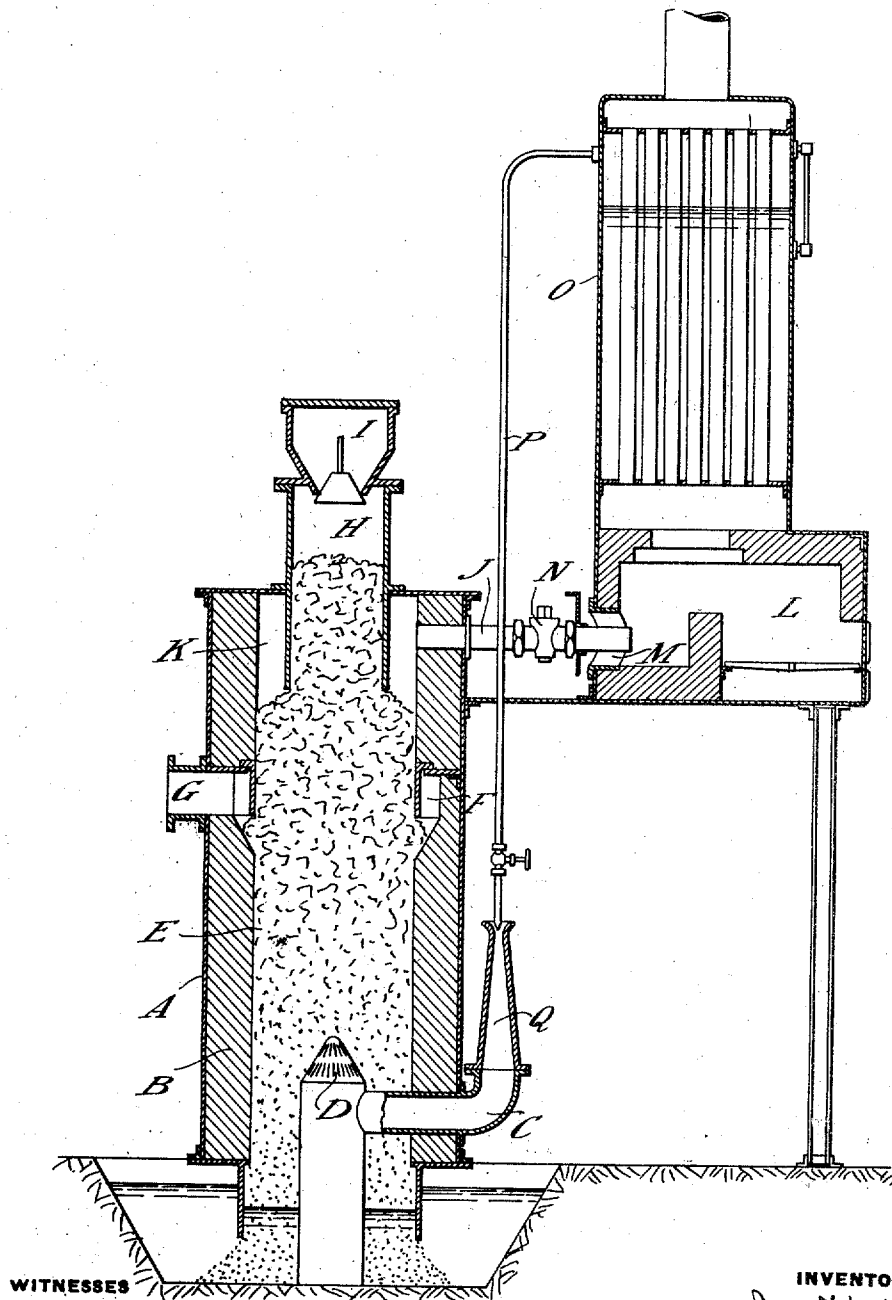


J. FIELDING.
METHOD OF WORKING UPDRAFT GAS PRODUCERS.
APPLICATION FILED JAN. 18, 1909.

986,374.

Patented Mar. 7, 1911.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN FIELDING, OF GLOUCESTER, ENGLAND.

METHOD OF WORKING UPDRAFT GAS-PRODUCERS.

986,374.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed January 18, 1909. Serial No. 472,997.

To all whom it may concern:

Be it known that I, JOHN FIELDING, a subject of the King of Great Britain, residing at Sherbourne House, in the city and county of Gloucester, England, have invented certain new and useful Improvements in the Method of Working Updraft Gas-Producers, of which the following is a specification.

The present invention relates to the working of upward draft gas producer of the type using bituminous fuel in which the main body of gas is led off at a level where the fuel is more or less incandescent so that only a small proportion of condensable gases are carried off with it, the bulk of such condensable gases or vapor being led off at a higher level, usually above the fuel level, and used for the generation of steam in a suitable boiler.

It has previously been proposed to employ such a gas producer for the driving of gas turbines, the fixed gases after passing through a scrubber being compressed and burned along with compressed air in a chamber leading to the gas turbine, the steam generated by the combustion of the uncooled condensable vapors being supplied to the combustion chamber simultaneously with the air and combustible gas. I therefore make no claim to this manner of utilizing the steam generated by the combustion of the condensable vapors.

Experience in the working of gas producers using bituminous fuel shows that it is essential to proper and regular working that some means be employed to prevent the clogging up of the fire by the accumulation of clinker and ash and in practice it is found that this is most effectively accomplished by passing through the body of the fire a relatively large volume of steam which not only tends to reduce or prevent the formation of clinker, but also enriches the composition of the gas by the addition of hydrogen resulting from the decomposition of the steam in its passage through the fire.

I have found that the amount of steam which can be generated by the combustion of the condensable gases is not greater than is required or can be economically used for this purpose. According to my invention therefore I cause the steam generated by the combustion of the condensable vapors to enter the fire along with the air supply, it being found convenient first to use the steam

for the purpose of driving an engine to work a fan or blower for forcing the air, together with the exhaust steam into the producer, or instead of the fan or blower a steam injector blower may be used, this arrangement providing a kind of closed circuit within the producer plant for the utilization of the whole or part of the condensable vapors derived from the first stage of the combustion of bituminous fuel, for the generation of the steam necessary in the working of the producer.

It is to be observed that by the method of working gas producers herein described in which the steam generator is fired by a proportion of the gas generated, the amount of steam will vary automatically in proportion to the total consumption of fuel and therefore in proportion to the amount of clinker to be reduced, and also the enrichment of the gas by the addition of hydrogen will be more or less automatically regulated. It combines the greatest economy with great simplicity of working and automatic regulation of the fire and quality of gas.

In the practice of my invention the condensable vapors are led from the producer to a fire-brick lined chamber where they are mixed with air and are burned, causing the brick lining to become intensely heated, so that any tar which might be deposited from the condensable vapors is immediately gasified on contact with the red-hot bricks, thereby preventing accumulation of tar in the furnace. The hot gases from this chamber are led into the fire-box of the boiler.

Apparatus for carrying out the process according to the invention is illustrated in the accompanying drawing, which is a sectional elevation of a producer and a steam generator connected with a steam ejector in an air inlet pipe.

A is the producer chamber lined with suitable refractory material B; C is the inlet pipe through which air and steam enter and pass to the central nozzle D which has perforations adapted to distribute the air and steam through the mass of the fuel E.

F is an annular collecting space from which the gas passes out through pipe G. The fuel at the level of the space F being practically incandescent, the bulk of the gases passing out through pipe G are fixed gases and only a small amount of condensable gases are present so that a comparatively small cleansing plant is necessary for

purifying the gas and the amount of practically valueless tarry residues from the cleansing apparatus will therefore also be small.

5 The fuel is fed from a hopper I through a tube H depending within the producer chamber A, so as to leave an annular space K from which the gases which are mainly condensable gases due to distillation caused
10 by radiated heat are carried by a short pipe J to a combustion chamber L lined with suitable refractory material where they mix with air entering the chamber at M and are burned; the combustion products being used
15 to generate steam in the boiler O which may be of any suitable type and from which the steam may be led through pipe P direct to the producer or to a steam blower Q in air inlet pipe C for supplying air to the producer. A regulating valve N controls the
20 supply of gases to the boiler furnace and the quantity of air mixed therewith may be similarly regulated.

25 Having thus described the nature of my said invention and the best means I know of carrying the same into practical effect, I claim:—

30 1. The method of working upward draft gas producers for the production of a pure gas from bituminous fuel, which consists in taking off the fixed gases and condensable

vapors at different levels in a producer, mixing the condensable vapors with air and burning the mixture in a steam generator furnace, and introducing the steam so produced together with the supply of air to the said producer, whereby substantial self-regulation of the producer is obtained, the rate of consumption of the fixed gases being accomplished by a corresponding rate
35 of generation of the condensable vapors and consequently of the steam supplied to the producer.

2. The method of working upward draft gas producers for the production of a pure
45 gas from bituminous fuel which consists in taking off the fixed gases and condensable vapors at different levels in a producer, mixing the condensable vapors with air and burning the mixture in a steam generator
50 furnace, using the steam so produced for the supply of air to the said producer and introducing the steam together with the air into the producer; substantially as described.

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

JOHN FIELDING.

Witnesses:

JOSEPH MILLARD,
W. J. SKERTEN.