

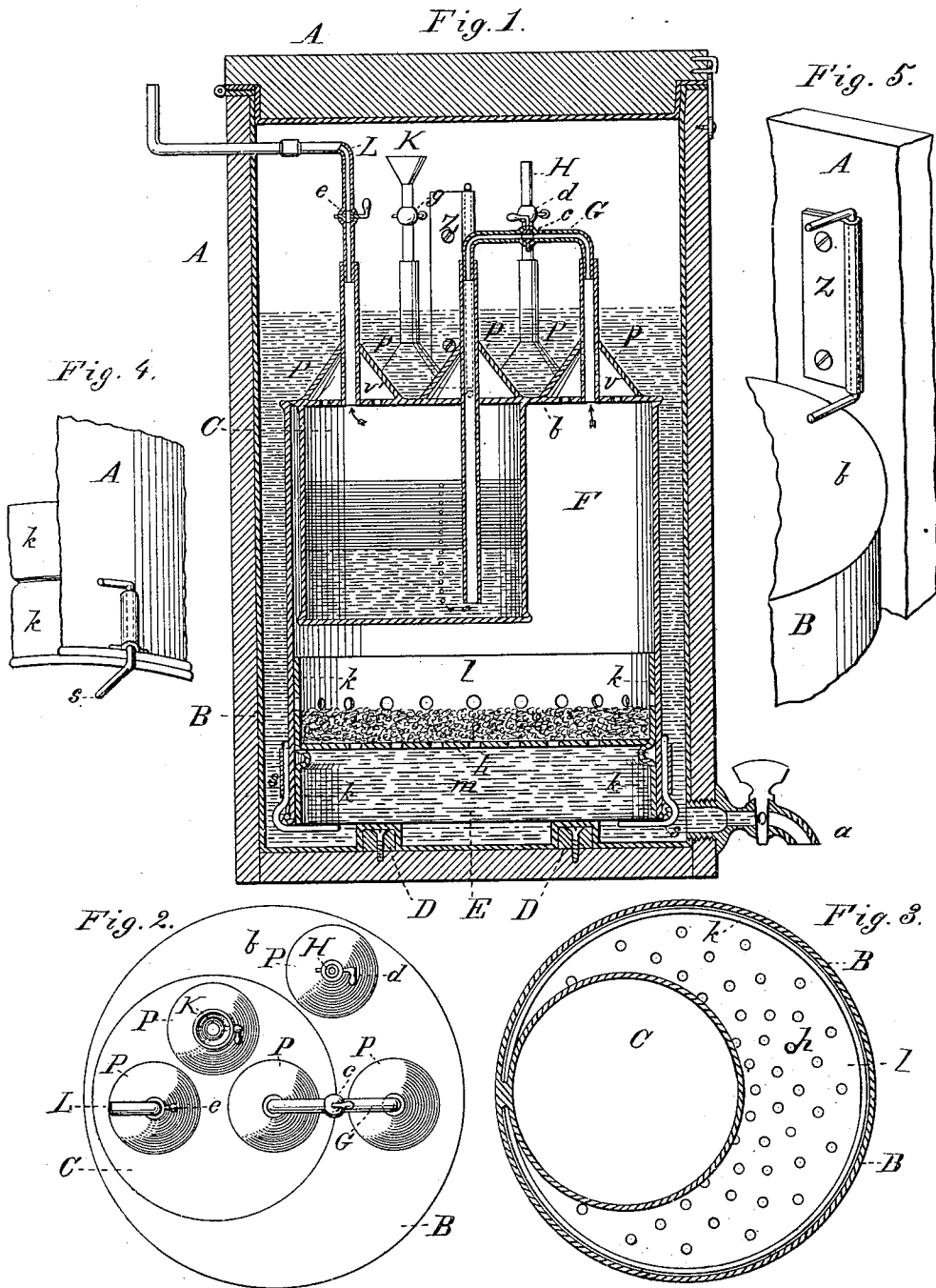
(No Model.)

L. S. GROVES.

APPARATUS FOR GENERATING AND CARBURETING HYDROGEN GAS.

No. 273,679.

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WITNESSES
Villette Anderson.
Philip C. Massi.

INVENTOR
L. S. Groves
By Anderson & Smith
ATTORNEYS

UNITED STATES PATENT OFFICE.

LEROY S. GROVES, OF AFTON, IOWA, ASSIGNOR OF ONE-HALF TO JOHN W. SHUTE, OF SAME PLACE.

APPARATUS FOR GENERATING AND CARBURETING HYDROGEN GAS.

SPECIFICATION forming part of Letters Patent No. 273,679, dated March 6, 1883.

Application filed November 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, LEROY S. GROVES, a citizen of the United States, residing at Afton, in the county of Union and State of Iowa, have invented certain new and useful Improvements in Apparatus for Generating and Carbureting Hydrogen Gas; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a vertical sectional view of my improved apparatus. Fig. 2 is a plan view of the inner case, its cones, tubes, and pipes. Fig. 3 is a cross-sectional view of the inner case; and Figs. 4 and 5 are detail views.

This invention has relation to apparatus for making gas; and it consists in the construction and novel arrangement of devices, as hereinafter set forth, and particularly pointed out in the appended claims.

The object of the invention is to provide a simple self-regulating apparatus for making gas, which will be easily managed, inoffensive, and perfectly safe.

In the annexed drawings, the letter A designates the outside case, barrel, or tank, having a suitable lining and a hinged lined cover or lid, which is designed to hold the acidulated water, and is provided with a waste-cock at *a*.

B designates an inner chamber, which contains the generating-chamber, the gas-chamber, and the gasoline-chamber, and which is provided with suitable pipes, valves, and a feed-tube, as will be hereinafter explained. This inner case, B, is made bottomless, in order that the basket E, which holds the iron or zinc filings or chips, may be readily inserted and detachably connected therewith.

D D represent sills or supports, which rest on the bottom of the outer case, A, and serve to hold the inner case above said bottom. On these sills or supports, within the inner case and at the lower portion thereof, is located a receiver or basket, E, in which iron filings are placed; or clippings of zinc may be used in the basket. The basket E consists of a perforated

rim or short casing, *k*, having an internal bead or ledge about midway of its height, upon which rests a perforated diaphragm, *h*, which divides the basket into two compartments, *l* and *m*, the upper one being for the filings or chips. The lower edge of the inner case, B, is wired and provided with sheaths on its outer side for the reception of the shanks of the removable spring-catches, for holding the basket E in place. The upper end of the inner case is closed by the top *b*, and the gas-chamber F within said case is connected to the gasoline-chamber by means of a bent tube, G, which extends from the top of the case B through the top of the compartment C and nearly to the bottom of the latter. This tube is provided with a check-valve at *c*. The gas-chamber F is also provided with an outlet-pipe, H, extending upward and provided with a check-valve, *d*.

Extending through the top of the gasoline-compartment are the filling-tube K and the outlet-tube L, the latter extending to the burner, and being provided with a check-valve, *e*. The filling-tube is provided with a valve at *g*.

Catches or fastenings Z are connected to the inner wall of the outer case, A, and are designed to be attached to the inner case, B, or to engage the same when placed in the outer case, so as to hold it in position. The various tubes which extend through the top *b* of the inner case, B, are strengthened by means of conical braces P, of metal. Within this conical brace-wall, around the tube G, is formed a chamber, *v*, which communicates with the tube G through a number of perforations made therein, and through perforations made in the base of said chamber *v* with the gas-chamber F of the inner case. In a similar manner the chamber *v'* within the cone-brace of the outlet-tube L of the gasoline-chamber is made to communicate with the gasoline-chamber and with the interior of the tube. These perforations provide many passages for the gas, and are designed to prevent obstructions from clogging the main conducting-tubes G and L.

In using the apparatus a quantity of zinc or iron clippings is first to be placed in the upper chamber of the basket E. The basket is then placed within the lower portion of the in-

ner case, B; and fastened thereto by means of the catches *s*. The vent or outlet tube L of the gasoline-compartment is then opened and the chamber C filled with gasoline of about 87° test, a little pure water having first been poured into the chamber. Then the check-valves *c*, *d*, *e*, and *g* are closed, and the inverted case B, with the attached basket of clippings, is placed within the outer tank, A, in such a manner that it shall rest on the sills or cleat-supports D. The inner case having been fastened to the tank by means of the catches Z, the tank-outlet *a* is closed, and water acidulated by the addition of sulphuric acid at the rate of one pound of the acid to each gallon of water is poured into the tank until the top *b* of the inner case is covered. The vent-cock H is now opened, and as the air escapes from the chamber F the acidulated water rises in said chamber from below, and, reaching the chamber *l* of the basket E, acts upon the zinc or iron therein, generating hydrogen gas. The vent-cock H is now closed and the hydrogen gas fills the chamber F. Upon opening the valve *c* of the tube G the hydrogen gas passes over and is conducted by the tube G to the lower portion of the gasoline-chamber, whence it rises through the water and gasoline and becomes carbureted and forms a rich illuminating-gas. When desired for use the valve *e* of the perforated outlet-pipe L is opened, allowing the gas to pass to the burner.

The apparatus is self-regulating. When the valve *e* of the outlet-pipe L is closed, the hydrogen-gas chamber F, becoming filled with the gas, displaces the acidulated water, forcing it downward in the inner case, B, until it is below the iron or zinc clippings in the basket E. In this manner action upon the zinc or iron is prevented and the apparatus ceases to make gas.

If care is used in managing this apparatus, the offensive odor of the gasoline will not be perceptible as the gasoline-compartment is, with the exception of the outlet-tube, perfectly inclosed. There is no waste of material. The

water in the tank can be discharged and the tank replenished without removing the inner case. So, also, the gasoline-chamber can be refilled through its feed-tube K without disturbing any other portion of the apparatus, the valve of the bent tube G being closed, however, while filling, to prevent the movement of the hydrogen gas into the gasoline-chamber at this time.

The apparatus is safe, as the inner case is surrounded by acidulated water of the character hereinbefore described, which is a powerful extinguisher of fire.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. The gas generating and carbureting apparatus, consisting of the tank A for acidulated water, the inner case, B, within said tank, having in its upper portion the gasoline compartment C, and in its lower portion the raised basket E for iron or zinc, the valved bent tube G, extending from the interior of the case to near the bottom of the gasoline-chamber, the valved feed-tube K, and the valved outlet-tube L, and tube H, substantially as specified.

2. The combination, with the tank A, of the inner case, B, its gasoline-compartment C, bent conducting-tube G and valve *c*, valved feeding-tube K and valved outlets L and H, the sill-supports D, raised basket E, and the fastenings or catches *s*, substantially as specified.

3. The combination, with the gas-chamber F and the gasoline-chamber C, of the perforated gas-conducting tubes G and L, and their cone supports or braces P, forming chambers *v* and *v'* around said tubes, the cones having perforated bottoms, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

LEROY S. GROVES.

Witnesses:

J. E. CHENY,
A. W. ENOCH.