

3. A gas producer including a revoluble shell, means for revolving said shell, a water jacket therein, a conduit connected and revoluble with the shell and disposed coaxially thereof, gas removing pipes leading to said conduit, a steam pipe revoluble with the shell leading from the water jacket and extending centrally through said conduit, a stationary conduit in communication with said revoluble conduit for conveying away the gas, and a stationary steam pipe in communication with said revoluble steam pipe.

4. A gas producer including a revoluble shell provided with a fuel chamber for forming gas, means for revolving said shell, a conduit leading therefrom a portion of which is coaxial and revoluble with said shell, a stationary conduit in connection with the coaxial portion of said revoluble conduit, and a flue pipe and a gas pipe leading from said stationary conduit provided with gates for utilizing said revoluble and stationary portions of the conduit for an up draft flue or for the removal of the gas therethrough.

5. A gas producer including a shell provided with a fuel chamber, a conduit leading from the upper end thereof, pipes for removing the gas from the device that enter said conduit, dampers for closing the outlets of said gas pipes, a gate in said conduit below the point where said pipes enter the same, a flue pipe leading from the upper portion of said conduit, a gate in said flue pipe, and a gate in said conduit beyond the flue pipe, whereby said conduit may be utilized for removing the gas from the device or for an up draft flue.

6. A gas producer including a shell provided with a fuel chamber, a conduit leading from the upper end thereof, pipes for removing the gas from the device that enter said conduit, dampers for closing the outlets of said gas pipes, a gate in said conduit below the point where said pipes enter the same, a flue pipe leading from the upper portion of said conduit, a gate in said flue pipe, a gate in said conduit beyond the flue pipe, whereby said conduit may be utilized for removing the gas from the device, a fuel tube entering said conduit near the shell, and a gate therein whereby said conduit may be closed while charging the device with coal and said fuel tube may be closed during the operation of the device.

7. A gas producer including a shell provided with a fuel chamber, a conduit leading from the upper end thereof a portion of which is coaxial with said shell, pipes leading from the lower part of the shell and entering said coaxial portion of the conduit for removing the gas, a water jacket surrounding the fuel chamber, a steam pipe leading centrally through the coaxial portion of said conduit and in communication with said water jacket, dampers oscillatingly mounted on said steam pipe in said conduit for closing said gas pipes, means for operating said dampers, a gate in the conduit between said dampers and the shell, a flue leading from the shell beyond said dampers, a gate in said flue, and a gate in said conduit beyond said flue, substantially as and for the purpose set forth.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

MELVIN E. CROWELL.

Witnesses:

V. H. LOCKWOOD,
O. M. McLAUGHLIN.