

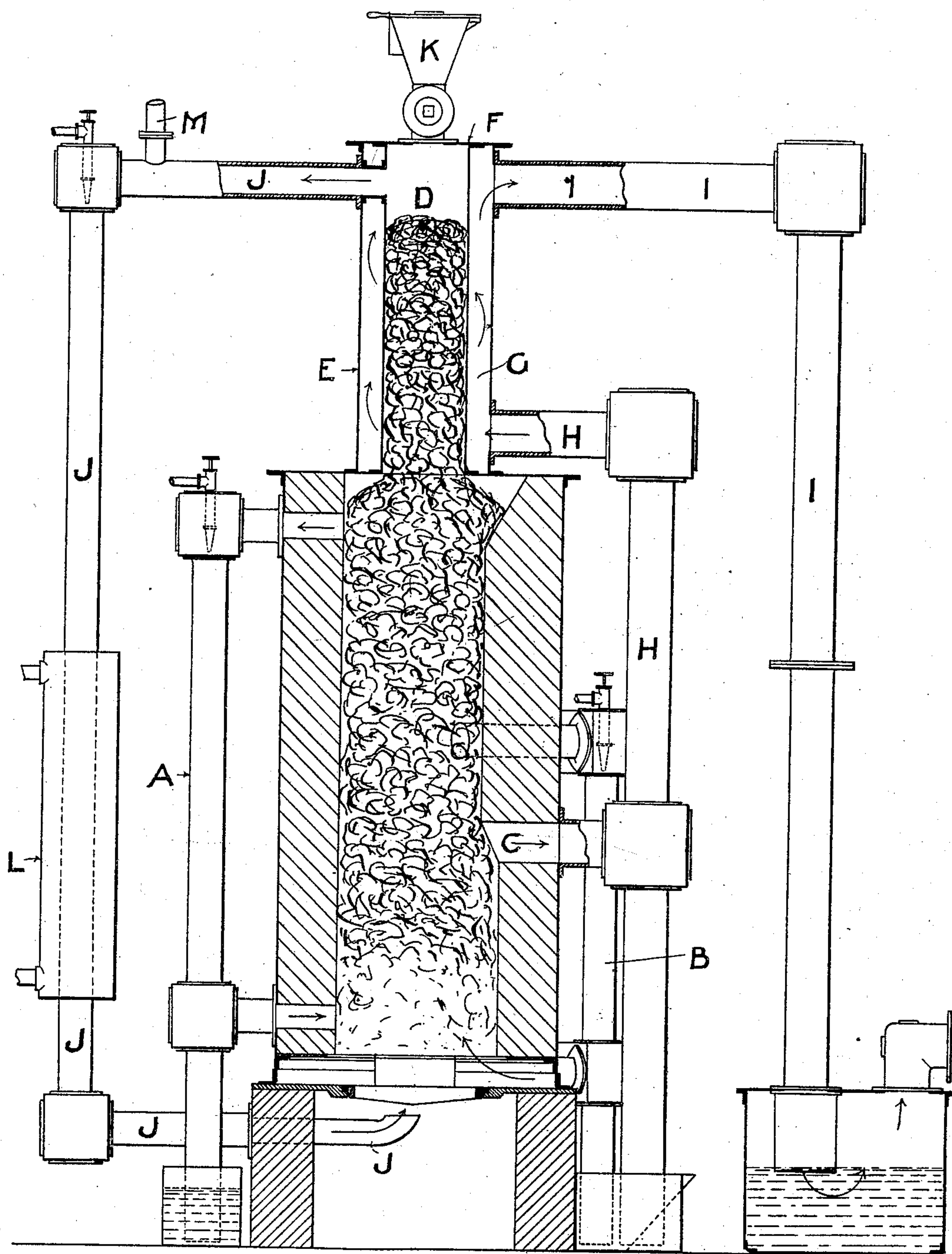
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C. WHITFIELD.

APPARATUS FOR THE MANUFACTURE OF COMBUSTIBLE GAS FROM PEAT.

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Witnesses:

Pickles D. Bailey.
John Camp.

Inventor.

Charles Whitfield

By his Attorney: Walter Gunn.

UNITED STATES PATENT OFFICE.

CHARLES WHITFIELD, OF KETTERING, ENGLAND.

APPARATUS FOR THE MANUFACTURE OF COMBUSTIBLE GAS FROM PEAT.

No. 795,874.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed January 17, 1905. Serial No. 241,424.

To all whom it may concern:

Be it known that I, CHARLES WHITFIELD, a subject of the King of Great Britain and Ireland, and a resident of Kettering, Northampton, England, have invented a new or Improved Apparatus for the Manufacture of Combustible Gas from Peat and Like Substances, of which the following is a specification.

This invention relates to the production or manufacture of gas for power and heating purposes from peat, wood, bagasse, lignite, and other substances, but chiefly peat, in which the percentage of fixed carbon is low and that of volatile hydrocarbons and moisture is high. As is well known, peat has an affinity for moisture, and the presence of the moisture has in the past constituted a serious obstacle to the commercially successful use of peat in the production of a satisfactory combustible gas. Attempts to dry the peat in bulk prior to use have been made; but the cost has been such as to militate against the cheap production of the gas. Attempts have also been made to use the peat in its moist state, with the result that the moisture in the form of steam has been carried over by the gas, this being due to the heat generated by the combustion of the fixed carbon being insufficient to deal with the excess of moisture and the failure to bring the volatile products where they may be fixed by the heat of the generator.

This invention has for its object to overcome the said drawbacks and to convert the whole of the combustible in the peat into combustible gas in a manner which renders the use of the peat for gas-producing purposes a commercial practicability, or, in other words, which insures the said effects being obtained without the application of any other heat than that produced by the combustion of the fixed carbon to carbonic oxid.

To this end my invention consists, essentially, in utilizing the sensible heat of the producer-gas for evaporating the moisture in the fuel, drawing off such moisture when vaporized, and mixing it (wholly or partially) with the air used for maintaining combustion in the producer.

Upon the accompanying drawing the figure is a vertical section of a producer suitable for giving effect to my invention.

As shown, the producer is preferably of the type in which the lighter hydrocarbon

vapors are circulated through a pipe A, and the heavier or higher temperature vapors are circulated through a pipe B before leaving the generator through the final gas-outlet C.

According to this invention the top of the producer is fitted with a heating-chamber D, composed, preferably, of sheet metal incased by an outer shell E and closed at the top by a plate F. The outer shell E, as shown, lies away from the inner shell, and thereby produces an annular cavity or space G all around the chamber D. From the final outlet C of the producer to the lower end of the said cavity extends a pipe H, and from the upper end of such cavity extends a pipe I, by which the gas after circulating through the cavity is conveyed away to the scrubber, &c., in the usual manner.

From the upper end of the heating-chamber D extends a pipe J, which leads away to the ash-pit of the producer, as illustrated.

The top plates of the heating-chamber are provided with a charging-hopper K, through which the producer is charged with the peat, &c., the quantity being such as to keep the apparatus filled up to the top part of the heating-chamber, as shown.

With the producer at work and after it begins to be evolved the gas is circulated through the pipes A and B. It then leaves by the final outlet C, from whence it passes through the cavity G and after circulating around the heating-chamber leaves by the pipe I. In thus causing the hot gas to pass through the cavity C use is made of the sensible heat of the gas to heat up the peat and evaporate the moisture contained in the peat prior to its entering the producer. Simultaneously the gas by giving up its heat to the peat is cooled and prepared for subsequent treatment. The moisture in the peat thus evaporated passes to the top of the heating-chamber D and from thence passes or is drawn off through the pipe J. The moisture thus carried away is wholly or partially used for helping to work the producer and for that purpose is either passed directly to the ash-pit or is first passed through a condenser L to extract the surplus moisture and then passed with the air into the ash-pit or lower part of the producer, where it is utilized in the production of the gas. The pipe J may lead from the chamber at a point other than the highest and in some instances from the lowest point.

In some cases the air for combustion and

the vapor may both pass through the condenser, and thus insure a more uniform saturation of the air; but in that case the condenser will require to be larger than when the vapor only is passed through it. A convenient point at which the air may enter and mingle with the vapor is at M, the injector for drawing off the vapor serving also to draw in the air. In such connection the air may be used to work the injector. In some cases the air and vapor may pass direct to the ash-pit without condensation or with only such condensation as the air alone will afford.

The mixture of air and vapor may be introduced into the ash-pit or producer under pressure or not, as desired, and the cooling may be such as to condense only the excess of moisture over the amount required for the production of gas of the desired quality.

Some portions of the gas may pass up into the chamber D and pass over with the vapor; but when the gas is circulated by injectors through the pipes A B it will have very little tendency to reach the heating-chamber D; but should any of the gas in any case find its way into the heating-chamber and be drawn over with the moisture it will not be wasted, but will pass with the moisture, &c., into the ash-pit or producer and be utilized in promoting the economical working of the producer.

It will now seen that with the peat, &c., dried or relieved of moisture immediately prior to its being used in the producer it cannot again take up moisture before being consumed, as is the case when the drying process is carried on as a separate process, and with the moisture vaporized, drawn off, and used to saturate the air for working the producer it is put to a useful purpose.

What I claim is—

1. In apparatus of the character indicated, a producer, a chamber fitted to the upper part of said producer through which the

fuel is fed to the producer, a jacket surrounding the said chamber, a pipe leading from the final gas-outlet of the producer to said jacket, a further pipe leading from the said jacket, a pipe leading from the interior of the said chamber to the ash-pit of the producer, and means for drawing the vapor from the chamber and delivering it into the ash-pit, as set forth.

2. In apparatus of the character indicated, a producer a jacketed chamber fitted to the upper part of the producer, means for conveying the hot gas from the producer through the jacket of said chamber, means for drawing off vapor from the interior of the chamber and delivering it to the ash-pit, and a condenser through which the vapor may pass on its way to the ash-pit, as set forth.

3. In apparatus of the character indicated, a producer, a jacketed chamber fitted to the upper part of the producer, means for conveying the hot gas from the producer through the jacket of said chamber, a pipe for conveying vapor from the interior of the chamber to the ash-pit, and means for delivering air into the said pipe and causing it to mix with the vapor and pass with such vapor into the ash-pit, as set forth.

4. In a gas-producer, a heating-chamber and fire-grate therefor, pipes for drawing off the volatile products from the upper parts of the producer and reintroducing them into the lower parts of the chamber, in combination with a jacketed chamber fitted to the upper part of the producer, means for conveying the gas from the producer through the jacket of said chamber, and means for drawing off the vapor from the interior of said chamber and delivering it to the ash-pit of the producer, as set forth.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

CHAS. WHITFIELD.

Witnesses:

JOHN CAMP,
PICKLES D. BAILEY.