(No Model.) 3 Sheets—Sheet 1.

H. ELDRIDGE.

GAS GENERATING APPARATUS.

No. 567,641. Patented Sept. 15, 1896.

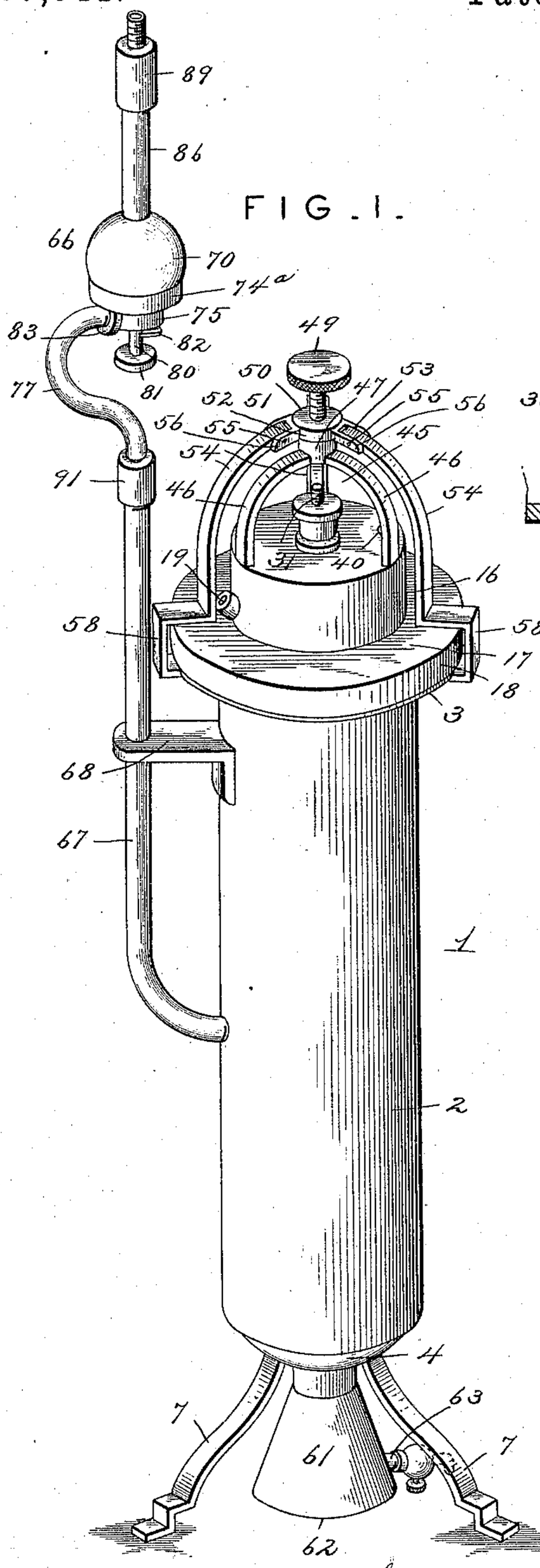


FIG. 1.

FIG. 5.

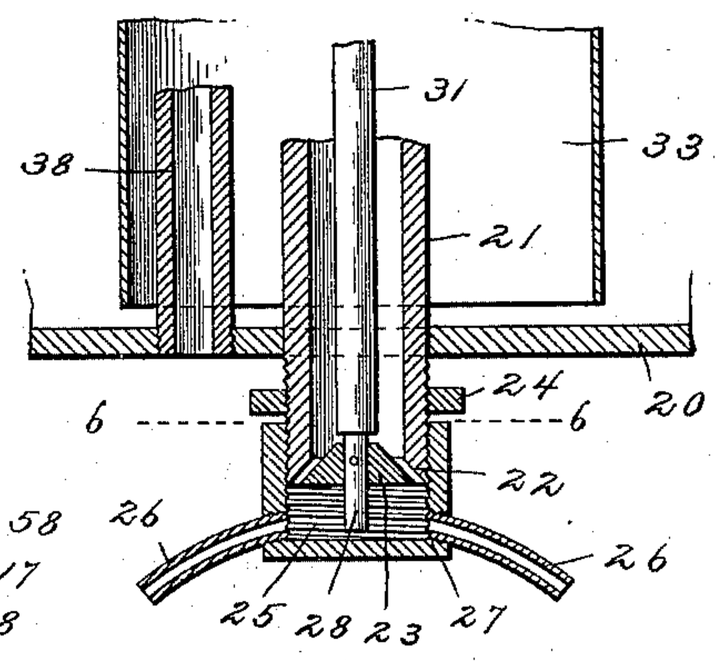
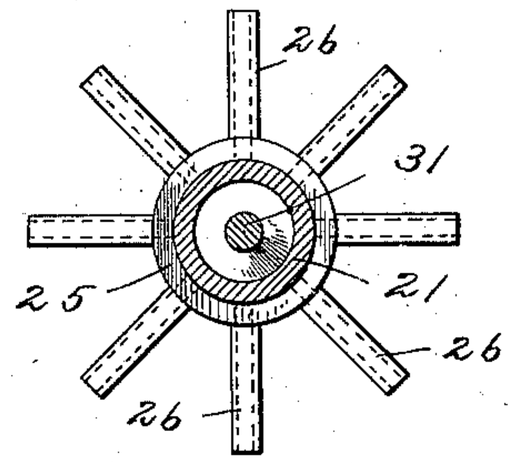


FIG. 6.



Witnesses
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Inventor

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C. A. Snow & Co.

(No Model.) 3 Sheets—Sheet 2.

H. ELDRIDGE.

GAS GENERATING APPARATUS.

No. 567,641. Patented Sept. 15, 1896.

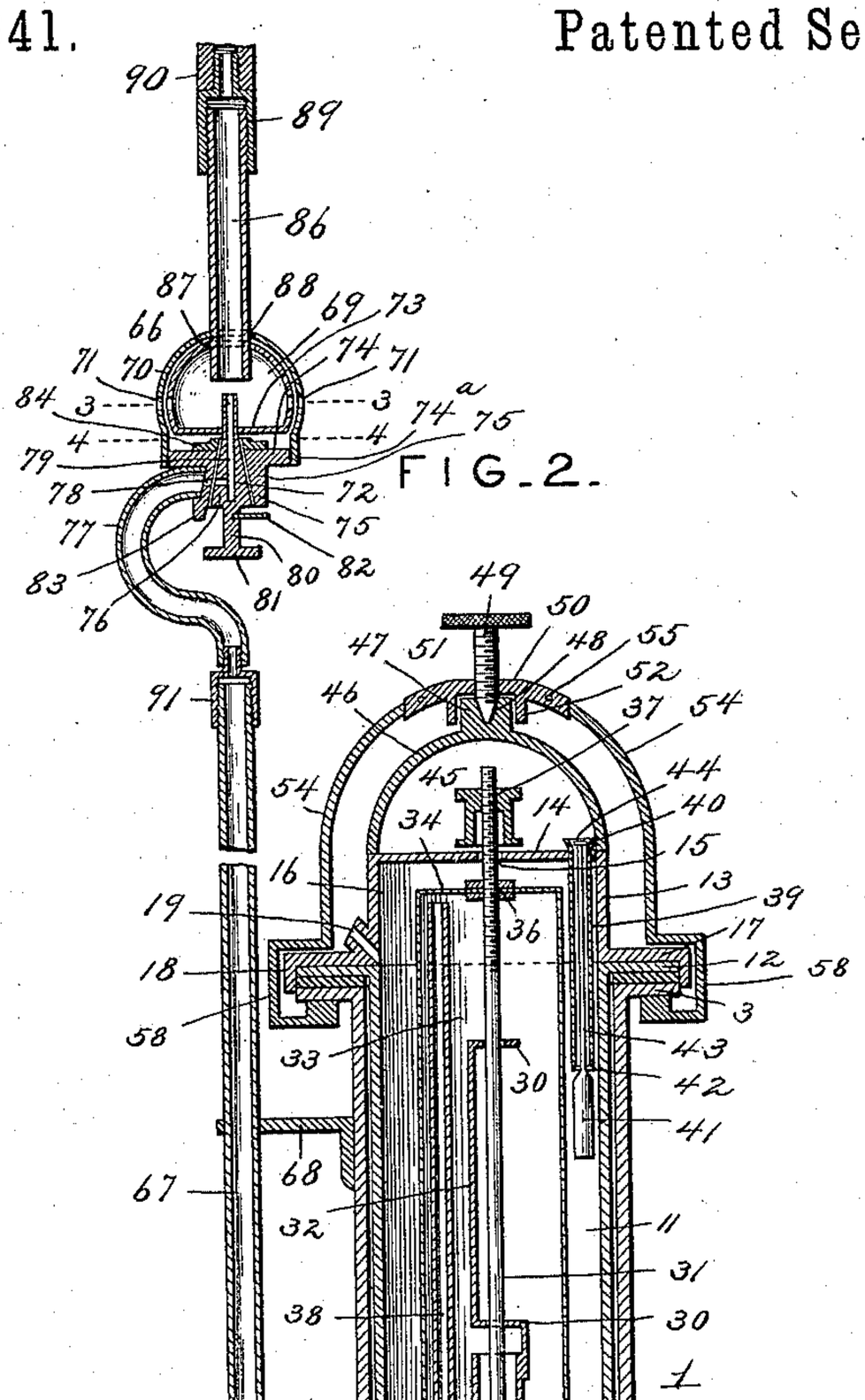


FIG. 2.

FIG. 3.

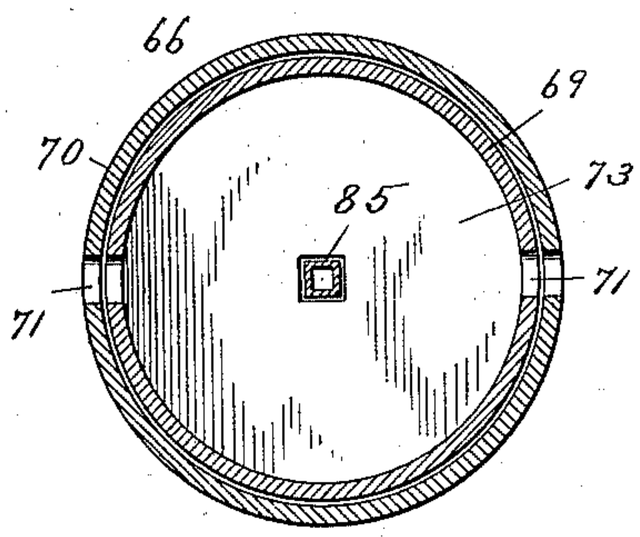
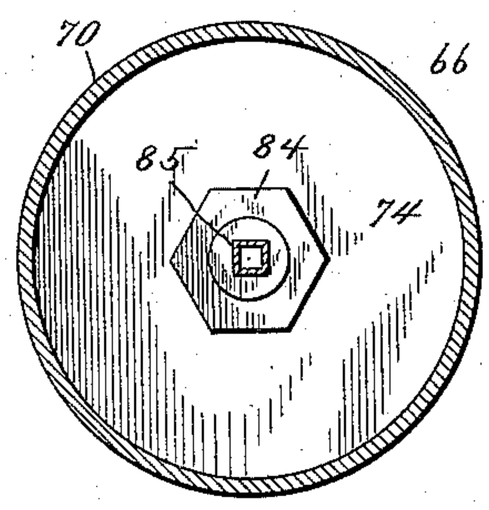


FIG. 4.



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(No Model.) 3 Sheets—Sheet 3.

H. ELDRIDGE.

GAS GENERATING APPARATUS.

No. 567,641. Patented Sept. 15, 1896.

FIG. 7.

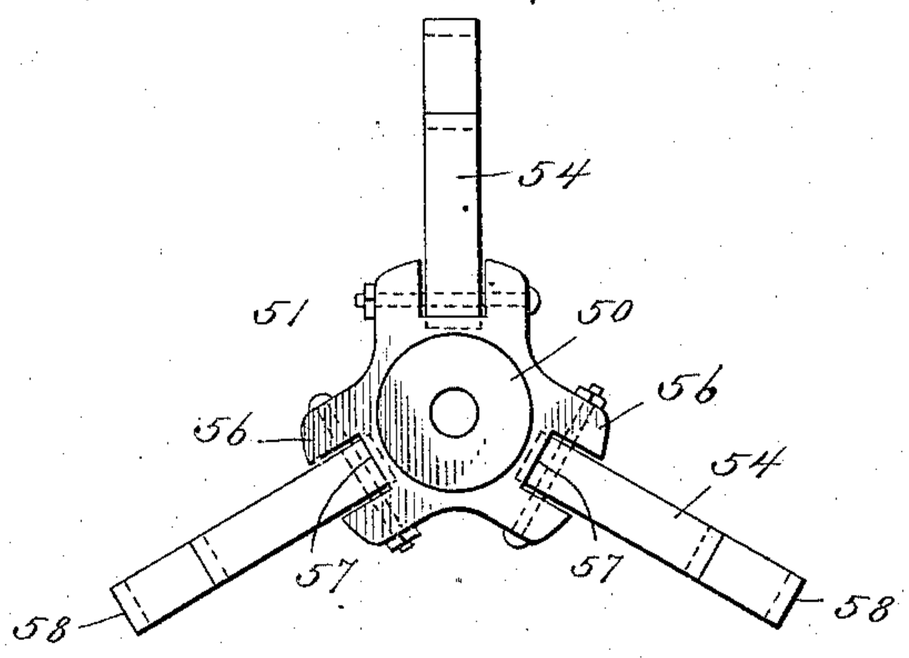


FIG. 8.

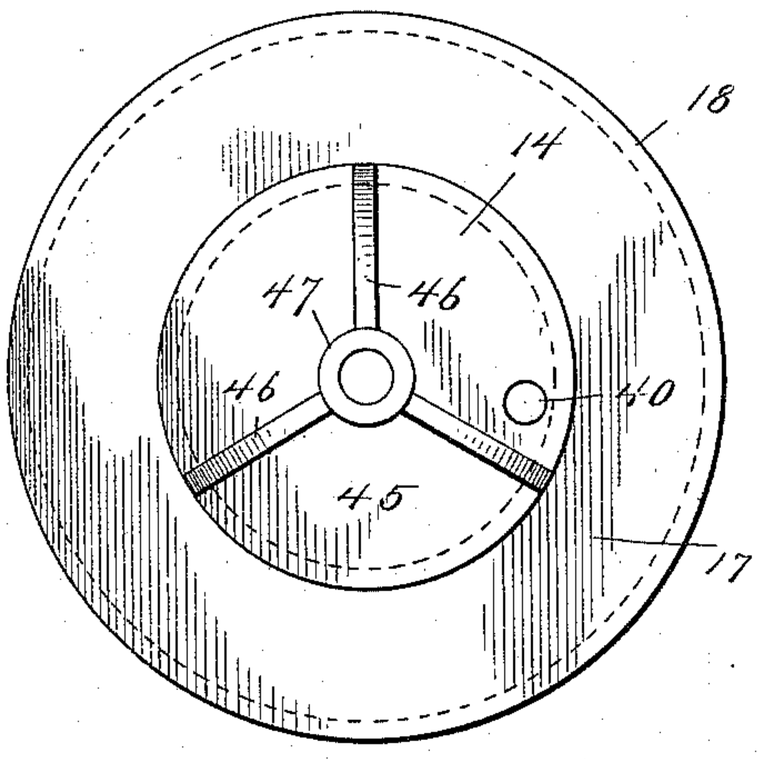


FIG. 9.

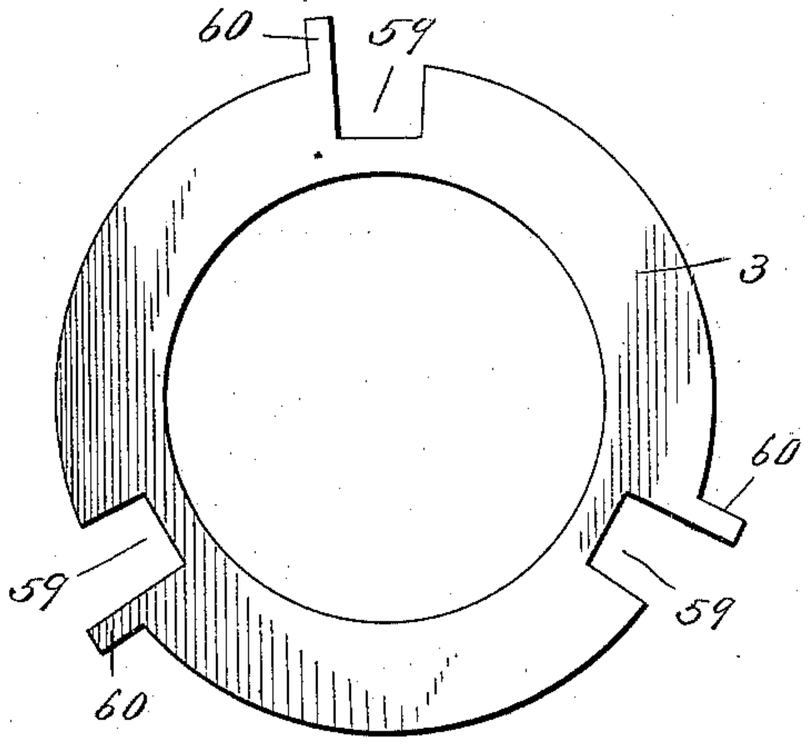
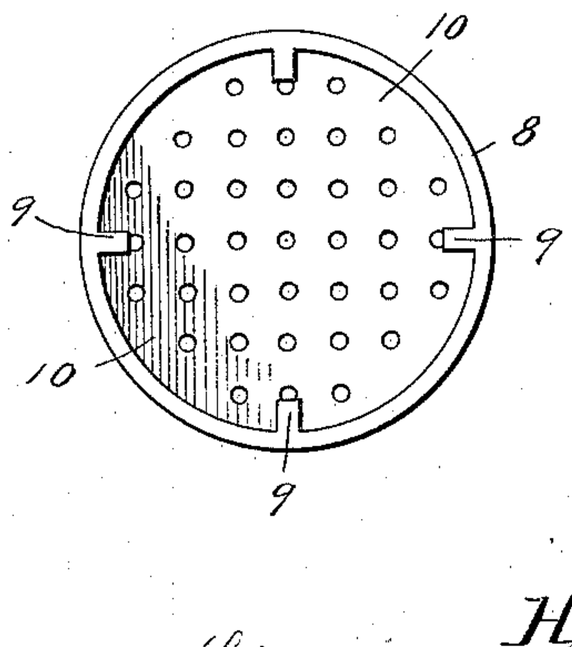


FIG. 10.



Witnesses
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Inventor
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UNITED STATES PATENT OFFICE.

HILLIARY ELDRIDGE, OF GALVESTON, TEXAS.

GAS-GENERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 567,641, dated September 15, 1896.

Application filed September 3, 1895. Serial No. 561,305. (No model.)

To all whom it may concern:

Be it known that I, HILLIARY ELDRIDGE, a citizen of the United States, residing at Galveston, in the county of Galveston and State of Texas, have invented a new and useful Gas-Generating Apparatus, of which the following is a specification.

My invention relates to gas-generating apparatus, particularly to those for generating gas to be used for illuminating and power purposes, and still more particularly to acetylene-generators.

My object is to provide a generator that may be used for generating various kinds of gases, but especially acetylene, with uniformity of flow of gas and at a uniform pressure, and economical and accurate combination therewith of air. I provide a device simple in construction, so that it may be manufactured in small sizes for private use by individual consumers, or in larger sizes, with parts readily adjustable for automatic action, so that the apparatus may be charged with the chemicals and left to automatically regulate itself until the supply of raw material is exhausted. This apparatus is especially adapted for generating gas and mixing it with air from that class of chemicals that generate gas from water by decomposition thereof and by affinity for oxygen or hydrogen. The air-mixing is to prevent smoking when the gas is used for illuminating purposes, and to prevent the deposition of carbon when used for power purposes.

With these and other objects in view my invention consists in the various combinations and details of parts hereinafter set forth by description and claims.

In the drawings, Figure 1 is a perspective view of my combined gas-generating and air-combining apparatus. Fig. 2 is a central vertical section thereof. Fig. 3 is a horizontal section of Fig. 2 through the air-combiner on line 3 3. Fig. 4 is a similar view on line 4 4. Fig. 5 is a central vertical section. Fig. 6 is a horizontal section of the drip-nozzle and its connections. Fig. 7 is a top plan view of the clamping-jaws. Fig. 8 is a top plan of the generator with the clamp removed. Fig. 9 is a detail plan view of the fastening-flange of the tank. Fig. 10 is a top plan view of the chemical-receiver.

Referring now to the details of construction by reference-numerals, 1 designates the main tank, which consists of a tubular body portion 2, provided with an outturned peripheral flange 3 at its open upper end, rounded bottom 4, centrally perforated at 5, with a depending flange 6, exteriorly threaded, and three divergent supporting-legs 7. Loosely seated in the lower half of tank 1 is the chemical receiver 8, open at the top, where it is provided with means for its removal from the tank, such as internal lugs 9, and closed at its bottom 10, which is perforated to constitute a strainer through which the surplus water may flow. Water-reservoir 11 fills the remaining upper portion of tank 1, leaving a small open space between the same and the receiver 8. This reservior is provided at its open upper end with flange 12, arranged to rest upon flange 3, with a heavy washer or gasket therebetween. A cap 13 incloses the upper end of reservoir 11, having a horizontal top 14, centrally perforated at 15, and a vertical wall 16, alining with the reservoir wall and provided at its lower edge with a horizontal flange 17, extending over flange 12. Flange 17 is downturned at its edge 18 to fit around flange 12, so as to hold said cap in accurate position. Wall 16 is perforated at its lower edge to form overflow-vent 19, extending diagonally upward from the mouth of reservoir 11. The horizontal bottom 20 of the reservoir is centrally provided with a short vertical tube 21, soldered or screwed therein, which projects slightly below said reservoir, and is beveled internally on its lower edge to form a valve-seat 22 for valve 23. Tube 21 is exteriorly threaded adjacent the valve-seat to receive the jam-nut 24 and drip-nozzle 25. This nozzle is in the form of a cap interiorly threaded for adjustment over the valve-seat and is provided with a series of nipples or drip-spouts 26, screwed or otherwise fastened into a corresponding series of perforations through the sides of said nozzle-cap flush with the bottom 27 thereof. This bottom 27 is arranged to receive the end 28 of the valve-rod, which projects below valve 23, so that by adjusting the nozzle up or down and fixing it by jam-nut 24 the amount of play of valve 23 away from its seat is accurately regulated. The upper end of tube 21 is provided with a supporting and guide

bracket formed integrally therewith or secured thereto, which comprises two or more perforated guide-lugs 30, adapted to receive the valve-rod 31, and a connecting-bar 32.

Concentrically arranged within reservoir 11 is an inverted cup or gas-chamber 33, which extends within a short distance of the top 14 of the cap 13, with its roof 34 centrally perforated to receive the upper end of valve-rod 31 therethrough. Valve-rod 31 is screw-threaded at its upper portion and provided on either face of roof 34 with clamping-nuts 36, which adjust said cup on the valve-rod and when brought together tightly against the gas-chamber roof make a gas-tight joint therewith. Valve-rod 31 passes up through perforation 15 and is provided on its projecting end with a long double-flanged nut 37. This nut is elongated so as to receive weights, if necessary, as explained later on. Within gas-chamber 33 an outlet-tube 38 is arranged, opening into tank 1 at its lower end and secured integrally at said end in the bottom 20 of the water-reservoir, and extending vertically with its open upper end adjacent the roof of the gas-chamber to permit the gas accumulated therein to escape out into the tank. Depending into the water-reservoir is filling-tube 39, secured at its upper end to project through the top 14 of the cap 13, where it has a funnel-mouth 40, into which water is poured to fill the reservoir. A float-valve 41, conical at its upper end to fit the beveled end or valve-seat 42 of the filling-tube 39, has a rod 43 extending through said tube and provided with a cross-bar or stop 44, normally resting in funnel 40, which rises by reason of its float end when the reservoir is sufficiently filled with water.

Arched over cap 13 and integral therewith is a cage 45, preferably composed of three braces 36, uniting at the center in a circular lug 47, projecting therefrom and conically bored to form a socket 48 in its upper surface to receive the beveled end of clamping-screw 49. This screw works by screw-threads through the spider member 50 of the clamp 51, which is provided on its under side with a depending annular flange 52, fitting around lug 47. Spider 50 further comprises three radial arms longitudinally recessed at 53 to form bearings for the downwardly-arched clamping-arms 54, which are pivoted therein by pivot-pins 55 passing horizontally through the adjacent ears 56. Projecting slightly over the rear portion of each recess 53 is a rib or stop 57 to limit the upward swing of arms 54. These arms are provided at their outer ends with rectangular depending jaws 58, adapted to retain the assembled parts together, passing through notches 59 in the outer edge of tank-flange 3, and adapted to be revolved around beneath said flange. Lugs 60 project from flange 3 adjacent the right side of notches 59 to limit the jaws 58 in their revolution to the left.

Secured to the bottom of tank 1 is a vessel 61 for the surplus water, which is screwed onto flange 6 and is preferably flared toward its bottom 62, so as to have more capacity. A little above the bottom a suitable faucet 63 is secured in a perforation 64 through the wall of said vessel. This faucet is provided with a depending neck 65 within the vessel, so as to provide a water seal to prevent the escape of gas when drawing off the surplus water.

My air mixer or combiner 66 is connected to tank 1 by a gas-discharge pipe 67, inserted into the wall of said tank at one side of the open space between the receiver and the reservoir. This pipe is supported adjacent to the tank by bracket-arm 68. The combiner 66 comprises an inner shell or mixing-chamber 69 and an outer shell or casing 70, snugly fitted thereover, and each provided through either side with alining air vents or apertures 71 in the form of slits, and a gas-regulating admission-valve 72, fitted to turn in the bottom 74 of the external shell. These shells are slightly more than hemispherical, and the inner one is provided with a horizontal bottom 73, secured to said spherical shell. The outer shell 70 has a tubular extension 74^a screw-threaded internally and provided with a rigid bottom or base 74, screwed therein flush with its lower edge. Base 74 has an extension 75 on its under side, which is vertically bored to receive the conical gas-plug 76 and laterally bored and screw-threaded to receive the lower connecting-tube 77. A horizontal gas-vent 78 through the opposing wall of extension 75 makes connection by means of the gas-channel 79, through plug 76, with the inner shell or mixing-chamber 69. Plug 76 is provided at its outer end with a stem 80 and cross-head 81 for turning the plug and with a stop-pin 82, projecting from said stem to come into contact with a lug 83 formed on extension 75 in the path of said stop-pin 82. At its inner end plug 76 is screw-threaded to receive the retaining-nut 84, which bears against base 74, and is provided with a squared hollow extension 85, which fits through a square aperture centrally provided in the bottom 73 of the inner shell 69. Thus when plug 76 is turned to bring the meeting ends of gas-vents 78 and 79 into alinement it also turns shell 69 so as to aline the air-vents 71, so as to admit air at the same time as the gas. The proportions of air and gas to be mixed are primarily regulated by proportioning the respective air and gas vents, and the relative proportions may be further regulated by turning the outer shell 70 relatively to its base 74 so as to bring air-vents 71 in complete alinement over each other, or only partially so. To permit this, an upper connecting-pipe 86 is provided, which extends at its lower end loosely through the crown perforation 87 in the mixing chamber or shell, but is joined fixedly within the alined perforation 88 in the outer shell, and is free to turn at its upper end by means of a coupling-sleeve 89, which connects its upper end with the service-pipe 90. The lower con-

necting-pipe 77 is curved around to join pipe 67 in axial alinement with the upper connecting-pipe 86, and is joined thereto by means of a coupling-sleeve 91, similar to sleeve 89. By means of this arrangement the distance between the gas-pipe 67 and the service-pipe 90 may be increased or decreased.

The operation of my improved gas-generator and air-mixer is as follows: Main tank 1 being empty, but having vessel 61 secured onto the bottom and gas-pipe 67 and air-combiner 66 in proper place, the chemical-receiver 8 is filled with calcium carbide, or such other chemical as is to be used, and lowered by means of the internal lugs 9 inside the tank against its lower end. The water-reservoir 11, gas-chamber 33, and cap 13 are then assembled and adjusted properly relatively to each other and clamped together by means of clamp 51, which serves as a handle by which to lift them over into place on the flange 3 of tank 1, with the gasket between the opposing flanges 3 and 12. The clamping-bolt 49 is then loosened up in its socket 48, so as to allow the rectangular jaws 58 to drop through the alining notches 59. Said jaws are then revolved around under the flange 3 and the bolt 49 is screwed down tightly into its socket to firmly bind all the parts together and to the main tank. The valve 23 is now closed by screwing down nut 37 on the valve-rod 31, and the water-reservoir 11 is filled with water poured through the funnel 40 until the float-valve 41 gives notice that the reservoir is sufficiently supplied. The valve 23 is now opened by reversing nut 37, and the water flows through tube 21 into drip-nozzle 25, and drips down from the drip-spouts 26 onto the calcium carbide. The gas thus generated by the water and chemical fills the gas-pipe 38 and open space surrounding the nozzle, and ascends into the gas-chamber 33. When the gas-pressure reaches the limit desired, it raises the gas-chamber, and thereby, through valve-rod 31, closes the valve 23 and cuts off the water-supply until the pressure begins to fall so as to lower the gas-chamber, when the valve gradually opens and the water again begins to drip. Thus the pressure and generation of the gas are automatically regulated to a uniform rate. If greater pressure is desired, the gas-chamber is weighted in any suitable manner, as by putting weights around the nut 37 between its flanges. If it is desired to generate the gas more rapidly, the water-supply is increased by lowering the nozzle 25, (secured by jam-nut 24,) so that its bottom 27 will allow the valve-rod end 28 more play, thereby opening the valve wider. The upper end of the valve-rod is in such case correspondingly adjusted in the gas-chamber roof 34 by means of nuts 36. Whatever overflow from the water-reservoir there may be by reason of the gas-pressure in the gas-chamber finds exit through overflow-vent 19. The surplus water from the calcium carbide trickles down through the reticulated bottom 10 and collects by means of the spheroidal bottom 4 in vessel 61. When it is desired to draw off this collected surplus water, the faucet 63 is opened and the water thereby escapes, but no gas escapes for the reason that the depending neck 65 of said faucet is always immersed or sealed in the water, as is evident from the drawings. As the gas escapes from tank 1 it is not in desired condition for consumption, but requires tempering by the introduction of outside air. This result is accomplished by opening valve 72 of the air mixer or combiner 66, which, by the same movement, opens the air-vents 71 into alinement, as adjusted, through the casing 70 into the mixing-chamber 69. The crude gas flows through pipe 67, connecting-tube 77, gas-vent 78 in extension 75, and gas-channel 79, through the tapered plug 76, into said mixing-chamber, and the air flows at the same time through the alined air-vents 71 into said chamber. The relative sizes of these vents is correctly proportioned originally to mix the gas and air in the quantities desired for the gas that the machine is intended to manufacture, (acetylene, for instance) but if another chemical is to be used, or for any other reason these relative proportions are to be varied, this can be done simply by turning the outer shell or casing 70 on its screw-threaded base 74 relatively to the inner shell or mixing-chamber 69 until the air-vents 71 aline only partially when the gas-plug 76 is turned to open the valve.

Many changes in proportions and arrangements of parts may be made within the spirit and scope of my invention.

What I claim is—

1. In a gas-generator, the combination with a main tank, of a chemical-receiver in its lower portion, said receiver having a perforated bottom, a vessel secured to said tank to receive surplus water therefrom, said vessel being provided with a faucet whose inner end has a downturned neck or water seal whereby water may be withdrawn without the escape of gas, a water-reservoir in the upper portion of said tank, a gas-chamber within said reservoir adjustably secured through its roof to a valve-rod, said valve-rod, the same being provided with a valve at its lower end adapted to close against a valve-seat provided in the bottom opening of said reservoir, whereby the flow from said reservoir is automatically regulated through said valve and valve-rod by the gas-pressure in said gas-chamber, substantially as described.

2. In a gas-generator, the combination with a main tank, of a chemical-receiver in its lower portion, said receiver having a perforated bottom, a vessel secured to said tank to receive surplus water therefrom, said vessel being provided with a faucet whose inner end has a downturned neck or water seal whereby water may be withdrawn without the escape of gas, a water-reservoir in the upper portion

of said tank, provided with a filling-tube in its upper portion having a float-valve therefor at its lower end, a gas-chamber within said reservoir adjustably secured through its roof to a valve-rod, said valve-rod, the same being provided with a valve at its lower end adapted to close against a valve-seat provided in the bottom opening of said reservoir, whereby the flow from said reservoir is automatically regulated through said valve and valve-rod by the gas-pressure in said gas-chamber, all of said parts being removable from each other and from the main tank, and a clamp provided with pivoted jaw-arms for clamping said parts together, substantially as described.

3. In a gas-generator, the tank provided with a bottom drain-opening, a chemical-receiver arranged within the lower end of the tank and provided with a perforate bottom, a water-reservoir arranged in the tank above said receiver and provided in its lower end with a discharge-tube having an automatically-controlled valve, a surplus-water vessel fitted to the bottom of the tank and communicating with the drain-opening therein, and a draw-off faucet fitted in one side of said vessel and provided at its inner end with a short downturned neck, substantially as set forth.

4. In a gas-generator, the tank open at its upper end, a chemical-receiver arranged within the lower end of the tank, a water-reservoir fitting within and closing the upper end of the tank, a discharge-tube fitted within the bottom of the reservoir above the receiver, an automatically-controlled valve arranged to cover and uncover the lower end of said tube, and a spray-nozzle cap having an adjustable connection with the lower end of said tube to limit the movement of said valve, substantially as set forth.

5. In a gas-generator, the combination of the tank having a chemical-receiver, a water-reservoir arranged within the tank above said chemical-receiver, a valved discharge-tube fitted within the bottom of the water-reservoir, and a nozzle-cap fitted on the lower end of said tube and provided with a series of radially-extending nipples or spouts discharging directly into said receiver, substantially as set forth.

6. In a gas-generator, the combination of the tank having therein a chemical-receiver, a water-reservoir arranged within the tank above said chemical-receiver, a tube fitted in the bottom of the water-reservoir and extending inwardly therein to a point near its top, a discharge-tube fitted in the bottom of the water-reservoir and provided at its lower end with an adjustable nozzle-cap disposed directly above said receiver, a vertically-movable valve-rod having a threaded upper end extended through and above the top of the water-reservoir and carrying at its lower end within said nozzle-cap a valve working over the lower end of said discharge-tube, an inverted gas-cup adjustably fastened at its closed upper end to the valve-rod and fitting over the inwardly-extending tube within the water-reservoir, and a regulating-nut mounted on the threaded upper extremity of the valve-rod above the water-reservoir, substantially as set forth.

7. In a gas-generator, the tank provided with an open upper end having an outturned peripheral flange, a chemical-receiver arranged within the bottom of the tank, a water-reservoir arranged within the tank above the receiver and provided with a valved discharge at the bottom, and at its open upper end with an offstanding flange resting on the flange at the upper end of the tank, a reservoir-cap inclosing the upper end of the reservoir and having at its lower edge a flange abutting with the flange at the upper end of the reservoir, and a clamping device for securing the abutting flanges together, substantially as set forth.

8. In a gas-generator, the tank provided with an open upper end having an outturned peripheral flange provided in its edge at intervals with notches and at one side of said notches with lugs, a chemical-receiver arranged within the bottom of the tank, a water-reservoir arranged within the tank above the receiver and provided at its open upper end with an offstanding flange resting on the flange of the tank, a flanged cap inclosing the upper end of the reservoir and provided at its top with a spider frame or cage having a centrally-disposed socketed lug, a clamping-frame arranged over said spider frame or cage, and comprising a spider member and a series of downwardly-arched clamping-arms pivoted at one end to said spider member and provided at their other ends with jaws adapted to engage with the flange at the upper end of the tank and to pass through the notches of such flange, and a clamping-screw mounted in said spider member and working in the socket of said socketed lug, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HILLIARY ELDRIDGE.

Witnesses:
N. H. CHRISTIAN,
JOSEPH JERSIG.