

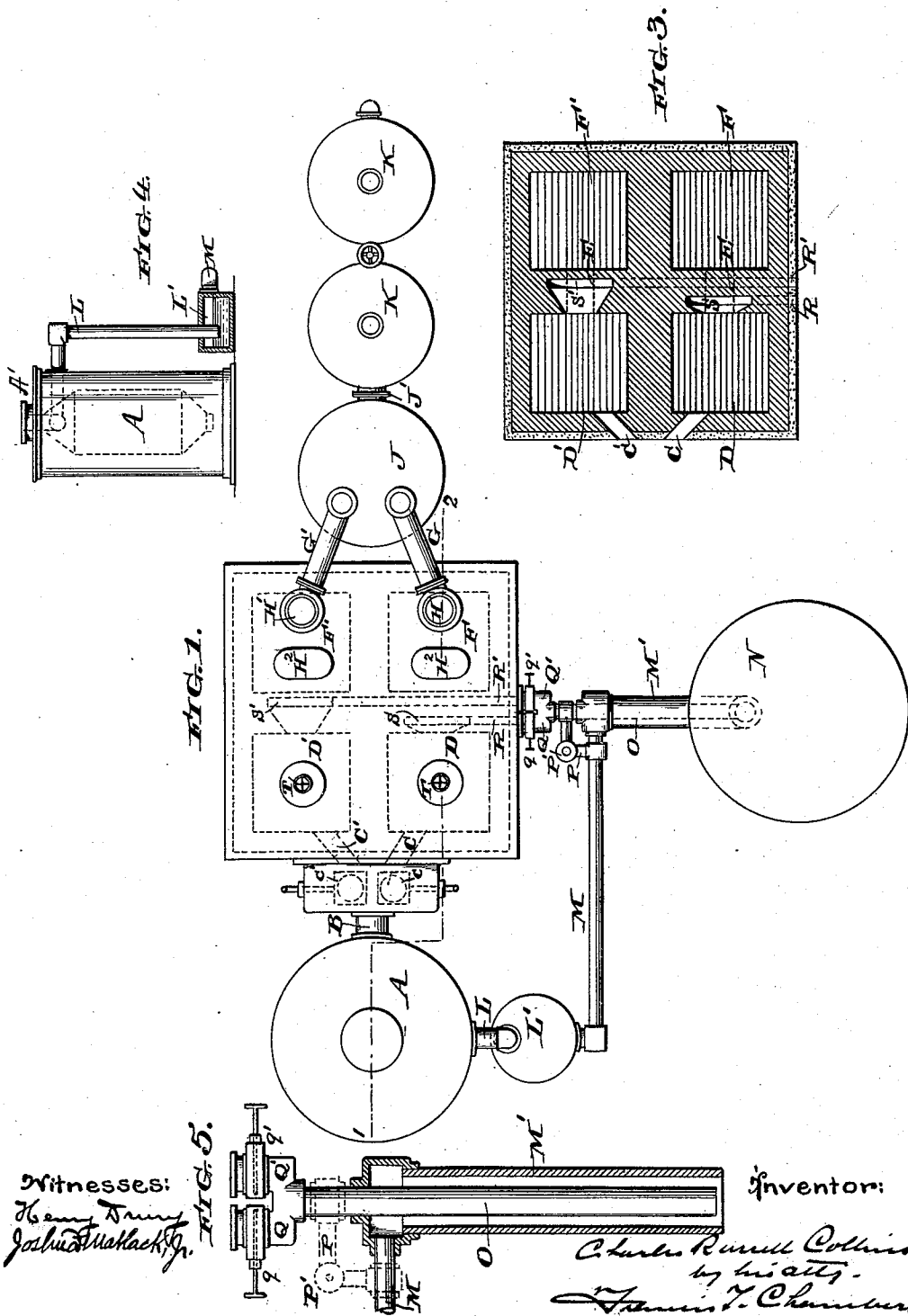
(No Model.)

3 Sheets—Sheet 1.

C. R. COLLINS.
GAS MAKING APPARATUS.

No. 472,785.

Patented Apr. 12, 1892.



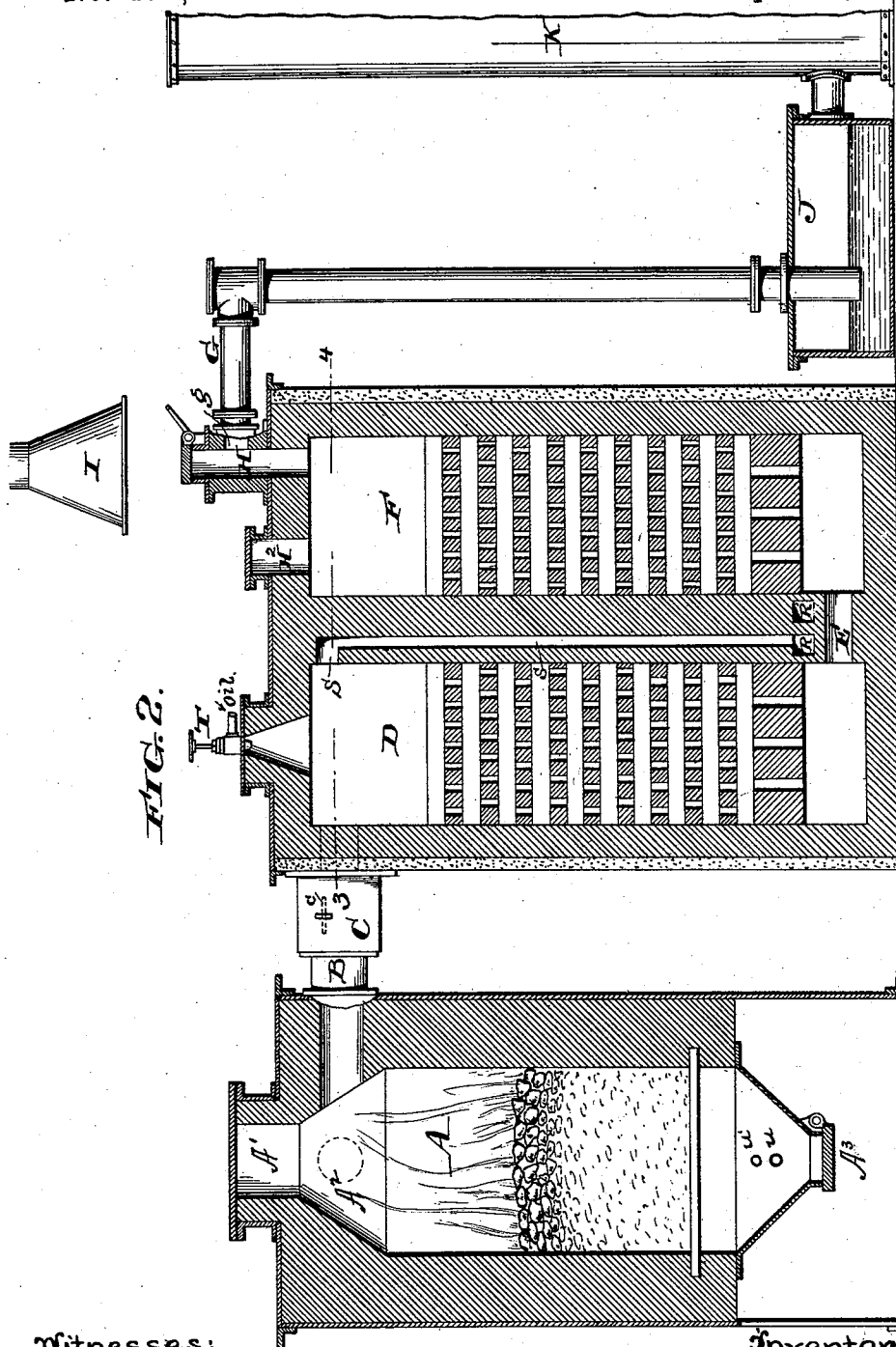
(No Model.)

3 Sheets—Sheet 2.

C. R. COLLINS.
GAS MAKING APPARATUS.

No. 472,785.

Patented Apr. 12, 1892.



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(No Model.)

3 Sheets—Sheet 3.

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No. 472,785.

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FIG. 6.

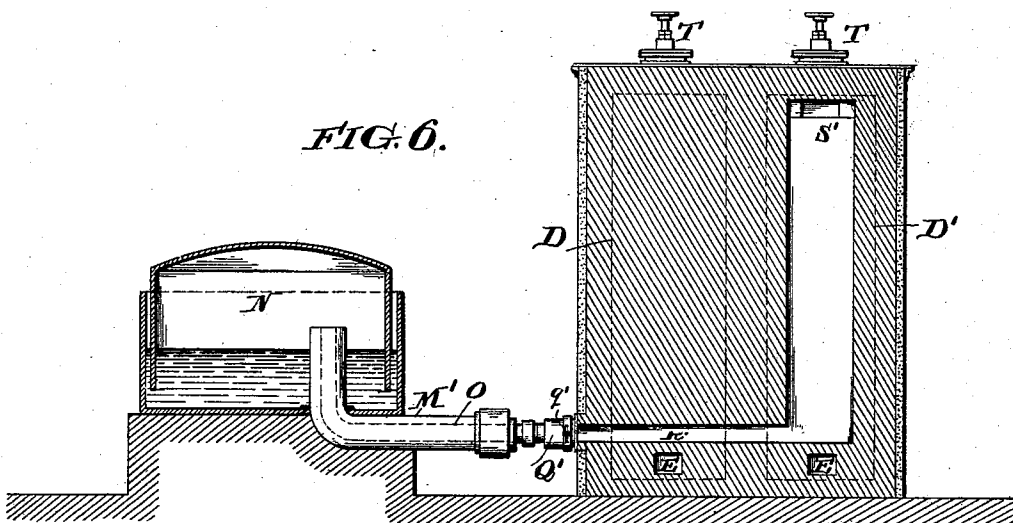


FIG. 7.

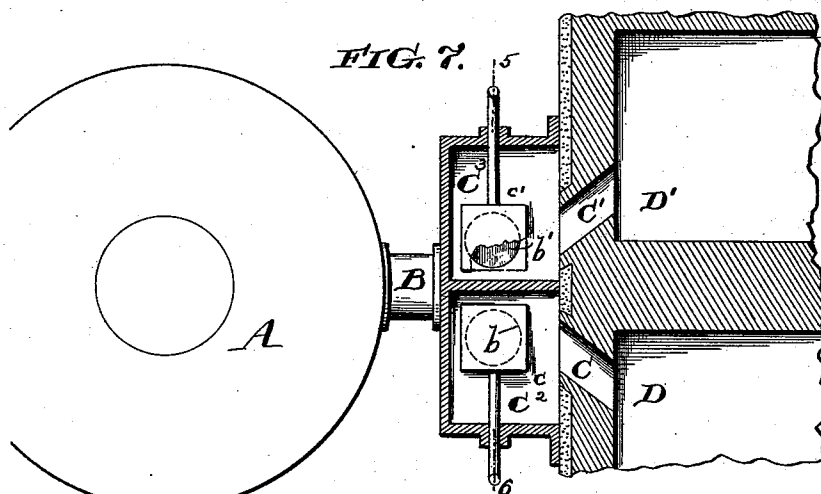
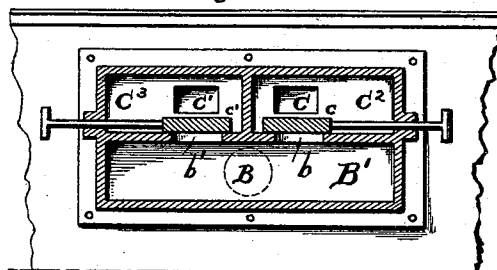


FIG. 8.



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Francis T. Chambers

UNITED STATES PATENT OFFICE.

CHARLES R. COLLINS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
THE UNITED GAS IMPROVEMENT COMPANY, OF SAME PLACE.

GAS-MAKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 472,785, dated April 12, 1892,

Application filed January 20, 1891. Serial No. 378,391. (No model.)

To all whom it may concern:

Be it known that I, CHARLES RUSSELL COLLINS, of the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improved Gas-Making Apparatus, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the construction of apparatus for the manufacture of carbureted water-gas, and has for its object to provide an apparatus in which the process of carbureting and fixing the water-gas may go on continuously, while the generator forming part of the apparatus is run intermittently, alternately making producer gas, which is used for heating the fixing-chambers, and water-gas, which is carbureted in said chambers.

The leading features of my improved apparatus consist in the combination, with a generator, of two separated and independent carbureting and fixing chambers or sets of chambers connecting independently with the generator, a gas-receiver or relief-holder connecting with the generator, conduits leading from the receiver to each carbureting and fixing chamber or set of chambers, and valves arranged in the conduits between the generator and the carbureting and fixing chambers and between the receiver and the carbureting and fixing chambers, by which gas can be directed from the generator and relief-holder to either carbureting and fixing chamber at will.

My invention will be best understood as described in connection with the drawings, in which it is illustrated, and in which—

Figure 1 is a plan view of an improved apparatus constructed in accordance with my invention; Fig. 2, a sectional elevation taken on the line 1 2 of Fig. 1; Fig. 3, a plan view taken on the section-line 3 4 of Fig. 2; Fig. 4, an elevation of the generator and the conduit leading from it to the receiver; and Fig. 5, a view, partly in section and on an enlarged scale, of the conduit leading from the receiver to the super heating-chambers, showing the devices preferably used in connection with it. Fig. 6 is a sectional elevation taken through the receiver and a masonry wall of the carburet-

ing and fixing chambers along the flue R'; Fig. 7, an enlarged plan, partly in section, showing the valves regulating the delivery of gas from the generator; and Fig. 8 is a section on the section-line 5 6 of Fig. 7.

A is the generator of usual construction, having a charging-opening closed by a lid (see Fig. 2) at A' and a gas-exit passage A² near its top. (Indicated by a dotted line in Fig. 2, because it is really on the side of the generator which is cut away.) A hinged gate A³ is provided at the bottom of the generator for the removal of ashes, and below the grate an air-blast pipe U and steam-pipe U' enter it. A conduit B also opens from the upper part of the generator, and, as shown, this conduit opens into a box B', which communicates through openings b b' with chambers C² and C³, from which in turn lead conduits or flues C C'. The passages b b' are opened or closed at will by valves c c'.

The conduits C and C' lead, respectively, to two separate and independent fixing-chambers or sets of fixing-chambers, in which the gas is carbureted and fixed. As shown, each such chamber consists of a chamber D or D', into which the gas-conduits lead, and into which provision is made for introducing the carbureting material. As shown, an oil-injector T is placed at the top of the chamber. The chambers D and D' should preferably be partly filled with checker-work and opened at their bottoms through conduits E into fixing-chambers F and F', respectively. These chambers being also filled with checker-work, as shown in the drawings. From the chambers F and F' conduits H G and H' G' lead to a wash-box J, which in turn communicates with scrubbers K, from which the gas is led to the place of use or storage.

Returning again to the generator, another conduit L leads from opening A² and through a seal-box L' and conduit M M' to a gas-receiver or relief-holder N. From the said receiver a pipe O leads, branching or forking at its end, as shown at Q Q', and communicating with conduits or flues R and R', formed in the masonry of the superheating-chambers. The flue R communicates with the vertical flue S, which opens into the top of the cham-

ber D, and the flue R' communicates with the vertical flue S', which opens into the top of the superheating-chamber D'. Valves *q* and *q'* are provided for controlling the passage of gas from the receiver to the chambers D and D'.

In order to economize the heat of the gas coming from the generator to the receiver, I cause the delivery-pipe O of the receiver to pass through the pipe M', the pipe O being thus jacketed with the hot gases coming from the generator, and I also prefer to provide a by-pass P, connecting the pipes M and O, as shown in the drawings, the said by-pass being furnished with a valve P', by which it can be opened or closed at will. This valve P' can, if desired, be an automatic valve, which will open whenever a determined amount or pressure of gas is accumulated in the receiver.

H² H³ indicate openings leading into chambers F F' for cleansing them.

The operation of my improved apparatus can be readily followed. Thus, for instance, a fire being lighted in the generator and fuel, coal, or coke supplied thereto, air is forced through the fuel, and the producer gas thus produced allowed to escape through conduit B and conduits C C' into the two sets of carbureting and fixing chambers, in which it is burned, in order to heat the chambers, the products of combustion being allowed to escape by opening the valve at the top of pipes H H', when they will pass through said pipes into the stacks I, placed above them.

In starting the apparatus one or both of the sets of carbureting and fixing chambers can be heated at the same time. When the fuel in generator is sufficiently ignited, the air-blast is turned off and steam turned into the bottom of the generator, which, passing through the fuel, is converted into water-gas. The valves *c* and *c'* having been previously closed, the water-gas passes from the generator through the conduit made up of L, L', M, and M' to the receiver or relief-holder N. The valves *q* and *q'* are allowed to remain closed until a sufficient amount of water-gas is accumulated in the relief-holder, and in the meantime, if more than one blast is required to accumulate the desired quantity of water-gas, the valves *c* and *c'*, or one of them, are opened whenever the steam is turned off and the air-blast turned on to the generator. A sufficient quantity of water-gas having been accumulated in the receiver and the carbureting and fixing chambers having been raised to a proper temperature, the operation is continued as follows: The valve *q* is opened, the valve *q'* closed, the valve *c'* opened, and the valve *c* closed. The air-blast being now in operation in the generator, the producer gas passes through the chambers D' and F' and escapes through the conduit H', which is opened at the same time with the valve *c'*, the gases of course being burned in the chambers D' and F' while passing through them. At the same time water-gas passes from the

relief-holder N through the chambers D and F, carbureting material being introduced in said chambers, as described, and the carbureted gases escaping through pipe G to the washer and scrubbers, the valve at the top of pipe H being of course closed. When the blast of the generator is continued long enough, the valve *c'* is closed, the steam again turned into the generator, and the water-gas formed in it escapes through the conduits L and L' and M and M' to the receiver N. When this run of water-gas is continued sufficiently long, the steam is shut off and the air-blast again admitted to the generator. The valve *c'* is previously closed, the valve *c* opened, the valve *q* closed, and the valve *q'* opened, and at the same time the valve at the top of pipe H is also opened. The producer gas then passes through and is burned in the chambers D and F, restoring the heat previously consumed in the carbureting of the gas, and the water-gas passes through chambers D' and F', and the valve at the top of pipe H' being closed the carbureted gases escape through pipe G' into the washer and scrubbers. It will be seen that by the above-described arrangement and operation I am enabled to keep a constant and practically uniform supply of water-gas passing through the carbureting and fixing chambers in spite of the fact that the generator is run intermittently, manufacturing alternately producer and water gas.

During the manufacture of water-gas in the generator it will often be convenient and desirable as a plan for economizing heat to pass the gases directly from the conduit M to the conduit O without first passing them into the receiver N. As a convenient device for so operating the apparatus I have shown the by-pass P, controlled by valve P', which can be opened either by hand or automatically when a sufficient quantity of gas has been accumulated in the receiver.

It is obvious, of course, that my apparatus can be used not only in the way above described, and for which it is peculiarly adapted, but also for the manufacture and carbureting of gas in the familiar intermittent way—that is to say, by first passing producer gas through both sets of chambers and burning it therein, and afterward passing the water-gas into said chambers to be carbureted and fixed.

As shown in the drawings, the carbureting and fixing chambers are of the kind adapted to be heated by internal combustion; but it will be understood, of course, that I do not limit myself to any particular construction of the carbureting and fixing chambers, which may be constructed in accordance with any of the numerous plans now in use. I may state, however, that I decidedly prefer the plan of heating the chambers by internal combustion. The gas is forced from the generator by its own pressure and from the receiver by the weight of the dome containing it, the valves *q q'* regulating the delivery of gas from

the receiver and being so set that the delivery is gradual.

I have in the specification and claims referred to chambers D, D', F, and F' as carbureting and fixing chambers; but it will be understood that in so describing them I do not intend to limit my invention on a construction in which the oil or other carbureting material is introduced directly into the chambers, for it is familiar practice to introduce the carbureting material at various points—as, for instance, in the generator—when it passes, together with the gas to be carbureted, into the carbureting and fixing chambers.

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

1. An apparatus for making carbureted water-gas, having, in combination, a generator, two carbureting and fixing chambers or sets of chambers, each having independent connection with the generator, a gas-receiver connecting with the generator, separate conduits connecting each carbureting and fixing chamber with the receiver, and valves arranged to control the course of gas from the generator and receiver to the carbureting and fixing chambers, substantially as and for the purpose specified.

2. An apparatus for making carbureted wa-

ter-gas, having, in combination, a generator, two carbureting and fixing chambers or sets of chambers, each having independent connection with the generator, a gas-receiver connecting with the generator, separate conduits connecting each carbureting and fixing chamber with the receiver, a by-pass connecting the conduit leading to the receiver with the conduits leading therefrom, and valves arranged to control the course of gas from the generator and receiver to the carbureting and fixing chambers, substantially as and for the purpose specified.

3. An apparatus for making carbureted water-gas, having, in combination, a generator, two carbureting and fixing chambers or sets of chambers independently connected with the generator, a receiver, a conduit leading from the receiver to the generator, a conduit leading from the receiver jacketed by the conduit leading into it from the generator, independent connections from the conduit leading from the receiver to each set of carbureting and fixing chambers, and valves situated in the conduits for governing the course of the gases, all substantially as and for the purpose specified.

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Witnesses:

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