

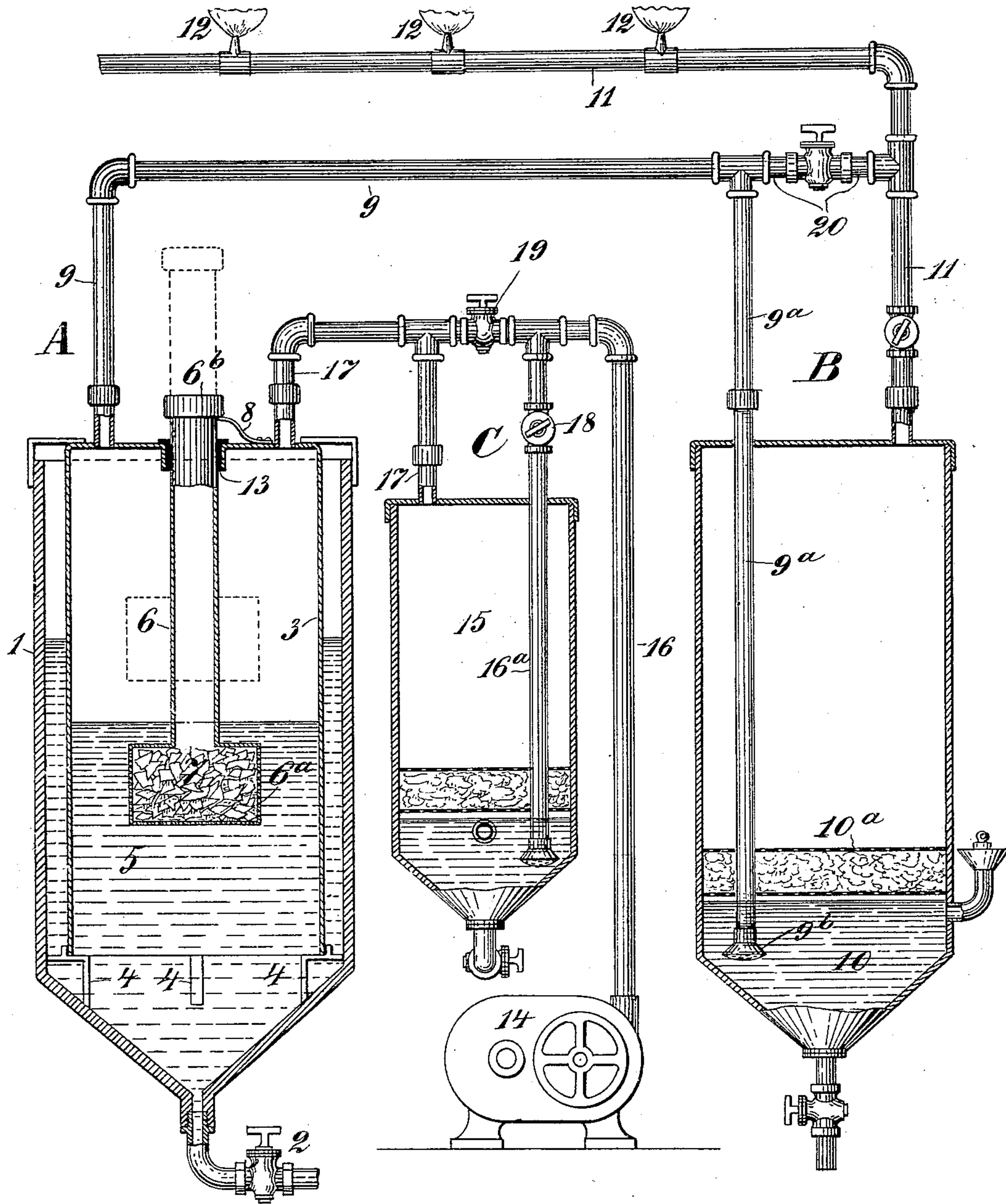
(No Model.)

W. H. & G. E. RUSSELL.

APPARATUS FOR MANUFACTURING CARBURETED HYDROGEN.

No. 602,408.

Patented Apr. 12, 1898.



WITNESSES:

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APPARATUS FOR MANUFACTURING CARBURETED HYDROGEN.

SPECIFICATION forming part of Letters Patent No. 602,408, dated April 12, 1898.

Application filed September 14, 1897. Serial No. 651,597. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. RUSSELL and GEORGE E. RUSSELL, citizens of the United States, and residents of Hasbrouck Heights, Bergen county, New Jersey, have invented certain new and useful Improvements in the Manufacture of Gas, of which the following is a specification.

Our invention relates to the manufacture of combustible gas, and particularly of gas adapted for illumination; and it consists in the apparatus employed in such manufacture.

Our invention consists in the liberation of hydrogen by the decomposition of water simultaneously by electrolysis and chemical action and the forcing of carbureted air into the generator, whereby it is intimately mixed and more or less combined with the hydrogen in the generator. The mixed air and gas may also pass through a carbureter on its way to the burners or a holder; and the invention has also for its object to produce an apparatus well adapted for house use or small plants, to produce a cheap gas, and to produce a gas of low specific gravity and high illuminating power, whereby it may be supplied through the same house-pipes that are employed for ordinary illuminating-gas and used with small burners.

In the accompanying drawing, which illustrates an embodiment of our invention, the figure is a vertical section or sectional elevation of the apparatus as we prefer to construct it.

C represents the carbureted-air-supply apparatus as a whole. A represents the generator as a whole, and B an additional or enriching carbureter.

The generator A is adapted for decomposing acidulated water both electrolytically and chemically for the production of nascent oxygen and hydrogen. This generator comprises an outer open vessel or reservoir 1, provided at its bottom with a cock-controlled waste-outlet 2 for drawing off sediment, &c. Within the vessel 1 is an inverted cup 3, preferably of copper and forming one electrode of the pile. This cup rests on supports 4 in the vessel 1 at its lower edge, whereby the acidulated liquid 5 in the vessel is permitted to pass freely under its lower edge. Any con-

venient means for effecting this object may be substituted for that shown.

Mounted in the bottom of the inverted cup 3 and insulated electrically therefrom is a tubular conductor 6, preferably of copper and having a receptacle 6^a at its lower pendent end to contain the other electrode 7, preferably zinc in scraps. The receptacle 6^a, which will by preference and for convenience be made of greater diameter than the tube 6, may be of copper connected integrally or electrically with the tube 6. The basket or receptacle 6^a will be perforated or foraminous. The outer end of the tube 6 is closed by a metal cap 6^b, and on the cup 3 is fixed a metal contact piece or spring 8, which comes in contact with the cap 6^b when the tube 6 is depressed and closes the circuit between the electrodes 3 and 7 of the pile.

Coupled by a union to the inverted cup 3 is a delivery-pipe 9 for the gas, which extends over to the carbureter B and connects there with a branch pipe 9^a, which extends down into the liquid hydrocarbon 10 therein, where said branch pipe is provided with a perforated nozzle or tip 9^b.

So far as described the action is as follows: When the generator is charged as described, the basket 6^a is submerged in the liquid electrolyte 5, which may be dilute sulfuric acid, and electrical action and chemical action are set up. By the former water is decomposed, and the freed gases (oxygen and hydrogen) rise in the holder formed by the inverted cup 3. Chemical decomposition is also set up, the zinc combining with the acid to form zinc sulfate, and hydrogen being liberated, this latter also rising in the holder. The carbureted air from the apparatus C flows to the generator under some pressure, and the latter is made quite hot by the chemical action going on therein, and the carbureted air is mixed with the gases in the generator. The mixed gases generated as described pass through the pipes 9 and 11 to the burners 12 or may pass through the pipes 9 and 9^a to the enriching-carbureter B, where they pass into the liquid mass 10, and then rise, passing through a filtering-diaphragm 10^a to eliminate any liquid particles held in suspension. This filtering-diaphragm may be conveniently made of mineral wool

held between two sheets of perforated metal or gauze. From the upper part of the carbureter B the gas may pass to the service-pipe 11, here shown as provided with burn-
5 ers 12.

The device C in its preferred form shown in the drawing comprises a suitable blower or air-forcing apparatus 14, driven by any power whatever, a carbureter 15, which may
10 be like the carbureter B, a pipe 16 and branch 16^a, connecting the eduction side of blower 14 with said carbureter, and a pipe 17, which leads the carbureted air to the hydrogen-gen-
erator.

Should the gases in the generator A accu-
15 mulate beyond that escaping at the burners, the liquid 5 in the inverted cup 3 will be depressed while it rises in the exterior vessel 1, and by removing the liquid more or less from
20 contact with the electrode 7 thus reduces the generation of gas. This action of the accumulated gas serves as an automatic regulator. If it be desired at any time to arrest the pro-
duction of gas in the generator, the tube 6
25 may be drawn up until the basket 6^a is above the level of the liquid 5, as seen in dotted lines. To enable it to do this, the tube 6 is made to play through an insulated gland or
packing 13. The scraps of zinc 7 may be in-
30 serted at the upper end of the tube 6 after the cap 6^b has been removed.

We have stated that the cup 3 will be of copper, by preference, and the electrode 7 of
35 zinc; but we do not limit ourselves in this respect. Other metals having similar electrical qualities may be used. The outer vessel 1 of the generator may be of any suitable material—as glass, for example.

Our gas produced by the generator may be
40 employed for enriching and rendering lighter the illuminating-gases now in use, such as the common "street-gas," so called, and the heavy gasolene-gas.

Having thus described our invention, we
45 claim—

1. In a gas apparatus the combination with

the hydrogen-generator A, the carbureter B, the pipe 9, connecting said carbureter and generator, the carbureted-air-supply apparatus C, connected with the generator A, of a
50 service-outlet leading from the carbureter B, and a valved by-pass connecting said service-outlet and said pipe 9, substantially as and for the purpose described.

2. In a gas apparatus, an electrical genera-
55 tor A, for decomposing the acidulated water forming the electrolyte of the generator, said generator comprising a vessel 1, a cup-like electrode 3, inverted in said vessel, a tube 6, mounted in the bottom of the inverted cup 3,
60 and insulated therefrom, said tube being adapted to play longitudinally in its bearing, a foraminous holder or basket 6^a on the lower end of the tube 6, and containing an elec-
trode 7, the said electrode, the liquid elec-
65 trolyte, and means for producing an electrical connection between the tube 6 and the cup 3, substantially as set forth.

3. In a gas apparatus, the combination with
70 an air-forcing apparatus for forcing air into the generator, of an electrical generator A, for decomposing the water in the electrolyte thereof, said generator comprising a vessel 1, a cup-like electrode 3, inverted in said vessel,
75 a tube 6, mounted in the bottom of the inverted cup 3, and insulated therefrom, said tube being adapted to play longitudinally in its bearing, a foraminous holder or basket 6^a on the lower end of the tube 6, and contain-
80 ing an electrode 7, the said electrode, the liquid electrolyte, and means for producing an electrical connection between the tube 6 and the cup 3, substantially as set forth.

In witness whereof we have hereunto signed
our names in the presence of two subscribing
85 witnesses.

WILLIAM H. RUSSELL.
GEORGE E. RUSSELL.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.