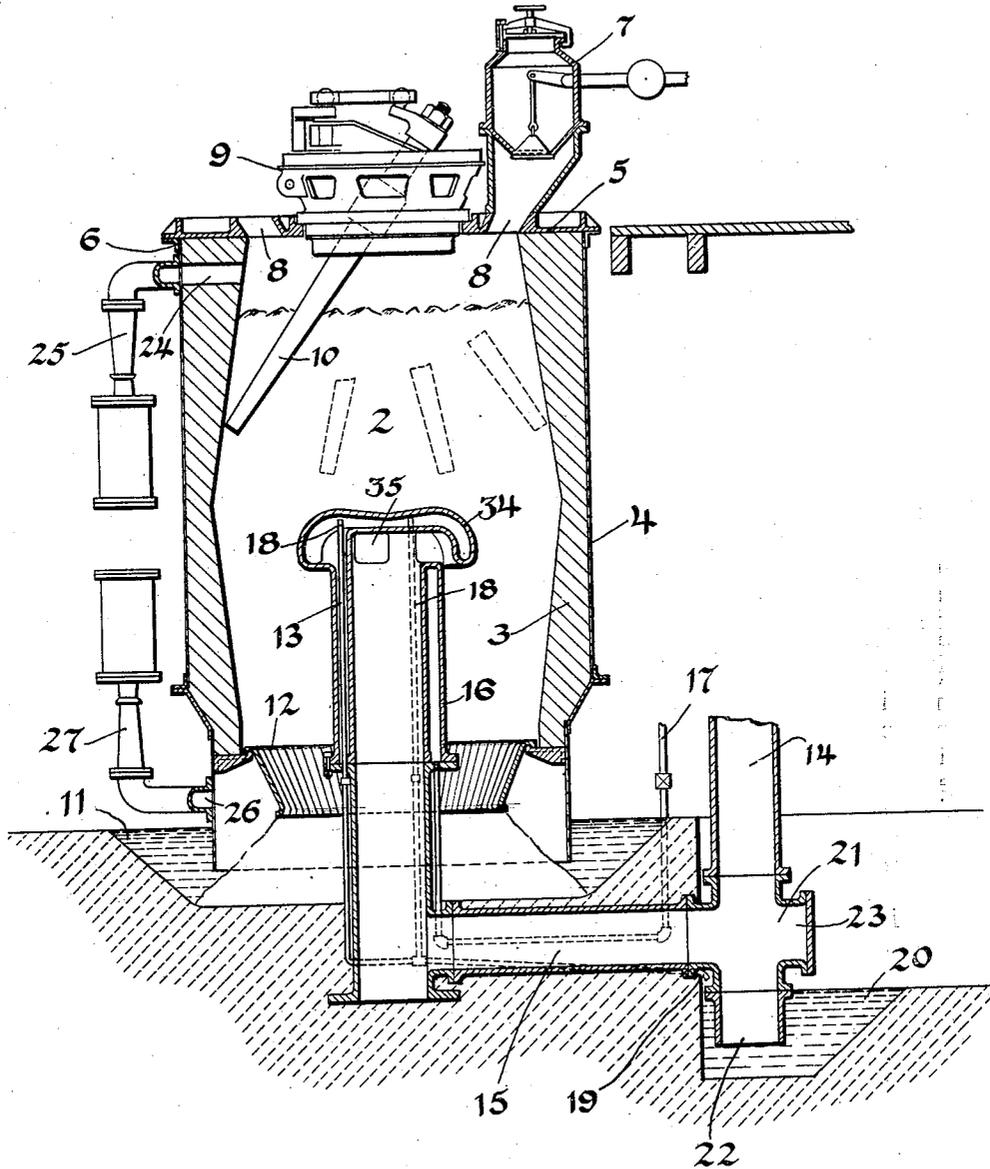


No. 890,951.

PATENTED JUNE 16, 1908.

G. WESTINGHOUSE.  
GAS PRODUCER.  
APPLICATION FILED DEC. 29, 1905.



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# UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

## GAS PRODUCER.

No. 890,951.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed December 29, 1905. Serial No. 293,817

*To all whom it may concern:*

Be it known that I, GEORGE WESTINGHOUSE, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Producers, of which the following is a specification.

This invention relates to gas producers and more particularly to producers adapted to utilize bituminous or soft coal as fuel.

The object of this invention is the production of a producer capable of generating a tar-free gas.

A further object is the production of a producer in which effective means are utilized for obtaining complete combustion and gasification of the fuel.

A further object is the production of a producer in which means are utilized for conserving a portion of the sensible heat of combustion in the fuel bed and utilizing said heat in an effective manner.

A further object is the production of a producer in which effective means are utilized for maintaining a porous and homogeneous fuel bed.

These and other objects I attain in a producer embodying the features herein described and illustrated in the single sheet of drawings accompanying this application in which

Figure 1 is a vertical section of a producer embodying my invention.

The gas generating chamber 2 is provided with a suitable lining 3 inclosed within a cylindrical shell portion of the producer. The top portion 5 is suitably connected to the shell portion by flange angle 6 and is provided with a suitable number of fuel feeding devices 7 adapted to discharge fuel through passages 8 into the interior of the gas generating chamber 2. A motor-driven stirring apparatus 9, mounted on the top portion 5, is provided with an arm 10 which extends into the gas-generating chamber and is so arranged that while operating it will thoroughly agitate the fuel contained in the upper portion of the chamber 2.

The shell portion 4 extends downwardly below the level of the water contained within a water pan 11 which forms an ash pit for the producer. The water contained in the water pan seals the interior of the producer and the pan is constructed to provide easy means for

the removal of the ash from the ash pit without interfering with the operation of the producer. Grate bars 12 are suitably supported at the bottom of the gas-generating chamber and are adapted to support the fuel bed contained therein. A gas offtake 13 communicates with a gas main 14 through a pipe 15 and extends through a water pan 11 and the grate 12 into the central portion of the gas-generating chamber. The gas offtake is provided at its top with a hood 34 arranged to prevent fuel in the gas-generating chamber from entering the gas passages. Gas offtake ports 35 are arranged in the offtake 13 below the hood portion 34 and are located near the central portion of the gas-generating chamber 2.

The hood portion 34 and the portion of the offtake in the gas-generating chamber are integrally formed and are provided with a water jacket 16 which is supplied with water from any suitable source through a valved pipe 17. The jacket water is discharged from the jacket through pipes 18 which extend through the interior of the jacket to the upper part of the interior passages in the hood portion 34 and are so arranged that the jacket will always be full of water. The pipes 18 connect with a pipe 19 which discharges into a hot well or water receptacle 20 from which the boiler operating the producer or any boiler may be supplied with feed water.

A dust trap 21 is located between a main 14 and the pipe 15 and is provided with a water sealed discharge port 22 and a port 23 with a suitably sealing means which provides access into the interior of the trap. The tendency for the gas to deposit dust or other solid material, which may be mechanically entrained in the trap, is increased by the arrangement of the pipes 14 and 15 and the trap 21 which causes the gas to turn abruptly on leaving the pipe 15 and then move vertically upward through the main 14.

The producer is provided with a blast inlet 24 extending through a shell 4 and lining 3 of the producer and entering the gas generator 2 above the fuel bed. The inlet 24 is suitably connected to an air and steam supply or other source of blast by a pipe 25. A blast inlet 26 is provided below the grate bars 12 and is connected to a blast source by a pipe 27. The blast inlets 24 and 26 may be provided with independent or dependent controlling valves but are preferably so ar-

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ranged that the major portion of the operating blast enters the chamber 2 through the inlet 24 above the fuel bed, the portion entering the inlet 26 being sufficient only to insure complete combustion of the fuel below the gas outlet ports 35.

A producer constructed in accordance with my invention overcomes the serious difficulties encountered in operating bituminous or soft coal producers. The stirring arm 10 in conjunction with the up and down blast inlets overcomes the tendency of the fuel to bridge and to mat or pack which is due to the coking action of the bituminous fuel and the formation of volatile carbon or flocculent tar in the cooler portions of the fuel bed. The gas offtake 13 and the blast inlets 24 and 26 are so arranged that the tar or volatile content of the gas is low for the reason that the blast enters the chamber 2 above and below the fuel bed thereby creating a flow of blast from all parts of the fuel bed towards its center. It is obvious that all the blast entering the chamber must pass through the central and hottest portion of the fuel bed before it is discharged through the gas offtake ports 15 and that the blast entering below the fuel bed in flowing towards the off-take ports 15 is thoroughly distributed throughout the lower portion of the fuel bed and therefore insures the complete combustion of any fuel that may have passed below the offtake ports 35. Since all the blast must pass through the central or hottest portion of the fuel bed, the tarry vapor and volatile material will be fixed into permanent gases and the gas generated in the generating chamber will be practically free from tar. The water jacket 16 besides being adapted to protect the gas offtake 13 is adapted to utilize a portion of the superfluous sensitive heat of the combustion within the fuel bed in heating water which may be used for feed-water or for other purposes. It is obvious that various arrangements and constructions may be made by those

skilled in the art and still fall within the limits and spirit of my invention.

What I claim is:

1. In combination in a gas producer, a gas generating chamber provided with up and down draft inlet ports, a gas offtake pipe extending upwardly through the bottom of said producer into the center of said chamber and provided at the top with offtake ports, a water jacket surrounding said pipe, a water-cooled hood above said pipe, and means for maintaining a flow of cooling water through said hood and the water jacket of said pipe.

2. In combination in a gas producer, a gas generating chamber provided with up and down draft inlet ports, a gas off-take pipe extending upwardly through the bottom of said producer to the center of said chamber and provided at its upper end with off-take ports, a water jacket surrounding said pipe, a water-cooled hood located above said pipe and protecting said ports and communicating with said water jacket, and means for admitting cooling water to said jacket and discharging it from said hood.

3. In combination in a gas producer, a gas generating chamber provided with a blast inlet port, a gas off-take pipe extending upwardly through the bottom of said producer and into the center of said chamber and provided at its upper end with off-take ports, a water jacket surrounding said pipe, a water-cooled hood above said pipe and protecting said ports, and communicating with said water jacket, and means for admitting cooling water to said jacket and discharging it from said hood.

In testimony whereof, I have hereunto subscribed my name this 27th day of December, 1905.

GEO. WESTINGHOUSE.

Witnesses:

CHARLES W. MCGHEE,  
JNO. S. GREEN.