

(No Model.)

2 Sheets—Sheet 1.

O. G. SEWARD.
ACETYLENE GAS GENERATOR.

No. 603,747.

Patented May 10, 1898.

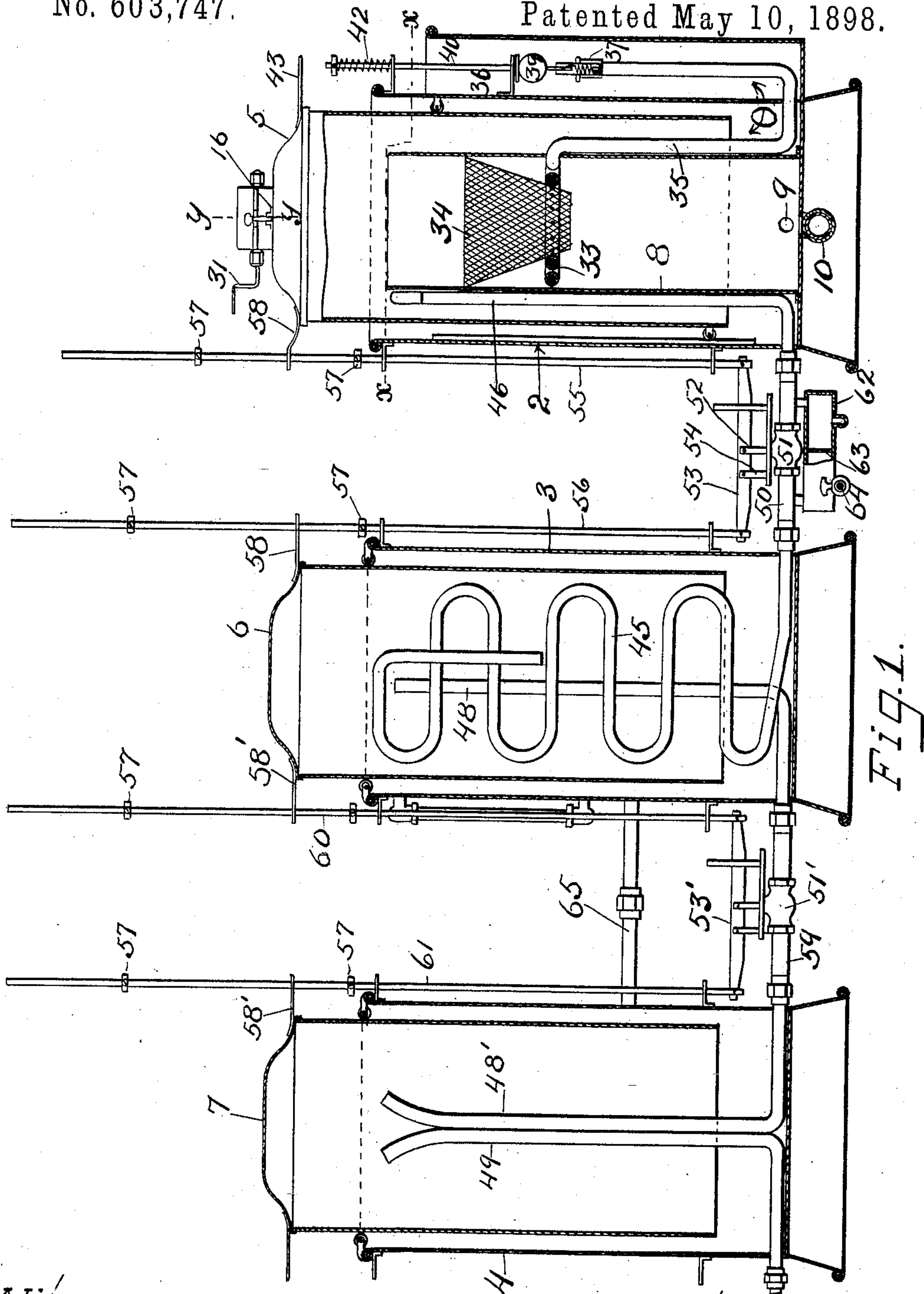


Fig. 1.

Witnesses

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Inventor

OLIVER G. SEWARD.

By Paul Otway
his attorneys

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2 Sheets—Sheet 2.

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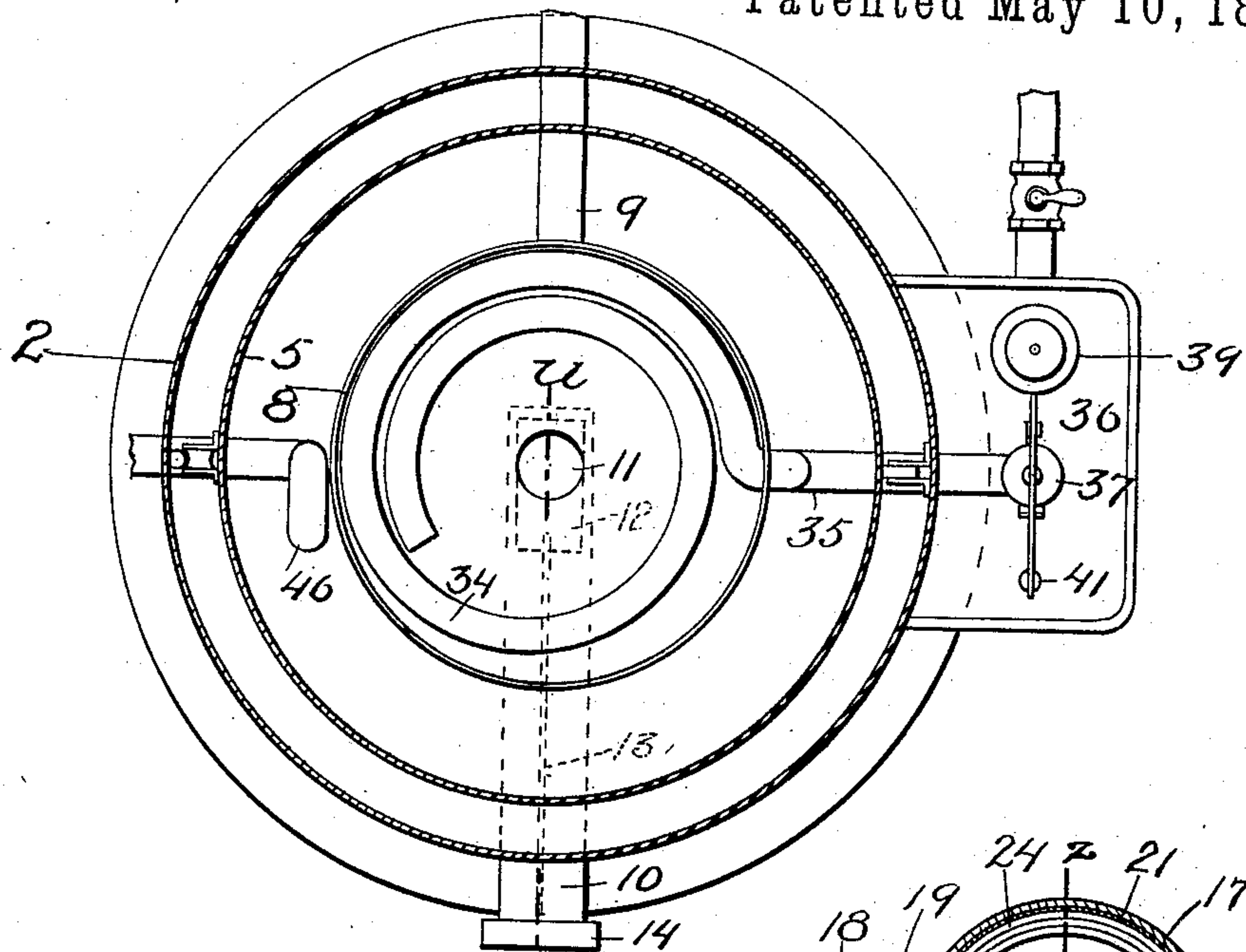


Fig. 2.

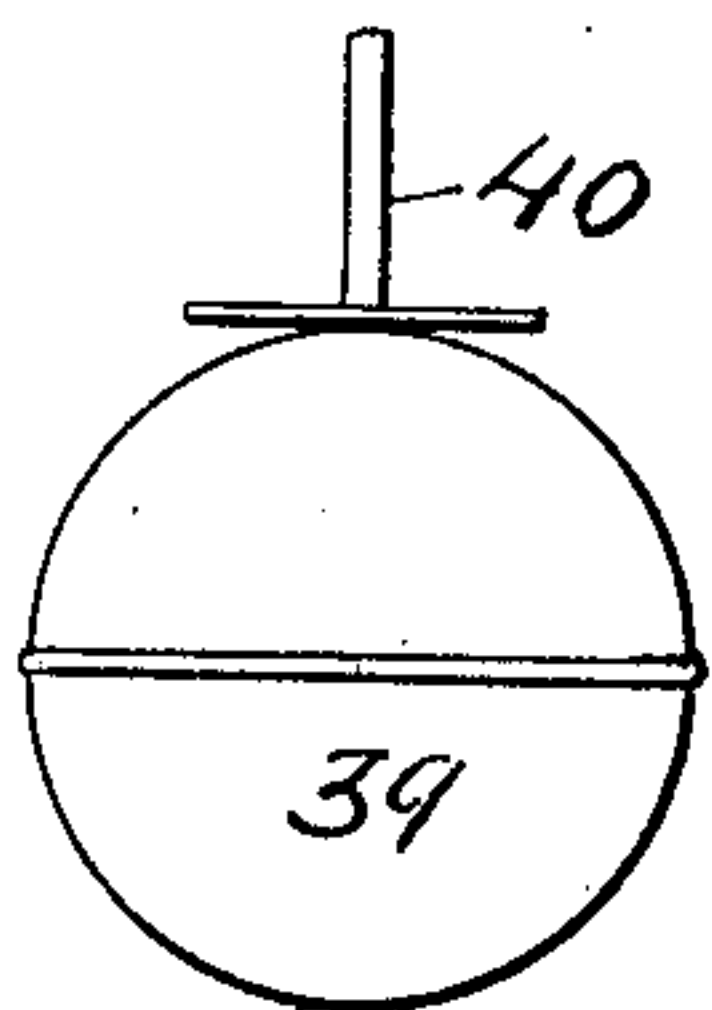


Fig. 3.

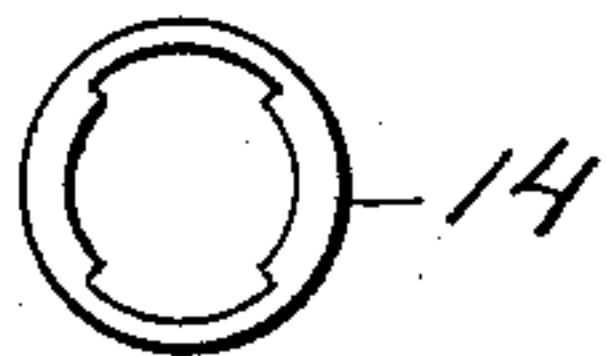


Fig. 7.

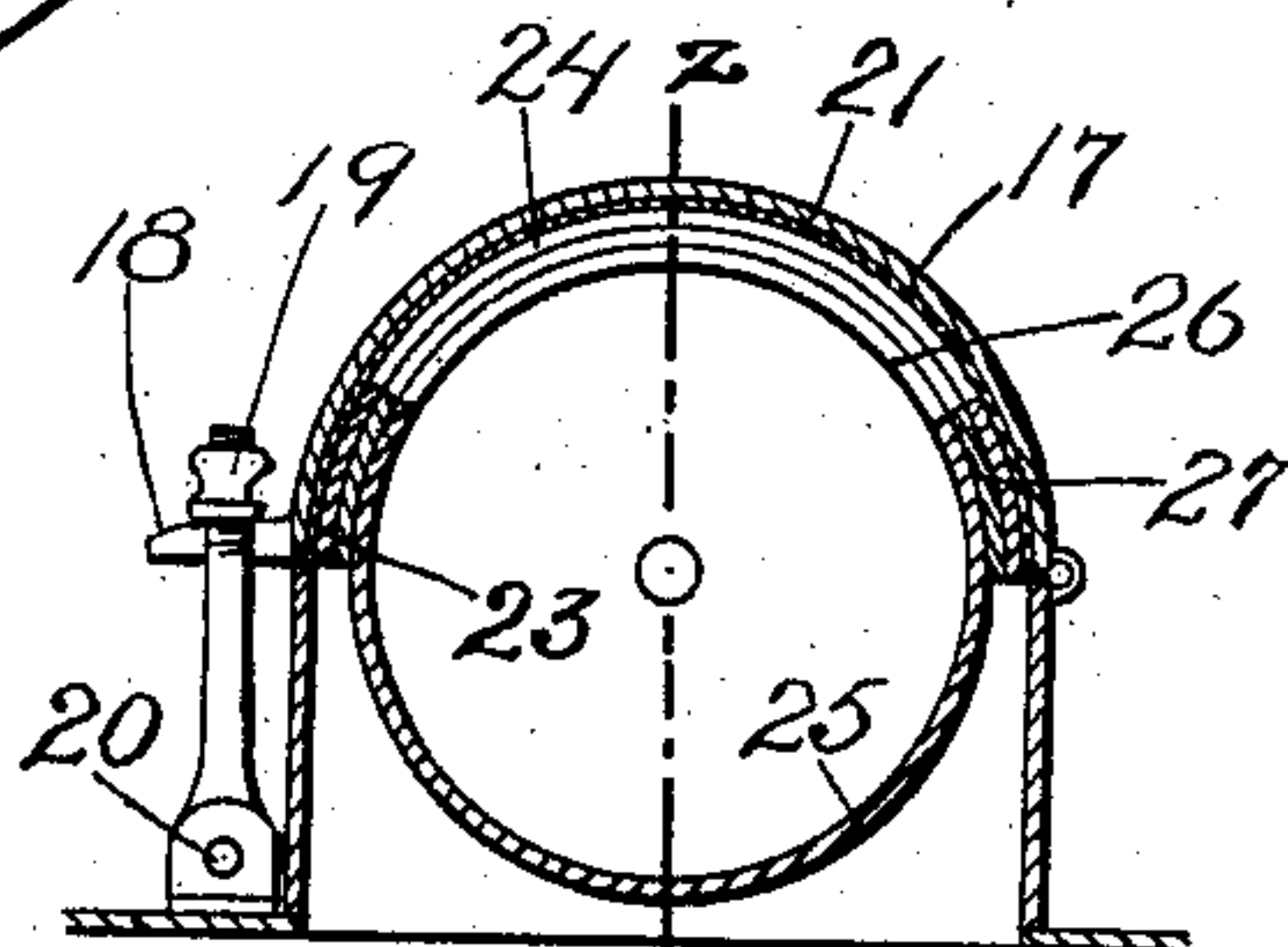


Fig. 4.

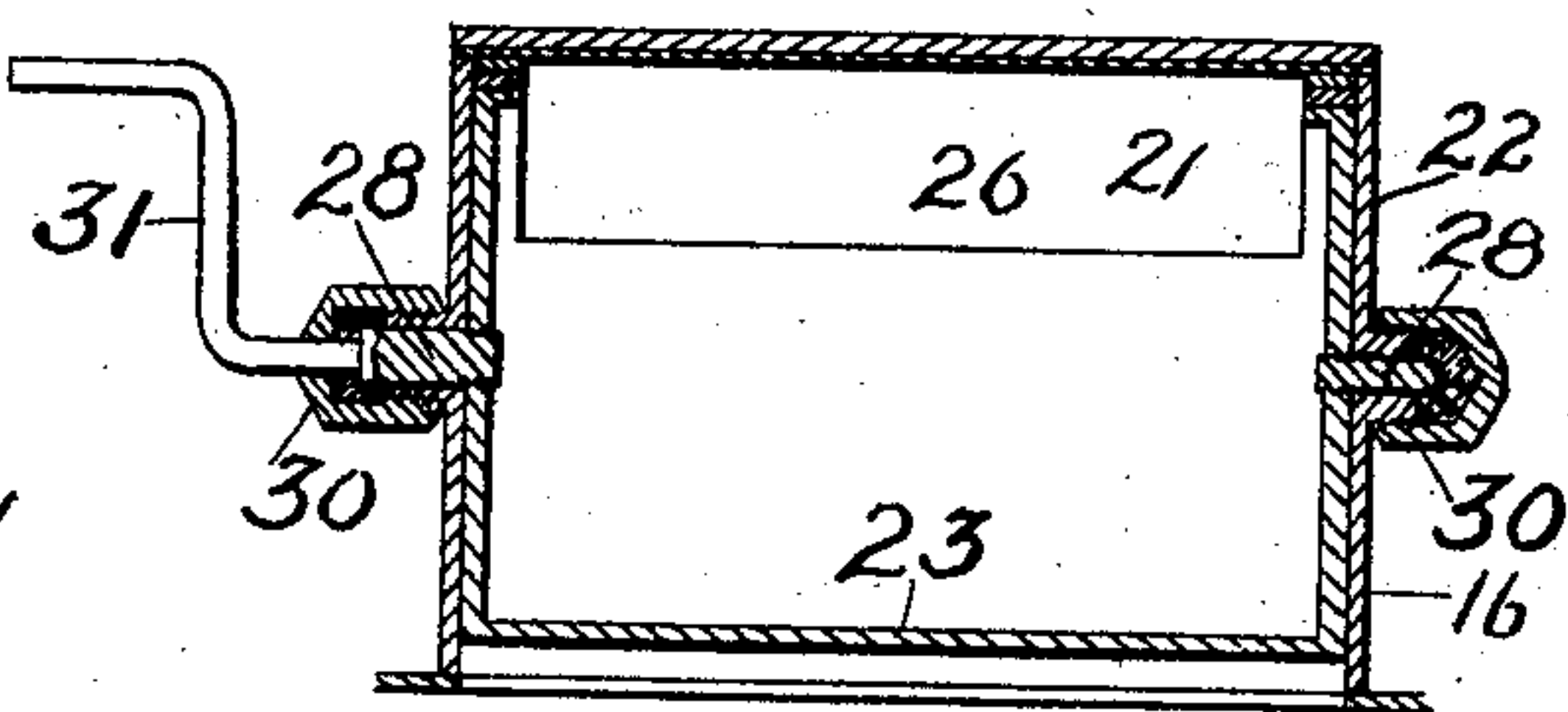


Fig. 5.

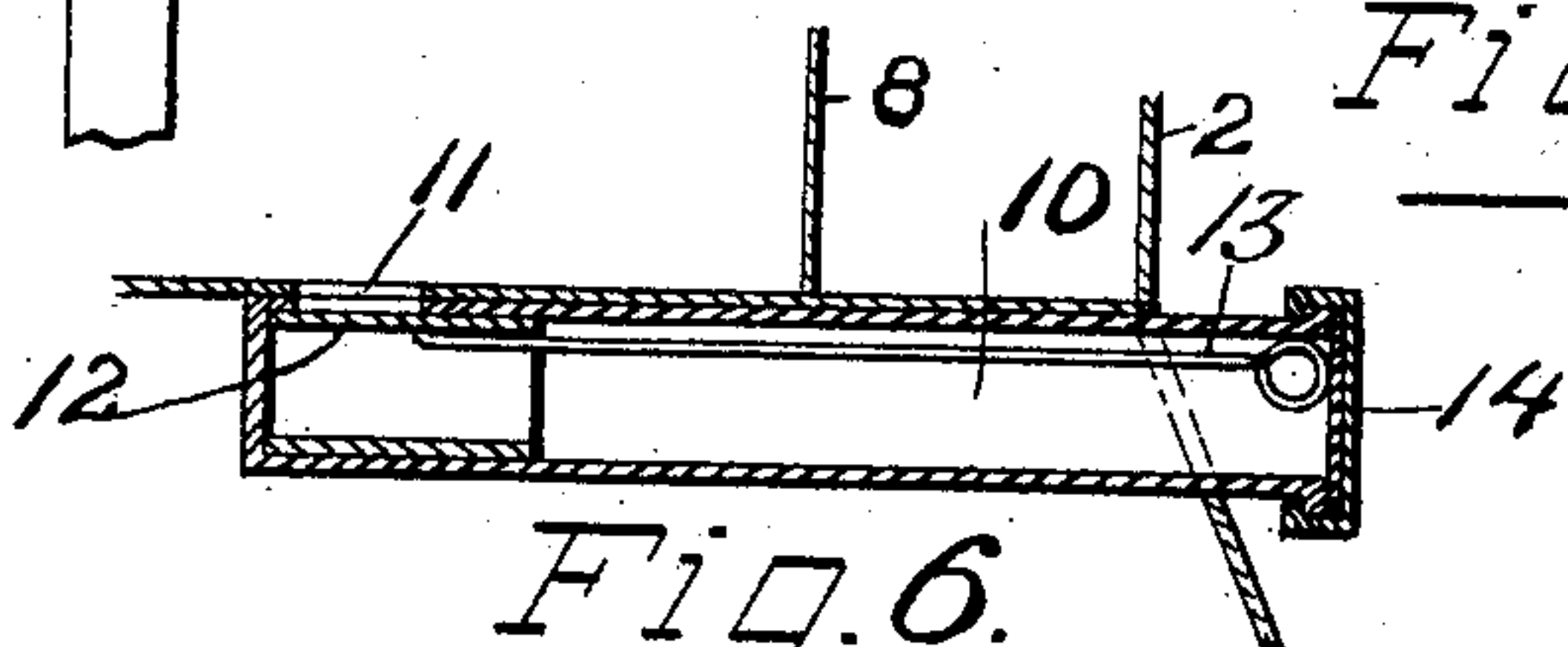


Fig. 6.

WITNESSES

Geo. M. Copenhagen.
D. H. Naylor

INVENTOR

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his attorneys

UNITED STATES PATENT OFFICE.

OLIVER G. SEWARD, OF MINNEAPOLIS, MINNESOTA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 603,747, dated May 10, 1898.

Application filed December 22, 1896. Serial No. 616,627. (No model.)

To all whom it may concern:

Be it known that I, OLIVER G. SEWARD, of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

My invention relates to means for generating, purifying, and storing acetylene gas; and the object of the invention is to provide combined means to generate and purify gas generated from calcium carbid, making said means of a simple and cheap construction, of large capacity, and automatic in action.

The invention consists generally in the combination with three tanks, each provided with a movable gas-holder, generating apparatus, and automatic water-feed devices provided with one of them, purifying means provided in another, and the third serving as a storage and pressure tank, means being provided between said parts to automatically regulate the flow of gas from one to the other.

The invention further consists in the construction and arrangement of each of said parts taken by itself; further, in means whereby the gas-producing material may be deposited in the generator without opening the same or letting off the gas therein; and, further, the invention consists in particular constructions and in combinations of parts, all as hereinafter described, and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a general vertical section of an apparatus embodying my invention. Fig. 2 is an enlarged horizontal section substantially on the line *x x* of Fig. 1, with the wire-guard in the generator removed to more clearly show the water-supply coil. Fig. 3 is an enlarged side view of the water-valve, which is normally closed by the float. Fig. 4 is a vertical section on the line *y y* of Fig. 1, but enlarged. Fig. 5 is a longitudinal section on the line *z z* of Fig. 4. Fig. 6 is a detail section on the line *u u* of Fig. 2, showing the clean-out passage or duct. Fig. 7 is a face view of the self-locking cap employed on the end of the clean-out duct or passage.

As shown in the drawings, 2, 3, and 4 represent three independent water-tanks, each having an open top closed by the vertically-movable gas-holder 5 6 7, respectively. Within the tank 2 I provide a cylinder 8, the upper end of which is open and rises above the level of the water in the three tanks. The bottom of this cylinder 8, which is the carbide-holder, is practically closed, though a water-flushing pipe 9 leads into the same and a duct 10 leads out of the bottom thereof, so that the residue of the carbide may be drawn off occasionally. The structure of the clean-out duct 10 is shown in detail in Figs. 2 and 6. It is a simple pipe having a hole 11 communicating with the cylinder 8, which hole is normally closed by the sliding sleeve 12 in the inner end of the duct 10, which sleeve may be drawn out by means of the rod or handle 13. In addition the end of the duct is tightly closed by the end of the cap 14. (Shown also in Fig. 7.)

The gas-holder 5 of the tank 2 carries a charging valve or dome upon its top. This is central over the chamber 8, so that the contents of the valve or duct will drop into the same. This valve or dome comprises the housing or dome proper, 16, the upper part of which is semicylindrical in form and comprises a hinged top or cover 17, hinged at one end and having a lug or lugs 18 at the other end or ends to be engaged by the binder-screw 19, which screw for convenience preferably has its lower end 20 pivoted. The ends 22 of the dome conform to the cross-section thereof, and a suitable packing strip or sheet 21, which covers the entire inner surface of the cover 17, laps over upon the upper edges of the ends 22 thereof, making a gas-tight joint therewith. Within the dome is an open-sided semicylinder 23, the opening 24 in which is smaller than the hinged top or cover 17, so that the latter closes around all edges thereof. Within this in turn is the valve-cylinder 25, the ends of which are complete, while one side is provided with an opening 26 of the size of that in the cylinder 23. A flexible sheet packing 27 is interposed between the two parts, so that the cylinder 25 may be rotated to carry its open side opposite the opening in the top of the dome, in which position the cylinder is filled with the gas-producing material, or the cylinder may be turned to present a solid sur-

face at the top and an opening at the bottom, whereupon the gas-producing material will drop into the chamber or carbid-holder 8. To prevent the leaking of gas around the studs 5 or end shafts of the valve-cylinder, each bearing is provided with a stuffing-box 30. The cylinder is turned from the outside by a crank 31 or like part. The water is supplied to the calcium carbid in the bottom of the chamber 10 8 through openings in the coil 33, provided therein. The carbid is kept off the top of this coil by a conical guard 34. The coil is supplied with water by a pipe 35, leading down to the bottom of the tank 2, so as not to 15 interfere with the movable gas-holder, and thence out and upward in the auxiliary water tank or pocket 36, provided on the outside of the tank 2. In a very large tank where considerable space is left between the walls 20 of the tank and the holder this pocket might be dispensed with and the valve in the water-supply pipe located between the tank and the gas-holder; but I prefer the construction shown. At the top of the pipe 35 I provide 25 a valve 37. (Shown more clearly in Figs. 3 and 2.) This valve may be of any suitable construction so long as it is adapted to be operated by the lever 38, which in turn is actuated by the float 39 or the movement of the 30 gas-holder. The float 39 and the rod 40 connected therewith are partly counterbalanced by light springs 41 and 42 upon the lever 38 and the rod 40, respectively. Both may be adjustable—one by a series of notches in the 35 lever 38 and the other by an adjustable collar on the upper end of the rod 42.

The gas-holder 5 is provided with an outwardly-projecting arm or lug 43, which, when the gas-holder falls, will strike and depress 40 the rod 40 and, overcoming the buoyancy of the float 39, open the valve 37 and let a quantity of water into the spray or supply coil in the carbid-holder. This water falling on the carbid in the latter will generate gas, which, 45 if its exit from the gas-holder is interrupted or checked, will accumulate therein and raise the gas-holder, thereby liberating the rod 40, whereupon the float 39 will raise the same and close the valve 37 and shut off the flow 50 of water to the carbid. From this time the gas will continue to form until the remaining carbid is consumed or dried, and the holder 5 will be raised still farther until striking its top it will open a gas-passage into the next 55 tank or holder. Within the tank 3 is a zig-zag condenser-pipe 45, the lower end of which is connected by a valve-pipe to the gas-outlet pipe 46, leading downward from above the water-level in the first tank or gas-generator. 60 The upper end of the pipe 45 is dropped down beneath the surface of the water in the tank 3, so that the gas flowing therefrom will necessarily pass through and be washed by the water. Bubbling up through the water it 65 will collect in the upper part of the gas-holder 6, from which it is conveyed by a pipe 48 48'

to the third or storage tank or holder 7. From this holder the gas is exhausted for consumption, flowing therefrom to the outlet-pipe 49. The connecting-pipe 50 between the gas-pipes 70 46 and 45 is provided with a valve 51, the stem 52 of which is pivoted on the lever 53. This lever has a fulcrum or pivot 54, preferably on the valve-casing, and to the ends of the lever are attached the vertically-movable rods 55 75 and 56, extending up the sides of the tanks 2 and 3, respectively. When the rod 55 is raised or the rod 56 depressed, the valve will be opened to permit the passage of gas from the first tank to the second. For this purpose I 80 provide on each rod two adjustable collars or buttons 57 to be engaged by arms 58 on the gas-holders. A similar pipe 59, connecting the gas-pipes 48 and 48' in the tanks 3 and 4, is provided with a similar valve 51', and a 85 lever 53', connected with the stem thereof, is arranged to be operated by either of the rods 60 or 61, which have buttons similar to the other rods to be engaged by arms 58' on the gas-holders 6 and 7. 90

62 represents a condensation pocket or cylinder divided into two chambers by a partition 63, and having each of its parts or chambers connected with the pipe 50 on opposite 95 sides of the valve therein. The partition is used to prevent the flow of gas through the pocket, and each part of the pocket is provided with a separate drip-valve 64, so that there are really two independent pockets. The level of the water in the generator-tank 2 may 100 vary at times, owing to the use of the water through the valve 37 and the pocket 36 and the tank being connected. On the other hand, the tanks 3 and 4 seldom require filling with water, and a water-pipe connected with 105 one will communicate with the other through a byway 65.

The operation of my device is as follows: Any amount of carbid may be deposited in the holder without liberating any particular 110 quantity of gas through the rotating cylinder valve or dome. The water enters through the coil and the gas accumulating in the holder 5 raises the same, cutting off the water-supply and eventually raising the rod 55, 115 thereby opening the valve and passage for the gas into the gas-holder 6. The gas will escape from the first holder into the second until exhausted from the first, whereupon the holder 5 will drop and engage the lower but- 120 ton on the rod 55 and close the valve 51. In turn when the gas-holder 6 rises to its full height it will close the valve 51 and through the rod 60 open the valve 51', which controls the passage into the third or storage tank 7. 125 The fall of the holder 6 will depress the rod 56 and open the valve 51 from the first gas holder or generator. At the same time it will close the valve 51'. The rise of the gas-holder 7 closes the valve 51', while the fall 130 thereof opens said valve, so that gas will flow into the holder 7 from the holder 6. The fall

of the gas-holder 7 is regulated by the consumption of the gas in the burners connected therewith.

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

1. In an acetylene-gas generator, the combination, of an annular water-chamber surrounding a chamber or space for gas-producing material, with an independent movable gas-holder adapted to rise and fall in said water-chamber, means in the top of said movable gas-holder for dropping gas-producing material into the chamber or space therefor without the escape of gas from the gas-holder, an inlet for water from the water-chamber to said space containing the gas-producing material, and automatic means governed by the production of gas for regulating the entrance of water from the water-chamber to the chamber or space containing the gas-producing material, substantially as described.

2. In an acetylene-gas chamber the combination of an open-topped chamber for calcium carbide with a water-tank surrounding same, a movable gas-holder in said tank and inclosing said chamber, a water-pipe communicating between said tank and said chamber to admit water from one to the other, a valve in said pipe, a float-lever whereby said valve is normally closed, and means whereby upon the fall of said holder said valve is opened, substantially as described.

3. The combination with the top of a gas-generator, of an open-sided cylinder revoluble therein, a casing or dome therefor and means on the exterior thereof to revolve said cylinder, to expose its open side to the interior or exterior of the gas-generator, and a top for said dome conforming to said cylinder, means for binding the same thereon, and suitable packing interposed between the cylinder and the parts of the dome, substantially as described.

4. In an acetylene-gas generator the combination of a suitable water-tank, with a chamber or space for calcium carbide, therein and surrounded thereby but having an open top, and an independent movable gas-holder, a water-pipe leading from said tank into said chamber or space, an exterior water-pocket, a float-valve provided therein, to control the entrance of water to said chamber or space, a float-rod and a lug upon said gas-holder to engage the same upon the fall of the gas-holder, whereby said valve is opened, substantially as described.

5. In an acetylene-gas generator, the combination, of a suitable tank, with a chamber or space for carbide arranged within said tank and having an open top which projects above the surface of the water in the tank, a gas-holder arranged in said tank to rise and fall therein and surrounding or covering said chamber or space to receive the gas therefrom, regulable means for jetting water into the upper part of said chamber or space and

upon the material therein, a clean-out hole at the bottom of said chamber or space, a valve or slide to close the same, and a flush-pipe leading into the lower part of said chamber or space, substantially as described.

6. In an acetylene-gas generator, the combination of a water-tank and a gas-holder, with a carbide-holder and means for supplying water thereto, an independent tank and gas-holder, provided with a suitable condenser, a gas-pipe communicating between the first-mentioned gas-holder and the said condenser, a gas-valve provided in said pipe, and means in connection with each gas-holder for automatically opening and closing said valve, substantially as described.

7. In an acetylene-gas generator, the combination with a suitable tank and gas-holder, provided with means for holding and dampening calcium carbide, of an independent tank and gas-holder, a gas-pipe forming a connection between the two gas-holders, a valve in said pipe, a valve-lever, upright rods, connected therewith, suitable guides for said rods, and means whereby the extreme movements of either of said gas-holders will actuate said rods and said valves, substantially as described.

8. In an acetylene-gas generator, the combination with a suitable tank and gas-holder, provided with means for holding and dampening calcium carbide, of an independent tank and gas-holder, a gas-pipe forming a connection between the two gas-holders, a valve in said gas-pipe, means whereby the extreme movements of said gas-holders operate said valve, and condensation-pockets connected with said gas-pipe, on opposite sides of said valve, substantially as described.

9. In an acetylene-gas generator, the combination with a water-tank and a gas-holder, of a separate water-tank, and gas-holder, a gas-pipe forming a communication between said gas-holders, a valve therein, a valve-lever, rods having guides, and also having stops to be engaged and operated by said gas-holders, to actuate said valve, substantially as described.

10. In an acetylene-gas generator, the combination with a water-tank and a gas-holder, of means for introducing calcium carbide, without the escape of gas from said holder, a carbide-holder, a water pipe and valve, to supply water to the carbide in said holder, means operated by said gas-holder to open said valve, a second tank and gas-holder, a gas-pipe, leading between the two gas-holders, a valve in said pipe, means whereby the extreme movement of either of said gas-holders, actuates said valve, in the gas-pipe, a third tank and gas-holder, a gas-pipe connecting the second and third gas-holders, a valve in said pipes, means whereby the extreme movements of either the second or the third gas-holder actuate said valve, and a gas-outlet from the third gas-holder, substantially as described.

11. In an acetylene-gas generator, the com-

5 bination, with the water-tank 2, of the interior open-topped chamber 8 arranged therein, the gas-holder 5 to rise and fall in the tank, the water-pipe 35 leading from the tank into
10 said chamber 8, the coil of said pipe within the upper part of said chamber 8, the valve for controlling the flow of water through said pipe, means whereby said valve is operated by said gas-holder, and the projection 34 ar-
15 ranged in the chamber 8 to prevent the lodging of material upon said coil or the stoppage of the openings therein, and means whereby said chamber 8 may be cleaned from the bottom, substantially as described.

15 12. In combination with the carbid receptacle or holder of an acetylene-gas generator,

the pipe 10 leading from the bottom thereof, and having an opening 11 through the bottom of said receptacle, the gas and water tight cap, 14, for the outer end of said pipe, the slid- 20
able tube, 12, arranged in said pipe to close said opening 11, and rod or handle, 13, whereby said tube may be drawn out of the pipe, when the cap 14 is removed, as and for the purpose
25 specified.

In testimony whereof I have hereunto set my hand this 28th day of November, A. D. 1896.

OLIVER G. SEWARD.

In presence of—

C. G. HAWLEY,

M. E. GOOLEY.