No. 688,072. Patented Dec. 3, 1901.

E. N. DICKERSON.

APPARATUS FOR GENERATING ACETYLENE GAS.

(Application filed May 22, 1897.)

(No Model.) 3 Sheets—Sheet 1.

Fig. I.

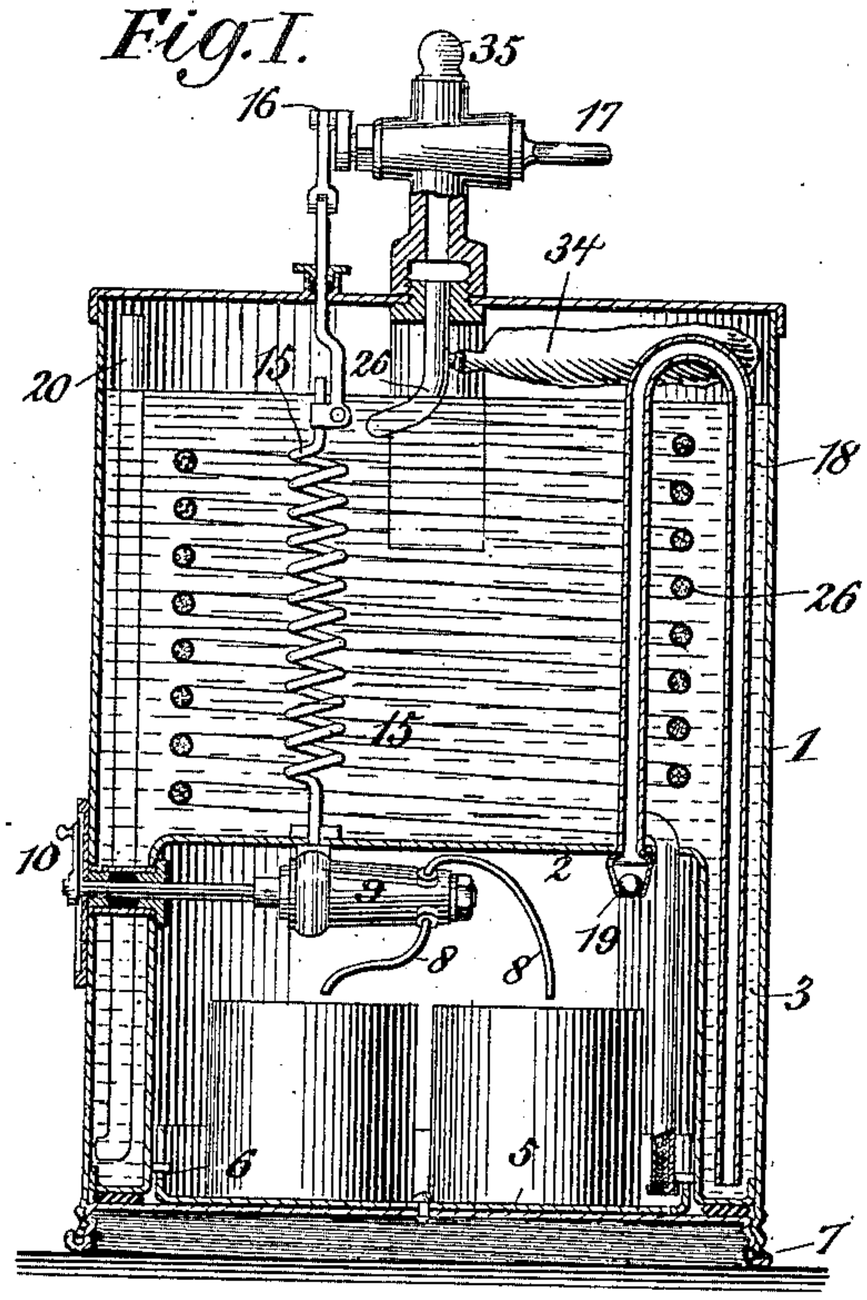


Fig. II.

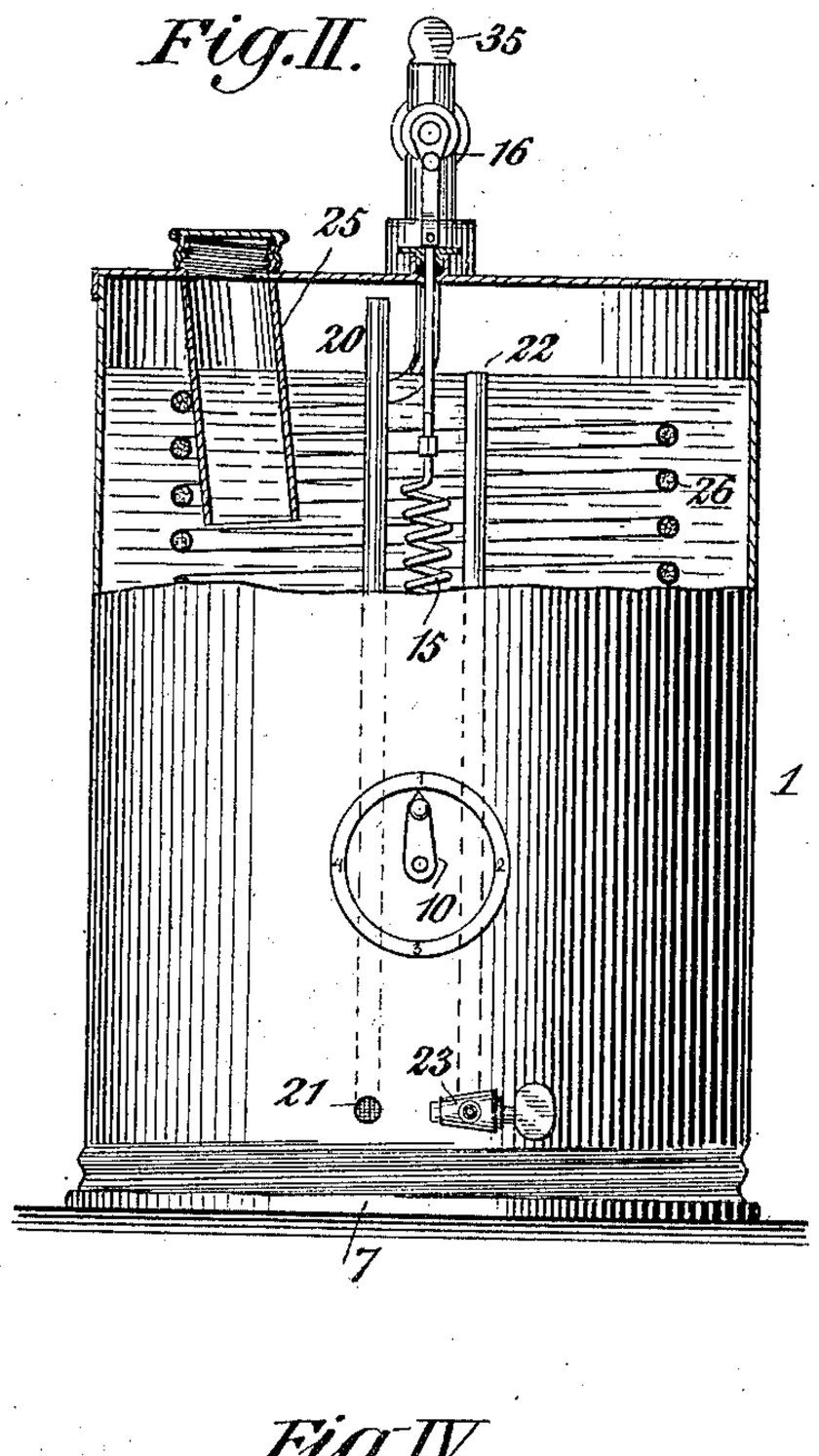


Fig. III.

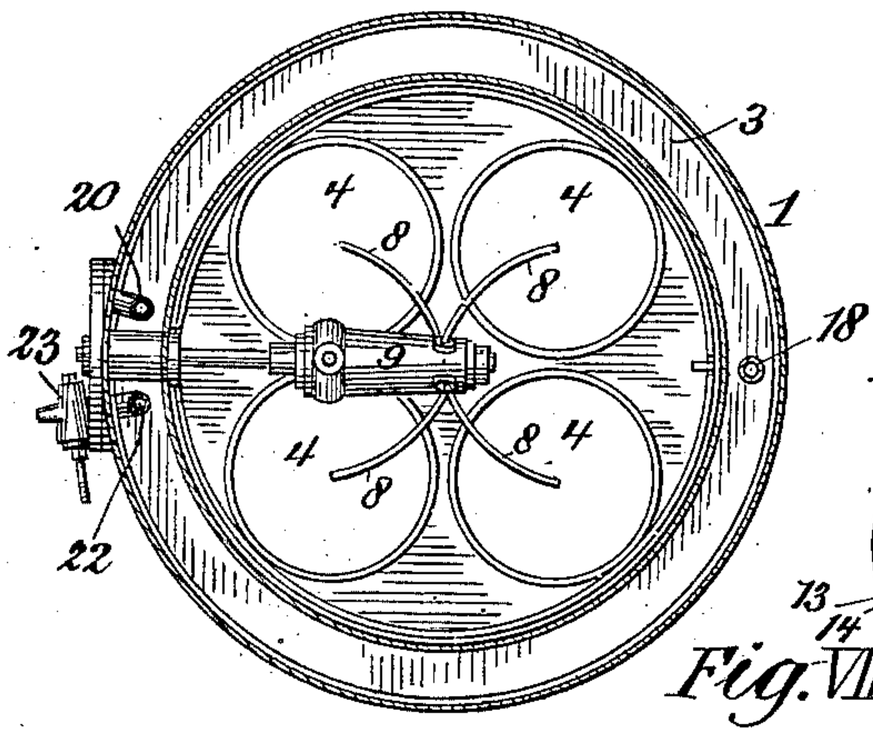


Fig. IV.

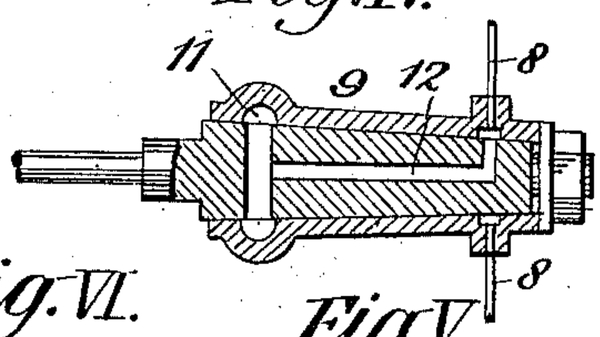


Fig. VI.

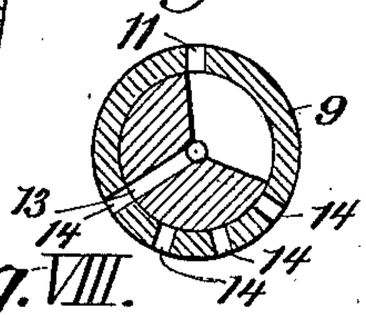


Fig. V.

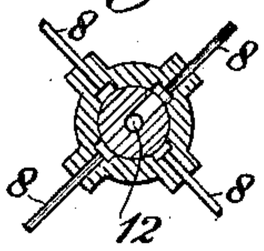


Fig. VII.

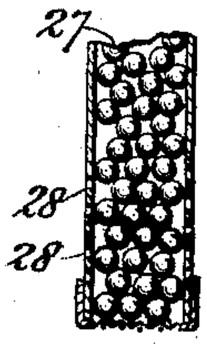
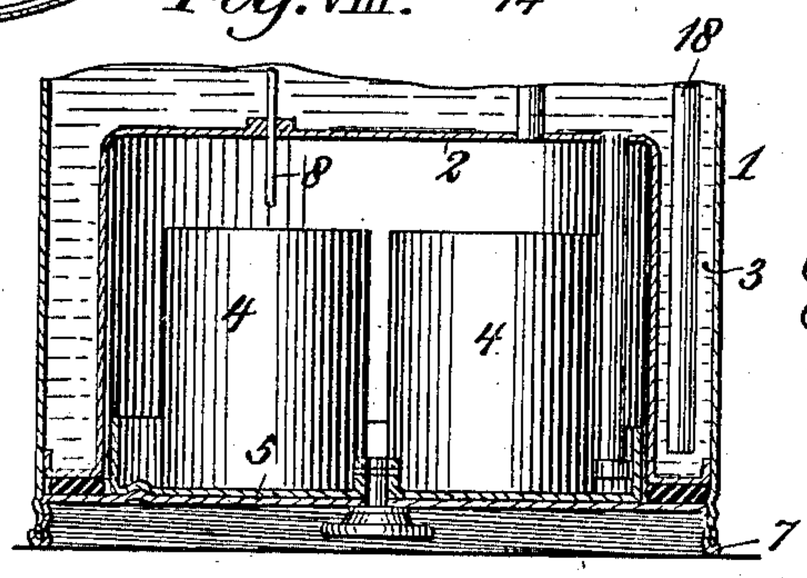


Fig. VIII.



WITNESSES:

D. F. Hayward

H. Coutant.

INVENTOR

E N Dickerson

No. 688,072. Patented Dec. 3, 1901.

E. N. DICKERSON.

APPARATUS FOR GENERATING ACETYLENE GAS.

(Application filed May 22, 1897.)

(No Model.) 3 Sheets—Sheet 2.

Fig. IX.

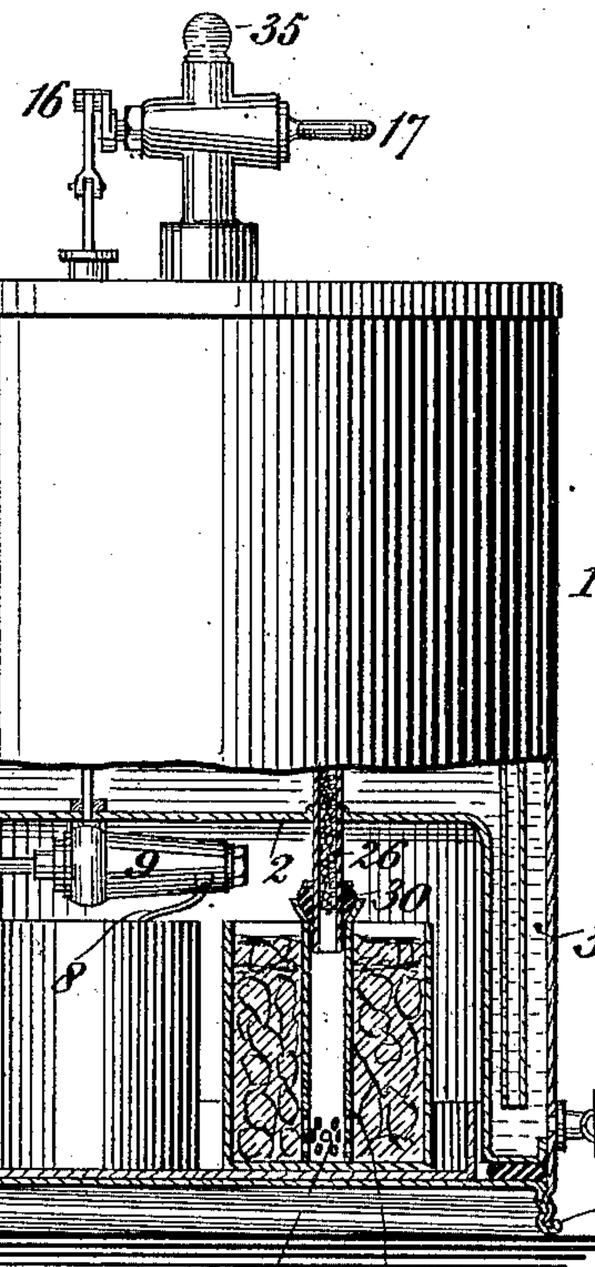


Fig. X.

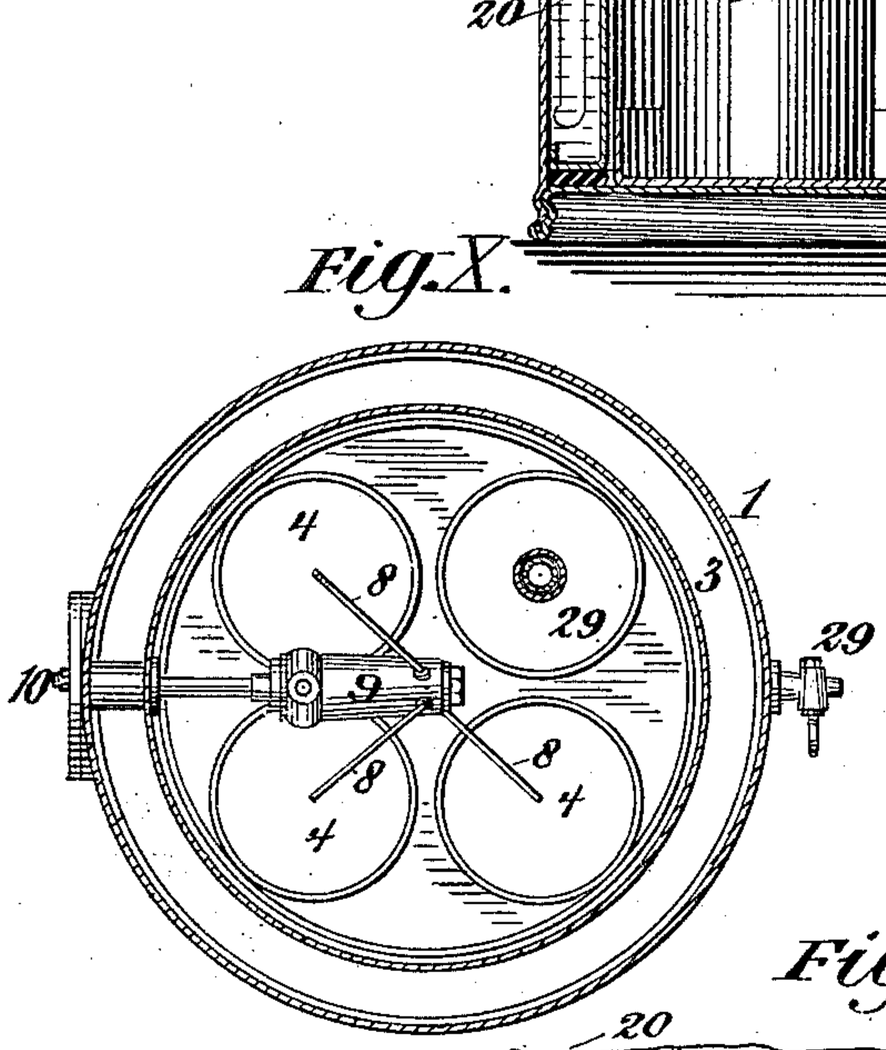


Fig. XI.

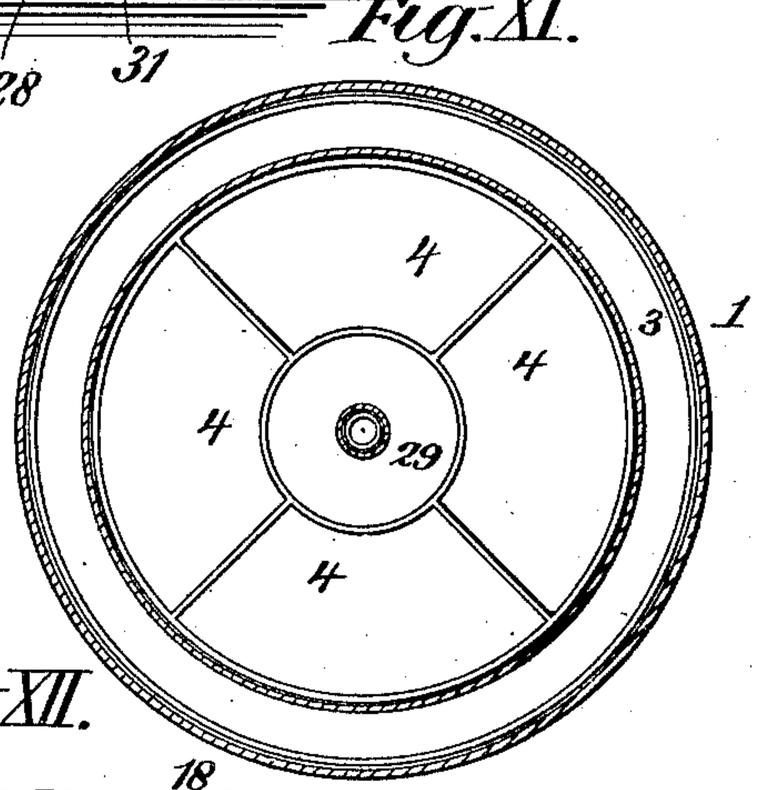
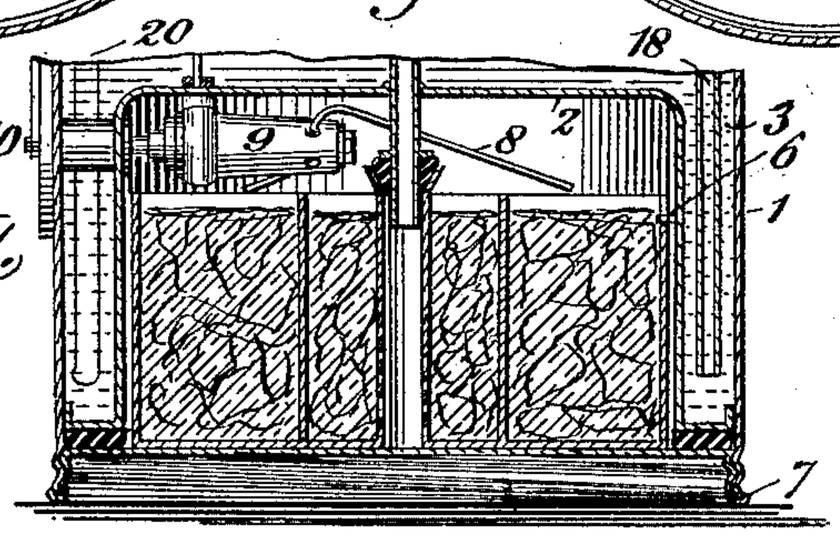


Fig. XII.



WITNESSES:

D. N. Maynard

H. Cawtard

INVENTOR

E N Dickerson

No. 688,072. Patented Dec. 3, 1901.

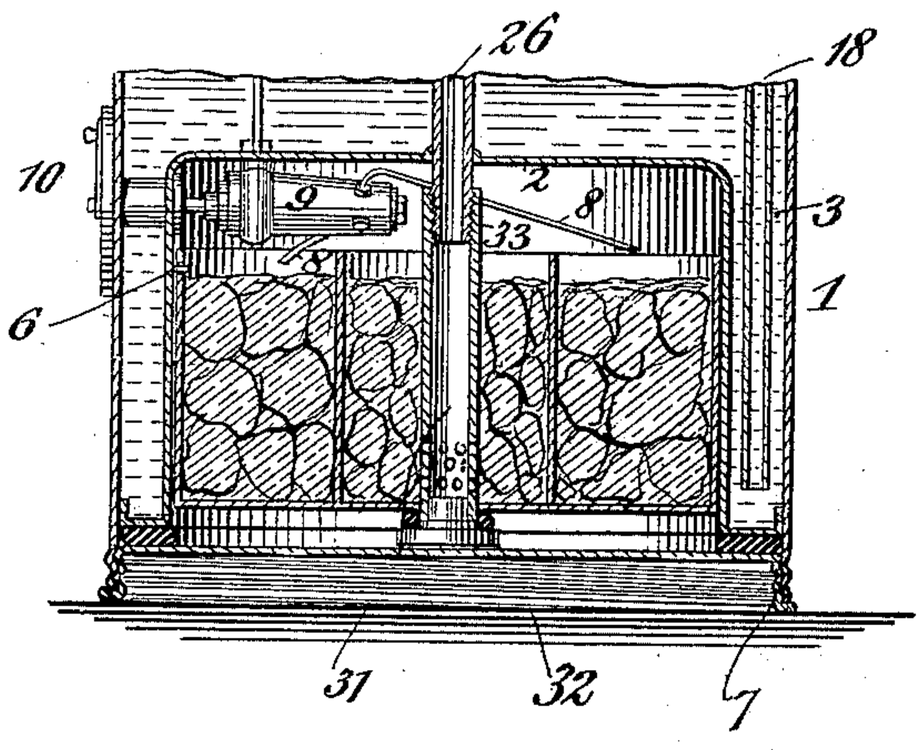
E. N. DICKERSON.

APPARATUS FOR GENERATING ACETYLENE GAS.

(Application filed May 22, 1897.)

(No Model.) 3 Sheets—Sheet 3.

Fig. XIII.



WITNESSES:

O. F. Haynes Jr.

H. Cantant.

INVENTOR

E N Dickerson

UNITED STATES PATENT OFFICE.

EDWARD N. DICKERSON, OF NEW YORK, N. Y.

APPARATUS FOR GENERATING ACETYLENE GAS.

SPECIFICATION forming part of Letters Patent No. 688,072, dated December 3, 1901.

Application filed May 22, 1897. Serial No. 637,649. (No model.)

To all whom it may concern:

Be it known that I, EDWARD N. DICKERSON, of No. 253 Broadway, in the city, county, and State of New York, have invented a new and useful improvement in automatic lamps, in which a gas is formed by the union of a solid and liquid, and especially in a portable lamp for generating acetylene gas, of which the following is a specification.

In my lamp water is supplied to the carbid by an automatically-controlled drip-pipe substantially of capillary size, through which the water falls drop by drop; but such supply is arrested whenever the pressure increases in the gas-generating chamber above a determined amount.

Further, my invention relates to safety devices in lamps, preventing excessive pressure therein.

My invention further relates to mechanism for generating gas at will from a number of carbid-containing chambers in the lamp by throwing the water from one to the other by a water-directing cock.

It further relates to a special means of drying the gas, which is very essential in this class of lamps, and it further relates to the general structure of the lamp, which is convenient in arrangement and is provided with special mechanism to prevent temporary variations in pressure from affecting the flame.

My invention will be readily understood from the accompanying drawings, in which—

Figure 1 represents a vertical section of my lamp; Fig. 2, a view, partly in section, at right angles to Fig. 1; Fig. 3, a horizontal section through Fig. 1 between the dividing-partition and the four-way stop-cock; Fig. 4, a cross-section through Fig. 5, showing the passages; Fig. 5, a cross-section through the four-way stop-cock; Fig. 6, a cross-section through a modified form of stop-cock; Fig. 7, an enlarged detail view of the end of the condensing-coil shown in Fig. 1; Fig. 8, a view of a modification of the four gas-generating chambers; Fig. 9, a view of a modification of my lamp shown in Fig. 1, showing mechanism for drying the gas by the action of the carbid; Fig. 10, a section through Fig. 9 below the horizontal separating-partition and above the stop-cock; Fig. 11, a horizontal section through Fig. 12; Fig. 12, a vertical section through a modification of the carbid-holding receptacles, and Fig. 13 a variation in the mechanism for locking the carbid-receptacles in place.

In my drawings, 1 represents the casing of a lamp, which may be of any desired shape. This is divided by the horizontal partition 2 into an upper water-chamber and a lower gas-generating chamber. The lower gas-generating chamber is, however, surrounded by an annular body of water 3, connecting with the upper water-chamber. This serves to keep the carbid-chamber cool and also to put the required pressure upon the gas-escape pipe, as will be hereinafter explained.

The carbid is carried in two or more receptacles 4. As shown, the generating-carbid is arranged in either three or four of such receptacles. They may be of any form—as, for instance, cylindrical, as shown in Fig. 3, or in the form of partial sectors of a circle, as shown in Fig. 11. As shown, they are supported in a suitable bottom 5, which fits in the carbid-chamber, and is arranged, when in position, to have a definite position in said chamber. This position may be determined by a locking-pipe entering one of said compartments or by a guiding-pin 6, as shown in Figs. 1 and 13, or in any other suitable way.

The gas-generating chamber is closed by a suitable screw-cap 7, closing against a gasket, or in any other suitable way. Water is supplied to the carbid in these chambers through delivery-pipes 8, by preference capillary. The water is arranged to be delivered to these chambers either by a directing stop-cock 9, which brings the water-supply alternately in connection with these different supply-pipes, or, as shown in Fig. 8, by revolving the vessels containing the carbid beneath a fixed supply 8, as there shown. In the form shown in the other figures a stop-cock is provided, having an indicating-handle 10, which will at will direct the current into any one of the generating-chambers 4, and this stop-cock may be of any convenient form. In the form shown in Figs. 4 and 5 water enters through the annular chamber 11 and is directed at will through the angular channel 12 into any one of the distributing-pipes 8.

In the form shown in Fig. 6, which is a somewhat cheaper construction, a sector is cut out

of one side of the plug of the cock, which opening communicates with the supply 11, and a channel 13 connects alternately with openings 14 in the casing of the cock, which openings are themselves connected with the delivery-pipes 8.

Water is supplied to the stop-cock through the coiled pipe 15, the open upper end of which is controlled by an arm connected with the crank 16, operated by stop-cock 17.

Connected with the gas-generating chamber is the escape-pipe 18, which dips down toward the bottom of the annular chamber 3. This is provided with an automatically-closing check-valve 19 at its inner end. An escape-pipe 20 opens into the gas-space above the water in the water-chamber and passes out from the lamp through the gauze-protected opening 21. An overflow-pipe 22 is also provided, the upper end of which is at the desired water-level and the lower end of which is provided with the stop-cock 23. A drain-cock 24 is also provided for emptying the lamp.

Water is supplied to the lamp through the pipe 25, provided with closing screw-cap, which dips below the surface of the water, thereby preventing explosion in the chamber above the water in case an explosive mixture shall be there present.

The gas which is to be burned escapes through the condensing-coil 26, which is by preference provided with water-arresting surfaces, such as tinned lead shot 27. (Shown in Fig. 7.) The lower end of this gas-pipe may extend down toward the lower part of the gas-chamber independent of the carbid, as shown in Fig. 1; but I prefer to have it arranged with its gas-withdrawing openings 28 in the bottom of a carbid-drying chamber. This may be one of the four chambers, as at 29, Fig. 10, which in this case is provided with a central tube, a continuation of the tube 26, having gas-inlet openings 28 and provided with packing 30, making a substantially gas-tight packing when the lower flanged tube 31 surrounds the gas-eduction pipe 26.

In the arrangement shown in Figs. 11 and 12 the drying-chamber 29 is centrally located and is surrounded with four generating-chambers, the arrangement being otherwise as shown in Fig. 9.

In Fig. 13 the central tube 31 is made revoluble by the handle 32. Its upper end is provided with a screw-thread, as at 33, engaging with the screw-thread on the lower end of the gas-tube 26. In this way by turning the handle 32 a continuous connection for the gas-tube is made, and also the carbid-receptacles are held in position independently of the bottom 7. The gas-tube 26 may be provided with an elastic gas-holding bag 34, preferably located above the water in the upper chamber of the lamp. Any temporary excess of gas produced will be taken up by this elastic receiver and given back to the flame which burns in the burner 35.

The operation of my lamp will now be readily understood. The carbid-chambers, including the drying-chamber, are suitably charged with carbid and are placed in position in the lamp and the inclosing bottom is screwed fast. Water is poured in through the pipe 25 until it passes out through cock 23, which is then closed. Then the handle 10 being arranged as shown in Fig. 2, water drops into the receptacle numbered 1, and the lamp being purged of air gas is burned in the usual way at the burner. If the burner is shut off, the upper end of the flexible tube 15 is raised above the water, as shown in Fig. 1. When the lamp is burning, the tube 15 is in the position shown in Fig. 2. In case of any excess of pressure the gas will escape through the escape-pipe 18 when its pressure is equal to the column of water from the surface of the water to the lower delivery end of that pipe. Water is prevented from returning into the gas-generating chamber by the check-valve 19. When the gas is exhausted in one chamber, the handle 10 is turned to the next number on the dial. The reason of dividing the carbid into a number of different chambers is because the drip of the water will only satisfactorily affect a limited horizontal cross-section of the material. In case of any temporary excess of pressure this can be taken up by the gas-bag, and any gas which escapes, either from the gas-bag in case of its rupture or from the escape-pipe 18, will pass down by the pipe 20 to the lower part of the lamp and escape to the air through the safety-gauze without danger of explosion. The check-valve 19 serves the further purpose when the lamp is turned off of preventing any vapors of water from entering the carbid-chamber.

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

1. The combination in an apparatus for generating acetylene gas, of an upper water-chamber and a lower separated carbid-chamber, the upper water-chamber communicating with the lower water-chamber by a water-delivery tube passing through the walls of the carbid-chamber, a multiple cock located in the lower carbid-chamber and having two or more branching tubes connected therewith, a handle passing through the wall of the carbid-chamber and extending to the air, and two or more receptacles in the carbid-chamber located beneath the ends of the supply-pipes controlled by said multiple way-cock, substantially as described.

2. The combination in a lamp for burning acetylene gas, of a chamber adapted to contain a body of calcium carbid, a water-delivery outlet for delivering water upon said calcium carbid, a gas-outlet, and a chamber for containing calcium carbid surrounding said gas-outlet, said gas-outlet communicating only with the carbid-containing chamber at its end, whereby the gas is forced to pass through the surrounding body of calcium car-

bid before escaping from the chamber, substantially as described.

3. The combination in an acetylene-lamp, of a central lower chamber for containing the carbid having a removable bottom opening to the atmosphere, an annular water-chamber surrounding said central chamber but disconnected therefrom, and an upper water-chamber connecting with said lower water-chamber, and a pipe connecting with said carbid-chamber extending above the water-level in the water-chamber, and then extending downward near the bottom of the annular water-chamber, substantially as described.

4. The combination in a lamp for generating acetylene gas, of two or more receptacles for containing carbid, a water-supply pipe controlled by the gas stop-cock of the lamp, and a stop-cock connected with said supply-pipe and adapted to control the delivery of water to any one of said carbid-receptacles separately and successively, substantially as described.

5. The combination in a lamp for generating acetylene gas, of a generating-chamber, a water-chamber for supplying water to said generating-chamber, and a water-supply tube for filling said water-chamber, carried beneath the normal water-level of said chamber, a valved overflow connected with said water-chamber but above the level of the opening of the water-supply tube, and a safety escape-pipe having an opening into the water-chamber above the level of the opening and said valved overflow, substantially as described.

6. The combination in a lamp for generating acetylene gas, of a generating-chamber containing two or more carbid-receptacles, a water-chamber, a water-supply tube therein having an upper opening, means for depressing and raising the upper open end of said tube in the water-chamber underneath and above the surface of the water in said chamber, a cock communicating with the lower end of said tube, and water-delivery tubes leading from said cock to said carbid-receptacles, substantially as described.

7. The combination in a lamp for generating and burning acetylene gas, of a generating-chamber, a gas stop-cock, a water-chamber, a water-supply tube therein having an upper opening, a connection between said tube and said gas stop-cock whereby the upper open end of the tube in the water-chamber may be raised and depressed above and underneath the surface of the water in said chamber by the movements of said stop-cock, substantially as described.

8. The combination in a lamp for generating acetylene gas, of a drying-chamber, a pipe opening near the bottom of said chamber, the delivery-pipe, and mechanism for making a gas-tight connection between said pipe and the delivery-pipe of the lamp when the lamp is closed, substantially as described.

9. The combination in a lamp for generating acetylene gas, of an upper water-chamber, a lower gas-generating chamber, means for connecting the water-chamber and the gas-generating chamber, an annular chamber surrounding the same and connected with the upper chamber, and a gas-escape pipe connected with the gas-generating chamber and passing downward into the annular chamber surrounding said gas-generating chamber, and provided with a check-valve preventing the flow of the water from the water-chamber into the gas-generating chamber, substantially as described.

10. The combination in a lamp for generating acetylene gas, with an upper water-chamber, a lower gas-generating chamber separated therefrom by a partition, two or more drip-pipes adapted to be collectively operated to be placed in communication with the water-supply in the upper chamber separately and successively, and two or more carbid-receptacles located in the gas-generating chamber beneath the open ends of said drip-pipes, mechanism for supporting said gas-generating chambers in the bottom of the lamp, and an independent closing bottom for hermetically sealing said generating-chamber, substantially as described.

11. The combination in an apparatus for generating acetylene gas, of a series of radial segmental chambers for holding calcium carbid, and a central, cylindrical drying-chamber, substantially as described.

12. The combination in a lamp for generating and burning acetylene gas, of a generating-chamber, a water-chamber, a flexible helical water-supply tube therein having an upper opening and adapted to supply water to said generating-chamber, and means for depressing and raising the upper open end of said flexible helical tube in the water-chamber underneath and above the surface of the water in said chamber, substantially as described.

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

E. N. DICKERSON.

Witnesses:
W. LAIRD GOLDSBOROUGH,
H. COUTANT.