No. 625,882. Patented May 30, 1899.

L. L. GROSS.

VACUUM TANK AND WATER LIFTER.

(Application filed July 12, 1898.)

(No Model.) 2 Sheets—Sheet 1.

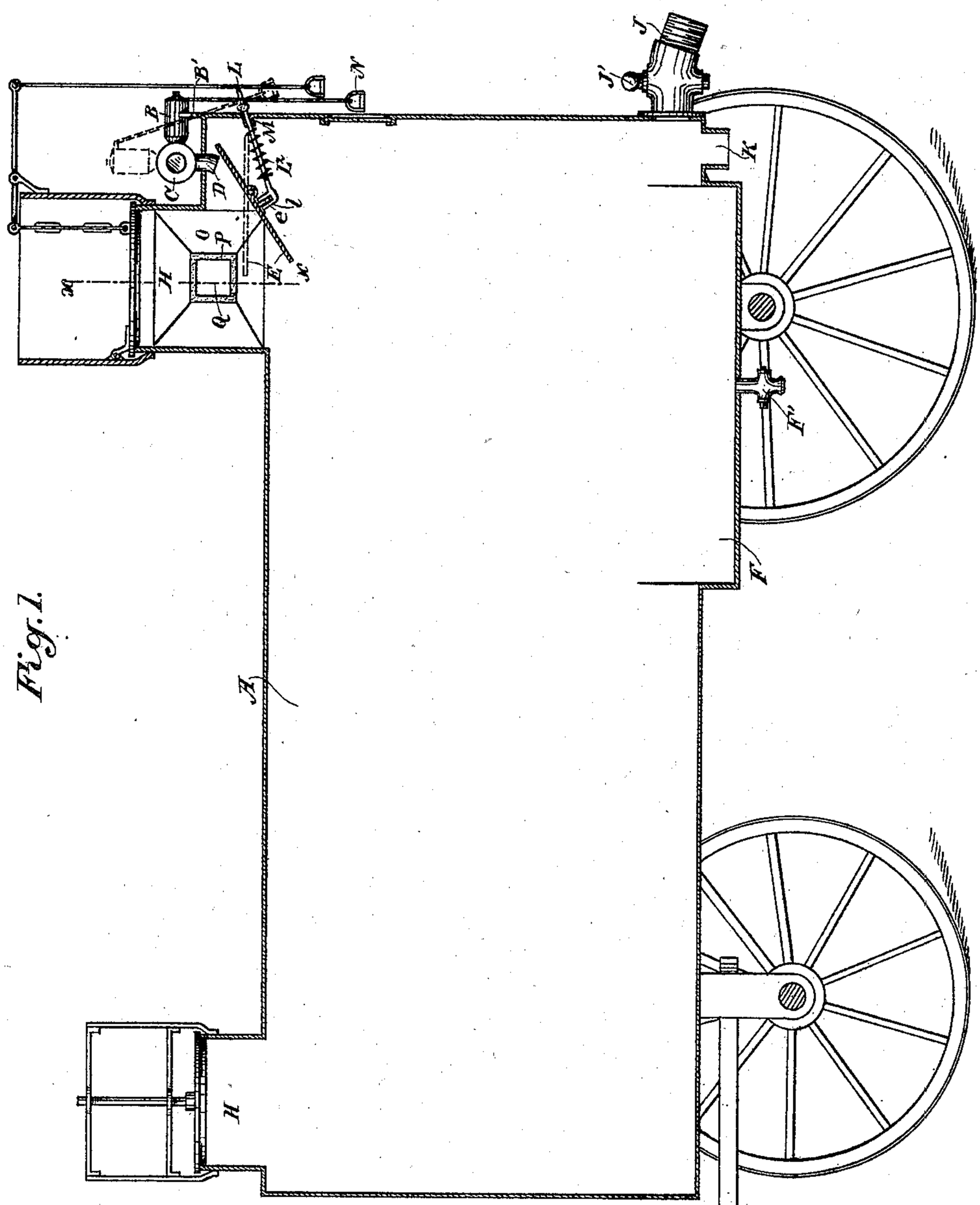

Fig. 1.

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Fig. 2.

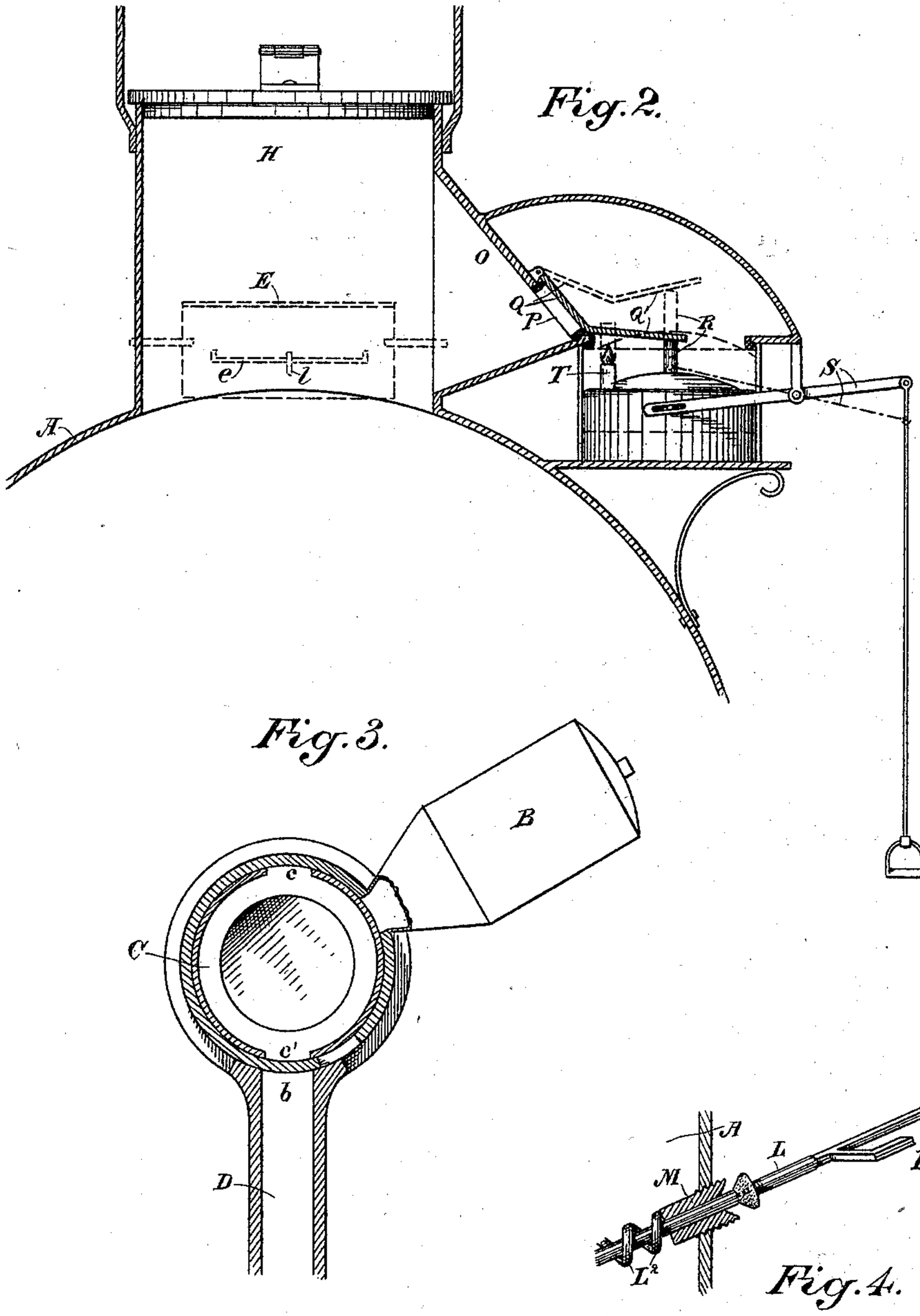

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

LUDWIG L. GROSS, OF PETALUMA, CALIFORNIA.

VACUUM-TANK AND WATER-LIFTER.

SPECIFICATION forming part of Letters Patent No. 625,882, dated May 30, 1899.

Application filed July 12, 1898. Serial No. 685,750. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG L. GROSS, a citizen of the United States, residing in Petaluma, county of Sonoma, State of California, have invented an Improvement in Vacuum-Tanks and Water-Lifters; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus which is designed for the purpose of filling tanks with water or other liquid or semiliquid which can be drawn into the tank by vacuum and to a means for producing a vacuum within the tank.

It also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section through my apparatus. Fig. 2 is a section on line *x x* of Fig. 1. Fig. 3 is a section through the charging device. Fig. 4 is a detail of the tilting-rod.

The tank A may be made of any suitable form and of material, such as sheet metal, which will sufficiently resist the explosive effects to be produced within it. Upon the top of the tank are large openings H, with inwardly-closing valves which are normally closed, but which will be opened by the force of the explosion to allow the escape of the gases produced thereby. These valves close immediately afterward, so that the subsequent contraction and the absorption of the gases in the tank will produce a vacuum, and this acts to draw water into the tank through an inlet-passage J, having a controlling valve or gate J'.

K is a discharge-passage, through which the contents of the tank may be discharged wherever needed or desired. In the lower part of the tank is formed supplemental and preferably depressed chamber F, which is lower than the main portion of the tank and is adapted to contain a body of water sufficient for the purpose of producing the gas when necessary. By employing this depressed chamber the water in the main chamber will drain into it and the main portion of the chamber will ordinarily be dry and not subject to corrosion, which would occur if the water were left to stand in it all the time. This chamber F can also be cleared of water whenever desired by means of a discharge-pipe F', with a suitable controlling-cock.

In order to produce an explosive gas and to properly control its production, I employ dry carbid of calcium, which may be discharged into the water-chamber F when desired, and the dissolving of the carbid in this water will produce a gas which, mixed with atmospheric air which is contained in the tank, will become explosive, and this gas when the tank is properly charged may be exploded by an electric spark, open flame, a cap or primer, or other suitable or well-known means.

In order to supply the carbid of calcium in measured charges and to control its delivery into the tank, I have shown a containing-receptacle B, which is filled with the carbid of calcium. The lower end of this receptacle connects with a cylindrical chamber C by means of a suitable inlet-passage *c*, formed in the cylindrical shell of the chamber C. The containing-chamber B has as its lower end a cylindrical sleeve which is turnable about the exterior of the chamber C, and when the chamber B is brought in line vertically above the chamber C the opening and bottom of the chamber B will coincide with the openings *c* and will thus allow a charge of the carbid to fall into the chamber C. This chamber C is made of such size that it will contain the necessary charge of the carbid. At the bottom of the chamber C is a discharge-opening *c'*, and in the movable shell, which is connected with the chamber B, is a corresponding opening *b*, which is out of line with the opening *c'* when the chamber B stands in a vertical position to admit carbid into the chamber C; but when the chamber B is turned down into a horizontal position the passage *b* will be brought to coincide with the passage *c'*, previous to which the passage *c* at the top will be closed by the unperforated portion of the cylindrical sleeve, which is turnable with the chamber B. The chamber B having been turned into position to discharge the carbid through the passage *c* and *b'*, the charge will pass downwardly through a pipe D and will fall upon a receiver or tray E, which is fulcrumed beneath the pipe D in such a position as to receive the charge of carbid and retain it until the operator desires to produce the gas within

the tank, and when this is to be done the table E is tilted to dump the charge, which falls directly into the chamber F at the bottom of the tank, this chamber being in line below the table.

The chamber C may be made with glazed ends, if desired, so that the interior can be inspected and the operator be assured that the charge of carbid is properly placed within the chamber.

Various devices may be employed for tilting the table E and discharging the carbid therefrom. In the present case I have shown the table having a link *e* formed on the lower side, and a rod L, slidable through a stuffing-box M in the end of the tank A, is provided with connecting links or lugs *l*, which engage with the link *e*, and thus enables the operator to tilt the table and discharge its contents at will.

N is a rod connecting with the upper part of the chamber B, having a handle at its lower end, by which the operator may tilt the chamber B to either a vertical position to charge the chamber C or into a horizontal position to cut off communication between the two. In the horizontal position the chamber B is supported by a bracket, as shown at B′.

The rod L, by which the table E is operated, has an open link or loop L′ at the end, and the handle-rod N may be engaged with this link or loop, so that when the chamber B has been pulled down into a horizontal position it is only necessary to pull outwardly the rod N to actuate the rod L and tilt the table E.

L^2 is a spring, of any well-known description, acting upon the rod L to retract it and through it bring the table E into a horizontal position whenever the pull upon the rod L is relieved, thus maintaining the table E in position to receive a charge from the chamber C at all times.

Various devices may be employed for igniting the explosive gas within the tank A when it is in the proper condition. I have here shown a hood O upon the exterior of the tank A or one of the openings H, and this hood is connected with the interior of the tank by an opening P, which is closed by a valve Q. The valve is here shown as hung at an angle, so as to close normally by gravitation, and it has an extension Q′ in an essentially horizontal position, so as to be engaged by a vertical movable rod or pin R, which is actuated by a lever S engaging the pushing-rod R by means of a crank-shaft or rocker-arm extending through the side of the chamber, the lever being exterior thereto. The pin R is here shown as connected with a lamp or burner at T, and this is movable upwardly in conjunction with the pin R, so that when the latter has pushed the valve Q up and opened communication with the tank the lamp T will be brought into line with the passage into the tank and will thus ignite the charge therein and cause it to explode.

By use of carbid of calcium and the mechanism herein described for introducing it and forming a gas and igniting the gas I have a very controllable and convenient method for producing vacuum in the tank to be used wherever needed.

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

1. In a vacuum suction-pump, the combination of a tank having inlet and outlet openings and controlling valves or cocks, a chamber adapted to contain carbid of calcium, having a sleeve at its lower end, a charge-measuring chamber upon which the sleeve of the carbid-chamber is turnable, said measuring-chamber having inlet and outlet openings, means for moving the carbid-chamber into and out of line with the inlet-opening of the measuring-chamber and means for submerging the charge within the tank to produce the gas.

2. In an apparatus of the character described, a main vacuum-tank, an oscillatory containing-chamber, a charge-measuring chamber interposed between the carbid-chamber and the tank, means for opening communication between the two chambers to admit a charge from the first to the second, a mechanism whereby the connection between the two chambers is closed and a communication between the charge-chamber is opened, whereby the charge is delivered into the tank, and a means for submerging the charge within the tank to produce the gas.

3. In an apparatus of the character described, a main tank, a carbid-containing chamber and means for oscillating the same, a charge-measuring chamber interposed between the carbid-chamber and the tank, mechanism whereby the two chambers may be connected to deliver a charge from the first to the second chamber, mechanism by which the connection between the two is closed, and connection between the charge-chamber and the tank is established whereby the charge is delivered into the tank, a table or receiver within the tank upon which the charge is received and means for submerging the charge in the tank to produce the gas.

4. In an apparatus of the character described, a main tank, a carbid-containing chamber and a charge-measuring chamber disposed with relation to the main tank and to each other as shown, mechanism by which the chambers may be first connected to measure and charge and the communication between the chambers afterward cut off and communication between the charge-chamber and the tank established, a tilting table or receiver within the tank upon which the charge is received, a mechanism connecting with the table whereby the latter may be tilted to deliver the charge into the bottom of the tank, said tank provided with a water-chamber into which the carbid is deposited whereby the gas is produced.

5. In an apparatus of the character described, a main tank with carbid and charge measuring chambers connected therewith, a tiltable table or receiver adapted to receive the charge from the measuring-chamber and retain it in the upper part of the tank, a mechanism by which said receiver may be tilted and discharged at will, and a supplemental depressed chamber in the bottom of the tank adapted to contain a body of water sufficient to dissolve and gasify the charge, said chamber being situated in line beneath the tilting receiver.

6. In an apparatus of the character described, a main tank, a carbid-containing and a charge-measuring chamber connecting with each other and with the tank, a mechanism by which the charge is delivered from the first to the second chamber and from the second chamber into the tank, a tilting receiver in the upper part of the tank upon which the charge is first delivered, a dissolving-chamber in the lower part of the tank in line beneath the tilting table, mechanism by which the carbid is discharged from the table into the solution-chamber whereby gas is produced, and a controllable igniting device in the upper part of the chamber whereby the gas is ignited when in proper condition.

7. In an apparatus of the character described, a main tank, a carbid-containing and charge-measuring chambers connecting with each other and with the tank as shown, a tilting receiver in the upper part of the tank adapted to receive the charge and a solution-chamber in the lower part of the tank into which it is dumped for the purpose of producing the gas, a supplemental chamber with a valve-opening connecting with the upper part of the tank, an igniting-flame mounted upon a carrier, said carrier being connected with the valve whereby the latter may be opened and the flame brought simultaneously into line with the opening, and a lever mechanism by which the device is actuated.

8. In an apparatus of the character described, a main tank, a carbid-containing chamber having a cylindrical sleeve forming the base thereof, a cylindrical charge-chamber around which the sleeve is turnable, openings through the sleeve and the chamber whereby the carbid-chamber is connected with the charge-chamber when it stands vertically above the latter and is cut off therefrom, and a communication opened between the charge-chamber and the tank when the sleeve of the carbid-chamber is rotated to turn in a horizontal position, and a mechanism by which the carbid-chamber is moved to either a vertical or horizontal position.

9. A vacuum-producing apparatus including a tank, having water inlet and outlet pipes, a mechanism to introduce a charge of carbid of calcium into said tank, supplemental means for submerging said carbid of calcium to produce a resulting gas, and an igniting device for the gas.

10. A vacuum-producing apparatus including a tank having water inlet and outlet pipes and having a supplemental water-tank, a mechanism to introduce a charge of carbid of calcium into said tank so that it is submerged in the supplemental tank, to produce an explosive gas, and means for igniting said gas within the tank.

In witness whereof I have hereunto set my hand.

LUDWIG L. GROSS.

Witnesses:
WILLIE B. SIMPSON,
ALWIN WESKE, Jr.