(No Model.)

R. T. VAN VALKENBURG.

CHEMICAL ENGINE.

No. 383,503. Patented May 29, 1888.

Fig. 1

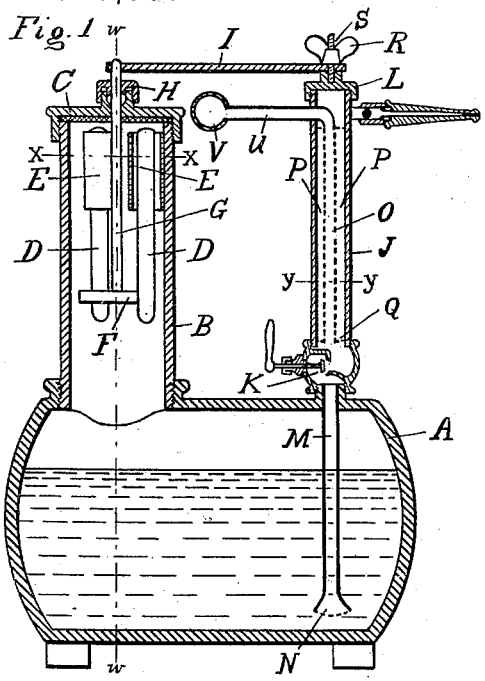


Fig. 2

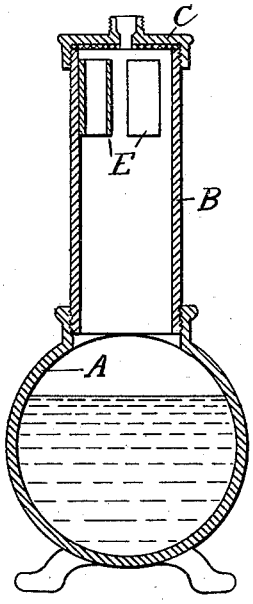


Fig. 4

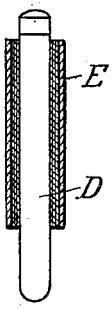


Fig. 3

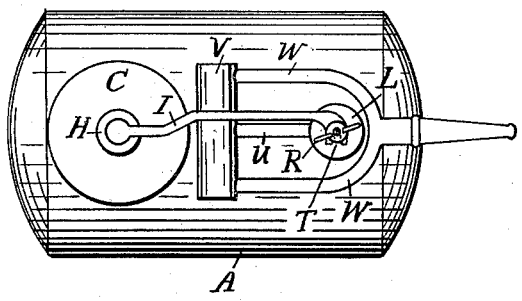


Fig. 5

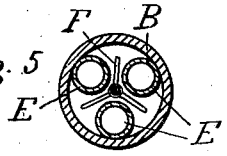
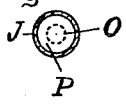


Fig. 6



Witnesses:

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UNITED STATES PATENT OFFICE.

RANDALL T. VAN VALKENBURG, OF MANCHESTER, MICHIGAN.

CHEMICAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 383,503, dated May 29, 1888.

Application filed July 25, 1887. Serial No. 245,220. (No model.)

To all whom it may concern:

Be it known that I, RANDALL T. VAN VALKENBURG, a citizen of the United States, residing at Manchester, in the county of Washtenaw and State of Michigan, have invented certain new and useful Improvements in Chemical Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in chemical engines; and the invention consists in the peculiar construction, arrangement, and combination of different parts, all as more fully hereinafter described, and specifically pointed out.

In the drawings which accompany the specification, Figure 1 is a vertical central longitudinal section of my device. Fig. 2 is a cross-section thereof on the line *w w* in Fig. 1. Fig. 3 is a top plan. Fig. 4 is a detail section of one of the pockets holding the glasses in which the liquid chemicals are inclosed. Fig. 5 is a horizontal section on line *x x* in Fig. 1. Fig. 6 is a horizontal section on line *y y* in Fig. 1.

A is a closed tank, suitably constructed to withstand a high degree of pressure, and for this purpose is preferably made of cylindrical shape, as shown. This tank, preferably has suitable legs to keep the apparatus in position, as shown. One end of this tank communicates on top with the hollow cylinder B, detachably secured thereto by means of a screw connection, or in an equivalent manner. The top of the cylinder is closed by the cap C, removably secured thereto in like manner. The interior of this cylinder forms a compartment in which the liquid chemicals are preserved in glass tubes D, preferably of the shape of the well known test-tubes, which are permanently closed in any suitable manner after being filled with the liquid. Around these tubes are wound a number of layers of paper or like material, to increase the diameter of the tube sufficiently to be firmly held against accidental displacement by forcing them into the tubular pockets E, a suitable number of which are secured to the walls of the cylinder B, near the upper end thereof.

F is a spider the legs of which extend in the intervals between the glass tubes below the pockets in which they are secured, so that by turning the spider the glass tubes will be broken, and this spider is secured to a stem, G, which projects upwardly through the cap C and through the stuffing-box H, secured therein and connects at its upper end with the handle I. J is another tube secured on top of the tank near the bottom. This tube is provided with the valve K and on top it is closed by the cap L.

M is a downward extension of the tube J, projecting nearly to the bottom of the tank A and terminating in a suitable strainer, N.

O is a perforated tube of smaller diameter than the tube J, and is secured within said tube so as to form an annular space, P, between the respective walls of the two tubes. At the bottom this tube is preferably supported on the perforated diaphragm Q.

R is a thumb-nut turning on the screw-bolt S, secured on top of the cap L and in connection therewith. The end of the lever I is provided with the notch T, adapted to engage upon the screw-bolt, for the purpose of holding the lever I by screwing the nut down upon it.

U is a lateral exit-pipe. V is a drum placed at right-angles thereto and communicating with the exit-pipe U near its middle or center. This drum is closed upon the ends, and is provided with the lateral discharge-pipes W, which join into nipples, to which a hose or nozzle is secured in the usual manner.

In practice the tank A forms the reservoir for a solution of a suitable compound to generate gas by chemical reaction with the acids contained in the glass tubes, for which the tube B serves as a receptacle, and which are firmly held against accidental displacement in any manner, as by the means described, but which may be easily broken by slightly unscrewing the nut R and turning the handle I. As soon as the acids come in contact with the solution in the tank, chemical reaction takes place, and if the valve is open the pressure of the liberated gas forces the liquid through the strainer N into the tube M, and through the valve K into the tube J, which, as above described, forms a reservoir for a gas-generating substance, packed in solid form into the annular space between the walls of said tube and the inner perforated tube, O. Through the perforations

of the tube O the liquid comes now, also, into contact with the solid substance, and the chemical reaction takes place likewise in said tube, and the products thereof will be ejected with great force through the exit-pipe U, drum V, pipes W, and discharge-nozzle T. The function of the drum V is to prevent the escape of unspent material by causing it to be throughly mixed before issuing.

What I claim as my invention is—

1. In a chemical engine, the combination, with the main reservoir or tank, of two receptacles connected therewith on the top, one receptacle containing a series of pockets for the reception of acid-containing glass vessels and a mechanical crusher, and the other receptacle being provided with an exit-pipe on top, a valve at the bottom, a lower extension projecting into the main tank to near the bottom thereof, and an annular chamber formed between the outer wall of said receptacle and an inner perforated pipe inclosed in said receptacle, and an outlet from said pipe, all substantially as described.

2. In a chemical engine, the combination, with the main reservoir or tank, of a dry-compound-retaining receptacle connected therewith on top and having a lower extension projecting into said main tank to near the bottom thereof and terminating in a strainer, a perforated tube within said receptacle, a valve between said lower extension and the receptacle, an exit-pipe communicating with the top of said perforated tube, a transverse drum communicating with said exit-pipe, and one or more exits from said drum, substantially as described.

3. In a chemical engine, the combination, with the main reservoir or tank, of a dry-compound-retaining receptacle connected therewith on top and having a lower extension projecting into said main reservoir or tank to near the bottom thereof and terminating in a strainer, a valve between said lower extension and the receptacle, and an exit-pipe communicating with the top of said perforated tube, all arranged substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 23d day of July, 1887.

RANDALL T. VAN VALKENBURG.

Witnesses:
JAS. WHITTEMORE,
P. M. HULBERT.