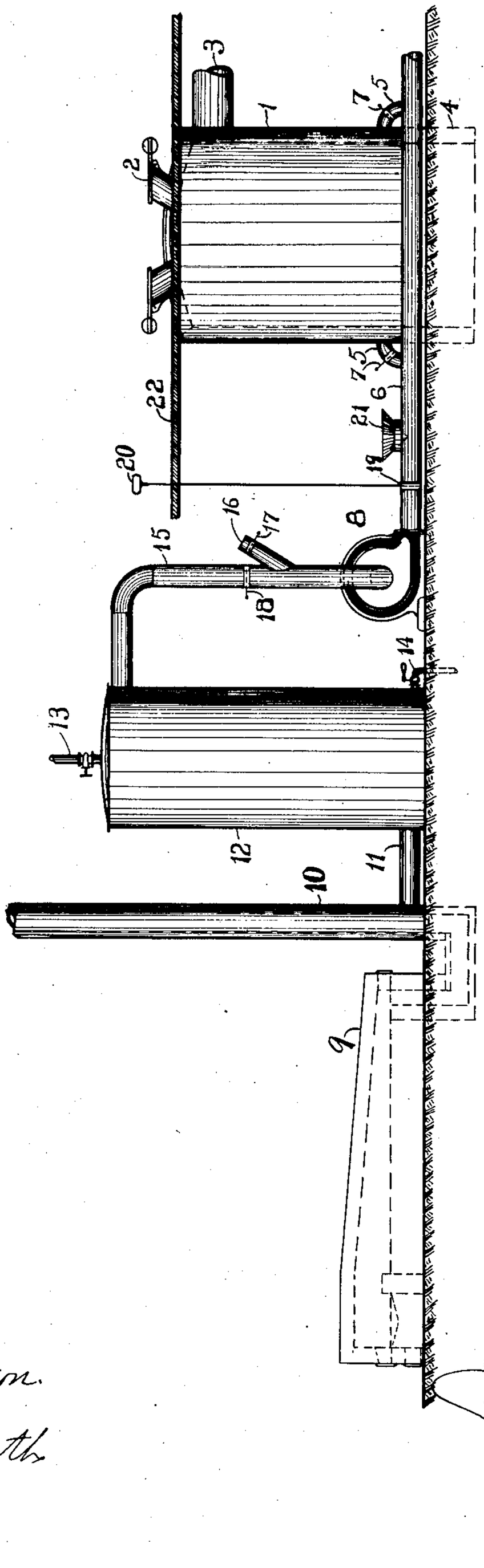
No. 814,279. PATENTED MAR. 6, 1906.

C. ELLIS.

APPARATUS FOR PRODUCING GAS.

APPLICATION FILED OCT. 21, 1905.



WITNESSES:

Warren E. Dixon.

Henry D. Smith.

INVENTOR

Carleton Ellis

UNITED STATES PATENT OFFICE.

CARLETON ELLIS, OF WHITE PLAINS, NEW YORK.

APPARATUS FOR PRODUCING GAS.

No. 814,279. Specification of Letters Patent. Patented March 6, 1906.

Application filed October 21, 1905. Serial No. 283,832.

To all whom it may concern:

Be it known that I, CARLETON ELLIS, a citizen of the United States, and a resident of White Plains, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Apparatus for Producing Gas, of which the following is a specification.

This invention relates to apparatus for the production of producer-gas in which washed and cooled products of combustion are used for the purpose of regulating and controlling the temperature of the gas-producing fuel mass.

The desirability of cooling products of combustion prior to introduction into gas-producers is well known in the art, being described in Patent No. 790,253, granted to me on the 16th day of May, 1905. Such cooling may be effected in various ways, and in the patent referred to I have shown a series of radiating fins as being a form of apparatus suitable for the purpose. The apparatus there shown does not, however, purify the products of combustion sufficiently for some applications, for it fails to free said products from furnace or flue dust. Purification I find to be often necessary, especially with the stack-gas of furnaces worked under strong draft, and consequently discharging waste gases charged with solid matter in suspension. Such solid matter is a source of annoyance in that it chokes the producer in the lower part about the twyers, where an "open" or free working fire is especially needed. This is the case in the operation of open-hearth steel furnaces, particularly during the "boil," when large quantities of iron oxid appear in the stack-gases and eventually clog the producer-fire. Again, the mixture thus discharged may be of an easily-fusible character, and therefore tend to bring about the formation of clinker through its fluxing action upon the ash of the coal.

The present invention has for its object the washing and cooling of the gases, preferably in one operation, in such a manner that the gases are delivered to the producer at the low temperature desired and are freed from all deleterious suspended matter.

The accompanying diagrammatic drawing shows the apparatus in elevation.

In the drawing, 1 is a gas-producer having the hoppers 2, the gas-outlet 3, water seal 4, twyers 5, blast-trunk 6, and damper 7.

8 is a blower of the centrifugal or positive type.

At 9 is shown a furnace having the stack 10 and the offtake 11 to the washing-tower 12. This tower is filled with coke, gravel, or other suitable material or grids and has a water-inlet at 13 and a water-outlet at 14. From this scrubbing-tower leads the connecting-pipe 15, extending to the blower 8. In this passage is placed an air-inlet 16 and the dampers 17 and 18.

19 is a damper placed in the blast-trunk 6 and operated by the rod 20.

21 is a safety device consisting of a cone filled with sand or weighted in some other manner and resting in a circular opening in the trunk 6.

The operation of the apparatus is as follows: Furnace-gases are drawn from the stack 10 through the passage 11 into the tower 12. As they enter at a high temperature and laden with dust they meet a downwardly-flowing stream of water, whereby cooling and washing are simultaneously instituted, the gases moving upwardly through the tower and being withdrawn near the top properly cooled and purified. In the pipe or conduit 15 admixture with air may be brought about by adjustment of the dampers 17 and 18 in order to produce an endothermic mixture capable of maintaining the producer-fire at the proper temperature. Cooled gases are admixed with air, if necessary, and forced by the fan into the producer 1. Cooling of the gases besides enabling the better control of the producer temperature also serves as a protection to the fan-blower or jet or other draft appliance employed. With cooled gases the blast-impelling means may be of smaller size and worked at slower speed than would be the case with hot gases, and this is an important consideration, as equipments destined for such use are often left in charge of unskilled workmen and slow-moving machinery handling cool gases requires less attention and is less likely to get out of order than high-speed machinery handling gases at a very high temperature. One advantage of this apparatus herein described lies in the damping action exerted by the washing-tower on such explosive mixtures as may form either through the backflow of the producer-gas or through the entrance of combustible gas from the stack through defective reversing-valves or otherwise. The water-

spray in the washing-tower effectually checks the travel of ignition of the explosive mixture. The proper proportioning of air to the stack-gases is best accomplished by trial, inasmuch as different fuels require different proportions of carbon dioxid to prevent the formation of clinker. The apparatus is such that such adjustment is easily effected, and the operator has no difficulty in regulating the composition of the blast mixture to produce the results desired. Regard should of course be had for such temperature regulation as will suffice to generate the maximum quantity of volatile hydrocarbons from the coal when bituminous coal is employed. As a rule the cooler the entering producer-blast the richer is the producer-gas in volatile hydrocarbons.

What I claim is—

1. A gas-producing plant comprising a gas-producer, a source of products of combustion, and means for washing said products and introducing the same into the producer.

2. A gas-producing plant comprising a gas-producer and means for introducing thereinto washed products of combustion and air in regulated proportions.

3. A gas-producing plant comprising a gas-producer, a source of hot products of combustion, a washing-tower and means for conveying said products through the washing-tower and into the producer.

4. A gas-producing plant comprising a gas-producer, a source of hot products of combustion, a washing-tower, means for conveying said products through the washing-tower and into the producer, and means for admixing regulated proportions of air with said products prior to entry into the producer.

5. A gas-producing plant comprising a fuel-burning furnace, provided with a chimney-stack, a gas-washer, a gas-producer and pipe connections provided with a draft-fan for causing a flow of waste gases from the stack through the washer into the producer, said pipe connections being also provided with means for admixing regulated proportions of air with the gases therein.

Signed at New York city, in the county of New York and State of New York, this 4th day of October, A. D. 1905.

CARLETON ELLIS.

Witnesses:
JAS. K. CLARK,
WARREN E. DIXON.