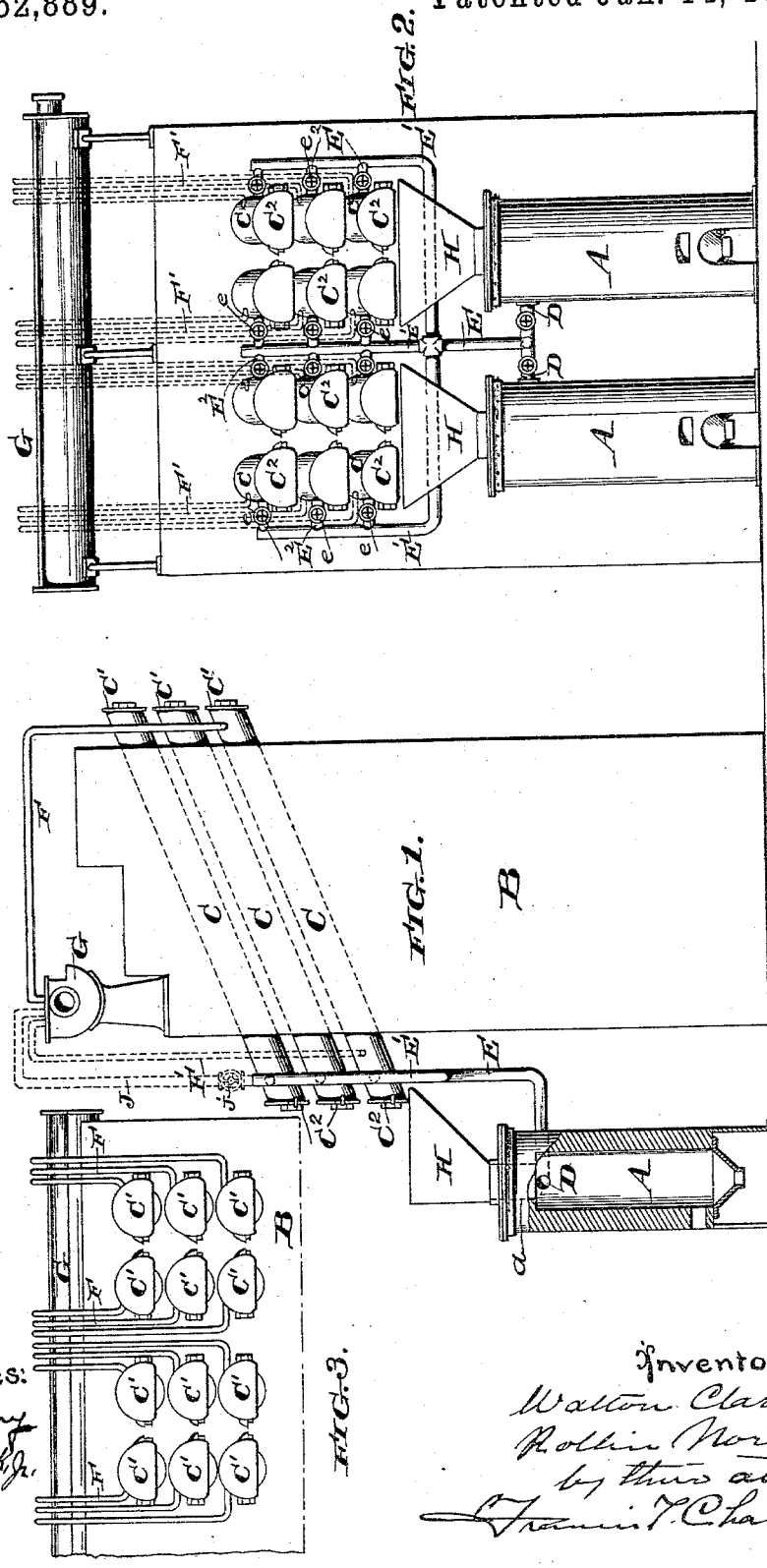


(No Model.)

W. CLARK & R. NORRIS.
APPARATUS FOR MAKING GAS.

No. 552,889.

Patented Jan. 14, 1896.



Witnesses:
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UNITED STATES PATENT OFFICE.

WALTON CLARK AND ROLLIN NORRIS, OF PHILADELPHIA, PENNSYLVANIA,
ASSIGNORS TO THE UNITED GAS IMPROVEMENT COMPANY, OF SAME
PLACE.

APPARATUS FOR MAKING GAS.

SPECIFICATION forming part of Letters Patent No. 552,889, dated January 14, 1896.

Application filed March 26, 1891. Serial No. 386,480. (No model.)

To all whom it may concern:

Be it known that we, WALTON CLARK, of Philadelphia, (Chestnut Hill,) and ROLLIN NORRIS, of the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in Apparatus for Making Gas, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to gas-making apparatus of the kind in which water-gas generators are combined with retorts for distilling bituminous coal, and particularly adapted for use in connection with apparatus, such as is described in Walton Clark's patent, No. 404,520, dated June 4, 1889. In this patented apparatus we have found that while it was decidedly advantageous to pass the water-gas from the generator through the retorts when freshly filled with coal the advantage decreased during the latter stages of the distillation of the coal in the retort, and that finally the passage of the water-gas through the retort had the effect of absorbing heat rather than communicating it to the coal. We have also found that where all of the retorts of a set are connected together at one end, as they are in Clark's patented apparatus, the opening of the end of one retort permits flames and gases to escape through it from the other retorts, this being objectionable both as interfering with the proper stoking and from the consequent loss of valuable gases. With a view of obviating the above-noted defects and of generally improving and cheapening the apparatus we have devised our present improvement.

Our invention consists in the improved apparatus for carrying out this process, which apparatus will be best understood as described in connection with the drawings in which it is illustrated, and in which—

Figure 1 is a side elevation of a generator and set of retorts constructed and provided with connections in accordance with our present invention. Fig. 2 is an elevation showing two sets of generators and retorts arranged side by side, and Fig. 3 is an elevation showing the charging ends of the retorts.

A A indicate the water-gas generators which are of usual construction; B, the masonry setting for the retorts, in which setting are formed proper flues, fire-chambers, &c., for the external heating of the retorts—such, for instance, as are described in Walton Clark's former patent.

C C C, &c., are the retorts, which are preferably set on an incline, as shown; C' C', &c., the charging-doors of the retort; C² C², &c., doors at their lower ends through which their contents are withdrawn. The door C² should be close to and above the tops of the generators A.

D D are water-gas conduits leading from the generators A A into a conduit E. The conduit E branches in the construction into three conduits E' E' E', from which branches E² lead to the ends of each retort C, valves *e* being provided in each of such branches so that they can be opened or closed at will.

F F are conduits leading from the opposite end of each retort C to a hydraulic main G.

The dotted lines F' indicate conduits leading from near the discharge ends of the retorts to the hydraulic main.

H H are hoppers which connect with the charging-ports *a* of the generators, and have their mouths arranged beneath the discharging-doors of the retort C.

In operating our improved apparatus the various retorts of each set are charged with bituminous coal at different times, so that the distillation of the bituminous coal will have just begun in one retort or in a certain number of retorts, while in another retort or a number of retorts it will be partially completed, and in a third set of retorts it will be entirely completed and the coke ready for discharge. The water-gas formed in the generator or generators passes through the conduits D, E, and E', and thence through the conduits E² to each retort. When a retort is freshly filled with coal the valve *e* in the pipe E² leading to it is opened, and the water-gas then passes through the retort, mixing with the coal-gas formed in it, the mixed gas escaping through pipe F near its charging-door and being connected to the hydraulic main. After the retort has been raised to a temperature

in excess of the temperature of the water-gas, the valve *e* leading to that retort is closed and the further distillation of the coal continued without admission of any water-gas to the retort, the coal-gas escaping in the same way as before to the hydraulic main. It is of course easy for the operator to determine about how long the valve *e* should remain open and how much of the distillation of the coal should be carried on by external heat alone. Some of the pipes *E*² will of course always be open so that the water-gas will always escape through some of the retorts to the hydraulic main.

When the distillation of any batch of coal is completed, the discharging-door at its lower end is opened and the stoker opening the charging-door pushes the coke out into the funnel *H*, whence it falls into the generator to be used in the manufacture of water-gas; or if no fuel is required in the generator the coke can be taken off and stored for future use. The pipe *E*² leading to the generator which is being discharged and refilled is of course always closed, and as the retort has no communication with either the generator or any other retort of the set the stoker will not be interfered with by escaping gases nor will any valuable gases be lost.

While we prefer to pass the water-gas

through the retorts during the portion of each run, it is yet true that many of the advantages of our apparatus can be secured by an arrangement of take-off pipes which do not draw the water-gas through the retort—thus, for instance, by carrying the take-off pipes, as indicated by dotted lines at *F'*, from the same end of the retorts that the pipes *E*² lead into. We find it advisable also to provide a by-pass pipe leading from the generator to the hydraulic main or receiver—as for instance, a pipe *J*, Fig. 1, with a valve *J'*—so that a portion of the water-gas can at proper times be led directly to the main without entering the coal-retorts.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

In combination with a water gas generator, a set of coal retorts, water-gas conduits leading from the generator to each retort, valves arranged to close each such conduit independently; gas take-off conduits leading from each retort, and a by-pass leading from the generator to the hydraulic main or receiver.

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