No. 675,769. Patented June 4, 1901.

T. H. DUNCOMBE.

ACETYLENE GAS GENERATOR.

(Application filed Feb. 16, 1901.)

(No Model.)

Fig. 1

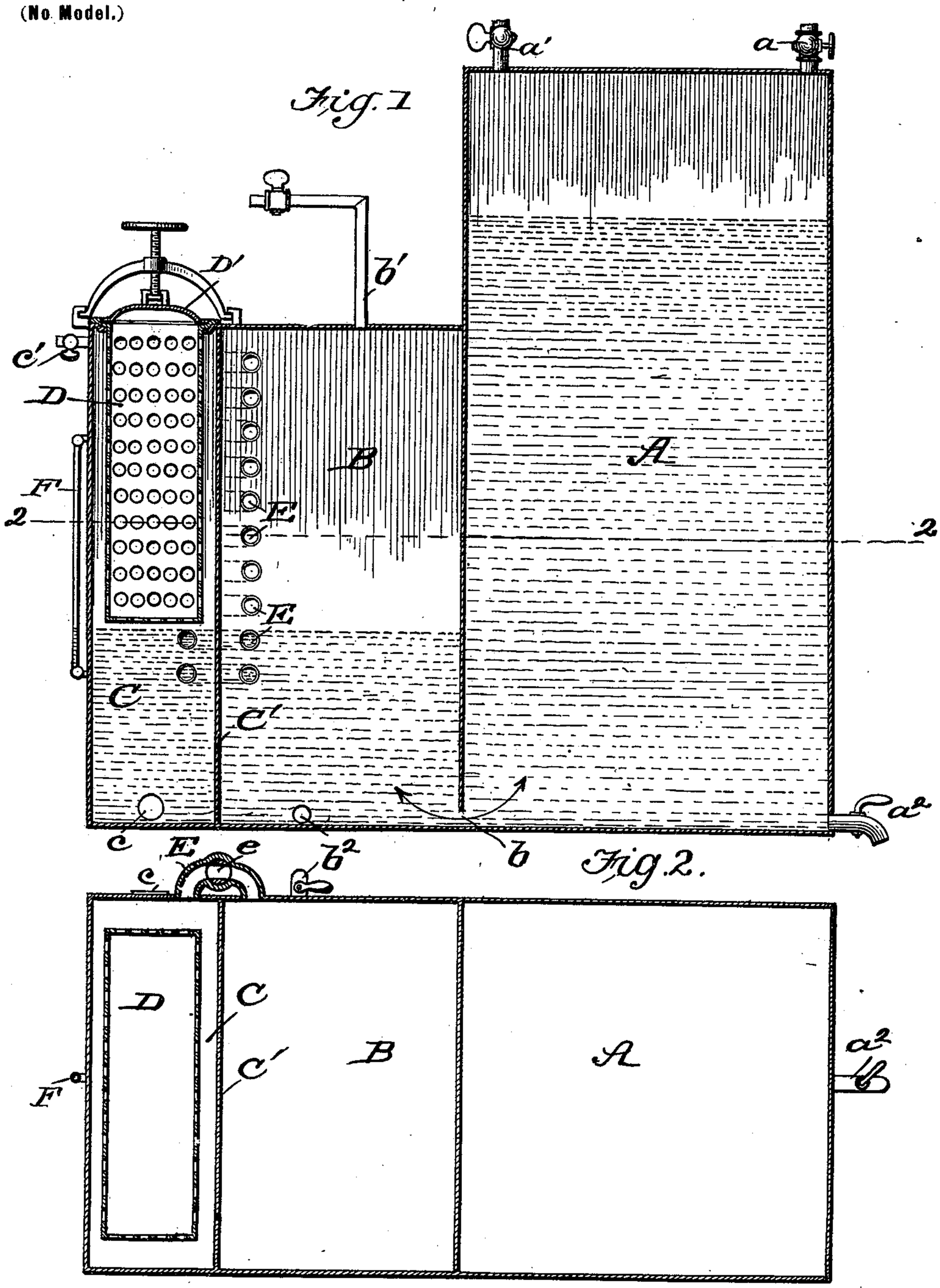

Fig. 2.

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ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 675,769, dated June 4, 1901.

Application filed February 16, 1901. Serial No. 47,596. (No model.)

To all whom it may concern:

Be it known that I, TYRRELL HUBERT DUNCOMBE, of St. Thomas, Ontario, Canada, have invented a new and useful Improvement in Acetylene-Gas Machines, of which the following is a specification.

My invention relates to acetylene-gas machines of that type in which a water-reservoir, a gas-receiver, and a generating-chamber are arranged side by side and the water by gravity is allowed to pass from the reservoir to the carbid in the generator to generate gas and is forced back and away from the carbid by the gas so generated to cause the production of gas to proceed or be discontinued in an automatic way.

My invention consists of a simple, cheap, and compact machine operating upon this principle, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a vertical longitudinal section of the machine, and Fig. 2 is a horizontal section on line 2 2 of Fig. 1.

In the drawings, A B C are three chambers arranged side by side and assembled in a single unitary construction and made, preferably, of galvanized sheet-iron. A is nearly twice as tall as B and C, and its horizontal cross-section is square. B and C have together about the same horizontal cross-section as A, and the outer walls of B and C form also a square. A is separated from B except at the bottom, where an opening *b* is left to form a permanent communication. B is cut off entirely from C by a tight partition-wall C′. In the upper part of the compartment C is arranged the basket or perforated receptacle D for calcium carbid, which is oblong in horizontal section and nearly fills the compartment C.

In the top of the chamber A there are an inlet water-supply pipe and valve *a* and an air vent and valve *a′*, while at the bottom there is a water-outlet pipe a^2 to draw off the water when desired.

In the bottom of the chamber B there is a water-outlet pipe b^2, and from the top there emerges the gas-supply pipe *b′*, which extends to the point of utilization for either light, heat, or power.

The carbid-receiver D has at its upper edge a supporting-flange, by which it is suspended from the top of the chamber C, and it is closed gas-tight by a cap D′, having a swiveling connection with two or more screw-stems with T-handles, whose threaded portions are tapped in yokes removably secured to the top of the chamber C. By means of this well-known construction the cap D′ may be either removed to permit the charge of carbid to be placed in the receiver D or be closed gas-tight while the machine is operating. Any other desired form of cover may be used in place of the cover D′.

In the side of the chamber C there are tapped at top and bottom the two ends of a glass water-gage F to indicate the height of the water in relation to the carbid. At the bottom of this chamber there is a clean-cut plug *c* for removing the slush of lime deposited in the bottom, while an air-cock *c′* at the top allows air to be drawn off when first starting the machine into action.

At the point of union between the two chambers B and C and extending through the greater portion of the vertical height from the top nearly to the bottom there is an external series of pipe-bends E, ranged one above the other. One end of each of these pipe-bends opens into the chamber B on one side of the partition C′, and the other ends of these pipes all communicate with the chamber C on the opposite side of the partition C′. Each of these pipe-bends has in it a stop-cock plug *e*, by which the communication between the chambers B and C may be opened or closed at any desired level. These pipe-bends form a series of intercommunicating passage-ways which lie in a series of different horizontal planes intersecting the carbid-holder, each at a different level, and extending practically throughout the entire vertical height of the carbid-holder.

The operation of my machine is as follows: The receiver D is first filled with calcium carbid, and the cap D′ is tightly closed upon the same. The outlets a^2, b^2, and *c* being closed, the air-vent *a′* is opened and water is introduced through the pipe *a* until the chamber A is filled and the chamber B partially so, the water passing in at *b* and the air being compressed into a cushion above it. The cocks in two or three of the lower pipes E are now opened and the water passing through the same rises in chamber C to contact with the carbid, and the generation of acetylene

gas begins. The first portions, which will be mixed with air, are allowed to escape through the air-vent *c'*. Then when the pressure of gas in chamber C forces the water below the level of the pipes E, which have been opened, the gas passes through such pipes and accumulates as a cushion in the top of chamber B. The first portions, which will be mixed with air, are allowed to escape through pipe *b'*, and then the pure gas fills the space in chamber B above the water. As the gas is drawn off at pipe *b'* and used up the head of water in reservoir A forces such water through *b* into B, raising the water-level in B and also in C by reason of the opened pipe-bends E, and this water rising to contact with the carbid generates more gas, whose pressure forces down the water-level away from the carbid, the gas passing through the opened lower pipe-bends E into the reservoir B until the pressure in B balances the weight of the water column in A. At first the water is allowed to come only in contact with the lower portions of the carbid, which are at or near the level of the lower pipe-bends E, whose plugs have been opened. When such portions of carbid have been used up, one or more of the pipe-bends E just above the first lot are opened and the water allowed to reach the higher level of the carbid-holder, and so on the pipe-bends E are gradually opened until they are all opened to the top. After this point has been reached and the calcium carbid has been used up the cocks *e* in all the bends E are closed, so as to cut off entirely the chamber C from the receiver B, and the cover D' of the carbid-holder is then removed and the holder refilled, the slush removed at *c*, the chamber C and carbid-holder closed again, and the operation of the machine proceeds as before.

A distinct and important advantage of the vertical series of intercommunicating connections in the form of pipe-bends E is that they permit a free and sensitive flow of water and gas between the gas-receiving chamber and gas-generating chamber without any possibility of such communications being obstructed by the accumulation of the deposited lime. That this may be made more clear I would state that when there is, as commonly employed, only two intercommunicating passage-ways between the gas-generating chamber and the gas-receiving chamber, the lower one near the bottom for the passage of water and the upper one near the top for the passage of gas, it happens that when the charge of carbid is partly used up the deposition of lime in the bottom of the generating-chamber is liable to choke the single water passage-way near the bottom and interfere with the sensitiveness of the flow therethrough in response to the varying pressure of the gas. This is what my invention is designed to avoid, for even if my lower pipe-bends become obstructed with deposited lime the flow of water back and forth through the partition C' is effected at the constantly higher level of the successively-opened pipe-bends and in a plane or zone of pure water unobstructed by deposited lime.

It is to be understood that when I speak of a "series" of intercommunicating passage-ways I do not include simply two passage-ways, as heretofore used, but a multiplicity or plurality in higher progression than a pair.

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

1. In an acetylène-gas machine, the combination of a gas-receiving chamber, and a gas-generating chamber joined together with a closed dividing-partition between them, and a series of intercommunicating connections arranged vertically one above the other along the line of said partition and at levels, or in horizontal planes intersecting the carbid-holder, and means for independently closing these intercommunicating connections substantially as described.

2. In an acetylene-gas machine, the combination of a receiving-chamber, and a gas-generating chamber joined together with a closed dividing-partition between them, a series of intercommunicating connections arranged vertically one above the other along the line of said partition and at levels, or in horizontal planes intersecting the carbid-holder, means for independently closing these connections, and a carbid-holder suspended in the upper portion of the generating-chamber beside the line of said connections substantially as described.

3. In an acetylene-gas machine, the combination of a gas-receiving chamber, and a gas-generating chamber joined together with a closed dividing-partition between them, and a vertical series of external pipe-bends arranged at different levels or planes intersecting the carbid-holder and having independent closure plugs or valves in them one end of each of which bends communicates with the gas-receiving chamber and the other end with the gas-generating chamber substantially as and for the purpose described.

4. An acetylene-gas machine comprising three chambers joined together in unitary structure, the first being of greater height than the others and adapted to form a water-reservoir, with inlets and outlets as described, the second chamber being a gas-receiving chamber and being in communication with the water-reservoir at the bottom, the third chamber being a gas-generator chamber containing a calcium-carbid holder, and a vertical series of intercommunicating connections between the gas-receiving chamber and the gas-generating chamber provided each with an independent closure plug or valve substantially as and for the purpose described.

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