No. 647,793. Patented Apr. 17, 1900.

D. C. BEGGS & W. FIELDING.

ACETYLENE GAS GENERATOR.

(Application filed Dec. 5, 1899.)

(No Model.) 2 Sheets—Sheet 1.

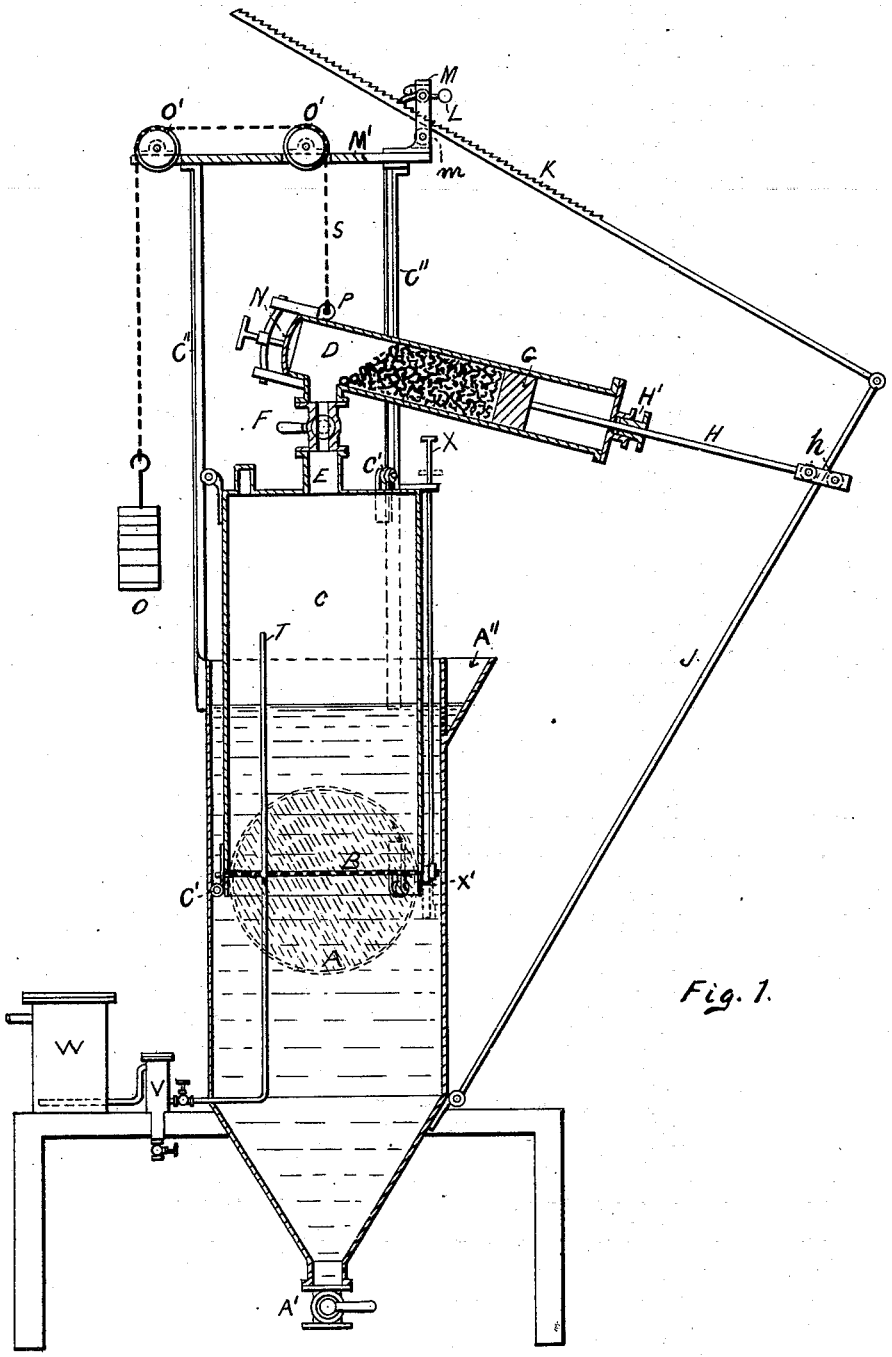

Fig. 1.

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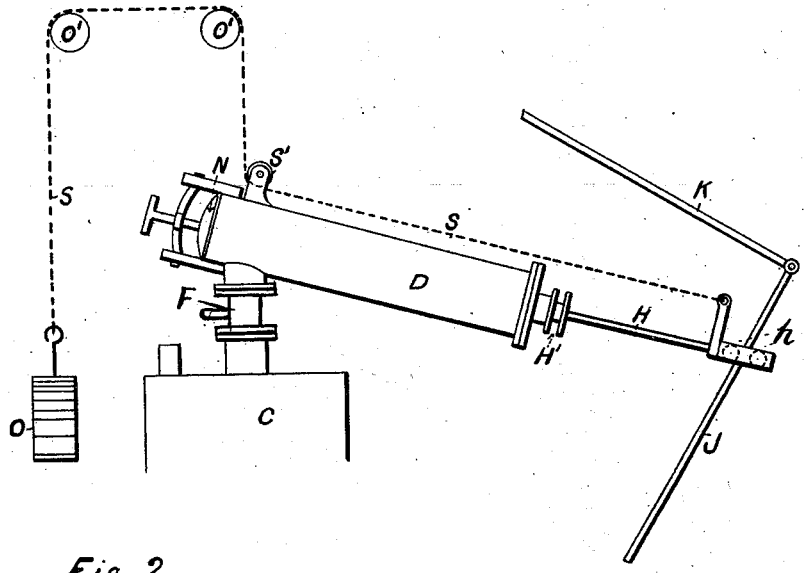

Fig. 2.

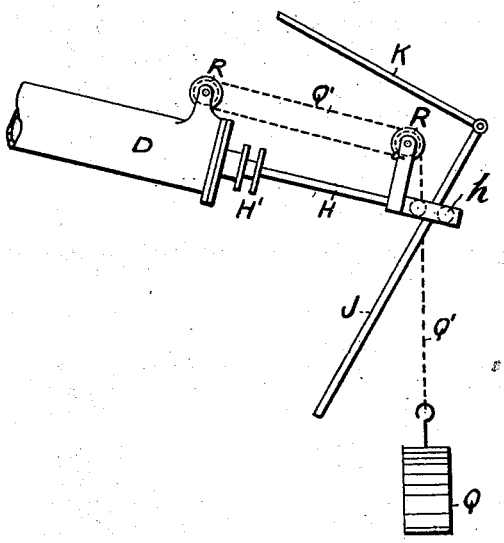

Fig. 3.

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UNITED STATES PATENT OFFICE.

DANIEL CHRISTIE BEGGS AND WILLIAM FIELDING, OF BALLYCLARE, IRELAND.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 647,793, dated April 17, 1900.

Application filed December 5, 1899. Serial No. 739,260. (No model.)

To all whom it may concern:

Be it known that we, DANIEL CHRISTIE BEGGS, solicitor, and WILLIAM FIELDING, Presbyterian minister, subjects of the Queen of Great Britain and Ireland, residing at Ballyclare, in the county of Antrim, Ireland, have invented certain Improvements in Apparatus for the Manufacture of Acetylene Gas, of which the following is a specification.

This invention relates to improvements in means for the generation of acetylene gas from carbid of calcium, said means being automatic in character and designed with the object of introducing the carbid of calcium into the generating-chamber in exact proportion to the consumption of gas from the holder or gas-container and without allowing escape of gas either during the operation or when the vessel or chamber containing the carbid requires recharging with such.

Our invention comprises the use of one or more vessels or chambers to contain the carbid of calcium and which are attached in a suitable position to the chamber or vessel in which the gas is generated, communicating therewith by means of one or more passages in accordance with the number of carbid-containers employed to each generator, such carbid-container having fitted within it a gas-tight piston or plunger that may be suitably operated so as to discharge the requisite quantity of carbid into the generating-chamber, such piston covering or sealing the passage between the carbid-container and generator when the whole of the carbid has been discharged therefrom while such passage is being closed by a suitable valve and immediately prior to the recharging of the container with a fresh supply of carbid of calcium.

Our invention will be fully described with reference to the accompanying drawings, in which—

Figure 1 is a vertical section of our improved automatic apparatus for the generation of acetylene gas, while Figs. 2 and 3 are modifications in the apparatus that will be hereinafter referred to.

In carrying out our invention and referring principally to Fig. 1, A is the generating-chamber, containing water, having at the bottom a cock A′, through which the water, dirt, and sediment may occasionally be drained off, and at the top an open end in which is inserted a gas-holder C. The latter is provided at the lower end with a perforated bottom B, pivoted to the holder C, so that it can be canted till it assumes a vertical plane by means of the rod X and lever X′. The upper end of the gas-holder C is closed except for a passage E, which communicates with the chamber D, containing the carbid of calcium either in lumps or powder. The chamber D, which may be of any length and diameter, is suitably mounted and secured on the gas-holder C, and its interior may be put into communication with the passage E, leading to the gas-holder, or shut off therefrom by the valve or cock F. One end of the chamber D is provided with a removable sealing-lid N, while the other end is bored for the reception of a piston or plunger rod H, to the interior end of which is secured a piston-head G, which is made to have a gas-tight fit with the wall of the chamber. The rod H may also be surrounded with a stuffing-box H′, either as a further precaution to prevent escape of gas or in substitution for forming a gas-tight joint with the piston-head G. The latter is sufficiently wide to entirely cover and seal the opening to the passage E when the piston reaches the end of its forward stroke and all carbid has been discharged. The outer end of the rod H carries two antifriction-rolls *h*, between which is passed a rod J, acting as a variable inclined plane, the lower end of which is pivoted to the generating-chamber A or to another suitable part of the apparatus or its framing, while its upper end is coupled to a second rod K, the free end of which is passed through a bracket M, mounted on the upper framing M′ of the apparatus. The lower side of the rod K rests on a roll *m* in the bracket M, while its upper side is provided with ratchet-teeth to engage with a spring-controlled catch L, also carried by the bracket.

The gas-holder C is capable of a rising-and-falling movement, according as the gas is generated or consumed, and is guided in such movements by the antifriction-rolls C′, which bear against the guides C″. In order to regulate the pressure of gas in the gas-holder and to assist it in rising, one or more weights

O are used, suspended from one end of a chain, the other end of which is passed over pulleys O′ and secured either to the gas-holder or to the chamber D at P, as shown. T is a pipe through which the generated gas passes from the gas-holder C to the condenser V and through the regulator and purifier W to the burner.

Assuming that the apparatus described is empty, the operation of gas-generation is as follows: The generating-chamber A is supplied with water through the side at A″, the cocks A′ and F being closed. The gas-holder is at its lowest position, and the chamber D is charged with carbid of calcium, its open end being afterward sealed by the cover N. The piston G is at the right-hand end of the chamber D. The valve F is now opened, allowing a quantity of carbid to fall into the generating-chamber. As gas is evolved the gas-holder C rises, and the rod H pulls inwardly the rod J, so that its upper end moves forward the rod K in the bracket M. As the gas is consumed by passing through pipe T the gas-holder C descends; but the rod K is firmly held by the catch L, thus holding the rod J at a fixed angle. This being so, any further descent of the gas-holder causes the rod J to push the piston-rod H and piston-head G inwardly, thus discharging carbid from chamber D into the gas-generator C, and so generating more gas. The fit of the piston-head G in the cylinder is sufficiently tight to cause the piston to remain immovable during the rising of the gasometer-bell, and thus drawing in on the rod J, causing it to assume a more vertical position and sliding the rod K still farther through the bracket, where it is again engaged by the pawl L and prevented from returning. If the quantity of gas evolved is greater than that being consumed, the holder rises again and the feed of the carbid stops; but immediately the consumption increases the gas-holder descends still farther and fresh carbid is discharged. This action continues until the whole of the carbid is discharged, and it will be seen that in all cases the quantity so discharged must be proportionate to the consumption. When the charge of carbid is exhausted, the piston G is covering the passage from the chamber D to the gas-holder C, thus preventing escape of gas into the chamber D to the rear of the piston. The cock F is then closed, the end N removed, the catch L disengaged, and the piston-head G and rod K moved back, after which the chamber D is recharged with carbid and the cover N placed in position again. Thereafter gas-generation proceeds again as described.

The piston-head G may be actuated in several different ways. Thus in Fig. 2 the chain S is continued forward under a pulley S′ to the end of the rod H, to which it is attached, while in Fig. 3 the piston is actuated by means of a weight Q on a chain Q′ working over pulleys R, one set of pulleys being mounted on the cylinder D and the other set of pulleys carried by a bracket secured to the rod H, the outer end of which engages with the rod J, as in Figs. 1 and 2.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. Apparatus for the generation of acetylene gas consisting in a gas-generating chamber provided at the top with an open end and capable of holding water; a gas-holder with an open end at the bottom and a partially-closed end at the top provided with a passage for the introduction of carbid of calcium therethrough, and capable of sliding backward and forward in the gas-generating chamber; guides for keeping the gas-holder in alinement with the gas-generating chamber; a weight, and a chain attached to said weight and to the gas-holder, for regulating the pressure of gas evolved therein; a carbid-holder located on the top of said gas-holder and provided at one end with a removable sealing-lid; a cock or valve located between said carbid-holder and gas-holder and capable of being opened and closed at will either to admit carbid to the gas-generating chamber or shut off escape of gas therefrom; a gas-tight piston located in the carbid-holder and adapted to discharge carbid of calcium through the passage in the gas-holder and into the latter; a piston-rod connected to the gas-tight piston at one end; an inclined rod pivoted at one end, passed through the piston-rod and coupled at the other end to a second rod, means for permitting the second rod to move endwise as the gas-holder rises and for holding it stationary as the gas-holder falls, and a pipe located in the gas-generating chamber and gas-holder arranged to convey the generated gas from the latter, substantially as and for the purposes described.

2. In apparatus for generating acetylene gas the combination with a rising-and-falling gas-holder and a carbid-holder located on the upper end thereof and provided with a movable gas-tight piston-head, of the means for moving said piston and rod backward and forward consisting of an inclined rod passing through the end of said piston-rod pivoted at its lower end to a stationary pivot and coupled at its upper end to a second rod; the second rod pivoted to the said inclined rod and provided with ratchet-teeth and capable of moving through a supporting-bracket for the second rod, and a spring-controlled ratchet carried by said bracket and adapted to engage with the ratchet-teeth on said rod substantially as described.

3. In apparatus for generating acetylene gas the combination with a rising-and-falling gas-holder and a carbid-holder located on the upper end thereof and provided with a movable gas-tight piston, of the means for moving said piston and rod backward and forward consisting of an inclined rod passing through the end of said piston-rod pivoted at its lower end to a stationary pivot, a second

rod pivoted to the said inclined rod and provided with ratchet-teeth, a supporting-bracket for the second rod and a spring-controlled ratchet carried by said bracket and adapted to engage with the ratchet-teeth on said rod, a weight, and a chain attached to said weight by one end and passed around a pulley located on the carbid-holder and attached to the piston-rod, substantially as described.

4. In a device of the character described, a gasometer, a cylinder carried thereby, a piston fitting in the cylinder, a rod pivoted at one end, means on the piston-rod for engaging said rod, a second rod pivoted to the first-named rod and provided with ratchet-teeth, and means for engaging said ratchet-teeth, substantially as described.

5. In a device of the character described, a gasometer, an inclined cylinder mounted on the dome thereof, a piston fitting in the cylinder, a rod having a fixed pivot connection at one end, means on the piston-rod for slidably engaging said rod, a second rod pivoted to the other end of the first-named rod and provided with ratchet-teeth, and a suitably-mounted pawl adapted to engage the ratchet-teeth of the second-named rod, substantially as described.

6. In a device of the character described, a gasometer with a suitable guide-frame, an inclined cylinder carried by the dome of said gasometer, a piston fitting in the cylinder, a rod having a fixed pivot connection at one end, means on the piston-rod for loosely engaging said rod, a second rod pivoted to the first-named rod and having ratchet-teeth thereon, a bracket mounted on the gasometer-frame, and a pawl on said bracket for engaging the teeth of the second-named rod, substantially as described.

7. In a device of the character described, a gasometer, an inclined cylinder carried thereby, a piston fitting in the cylinder, a rod having a fixed pivot connection at one end, a roller-bracket on the piston-rod for loosely engaging said rod, a second rod pivoted to the other end of the first-named rod and provided with ratchet-teeth, means for engaging the ratchet-teeth, and a chain weight and pulley connection between the bracket and cylinder for assisting the inward movement of the piston, substantially as described.

In witness whereof we have hereunto set our hands and seals in the presence of two witnesses.

DANIEL CHRISTIE BEGGS. [L. S.]
WILLIAM FIELDING. [L. S.]

Witnesses:
JAMES ALEXANDER CULBERT,
JOHN JOHNSON.