E. G. JEWETT.

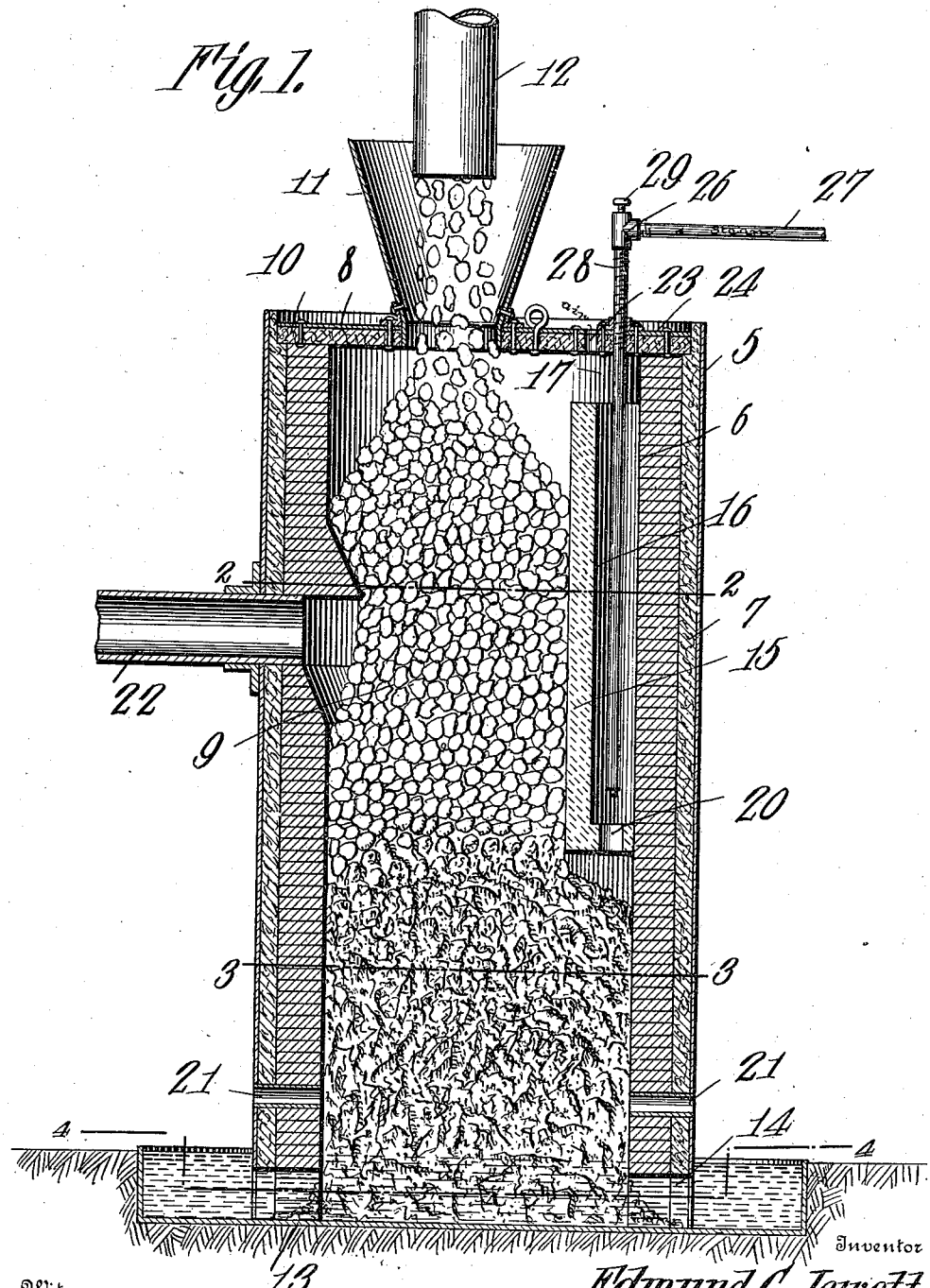
METHOD OF PRODUCING GAS.

APPLICATION FILED MAR. 6, 1908.

972,864. Patented Oct. 18, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

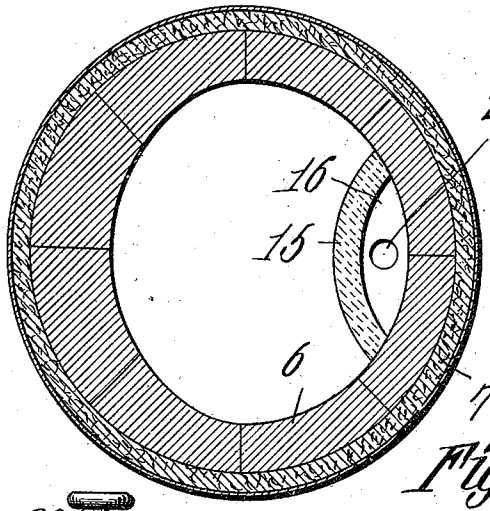

Fig. 2.

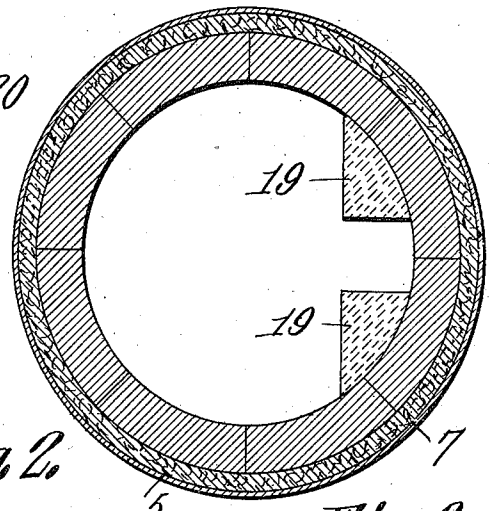

Fig. 3.

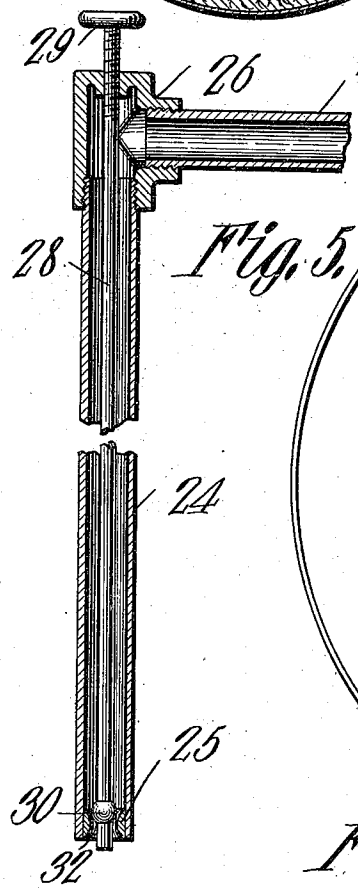

Fig. 5.

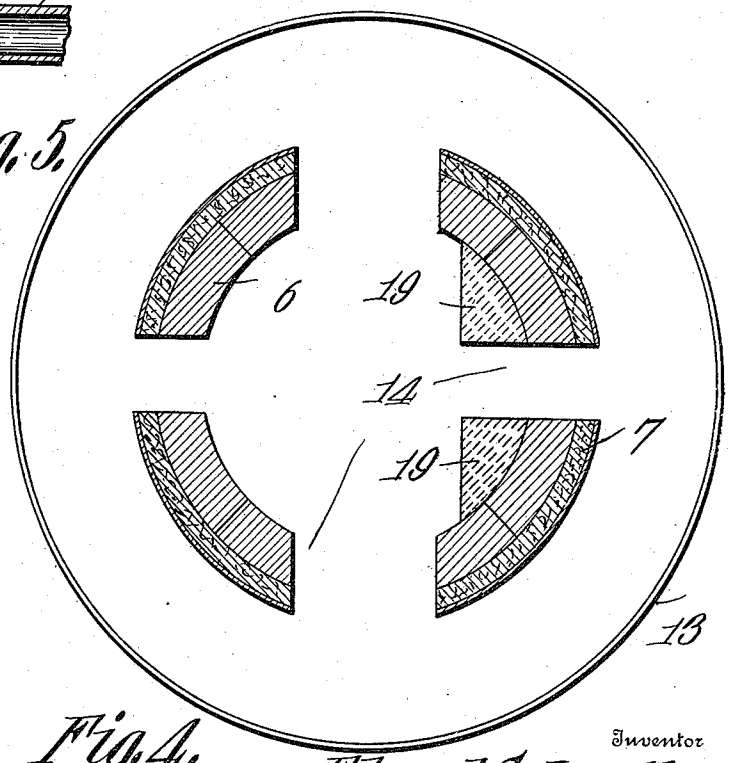

Fig. 4.

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UNITED STATES PATENT OFFICE.

EDMUND G. JEWETT, OF BELLINGHAM, WASHINGTON.

METHOD OF PRODUCING GAS.

972,864. Specification of Letters Patent. Patented Oct. 18, 1910.

Application filed March 6, 1908. Serial No. 419,583.

To all whom it may concern:

Be it known that I, EDMUND G. JEWETT, a citizen of the United States, residing at Bellingham, in the county of Whatcom and State of Washington, have invented a new and useful Method of Producing Gas, of which the following is a specification.

This invention relates to the manufacture of gas and more particularly to a method of eliminating heavy hydrocarbons resulting from the distillation of coal or other fuel when manufacturing said gas.

The method consists in burning the heavy hydrocarbons distilled from the fuel in the upper part of the producer and passing the products of that combustion through the incandescent zone of fuel in the lower portion of the producer.

In the accompanying drawings forming a part of this specification: Figure 1 is a longitudinal sectional view of a suction gas producer constructed in accordance with my invention. Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1. Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1. Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 1. Fig. 5 is an enlarged detail sectional view of the steam injector.

Similar numerals of reference indicate corresponding parts in all of the figures of the drawings.

The improved gas producer forming the subject matter of the present invention comprises a cylindrical body portion or casing 5 having a fire brick lining 6 surrounded by an asbestos jacket 7, the latter being preferably interposed between the casing 5 and lining 6, as shown. Mounted on the top of the cylinder or casing 5 is a removable cover 8 which forms a closure for the top of the fuel chamber 9, the latter being preferably extended the entire height of the cylinder. The cover 8 is also provided with an asbestos jacket or covering 10 and piercing the cover or closure 8 is a hopper 11 through which fuel is introduced into the chamber 9. If desired, however, a pipe or similar conductor 12 may be inserted through an opening in the cover 8 instead of employing the hopper 11 and in which event the pipe 12 will communicate with a coal bin or other source of coal supply on the floor of a building above the floor on which the producer is erected.

Surrounding the base of the cylindrical casing 5 is a pan or trough 13 adapted to contain a quantity of water so as to form a liquid seal, there being one or more openings 14 formed in the casing 5 and lining 6 so as to permit the removal of the ashes from the lower portion of the producer. Arranged within the chamber 9 is a vertically disposed partition 15 preferably segmental in cross section, as shown, and spaced from the adjacent interior wall of the chamber 9 to form a vertical flue or combustion chamber 16. The upper end of the partition 15 is spaced from the closure 8 to produce a passage 17 which forms a source of communication between the combustion chamber 16 and fuel chamber 9 so that hydrocarbons distilled from the coal in the upper part of the producer may pass into the combustion chamber and be burned and the products of that combustion blown through the incandescent zone of fuel in the lower part of the producer. The lower end of the partition 16 terminates short of the water pan or trough 13 and is supported in elevated position within the fire chamber 9 by means of spaced columns 19 formed of fire brick or other suitable refractory material, there being a closure extending across the bottom of the flue 16 and having a centrally disposed opening or orifice 20 formed therein to permit the passage of the products of combustion from the chamber 16 into the chamber 9.

The air is supplied to the lower portion of the producer through suitable pipes or intakes 21, the gases generated in the chamber 9 passing off through a vent pipe or conductor 22 extending laterally from one side of the producer. A suction fan is preferably connected with the vent pipe 22 for producing a suction in the fire chamber 9 and thus drawing the gases from said chamber through the vent pipe to a suitable source of consumption. It will of course be understood that the gases discharged through the pipe 22 may be conducted through the usual scrubbers and purifiers and when the gas is used for power purposes said gas may be passed through a boiler so that the heat of the gas may be utilized for generating steam. A suitable air vent 23 is also preferably formed in the cover 8 for admitting fresh air to the upper portion of the producer. If desired, however, the air vent 23 may be dispensed with, a sufficient quantity of air being admitted through the hopper with the coal when the

latter is fed to the chamber 9. A small quantity of air is also drawn downwardly between the cover and its seat when the fan is operated, it being noted in this connection that the cover is loosely fitted in the cylinder or casing so that the same may be readily removed to effect repairs of the interior of the producer.

Extending through the cover 8 is a steam pipe 24 the lower end of which projects within the flue 16 and extends to a point adjacent the lower end of the partition 15 and is provided with an annular bushing constituting a valve seat 25. The upper end of the pipe 24 is provided with a T coupling 26 which in turn is connected with a conductor 27 leading to a boiler, engine exhaust or other suitable source of steam supply. Threaded in the end of the coupling 26 is a threaded rod or stem 28 having one end thereof provided with a hand wheel 29 and its opposite end formed with a substantially globular valve 30 which engages the bushing or seat 25 so that by rotating the wheel 29 the quantity of steam discharged through the jet or orifice 32 may be regulated at will. The quantity of steam discharged through the orifice 32 is also regulated automatically by reason of the expansion of the pipe 24, that is to say, when the heat in the flue 16 becomes excessive the pipe 24 will expand and lengthen while the rod 28, being surrounded by steam, will remain relatively stationary thus increasing or decreasing the distance between the valve 30 and seat 25 with a corresponding increase or diminution of the volume of steam ejected through the orifice 32. It will thus be seen that the pipe 24 and rod 28 constitute in effect a thermostatic valve so as to permit the automatic or manual regulation of the steam admitted to the flue 16.

The interior walls of the casing or cylinder are projected laterally within the fuel chamber at the vent opening 22 so as to form an over-hang and thus prevent the coal or other fuel from clogging or otherwise obstructing the vent opening.

In operation the fire is started with wood, as coal fires usually are, leaving the air vents 21 open, the draft being produced by suction through the vent 22. Bituminous coal or similar fuel is then introduced through the hopper into the fire chamber 9 and steam admitted to the flue or combustion chamber 16 by manipulating the hand wheel 29. The steam discharged at the orifice 32 will create a down draft in the flue 16 greater than the suction produced in the conductor 22 thus drawing the hydrocarbons containing tar derived from the destructive distillation of the new coal at the top of the producer downwardly through the passage 17 into the combustion chamber or flue 16 when they are consumed, the products of that combustion being blown through the incandescent zone of fuel in the lower part of the producer. A portion of the gas is discharged through the pipe or conductor 22, while a small quantity thereof will pass upwardly through the new coal at the top of the producer thus super-heating the same and removing from it all volatile substances.

Attention is here called to the fact that the gases of distillation in the upper part of the producer are combustible gases with a temperature above that of the flame of the gas when ignited. The air necessary to promote combustion at that point is admitted through the aperture 23 above said combustion chamber. It will also be noted that the flame travels almost the entire length of the combustion chamber before coming in contact with the steam.

By passing the destructive hydrocarbon distillates of the coal from the upper portion of the producer into the flue 16 the same are effectually consumed thus producing a gas rich in hydrogen and carbon monoxid which is found very desirable when employed for power purposes.

Having thus described the invention what is claimed is:

A method of producing gas which consists in blasting a bed of fuel to incandescence, and simultaneously distilling a superposed body of fuel, and carrying the distilled and separated matter successively into contact with an excess of oxygen, to burn the same and then injecting said hot products of combustion by a steam blast, into the incandescent body of fuel from which the distilled matter has been previously expelled, whereby substantially complete combustion of the said distilled and separated matter is first effected, and the products of said combustion, together with the excess oxygen are injected into said incandescent body of fuel, the combustion of the distilled and separated matter taking place in a chamber inclosed by and communicating at its opposite ends with the chamber containing the incandescent bed of fuel.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

EDMUND G. JEWETT.

Witnesses:

CHAS. A. SOTHER,

HELEN DOANE.