

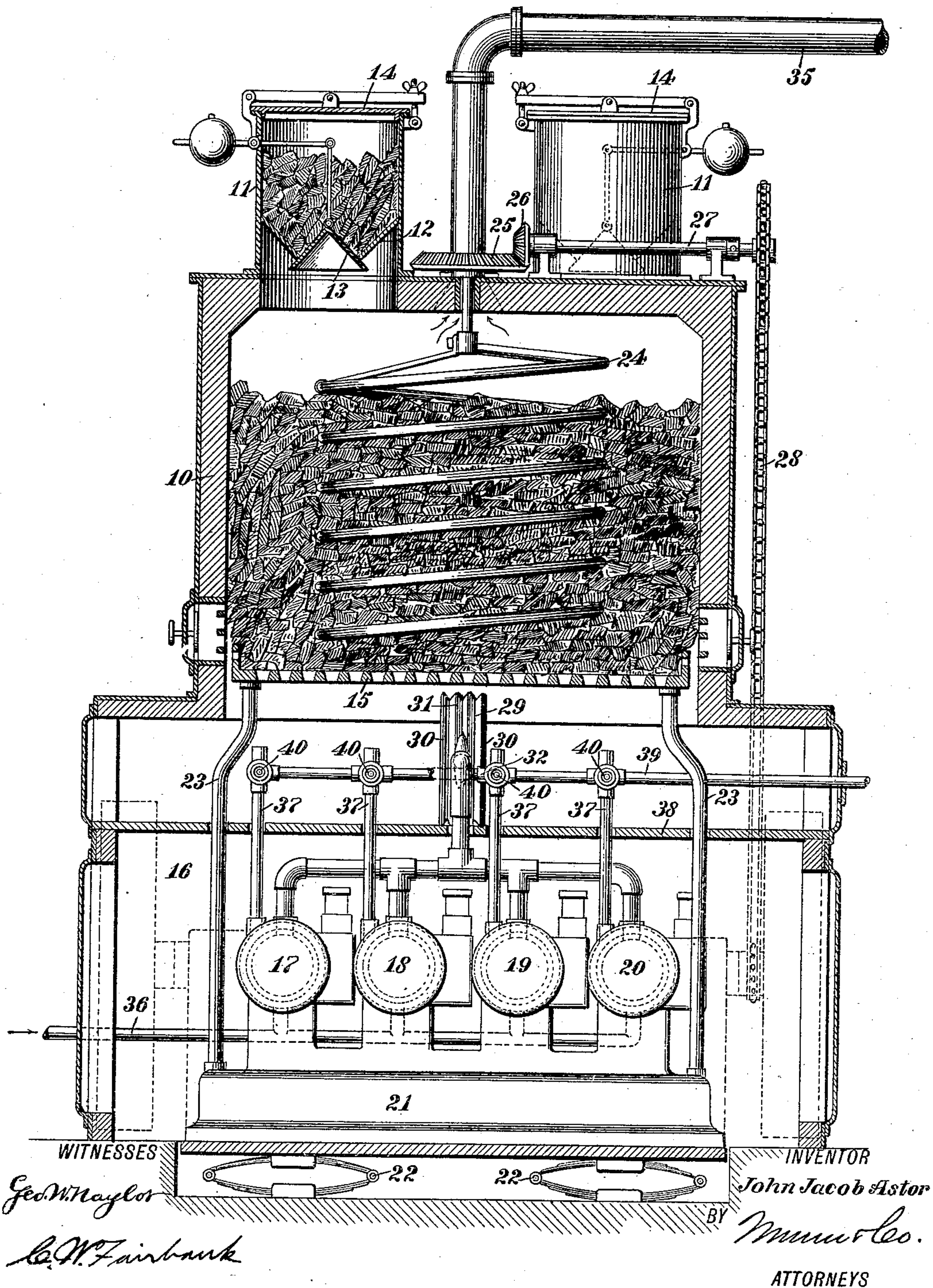
J. J. ASTOR.
VIBRATORY DISINTEGRATOR FOR GAS PRODUCERS.
APPLICATION FILED MAY 10, 1909.

940,493.

Patented Nov. 16, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

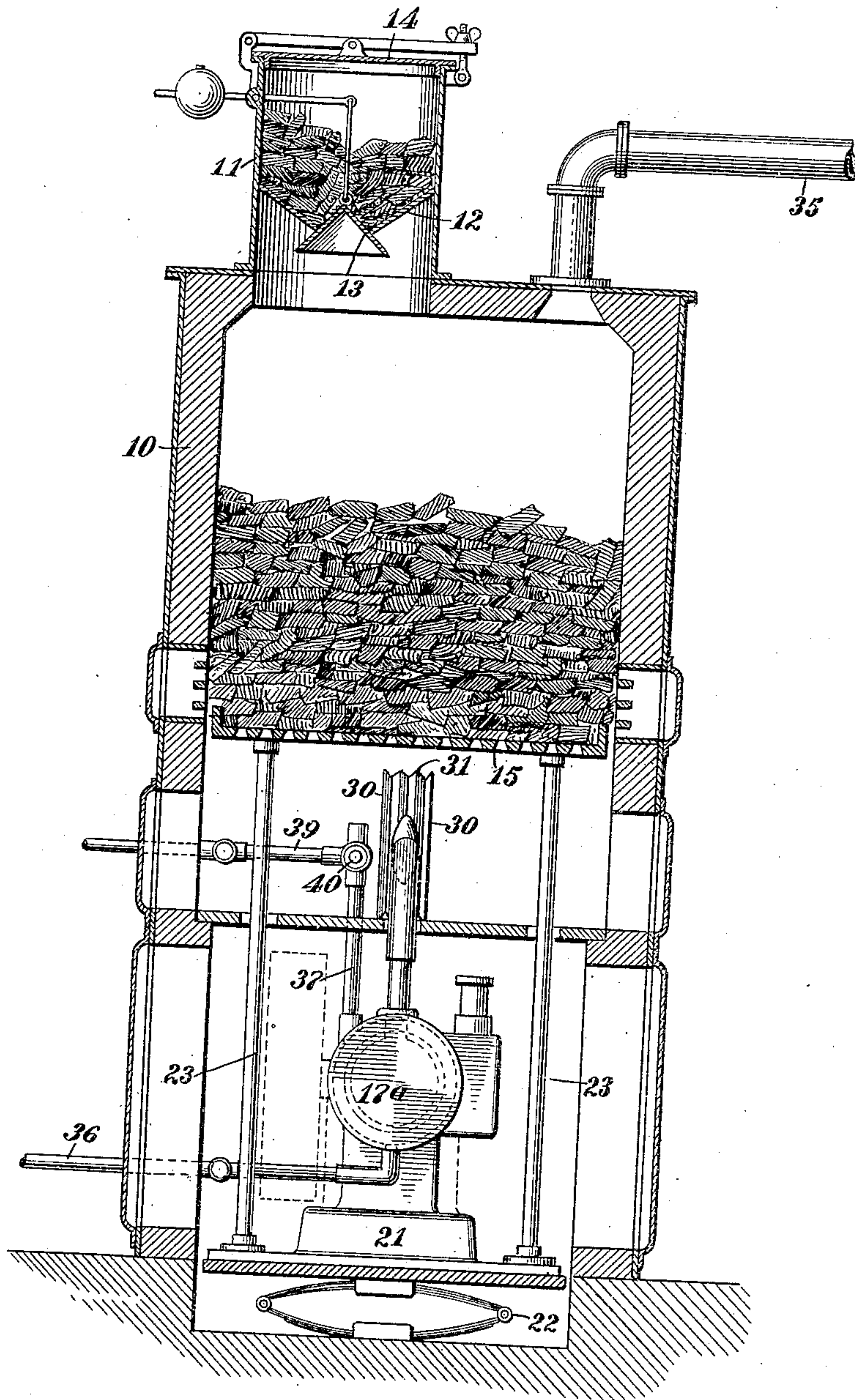


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Fig. 2.



WITNESSES

Geo. W. Maylor

C. W. Fairbank

INVENTOR

John Jacob Astor

BY *Mum & Co*

ATTORNEYS

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Fig. 3.

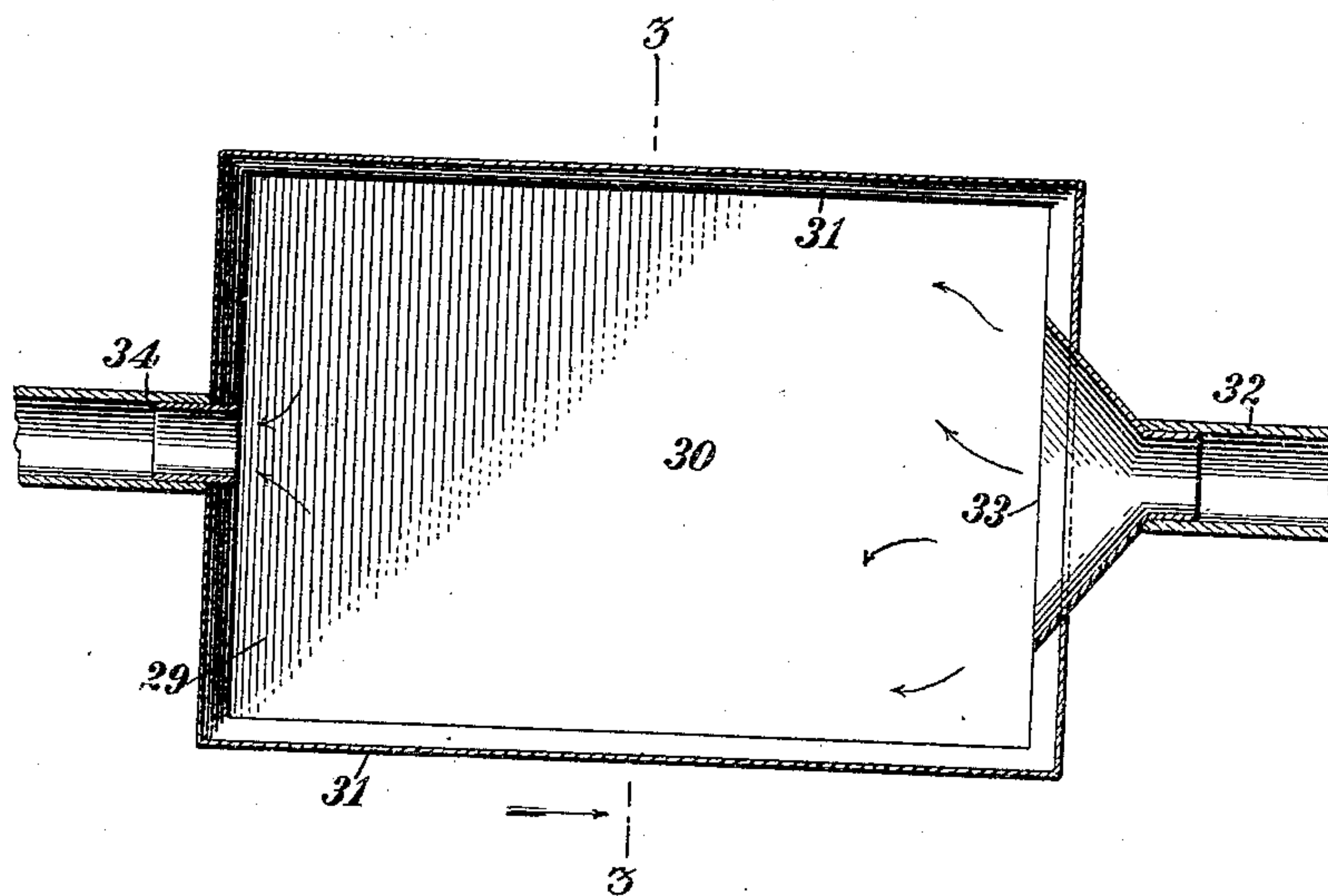
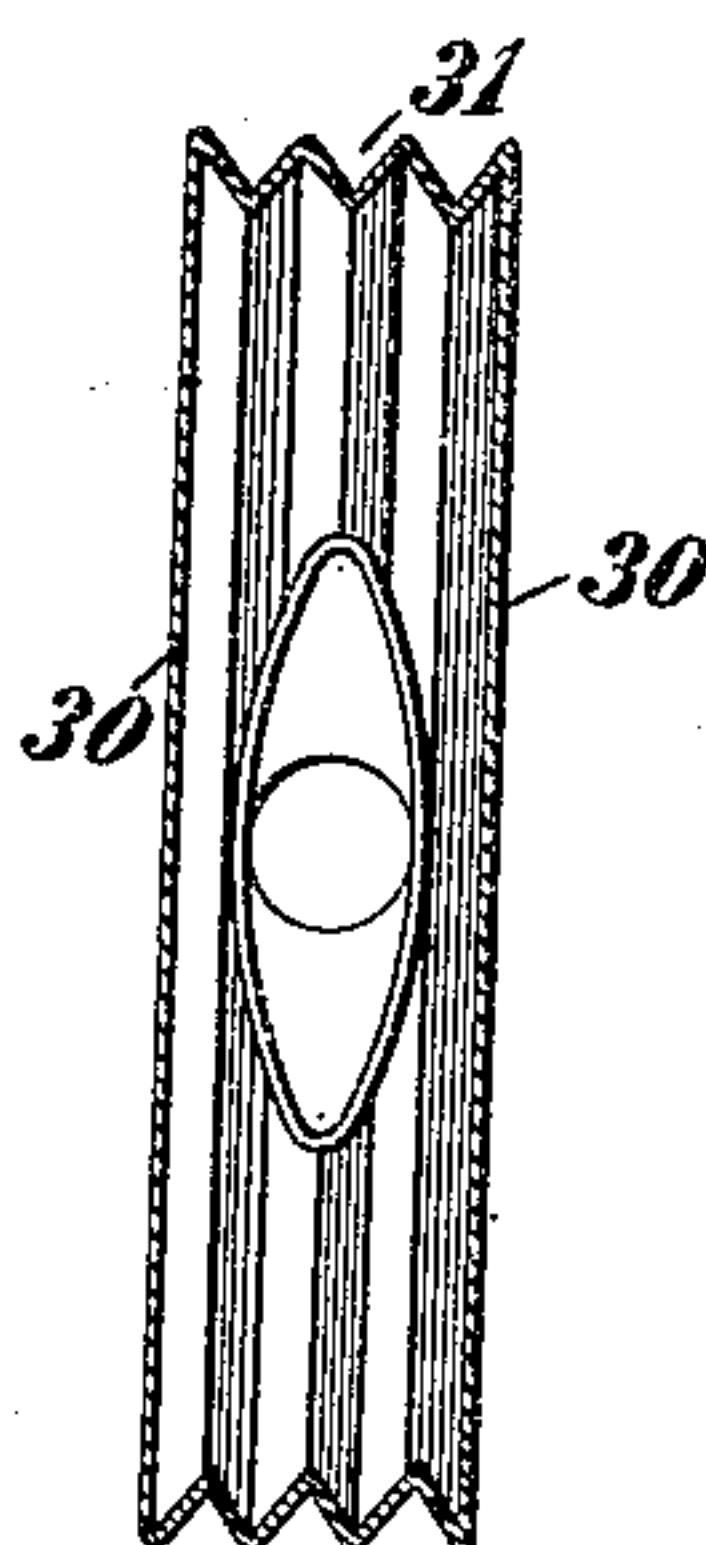


Fig. 4.



WITNESSES
Geo. W. Naylor
C. W. Fairbank

INVENTOR
John Jacob Astor
 BY *Mum & Co.*
 ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN JACOB ASTOR, OF NEW YORK, N. Y.

VIBRATORY DISINTEGRATOR FOR GAS-PRODUCERS.

940,493.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed May 10, 1909. Serial No. 495,123.

To all whom it may concern:

Be it known that I, JOHN JACOB ASTOR, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Vibratory Disintegrator for Gas-Producers, of which the following is a full, clear, and exact description.

10 This invention relates to certain improvements in the manufacture of producer gas, and the object of the invention is to render practical the manufacture of producer gas from peat.

15 The main essential feature of my invention involves the disintegrating action on the peat caused by the expansion of the gas occluded in the peat or held within its pores, and interstices. I utilize the gas or a portion thereof manufactured from the peat to operate an engine, and utilize the exhaust gas from this engine for creating the alternate compression and rarefaction of the air and gas in the peat chamber. To aid in the
25 disrupting and disintegrating of the peat to facilitate the production of the gas, I preferably mount the engine within the base or beneath the producer, and support the grate or floor of the peat chamber on the engine
30 base, so that the jar and vibration of the engine will be communicated to the peat.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the
35 figures, and in which—

Figure 1 is a vertical section through an apparatus constructed in accordance with my invention; Fig. 2 is a vertical section
40 through a form of apparatus somewhat simpler than that shown in Fig. 1; Fig. 3 is a longitudinal section through the muffler which operates to alternately compress and expand the air in the peat chamber; and
45 Fig. 4 is a transverse section on the line 3—3 of Fig. 3.

In the accompanying drawings, I have illustrated two embodiments of my invention, but I wish these specific forms to be
50 considered merely illustrative of the invention, as it is evident that various other forms may be designed, without departing from the spirit of my invention as defined in the appended claims.

55 In the apparatus shown in Fig. 1, I em-

ploy a peat chamber 10, having heat insulating walls of any suitable character and provided with one or more charge openings in the top thereof. As shown, each charge opening includes a receiver 11, having a
60 hopper 12 at the lower portion normally closed by a movable bell 13. Each receiver is provided with a cover 14, which may be sealed air-tight to prevent the escape of gas.

The producer operates according to the
65 well-known method of manufacturing producer gas, that is, air is admitted to the fuel, in this case peat, and a slow combustion is maintained in the peat chamber.

In the lower portion of the peat chamber
70 is a floor, grate or basket 15, for supporting the peat and permitting the access of the necessary air thereto. This floor or grate is supported some distance above the bottom of the apparatus, and below the grate is
75 formed a chamber or compartment 16, within which is mounted the engine. This engine may have any desired number of cylinders and may be of any desired size or construction, but as illustrated there are four
80 cylinders 17, 18, 19 and 20, all rigidly mounted upon the same base 21. This base is so supported that it may move to a very limited extent by the jar or vibration caused by the explosions within the several cylin-
85 ders. As shown, the base 21 of the engine is supported upon very heavy springs 22, so that the entire engine and base may vibrate.

Extending upwardly from opposite ends of the base 21 are posts or standards 23,
90 which directly support the floor or grate 15 of the peat chamber. Thus, as this floor or grate is rigidly connected to the base 21 and the latter jars or vibrates during the explosions in the engine, it is evident that this
95 jarring or vibrating effect will be transmitted to the peat and the latter will be continuously agitated to aid in breaking up and disintegrating the fibrous mass. To further aid in mechanically breaking up the peat, I
100 may, if desired, provide a rotatable helical agitator 24, normally embedded within the peat and having a shaft extending up through the top wall and provided with a bevel gear wheel 25. This bevel gear may
105 intermesh with a bevel pinion 26, mounted on a shaft 27, and the latter may be directly connected to the engine shaft by a chain 28 and suitable sprockets. Thus the peat will be mechanically agitated not only by the jar-
110

ring of the engine but also by the action of the agitator 24.

The most important feature of my invention is the alternate rarefaction and compression of the gas within the peat chamber, and the utilization of the exhaust from the engine for accomplishing this result. Within the producer and preferably directly below the grate or floor 15, I provide a muffler 29 in the form of a comparatively thin box having distensible sides. The box as illustrated, is substantially rectangular in longitudinal section, and connecting the two opposite sides 30, 30 is a corrugated, fluted or accordion plaited peripheral wall 31. This peripheral wall is so formed that the opposite sides 30, 30 are spread apart by an increase in pressure of the gas within the muffler and tend to move toward each other upon a reduction of this gas pressure. The muffler is provided with an inlet conduit 32, connected to one end thereof, said conduit preferably having an elliptical or oblong discharge opening 33 in one end of the muffler. At the opposite end of the muffler is any suitable form of outlet conduit 34. The muffler is connected by the conduit 32 to the exhaust of the engine, so that the pulsations of the gas due to the intermittent and successive delivery from the engine upon the successive openings of the exhaust valve of the engine, will cause the pressure in the muffler to alternately rise and fall, and cause the opposite sides to be alternately distended and contracted. This vibration of the opposite sides of the muffler causes a corresponding variation of the gas pressure within the peat chamber and the variation in pressure is communicated throughout the entire mass of peat to the smallest interstices. This expansion of the gas in the pores and in the interstices of the peat, following each compression, operates to disrupt or break down the cellular and fibrous structure of the peat, and facilitates the escape of the occluded gas. This gas is of a combustible nature as it has been formed by the partial decomposition or decay of the vegetable matter making up the peat.

This vibratory disintegrator operates not only to facilitate the escape of the gas within the peat, but it also serves to render the transmission of the heat throughout the entire mass of peat more uniform. The peat is a very poor heat conductor, but by agitating it and disintegrating it in accordance with my invention, the peat is permitted to become heated more uniformly and the lower portion of the mass of peat is prevented from becoming entirely consumed before the upper portion of the mass of peat becomes thoroughly heated.

If a fast running engine having a large number of cylinders be employed, it is evident that there would be very little varia-

tion in the pressure in the exhaust pipe from the engine and that the opposite sides of the muffler would not have time to move to any appreciable extent between successive deliveries of exhaust gas. It is, therefore, desirable to connect the muffler to only one of the engine cylinders if the engine be a fast running one, but if the engine be a very slow running engine, it may be found desirable to deliver the exhaust gas from two or more cylinders to the muffler.

In the specific form illustrated in Fig. 1, I deliver the exhaust gas from all of the engine cylinders to the muffler, as the engine is assumed to be a very slow running engine.

A very much simpler embodiment of my invention is illustrated in Fig. 2, in which I have omitted the mechanical agitator 24 and employed only a single engine cylinder 17^a, the exhaust from which is delivered to the muffler.

It is to be understood that the gas generated in my improved producer is not delivered directly to the gas engine, but is conducted through a conduit 35 to any suitable form of scrubber and purifier, and thence to a gas receiver, from which the gas may be drawn off for use either in a gas engine or for any other suitable purpose. By placing the engine within the base of the producer, I utilize the heat of the engine for heating the air necessary to supply to the peat.

I preferably provide each engine cylinder with a jacket to which air is delivered through a conduit 36 and from which the heated air may escape through conduits 37 to the space beneath the peat chamber. It may be found that the amount of air delivered through the several conduits 37 will be more than is needed, and I therefore provide a conduit 39 connecting all of the conduits 37, and at the intersection of this conduit with each of the conduits 37, I provide a three-way valve 40. By controlling these valves I may deliver the air from the jackets to the space beneath the peat chamber, or I may deliver all of this air to the exterior of the producer, or I may deliver the air from certain of the jackets to the inside of the producer and deliver the air from the other jackets to the exterior, as may be found most desirable. The space beneath the floor or grate 15 is preferably subdivided by a horizontal partition or diaphragm 38, which prevents the small particles of peat and the like from dropping directly on to the engine.

Substantially all of the gas may be driven off from the peat in accordance with my invention, and the residual mass used for coke, but, if desired, I may interrupt the process before the coking is completed, and utilize the residuum as a fertilizer.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent:

5 1. A gas producer, including a chamber adapted to receive peat, and means for rapidly and intermittently varying the gas pressure within said chamber.

10 2. A gas producer, including means for supporting peat, an internal combustion engine operated by the gas from the peat, and means operated by the engine for disintegrating the peat, said means operating to rapidly vary the pressure of the gas within said peat.

15 3. A gas producer, including means for supporting peat, an internal combustion engine operated by the gas from the peat, and means operated by the engine for disintegrating the peat, said means comprising a vibratory disintegrator operated by said engine and serving to rapidly raise and lower the pressure of the gas within said peat.

20 4. A gas producer, including means for supporting peat, an internal combustion engine operated by the gas from the peat, and means operated by the engine for disintegrating the peat, said means comprising connections between said engine and said supporting means for transmitting to the latter the jar of the engine.

25 5. A gas producer, including means for supporting peat, an internal combustion engine operated by the gas from the peat, and means operated by the engine for disintegrating the peat, said means comprising a vibratory disintegrator operated by the exhaust gas from said engine and serving to

rapidly raise and lower the pressure of the gas within said peat.

6. In combination, a gas producer having a chamber adapted to receive peat, a gas engine, and a vibratory disintegrator operated by the exhaust gas from the engine and serving to alternately raise and lower the pressure of the gas in the peat chamber. 40

7. An apparatus for obtaining gas from peat, including means for breaking up the peat by alternately and rapidly raising and lowering the pressure of the gas within the peat. 45

8. A gas producer, including a chamber adapted to receive peat, a second chamber, an internal combustion engine disposed within said second chamber and having a jacket, and means for delivering air through said jacket and delivering the same to the peat chamber to support combustion in the latter. 50 55

9. The combination with a gas producer having a peat chamber, of a gas engine having a muffler within said producer.

10. The combination with a gas producer having a peat chamber, of a gas engine having a muffler within said producer, said muffler having the opposite walls thereof distensible upon successive pulsations of the exhaust gas escaping from said engine. 60 65

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN JACOB ASTOR.

Witnesses:

CLAIR W. FAIRBANK,
WM. A. DOBBYN.