F. E. STOVER.

ACETYLENE GAS GENERATOR.

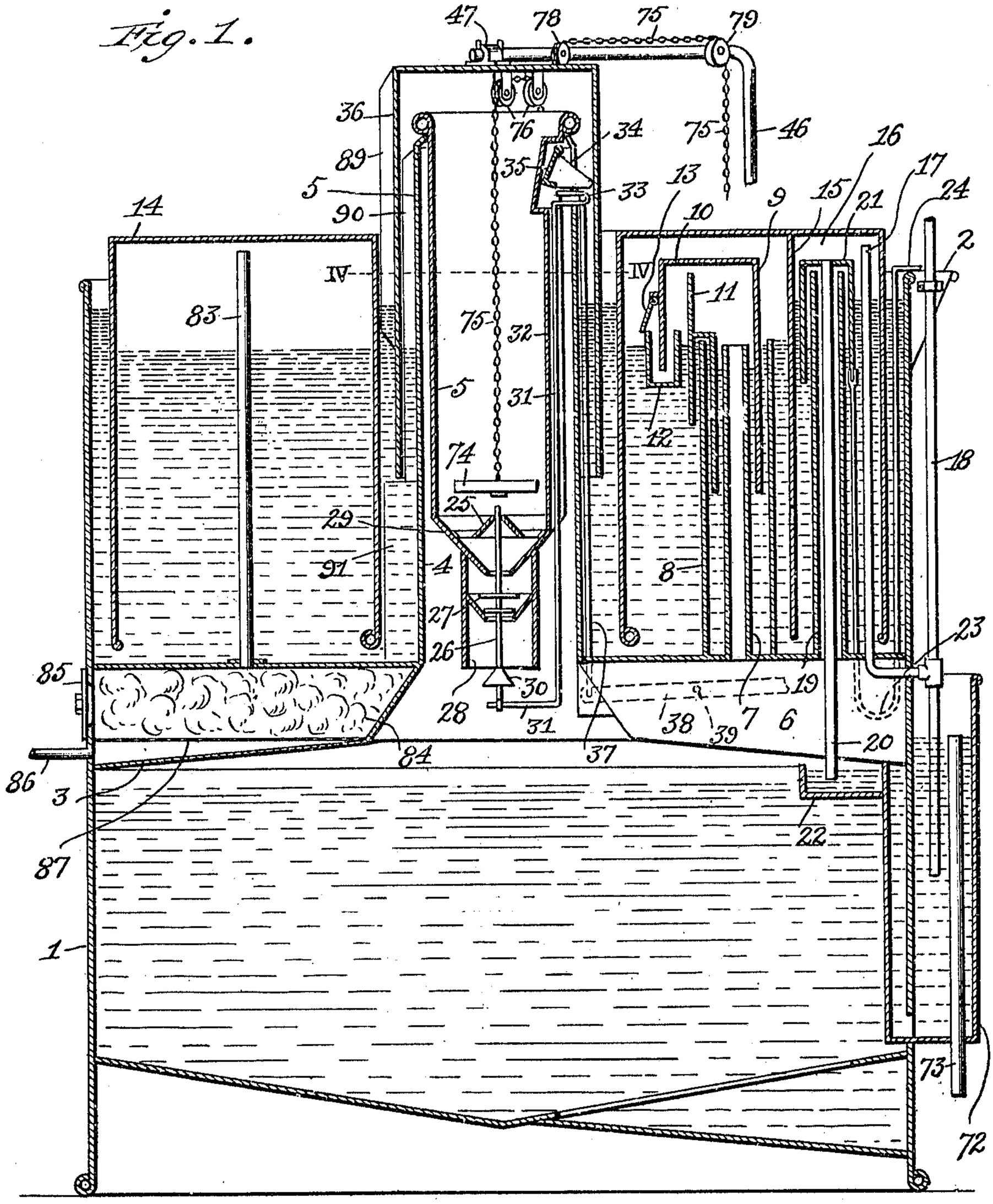
APPLICATION FILED JULY 9, 1908.

955,997.

Patented Apr. 26, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

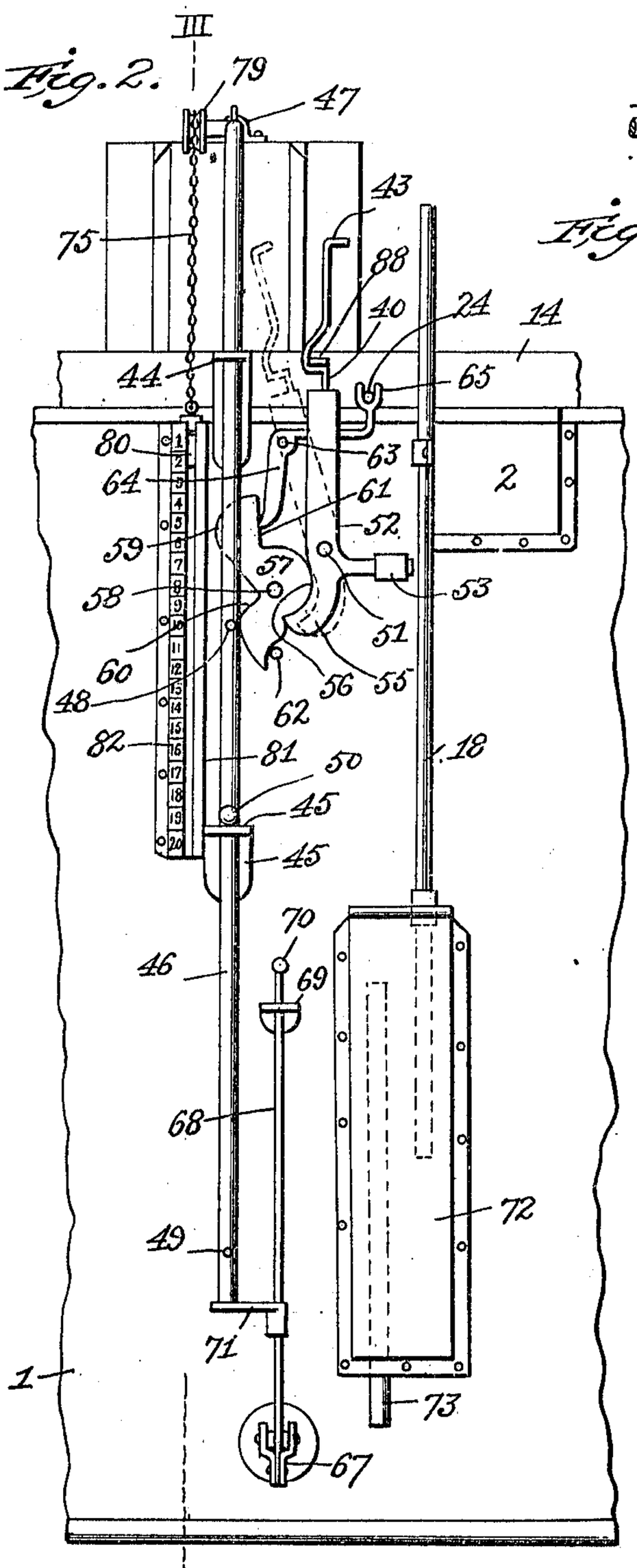

Fig. 3.

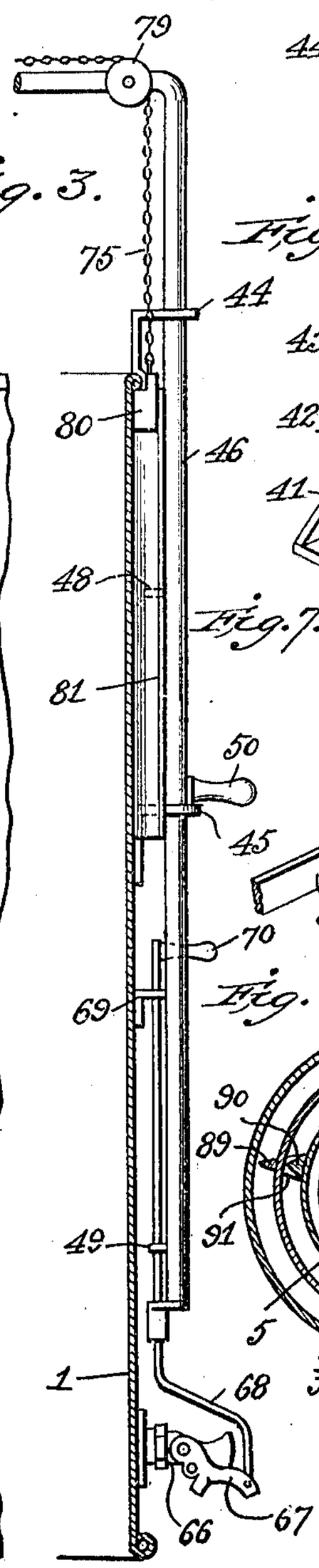

Fig. 6.

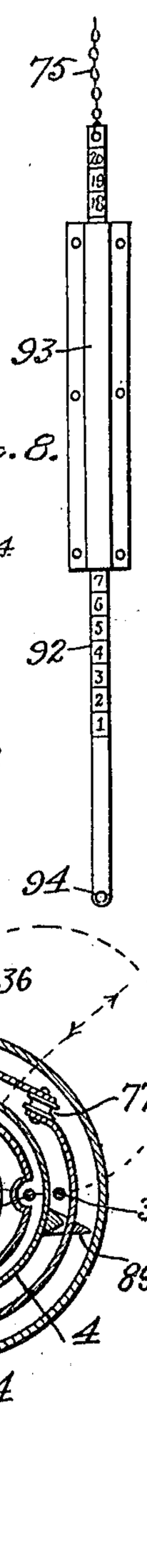

Fig. 8.

Fig. 7.

Fig. 4.

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FRANK E. STOVER, OF LURAY, VIRGINIA.

ACETYLENE-GAS GENERATOR.

955,997. Specification of Letters Patent. **Patented Apr. 26, 1910.**

Application filed July 9, 1908. Serial No. 442,637.

To all whom it may concern:

Be it known that I, FRANK E. STOVER, a citizen of the United States, residing at Luray, in the county of Page, State of Virginia, have invented new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

My invention relates to improvements in acetylene gas generators of the carbid feed type, and has for its objects to provide certain improvements in the construction of the same as will be hereinafter more specifically described and claimed, reference being had to the accompanying drawings, in which:

Figure 1 is a central vertical sectional view of the generator, the upper end of the lifting rod for the carbid chamber cover being shown, for the purposes of illustration, moved to the opposite side of the overflow chamber from its true position as shown in Fig. 2. Fig. 2 is a detail side elevation of the generator. Fig. 3 is a vertical sectional view of one side of the generator on the line III—III, Fig. 2. Fig. 4 is a horizontal sectional view on the line IV—IV, Fig. 1. Figs. 5, 6 and 7 are detail perspective views of various parts. Fig. 8 is a detail elevation of a modified construction of carbid indicator.

Similar numerals of reference indicate corresponding parts in the several views.

In the said drawing the reference numeral 1 denotes the outer casing, on the top of which on one side is located a filling spout 2 for charging the same with water. Said casing is divided into an upper or gas chamber and a lower or generating chamber by a partition 3, formed into a central neck 4 open at its top for the reception of the removable carbid chamber 5. At one side said partition 3 is extended into a narrow upwardly projecting chamber 6, into the top of which is tapped a pipe 7, the same projecting upwardly into the gas chamber and being open at top and bottom for the purpose of affording communication between the gas and generating chambers. Encircling said pipe 7, and projecting a little above the same, is a pipe 8, open at its top only. Resting on pipe 8 is a cup valve 9, the same being water-sealed between said pipe and pipe 7, and being extended at one side at 10, a partition 11 extending almost to the top of said cup valve, dividing the same into two chambers. At the lower end of said extension 10 is a trap 12, the upper outer side of which is provided with a flap valve 13, all for a purpose hereinafter to be described.

An annular gas bell or holder 14 is located in the upper or gas chamber, the same being open centrally to accommodate the vertical neck 4 receiving the carbid chamber 5, as shown. By means of a partition 15 a chamber 16 is formed in the gas bell, into which opens the upper end of the branch 17 of vent pipe 18, said chamber also receiving the tube 19 communicating at its lower end with the generating chamber. Passing freely through this tube is a pipe 20, open at both ends, and carrying at its upper end a cup 21 covering the upper end of tube 19 and water-sealing the same. The lower end of pipe 20 is normally submerged in a trap 22 in the generating chamber, while a wire 23 attached to the lower edge of the sleeve 21, and passing downwardly therefrom beneath the lower edge of gas bell 14 and thence upward to the exterior of casing 1, where it is turned outward horizontally at 24, serves, through means hereinafter described, to raise and lower sleeve 21 and pipe 20.

Within the carbid chamber 5, near its lower end, is a deflector plate 25, through which passes the rod 26 of the feed valve 27. Said valve is of the double disk construction disclosed in Letters Patent No. 874,351, granted to me December 17, 1907, but is located in an elongated sleeve 28 depending from the inverted cone-shaped lower end 29 of carbid chamber 5, while a deflector 30 is mounted on the lower end of rod 26. By means of this construction the carbid in dropping is scattered in a circle outside the walls of sleeve 28, so that as the generated gas rises any moisture contained therein will condense outside the sleeve 28 and will drip back into the generating chamber.

To operate the feed valve I employ substantially the construction disclosed in Letters Patent No. 853,746, granted to me May 14, 1907, the same consisting of a rod 31 which is connected to the lower end of valve rod 26, and extends upward therefrom in a groove 32 formed in one side of the carbid chamber 5, and terminates in an eye or loop 33 at its upper end that projects horizontally through a vertical slot 34 in the central neck 4. A latch 35, operating as does the latch in said Letters Patent, prevents movement of the valve 27 while the carbid

chamber cover 36 is removed, while detachably connected to the eye or loop 33 of rod 31 is the bent upper end of a rod 37 that extends downwardly outside the neck 4 and is at its lower end connected with a lever 38 pivoted intermediate its length at 39 upon the side of chamber 6 within the water space of the gas bell 14. The outer end of said lever is connected to an operating rod 40 extending above the outer casing 1, as seen in Fig. 2, and bent or formed near its upper end into a notch having a horizontal bottom portion 41 and an inclined extension 42 thereof, said rod being also formed at its upper end into a hook 43.

Mounted to move vertically in brackets 44 and 45 fixed to the outside of the casing 1 is a lifting rod 46 for the carbid chamber cover 36, said rod being extended horizontally to engage said cover at 47, and being provided with pins 48 and 49 and with lifting handle 50 for a purpose hereinafter to be described.

Pivoted at 51 to the side of casing 1 is a bell crank lever 52, the same having its horizontal arm counterweighted at 53, and having its vertical arm bent horizontally at 54 to project over the upper edge of casing 1 and apertured to receive the rod 40, as seen in Fig. 7, said rod passing freely therethrough. Said bell crank lever 52 also has a downward curved extension 55, against which contacts the cam face 56 of a member 57 also pivoted at 58 to the casing 1, and formed into another cam surface 59, a shoulder 60 and a straight face 61. The movement of the lower end of said member 57 on its pivot to the right is limited by a stop pin 62 on the casing 1, and, when in contact therewith, the cam surface 59 projects in the path of vertical movement of the pin 48 on the lifting rod 46, as seen in Fig. 2, and for a purpose hereinafter to be described. Also pivoted at 63 on the casing 1 is a second bell crank lever 64, one arm of which is in contact with the straight face 61 of member 57, while the other upwardly projecting arm thereof is bifurcated at 65 to embrace the onturned end 24 of wire 23.

At the lower portion of the casing 1 is the usual sludge valve 66, to the lever 67 of which is connected an operating rod 68 passing upward therefrom through a bracket 69 on the casing 1 and terminating in a handle 70. Fixed to and projecting from one side of said rod 68 is a lug 71, upon which rests the lower end of lifting rod 46 when the latter is in its lowermost position.

The vent pipe 18 is extended downwardly into the overflow box 72, so as to drain off thereinto any water in said pipe, while said box is also provided with an overflow pipe 73.

The device is also provided with an improved carbid indicator, the same consisting of a weight 74, adapted to rest on and move with the body of carbid in carbid chamber 5, and from which extends a chain 75 passing over pulleys 76 in the upper end of the carbid chamber cover 34, as seen in Fig. 1, and from thence downward outside the carbid chamber 5 to a pulley 77 located at the bottom of the carbid chamber cover 34, as seen in Fig. 4. From said pulley the chain 75 passes upward between the carbid chamber cover 36 and the gas bell 14 to the pulley 78 on the horizontal portion of lifting rod 46, and from thence around pulley 79 to the outside of the casing 1, where it carries at its lower end an indicating block 80 vertically movable in a guide 81 on the casing 1 marked with a scale 82, said block being shaped to contact with the rolled upper edge of casing 1 when at its upward limit of movement in said guide to prevent its withdrawal therefrom, as seen in Fig. 3. I prefer to attach the pulley 77 to the bottom of the carbid chamber cover 36 by splitting the latter vertically for a short distance and bending said split edges oppositely to lie substantially parallel with each other, as shown in Fig. 4, to form bearings for the pintles of said pulley 77.

Projected up into the gas bell 14, and open at its upper end, is a discharge pipe 83 which communicates at its bottom with a purifying chamber 84 located above the partition 3, the same being filled with cotton or other purifying agent through a hand hole closed by a plug 85. Communicating with said chamber is the service pipe 86 of the generator, a screen 87 being located in said chamber 84 to prevent the cotton therein from choking said service pipe.

The operation of my improved construction is as follows: It is charged with water through filling spout 2 alone, the gas bell chamber being first filled thereby to the level of pipe 8, which then fills and overflows through pipe 7 into the underlying generator chamber, which then fills to the level of overflow pipe 73, the filling being completed when water begins to discharge from the latter. With the carbid chamber charged with carbid, and the parts in the position shown in Figs. 1 and 2, an initial discharge of carbid into the generating chamber is effected by manually moving the operating rod 40 up and down, which, through lever 38 and rods 37 and 31, operates valve 27. The gas generated thereby passes upward through pipe 7 and over partition 11 and blows the water out of trap 12, whereby it passes into the gas bell 14 through flap valve 13. The rise of the gas bell 14, due to the accumulation of gas therein, brings a lug 88 on the side of the gas bell 14 into the notch in rod 40, as described in my Letters Patent No. 853,746, hereinbefore referred to, so that

as the gas is subsequently exhausted from gas bell 14 through service pipe 86, the consequent sinking of said gas bell will actuate the feed valve 27 to generate more gas.

To vent the machine it is only necessary to lift the rod 46 until the pin 48 thereon passes cam 59 on member 57, which results in turning said member 57 on its pivot, which, through the engagement of cam 56 with the extension 55 of bell crank lever 52, tilts the latter on its pivot 51 to the position shown in dotted lines in Fig. 2, thereby disengaging rod 40 from engagement with lug 88, so that the valve 27 will no longer be operated. This movement of member 57 also, through the engagement of its face 61 with bell crank lever 64, will tilt said lever on its pivot, thereby lifting its upper bifurcated end 65, and with it the wire 23, whereby the cup 21 and pipe 20 are raised so that the lower end of the latter is lifted out of the water in trap 22, which places the generating chamber in communication with the branch 17 of vent pipe 18 and thus venting said generating chamber to atmosphere. This at the same time, through pipe 7, vents cup valve 9, reducing the pressure therein to atmosphere, which causes the excess pressure in gas bell 14 to force the water up between trap 12 and partition 11 until said trap fills, which prevents the escape of gas from the gas bell 14, the flap valve 13 offering sufficient opposition to the initial return of the gas to permit this operation, as will be readily understood.

If it is desired simply to vent the generating chamber, the rod 46 is lifted only far enough to have the pin 48 operate the member 57 as described, and the parts may be maintained in this position by permitting said rod to drop back sufficiently to have pin 48 rest on the shoulder 60 of member 57, which has, by the described movement of said member on its pivot, been moved into the path of said pin. It being understood that the various pivots of member 57 and bell crank levers 52 and 64 are constructed to offer sufficient resistance to prevent their turning under the weight of said rod 46 and its parts, said rod will be supported by said shoulder 60 and the machine will remain vented until sufficient pressure is exerted on handle 50 to again rotate member 57 on its pivot to the position shown in Fig. 2, which will cause the parts to return to their operative positions.

To recharge the carbid chamber 5 the rod 46 is lifted until the lower pin 49 thereon passes through the lower bracket 45, the apertures in said brackets 44 and 45 being so shaped as to permit the passage of pins 48 and 49, as shown in Figs. 5 and 6, when by rotating said rod 46 part way the pin 49 will engage the top of said bracket 45 and thereby support said rod 46 in its lifted position. This lifting movement of rod 46 also raises the carbid chamber cover 36 until the latter is clear of the carbid chamber 5, and the subsequent rotation of said rod 46 then swings said cover 36 bodily to one side, as shown in dotted lines in Fig. 4, thereby permitting access to the carbid chamber 5. This removal of the cover 36 also releases latch 35, as described in my Letters Patent No. 853,746, hereinbefore referred to, whereby the feed valve 27 is effectually locked against movement. During this lifting movement of rod 46 and cover 36 the indicating block 80 will first be raised to its uppermost position in contact with the flange of casing 1, and the further movement of the parts will cause weight 74 to be then lifted by chain 75, the result being that by the time the cover 36 has reached its uppermost position ready to be swung to one side, said weight 74 will have been drawn well up within said cover so as not to interfere with the lateral movement of said cover.

It will be observed that the upward movement of rod 46 carries it away from contact with the lug 71 on the sludge valve rod 68, so that by the time the machine is vented said rod 68 is free to be moved vertically by its handle 70 to open the sludge valve 66, and that the return of rod 46 to its lowermost position automatically forces said sludge valve to its closed position.

I prefer to provide the exterior surface of the carbid chamber cover 36 with vertical ribs 89 to position the gas bell 14 centrally with respect thereto, and I also provide the central neck 4 with similar ribs 90 to contact with and position the carbid chamber cover 36, said ribs 90 being abruptly extended at their lower portions 91 to afford a seat for the carbid chamber cover 36 and to additionally position the gas bell 14.

I have shown in Fig. 8 a slightly modified construction of carbid indicator, the chain 75 in this instance being attached to a bar 92 having a scale thereon and vertically movable in a guide 93 fixed to the casing 1, a pin 94 in the lower end of said rod 92 limiting its upward movement so that it will also operate to lift weight 74 when the carbid chamber cover 36 is lifted.

In Fig. 1 I have shown the lever 38, as well as the wire 23 in dotted lines, as though located on the far side of chamber 6, whereas said parts are located upon the other or near side of said chamber, this method of illustration being adopted to dispense with the necessity of an additional sectional view like Fig. 1, but in a different vertical plane. So also I have shown in Fig. 1 the upper part of the rod 46 and its chain 75, which would not show in a true sectional view through

overflow box 72 as shown in Fig. 2. Furthermore, I have shown in Fig. 1 the service pipe 86 and purifying chamber 84 upon the opposite side of the casing to the vent pipe 18 and the other operative parts, whereas said parts are all preferably located on the same side of the generator.

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

1. In an acetylene generator, a casing, a carbid chamber cover, means on the casing for lifting said carbid chamber cover, a vent pipe, and means for opening communication between said vent pipe and the generating chamber operated by the means for lifting the carbid chamber cover.

2. In an acetylene generator, a casing, a carbid chamber cover, means on the casing for lifting said carbid chamber cover, a vent pipe, a carbid feed valve, and means for opening communication between said vent pipe and the generating chamber and for putting out of operation the carbid feed valve, both operated by the means for lifting the carbid chamber cover.

3. In an acetylene generator, a casing, a carbid chamber cover, a sludge valve, and means on said casing for simultaneously lifting said carbid chamber cover and unlocking said sludge valve.

4. In an acetylene generator, a carbid chamber cover, a vertically movable rod for lifting said cover, a feed valve controlling lever, a vent controlling lever, and a pivoted member operated by the vertical movement of said rod and controlling the positions of both of said levers.

5. In an acetylene generator, a carbid chamber cover, a vertically movable rod for lifting said cover, a feed valve controlling lever, a vent controlling lever, a pivoted member controlling the positions of both said levers, and a pin on said rod adapted in the upward movement of said rod to strike and tilt said pivoted member in one direction and in the downward movement of said rod to strike and tilt said pivoted member in the opposite direction.

6. In an acetylene generator, a generating chamber, a gas chamber above said generating chamber, a pipe open at both ends and having its lower end normally water-sealed in said generating chamber, a vent communicating with said pipe, and means for lifting said pipe from its water-seal to establish communication between said generating chamber and vent.

7. In an acetylene generator, a generating chamber, a gas chamber above said generating chamber, a pipe open at both ends and having its lower end normally water-sealed in said generating chamber, a vent communicating with said pipe, a carbid feed valve, means for operating said valve, and a common means for disconnecting said valve operating mechanism and for lifting said pipe from its water-seal to establish communication between said generating chamber and vent.

8. In an acetylene generator, a generating chamber, a gas chamber above said generating chamber, a water-sealed chamber in said gas chamber, a vent in constant communication with said water-sealed chamber, a pipe open at both ends and having its lower end normally water-sealed in said generating chamber and its upper end communicating with said water-sealed chamber, a tube through which said pipe passes and in which it is freely movable vertically, a water-seal in said water-sealed chamber for the upper end of said tube, and means extending to the exterior of the device for moving said pipe vertically.

9. In an acetylene generator, a carbid chamber, a removable cover for said chamber, a rod for lifting said cover, and a carbid indicator carried entirely by said cover and rod.

10. In an acetylene generator, a casing, a carbid chamber, a removable cover for said chamber, a vertically movable rod mounted on said casing and adapted to lift said cover free from said carbid chamber, and a carbid indicator carried entirely by said cover and rod.

11. In an acetylene generator, a carbid chamber, a removable water-sealed cover therefor, and a carbid indicator weight carried by said cover and adapted to be automatically drawn within said cover when the latter is lifted to uncover said carbid chamber.

12. In an acetylene generator, a casing, a carbid chamber, a removable water-sealed cover therefor, a vertically movable lifting rod mounted on said casing and connected to said cover to lift the latter free from said carbid chamber, and a carbid indicating device embodying a weight, a chain and an indicator proper, the latter indicating in conjunction with said casing the amount of carbid in said carbid chamber, and being limited in its movement to retract said weight within the cover when the latter is lifted.

13. In an acetylene generator, a casing, a carbid chamber, a carbid chamber cover, a lifting rod mounted on said casing for lifting said cover, a sludge valve, an operating rod therefor, and a lug on said rod lying in the path of said lifting rod upon which the latter rests when in its lowermost position to retain said sludge valve closed.

14. In an acetylene generator, a carbid chamber receiving neck, a carbid chamber cover fitting over said neck, a gas bell cen-

trally apertured to permit the passage of said neck and cover, and ribs on said neck to position said cover with respect thereto, said ribs being projected beneath said cover to serve as a support for the latter and to position said gas bell.

In testimony whereof, I have hereunto set my hand in the presence of two subscribing witnesses.

FRANK E. STOVER.

Witnesses:
PERCY B. HILLS,
EDWIN L. YEWELL.