

(No Model.)

2 Sheets—Sheet 1.

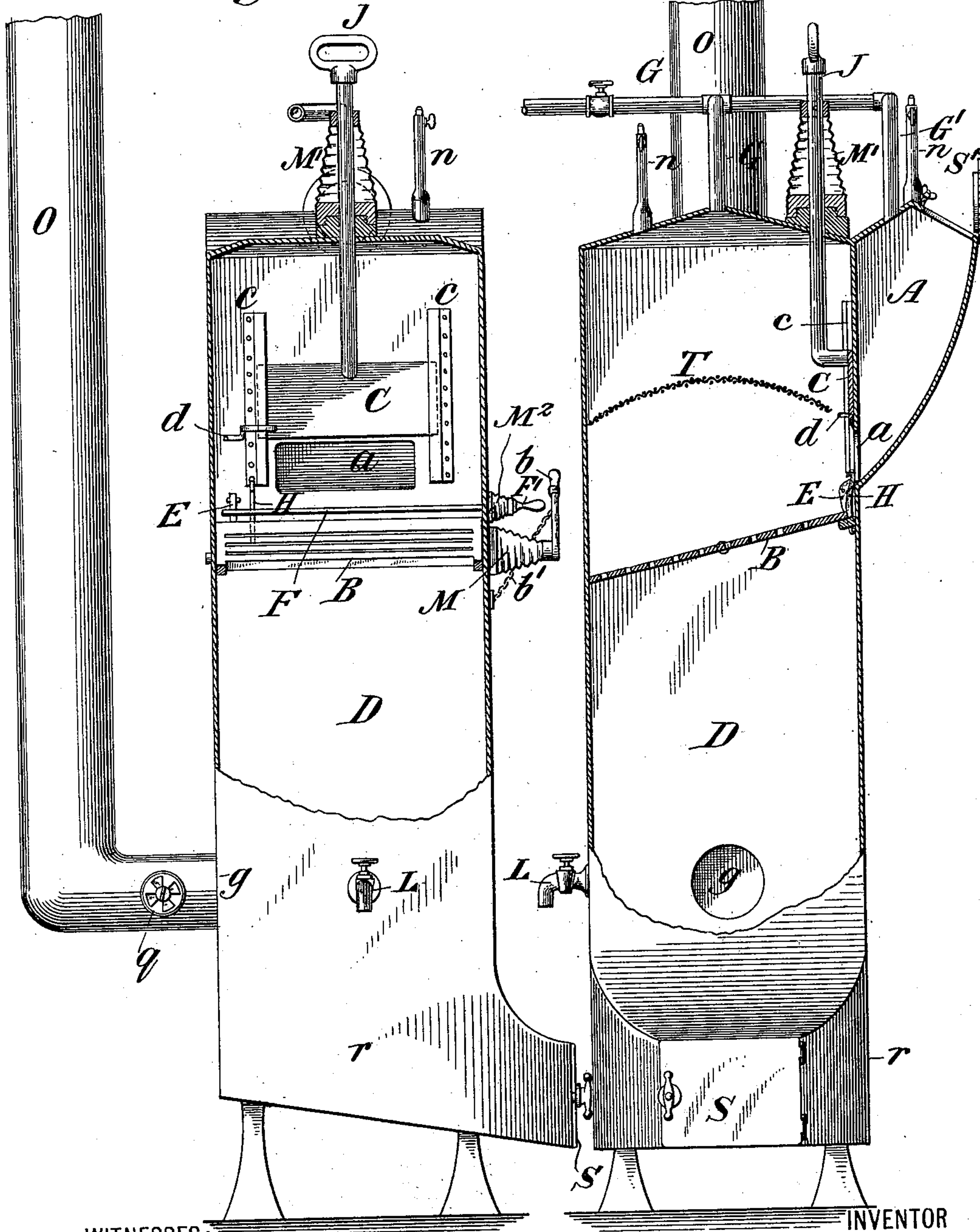
G. BETTINI.
ACETYLENE GAS GENERATOR.

No. 594,849.

Patented Dec. 7, 1897.

Fig. 1,

Fig. 2,



WITNESSES:

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Fig. 3,

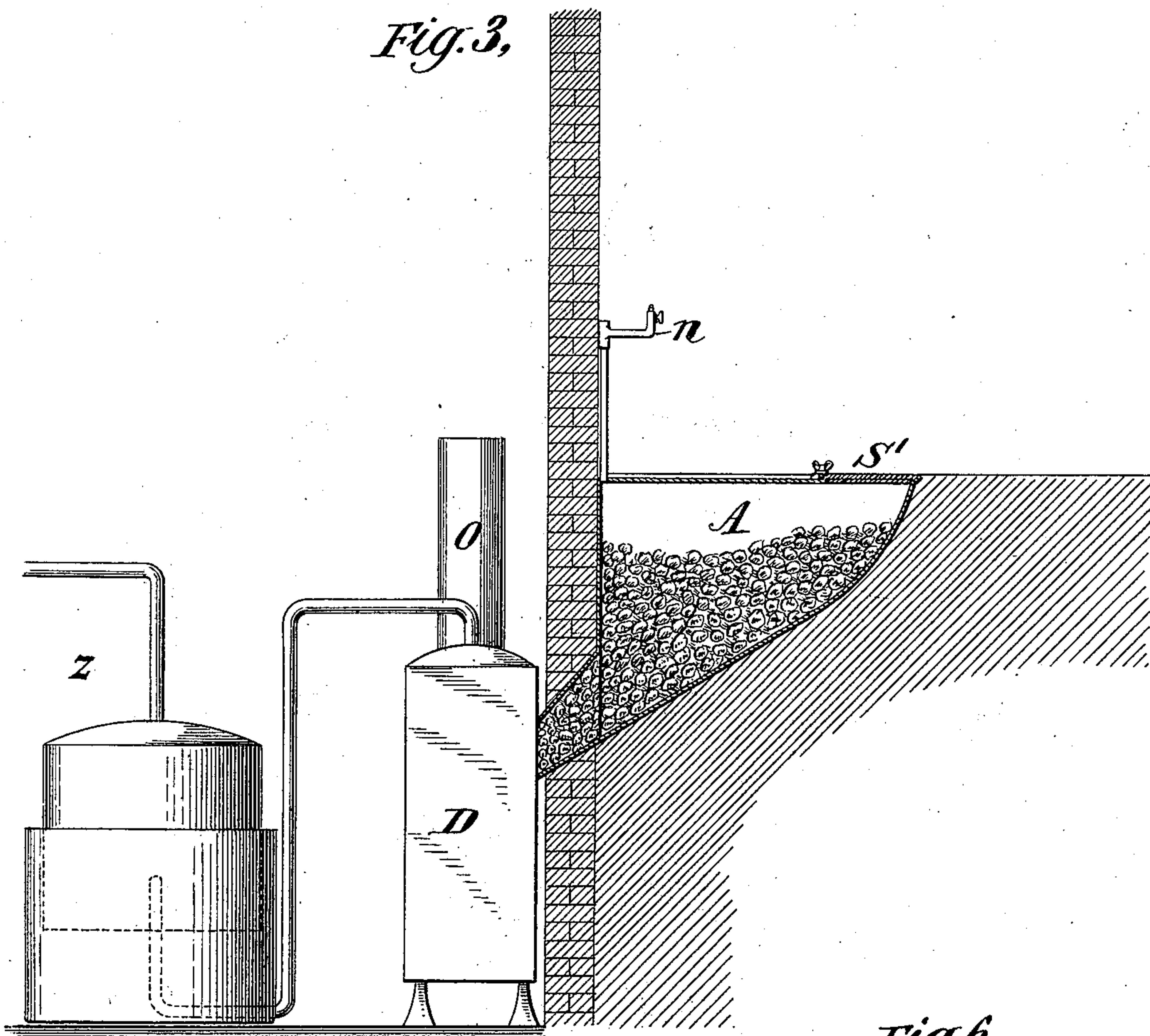


Fig. 4, C

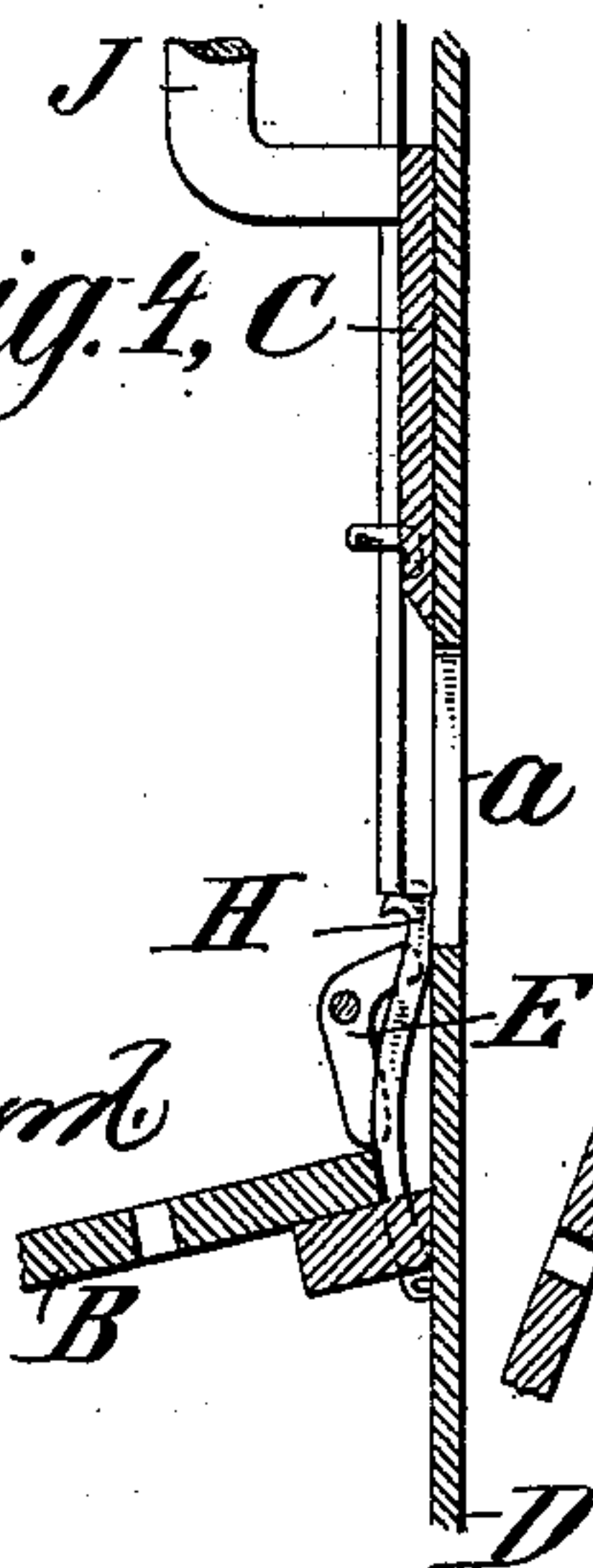


Fig. 5,

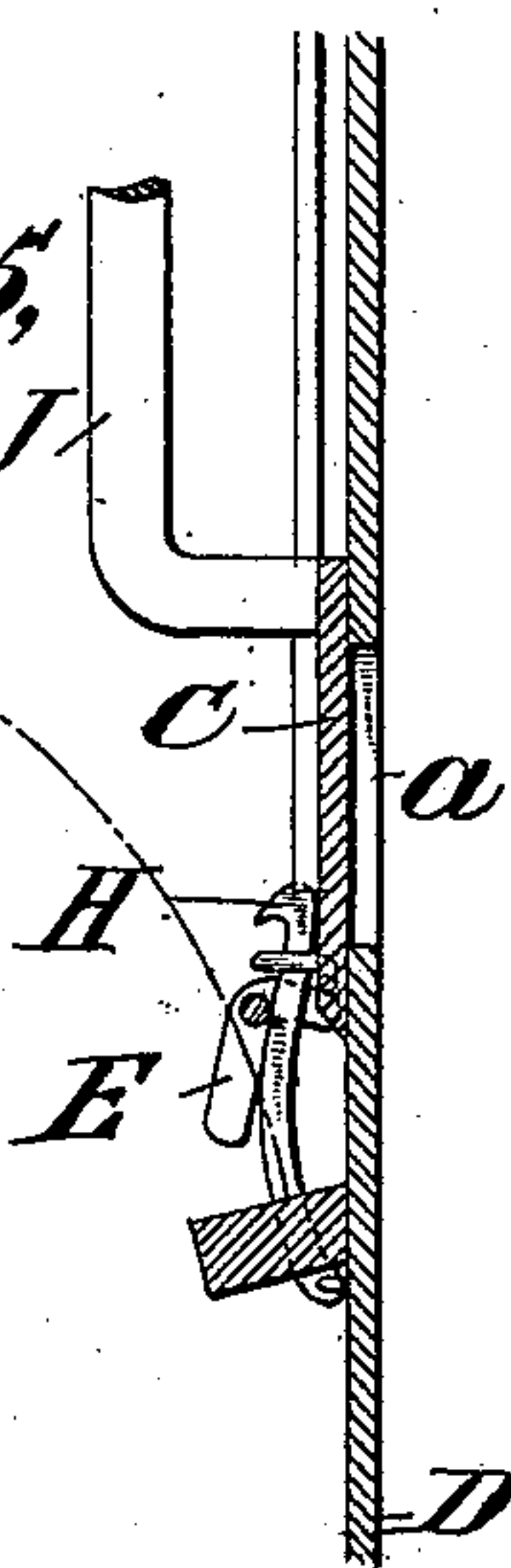
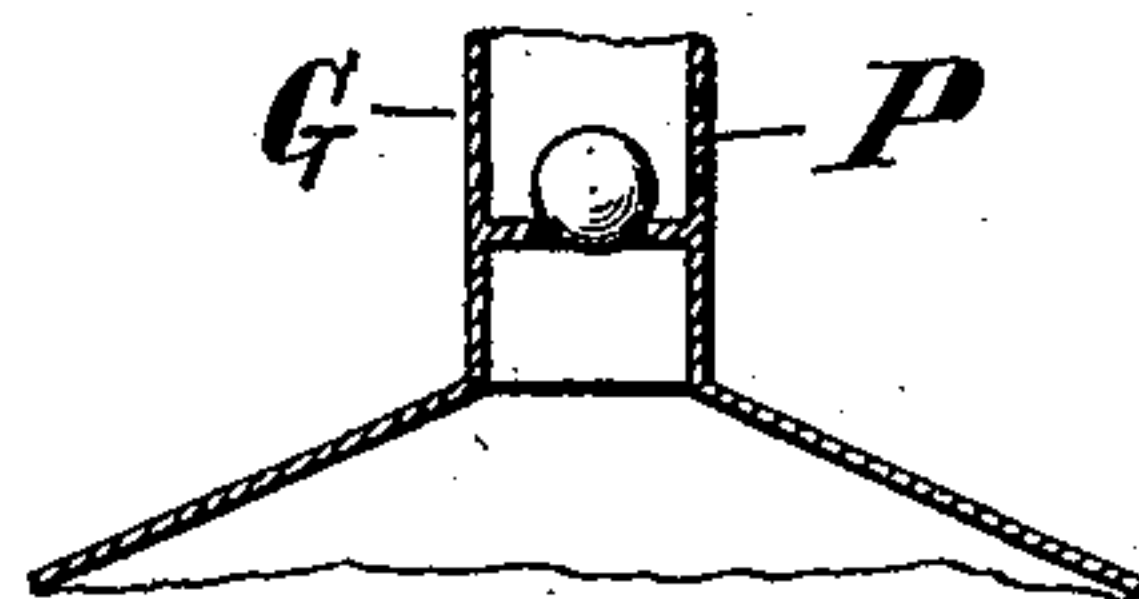


Fig. 6,



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UNITED STATES PATENT OFFICE.

GIANNI BETTINI, OF NEW YORK, N. Y.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 594,849, dated December 7, 1897.

Application filed September 3, 1896. Serial No. 604,719. (No model.)

To all whom it may concern:

Be it known that I, GIANNI BETTINI, a subject of the King of Italy, and a resident of New York city, in the county and State of New York, have invented certain new and useful Improvements in Gas-Generators, of which the following is a specification.

My invention has reference to gas-generators in which the evolution of the gas results from the contact of a liquid with a solid, leaving a solid residue, and it has special reference to generators of acetylene gas.

It has for its object to render the process of separating the gas a continuous process and generally to simplify and perfect the mechanism.

It consists of the mechanisms herein set out.

In the accompanying drawings, which form a part hereof, Figure 1 is a view, partly in section, of an apparatus embodying my invention. Fig. 2 is a view, partly in section, taken on a line at right angles to the plane of section of Fig. 1. Fig. 3 is a diagrammatic view of my apparatus set up with a storage-supply and a gasometer in connection therewith. Figs. 4 and 5 are details illustrating certain devices for locking movable parts from being operated at a wrong time. Fig. 6 is a detail illustrating a check-valve for the discharge-pipes.

D is the main body of the generator. It is made of suitable material and gas-tight and is adapted at its upper end to receive the generated gas and to discharge the same through delivery-pipe G and at its lower end *r* to receive the solid residue, from which said residue may from time to time be removed through the gas-tight and liquid-tight port or door S.

The generator D has an inlet *a* for the solid ingredient and an inlet *g* for the liquid ingredient, the latter below the level of the former, and between the two it has a movable support B for the solid ingredient whereon the operation of generation of the gas takes place. The support B is of such form and character as to effectually support the solid ingredient during the gas-generating process and at the same time to permit the contact of the liquid ingredient with the solid ingredient, and in order to provide access for the purposes of

said contact I preferably make the support B in the form of a grate with bars and intervening spaces or slots, as shown, and I preferably arrange it so that when performing its supporting functions it is normally sloping or inclined downward away from the opening *a*. This supporting-grate B is movable in order to accomplish the removal therefrom of the solid residue left by the operation of the generation of the gas, and to that end it is pivoted centrally and connected through an airtight bearing-box to the external mechanism *b*, which is a handle-bar by which the grate B may be shaken or turned. To more reliably hold the grate B in position during the gas-generating operation the handle-bar *b* may at such time be locked, as by the chain *b'*. The bar which connects the grate B with the handle *b* passes through a gas-tight bearing-box M, which has a flexible part consisting of suitable bellows-like construction of gas-tight fabric or rubber, which permits the necessary motion of the parts in shaking or turning the grate B without permitting the escape of gas from the generator or the entrance of air into the generator.

A is the feed-box or supply-receptacle for the calcium carbide or other solid ingredient. It opens at *a* into the generator above the position of the support B. A gate or port C closes or opens the inlet *a*. To that end it slides vertically in slideways *c c* and is controlled by a rod operated by suitable mechanism J, exterior to the generator, the connecting-rod passing through a gas-tight bearing-box M' in the generator. This gas-tight bearing-box permits the necessary motion of the part J required to close or open the gate C without permitting the escape of gas or the access of air to the generator.

It is important that the supporting-grate B should never be turned from its supporting position except when the gate C is down and the inlet *a* thereby closed. To that end the supporting-grate B is locked in its supporting position by the trip E whenever the said support is returned to its supporting position and so long as the gate C is wholly or partly open. When, however, the gate C is lowered and the inlet *a* thereby wholly closed, an arm *d* on the gate C strikes against the

trip E and moves it so that it no longer locks the grate B in supporting position. Any suitable form of catch and trip might be used for this purpose. It is also important that the gate C should never be raised and the inlet *a* thereby opened unless the grate B is in its supporting position. To that end the device or catch H is provided. This catches the arm *d* of the gate C whenever the latter is lowered and locks it in that position unless the grate B is in its supporting position, in which case the latch is forced back by the grate out of locking position. Any suitable locking device might be substituted for the special latch H.

T is a perforated metallic shield or screen which I preferably use to prevent the solid ingredient from piling up into the upper part of the generator. It is shown in Fig. 2, but is broken away in Fig. 1.

F is a slicing or stirring rod for stirring and mixing the solid ingredient on the support B during the operation of gas-generation and for shaking and sifting the solid residue through the grate B without moving the latter. This slicing bar or rod is pivoted or suitably mounted in the wall of the generator and is connected through a gas-tight bearing-box with the external operating-handle *F'*. The gas-tight bearing-box is marked *M*² in the drawings. It permits of the universal manipulation of the slicing-rod F without permitting the escape of the gas from or the access of air to the generator. The bearing-boxes *M* and *M*² should also be liquid-tight. The receptacle A has at the top a suitable port or manhole *S'*, constructed to be closed air-tight and gas-tight. It has also a gas-discharge pipe *G'*, connecting with the gas-discharge pipe *G*, for the removal of any accidentally-formed gas that may accumulate in the top of the receptacle A. The generator D and the feed-receptacle A may also have the gas-test burners *n n* at the top. The liquid-inlet *g* is supplied from the open liquid stand-pipe O, which has a suitable valve *q* at the bottom. The generator has an escape-cock L for drawing off the liquid when desired. The generated gas passes through the discharge-pipe *G* into any suitable gasometer or storage-tank Z or into a series of same. The gas-discharge pipes *G* *G'* have a ball check-valve or other suitable valve *P* to freely permit the passage of the gas upward and outward, but to prevent its passage backward.

The operation of the device is as follows: The receptacle A being filled with the solid ingredient while the gate C is closed, and the generator being closed up and the grate B being turned into its supporting position, the gate C is opened and the solid ingredient allowed to enter and cover the support B. A suitable quantity of water is then introduced into the water-supply or stand pipe O, the valve *q* is opened, and the water rises in the generator until it comes in contact with the solid

ingredient on the support B, when the generation of gas begins. The quantity of water in the pipe O should be regulated in such a way that when the evolution of gas is too great the level of the water in the generator will be forced down by the pressure and the generation of the gas be thereby automatically regulated. The amount of pressure of the gas may be regulated by the amount of water kept in the stand-pipe O. The solid residue of the gas-generating process will to some extent fall through the openings of the support B. Whenever necessary or desirable, the slicing or agitating rod F may be manipulated to expedite or accomplish this sifting of the solid residue through the openings of the support B. The gate C may be more or less opened or closed as experience may dictate. Whenever desirable, the gate C may be wholly closed and the support B may be turned, thereby entirely dumping the solid residue that may cling thereto that would otherwise remain thereon and interfere with the further generation of gas. This solid residue falls to the bottom of the generator, where it gradually accumulates, displacing the water. After such dumping of the solid residue the gate C is again opened, and the gas-generating process continues. This may be kept up indefinitely long without at any time substantially interrupting the gas-generating process until the accumulation of the solid residue in the bottom of the generator threatens to fill up the inlet *g*. That solid residue is then removed in the following manner: The gate C having been closed and the grate B dumped the valve *q* is closed. The water remaining in the bottom of the generator and on top of the solid residue is drawn off by the faucet L. The door *S* is then opened and the solid residue is raked or shoveled out, after which the door *S* is closed and the process resumed.

Fig. 3 shows in diagram a preferred arrangement of the feed-receptacle A as a storage-vault and outside of the wall of the house in combination with the generator D in the cellar of the house against the wall. It shows also the gas-storage tank Z. The generator here described is absolutely safe from explosion, inasmuch as any tendency in that direction would be prevented by the open stand-pipe O. The process, moreover, is practically continuous so long as the solid residue does not have to be removed from the bottom of the generator, and the receptacle for the same in the bottom of the generator may be made as large as desired. All of the manipulation required is exterior to the generator and may be accomplished without the escape of gas into the surrounding air and without any dangerous admixture of air with gas within the apparatus.

Many modifications may of course be made in the details of the mechanism shown without departing from the spirit of the invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an acetylene-gas generator, the combination with a suitable inlet for the solid ingredient and a suitable inlet for the liquid ingredient, of a movable support for the solid ingredient placed below the inlet for the solid ingredient and above the inlet for the liquid ingredient, and mechanism to move said support from outside the generator without opening the generator, a shield above the said support and a door at the bottom or near the bottom of the generating-chamber for the removal of residue, and to thereby displace the solid residue from said support, whereby the generation of the gas may be practically continuous, substantially as set forth.

2. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a supply-chamber for the solid ingredient having feeding-inlet, and a liquid-supply chamber having inlet, of a movable supporting-grate placed between the two inlets and mechanism to move it from outside the generator-chamber, a shield above the said grate and a door near the bottom of the generating-chamber for the removal of the residue, substantially as set forth.

3. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a supply-chamber for the solid ingredient having a discharge-opening into the generating-chamber, a closing port or gate for said discharge-opening inside the generating-chamber and mechanism to operate it from outside the generator, and a liquid-supply chamber having inlet and valve and mechanism to operate the valve from outside the generator, of a movable supporting-grate placed between the two inlets and mechanism to move it from outside the generator-chamber, substantially as set forth.

4. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a supply-chamber for the solid ingredient having feeding-inlet and also having a closing port or gate and mechanism to operate it from outside the generator, and a liquid-supply chamber having inlet, and valve and mechanism to operate the valve from outside the generator, of a movable supporting-grate placed between the two inlets and mechanism to move it from outside the generator-chamber, and mechanism to prevent the opening of the port or gate when the grate is moved out of its supporting position, substantially as set forth.

5. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a supply-chamber for the solid ingredient having feeding-inlet, and also having a closing port or gate and mechanism to operate it from outside the generator, and a liquid-supply chamber having inlet and valve and mechanism to operate the valve from outside the generator, of a movable supporting-grate placed between the two inlets and mechanism to move it from outside the generator-chamber, and mechanism to prevent the mov-

ing of the grate from its supporting position when the port or gate is open, substantially as set forth.

6. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a supply-chamber for the solid ingredient having feeding-inlet, and also having a closing port or gate and mechanism to operate it from outside the generator, and a liquid-supply chamber having inlet and valve and mechanism to operate the valve from outside the generator, of a movable supporting-grate placed between the two inlets and mechanism to move it from outside the generator-chamber, mechanism to prevent the opening of the port or gate when the grate is moved out of its supporting position, and mechanism to prevent the moving of the grate from its supporting position when the port or gate is open, substantially as set forth.

7. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a suitable inlet for the solid ingredient and a suitable inlet for the liquid ingredient, of a movable supporting-grate B placed between the two inlets and an external operating device *b* and gas-tight bearing-box for same, a shield above the said grate and a door near the bottom of the generating-chamber for the removal of the residue, substantially as set forth.

8. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a supply-chamber for the solid ingredient having feeding-inlet, and a liquid-supply chamber having inlet, of a movable supporting-grate placed between the two inlets and mechanism to move it from outside the generator-chamber, and a stirring or agitating device placed above the grate and mechanism to operate it from outside the generator-chamber, substantially as set forth.

9. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a suitable inlet for the solid ingredient and a suitable inlet for the liquid ingredient, of a movable supporting-grate B placed between the two inlets and an external operating device *b* and gas-tight bearing-box for same, and a slicing device *F* placed above the grate and mechanism to operate it from outside the generating-chamber and gas-tight bearing-box for same, substantially as set forth.

10. In an acetylene-gas generator, the combination with a gas-tight generating-chamber and a supply-chamber for the solid ingredient having a discharge-opening into the generating-chamber, a closing port or gate for said opening inside the generating-chamber and mechanism to operate it from outside the generator, said mechanism having a gas-tight bearing-box, and a liquid-supply chamber having inlet and valve and mechanism to operate the valve from outside the generator, of a movable supporting-grate placed between the two inlets and mechanism to move it from

outside the generator-chamber, substantially as set forth.

11. In an acetylene-gas generator, the combination with a gas-tight generating-chamber 5 and a supply-chamber for the solid ingredient having feeding-inlet and also having a closing port or gate and mechanism to operate it from outside the generator, said mechanism having a gas-tight bearing-box, and a 10 liquid-supply chamber having inlet and valve and mechanism to operate the valve from outside the generator, of a movable supporting-grate placed between the two inlets and mechanism to move it from outside the generator-chamber, said mechanism having a 15 gas-tight bearing-box, substantially as set forth.

12. In an acetylene-gas generator, the combination with a gas-tight generating-chamber 20 and a suitable inlet for the solid ingredient having closing port or gate and mechanism to operate it from outside the generating-chamber, said mechanism having a gas-tight bearing-box, and a suitable inlet for the liquid ingredient, of a movable supporting-grate B 25 placed between the two inlets and an external operating device *b* and gas-tight bearing-box for same, and a stirring or agitating device *F* placed above the grate and mechanism to operate it from outside the generating-chamber and gas-tight bearing-box for same, 30 substantially as set forth.

13. In an acetylene-gas generator, the combination with a suitable inlet for the solid ingredient and a suitable inlet for the liquid ingredient, of a movable support for the solid ingredient placed below the inlet for the solid ingredient and above the inlet for the liquid ingredient, and inclined or sloping downward 40 from the inlet for the solid ingredient when in its supporting position, and mechanism to move said support from outside the generator without opening the generator, and to thereby displace the solid residue from said support, and a door near the bottom of the generating-chamber for the removal of the residue, whereby the generation of the gas may be practically continuous, substantially as set forth. 45

14. In an acetylene-gas generator, the combination with a suitable inlet for the solid ingredient and a supply-chamber and storage-vault for same with downwardly-inclined bottom or slide and a suitable inlet for the liquid 55 ingredient and an open stand-pipe for same, of a movable support for the solid ingredient

placed below the inlet for the solid ingredient and above the inlet for the liquid ingredient, and mechanism to move said support from outside the generator without opening the generator, and to thereby displace the solid residue from said support, and a door near the bottom of the generating-chamber for the removal of the residue, whereby the generation of the gas may be practically continuous, substantially as set forth. 60 65

15. In an acetylene-gas generator, the combination with a suitable inlet for the solid ingredient and a supply-chamber and storage-vault for same with downwardly-inclined bottom or slide and a suitable inlet for the liquid ingredient and an open stand-pipe for same, of a movable support for the solid ingredient placed below the inlet for the solid ingredient and above the inlet for the liquid ingredient 70 and inclined or sloping downward from the inlet for the solid ingredient when in its supporting position, and mechanism to move said support from outside the generator without opening the generator, and to thereby displace the solid residue from said support, a shield above the said movable support and an opening near the bottom of the generating-chamber for the removal of the residue, whereby the generation of the gas may be 85 practically continuous, substantially as set forth.

16. In an acetylene-gas generator, the combination with a suitable inlet for the solid ingredient and a suitable inlet for the liquid ingredient, of a movable support for the solid ingredient placed below the inlet for the solid ingredient and above the inlet for the liquid ingredient, and mechanism to move said support from outside the generator without opening the generator, and to thereby displace the solid residue from said support, and a flexible gas-tight bearing-box for said mechanism, a shield above the said movable support and an opening near the bottom of the generating-chamber for the removal of the residue, whereby the generation of the gas may be practically continuous, substantially as set forth. 90 95 100

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 105

GIANNI BETTINI.

Witnesses:

J. CARTER BEARD,
EDWIN SEGER.