

No. 647,337.

Patented Apr. 10, 1900.

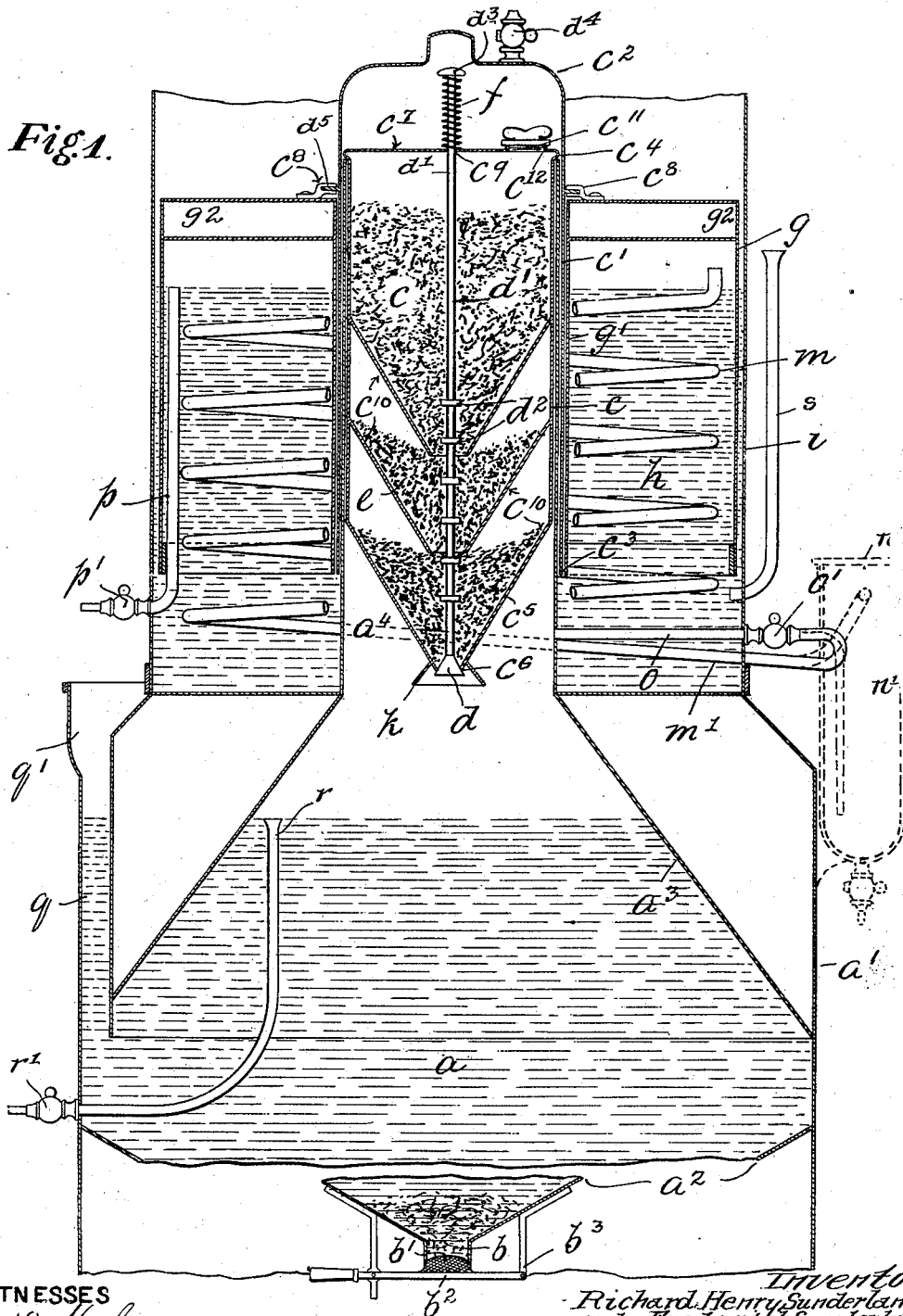
R. H. & F. SUNDERLAND & G. MARSHALL.

ACETYLENE GAS GENERATOR.

(Application filed July 15, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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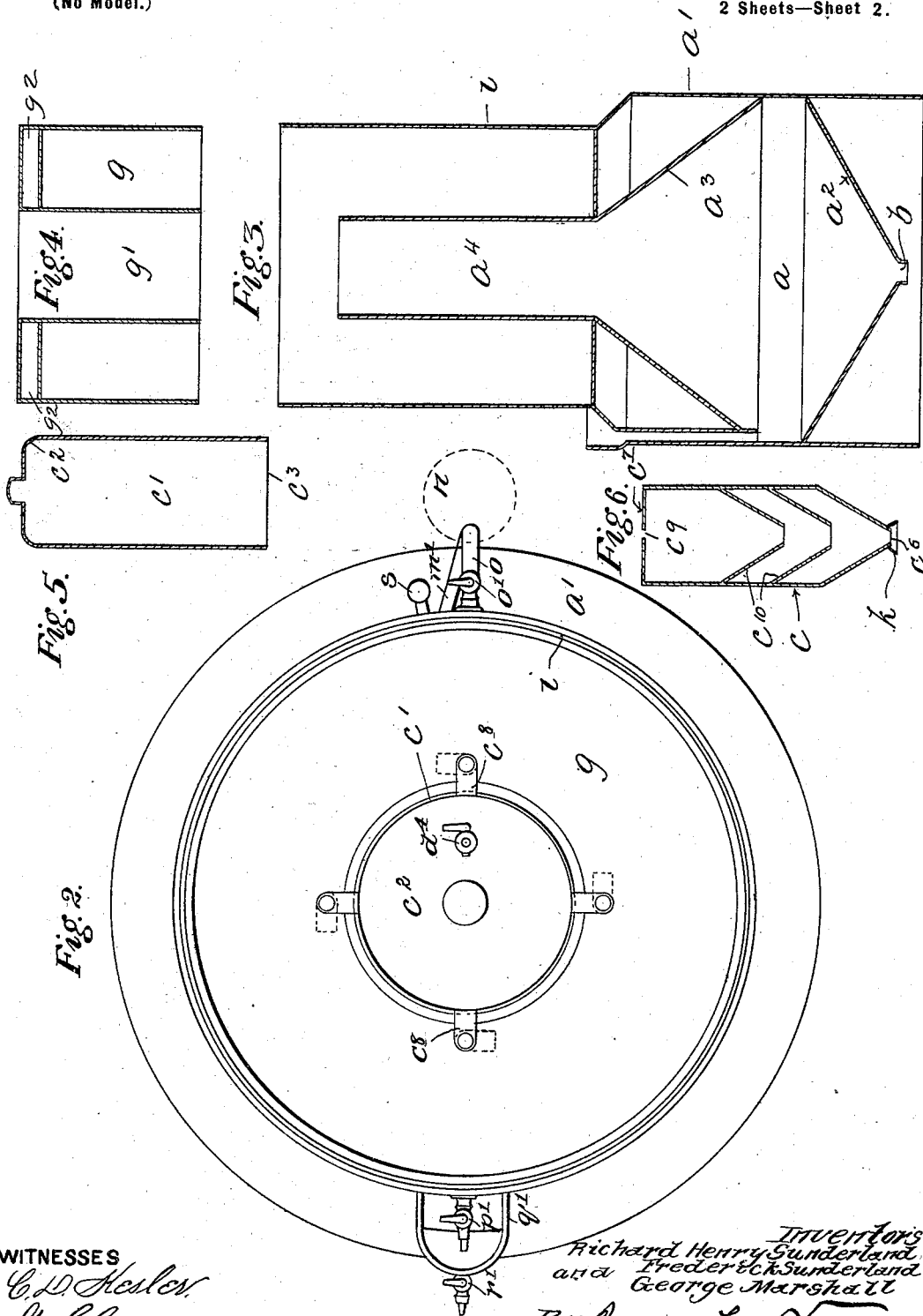
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UNITED STATES PATENT OFFICE.

RICHARD HENRY SUNDERLAND, FREDERICK SUNDERLAND, AND GEORGE MARSHALL, OF BIRMINGHAM, ENGLAND.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 647,337, dated April 10, 1900.

Application filed July 15, 1899. Serial No. 723,989. (No model.)

To all whom it may concern:

Be it known that we, RICHARD HENRY SUNDERLAND, clothier, of 55 Bull street, FREDERICK SUNDERLAND, manufacturer, of 80 Lionel street, and GEORGE MARSHALL, mechanic, of Small Heath, Birmingham, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Acetylene-Generators, of which the following is a specification.

This invention relates to apparatus for the generation of acetylene gas.

The object of our present invention is to improve and simplify the construction of the apparatus in such a manner that the escape of gas is prevented, the apparatus may be recharged with carbid while in operation, the liability to explosion is minimized, and the generated gas is cooled and purified before it is conveyed to the gas-holder.

Figure 1 of the accompanying drawings represents a complete vertical section of an apparatus for generating acetylene gas pro rata with the consumption constructed and provided with the improvements according to one form of our present invention. Fig. 2 is a top side plan of the same. Fig. 3 represents, upon a reduced scale, a section of the body part of the generator separately. Fig. 4 is a sectional view of the gas-holder separately, and Fig. 5 a similar view of the sealing-bell thereof separately. Fig. 6 represents a separate sectional view of the carbid-holder.

The same letters of reference indicate corresponding parts in the several figures of the drawings.

In a generator constructed according to this form of our invention the generating-chamber *a* is located within a base or body part *a'* and has a conical bottom *a²* and also a conical or sloping roof or sides *a³*, which are thus formed both in order to decrease the surface area of the water contained therein, whereby the gas generated is not so liable to become humidified by contact with a considerable water-surface, and also to prevent the accumulation of large quantities of air in the generator, thus minimizing the liability of explosions occurring, especially on the apparatus being first started. The conical bottom is fitted with an outlet *b*, through which the lime residues and other waste products are removed and the water contained within the

said chamber emptied when required, the said outlet being closed by a plug or like valve *b'*, supported by a bar *b²*, hinged to the framing *b³*, and held up to keep the plug in its closed position by a suitable catch.

The upper part of the generator is extended into a cylindrical compartment *a⁴*, within which a removable carbid-holder *c* is supported and held in a constant position by an annular shoulder *c⁴*, resting upon the top edge of the said compartment, which is surrounded by a sealing-bell or outer sleeve *c'*, whose closed upper end *c²* incloses both the top of the carbid-holder and the open end of the said cylindrical extension *a⁴*, as represented in Fig. 1, while the lower end *c³* of the said sleeve is open, but is water-sealed, as hereinafter described, to prevent the escape of any gas that may pass upward between the holder *c* and the walls of the chamber *a⁴*. The bottom *c⁵* of the carbid-holder is coned or formed hopperwise and is provided with a central opening or outlet *c⁶*, the edges of which constitute a seating for a conical closing-valve *d*, carried and worked by an upright stem *d'*, passing upward through the inside of the said holder and provided at intermediate points along its length with projections or teasers *d²*, adapted to keep the carbid *e*, contained within the holder, loose or preventing it from clogging. The said stem passes out through a hole *c⁷* in the roof or upper end *c⁷* and has at its termination a head or button *d³*, while surrounding the part of the stem coming between the headed termination and the roof of the holder is a spring *f* to raise the valve and keep it up to its seating during such times that the gas-holder *g*, which is located around the said carbid-container and works within a water-seal *h*, contained in an upper tank or open-topped chamber *i*, supported by the base or body part *a'*, is raised by the internal pressure of the generated gas; but when the gas is consumed and the holder *g* falls then the inside of the closed end *c²* of the bell or sealing-sleeve *c'*, which is connected by catches, such as *c⁸*, to and moves up and down with the said gas-holder, comes against the top of the valve-rod, compresses the spring, and opens the valve, which allows a quantity of carbid to fall through the opening into the water contained within the generating-chamber, thus generating a fresh supply of gas for

raising the gas-holder and the bell connected thereto and relieving the valve-rod of the weight, whereon the spring reacts to draw the valve into its closing position. The top of the bell may be provided with a cock d^4 , which is opened when necessary to form an air-vent. The catches c^8 are pivotally mounted on the top of the gas-holder g and have bifurcated ends which may be turned into and out of engagement with a flange d^5 on the sealing-bell c' , as shown in Fig. 1.

Around the opening in the conical bottom of the carbid-holder is a shield or guard k to prevent the valve being clogged by the impurities and residual matters resulting from the decomposition of the carbid and which are apt to accumulate upon surfaces exposed to the generated gas, while to provide for the recharging of the carbid-container an opening c^{12} is made in the top and fitted with a screw-plug or closure c^{11} , to which access is gained by releasing the catches c^8 and raising the sealing-bell c' . The carbid-holder may be thus recharged without stopping or interfering with the generation of gas. The carbid-container is also provided interiorly with a series of downwardly-sloping partitions c^{10} to prevent the weight of the carbid at the top compressing or clogging that at the bottom.

The rising-and-falling gas-holder g is provided with a central open-ended shaft g' , thus forming an outer annular compartment into which the generated gas is delivered and a cylindrical inner chamber surrounding the sealing-bell, both the inner and outer chambers, together with the said sleeve c' , being sealed by the water contained in the upper tank i , wherein the said gas-holder works. This said tank also has disposed within it a coil or worm m , through which the generated gas is passed in being conveyed from the generator to the gas-holder for the purpose of cooling it after the same has been treated, if necessary, in a purifier, such as marked n and shown in dotted lines in Fig 1, attached to one side of the apparatus. Thus the generated gas rises to the upper part of the chamber a and passes thence through a pipe o , provided with a stop-cock o' , into the purifying-chamber n' , containing sulfate of iron or other suitable substance adapted to remove any impurities which may be present in the gas, which then passes through the pipe m' to and through the cooling-worm m to the top of the gas-holder and from it is delivered through a service-pipe p , whose lower end, which passes through the wall of the tank i , is fitted with a main cock p' for controlling the gas-supply.

The cock o' provides a means whereby communication between the generator and the gas-holder may be cut off while the carbid-container is being recharged, thus preventing the escape of gas, while q is a passage or pipe with a funnel-shaped inlet end q' , by which the generator-chamber is filled with water. A pipe r , leading from the generator to the outer air, has a cock r' , by opening

which any gas in the generator-chamber a may be permitted to escape after the cock o' has been turned to close communication with the gas-holder. A pipe s leads into the tank i . Through this pipe water may be supplied to said tank.

The inclosed annular extension g^2 at the top of the bell g is provided for the purpose of adding to the height of said bell without increasing its internal capacity, the object being to prevent water running over the top of the bell and weighting it down when it is in its lowermost position.

Having fully described our invention, what we desire to claim and secure by Letters Patent is—

1. In an acetylene-generator, the combination with a generating-chamber, of a carbid-holder interiorly provided with a series of downwardly-sloping cone-shaped partitions and having a tapered bottom provided with a discharge-opening, a spring-pressed stem provided at intervals along its length with a series of projections and having at its lower end a valve normally closing the opening in the holder, and a bell having a portion extending over the upper end of said stem whereby to depress the same in the downward movement of the bell, substantially as described.

2. In an acetylene-generator, the combination with a generating-chamber having an open-ended shaft or extension at the upper end, of a carbid-holder located within the said shaft, a water-seal tank surrounding the said shaft, and having within it an annular gas-holder provided with a central cylindrical part working over the said shaft, and a sealing-bell inclosing the said carbid-holder and shaft and detachably connected to the gas-holder, and having a lower open end submerged in the water of said tank in the space between the said cylindrical part of the gas-holder and said shaft, substantially as described.

3. In an acetylene-generator, the combination with a stationary carbid-holder located within an open-ended shaft extending from the generating-chamber, of an outer sealing-bell, inclosing the said carbid-holder and shaft and detachably connected to a rising and falling gas-holder, with its open-mouth end dipping into a water seal and its closed upper end serving on the descent of the gas-holder consequent upon the consumption of gas, to operate the stem of a spring-closed carbid-supply valve, substantially as described and set forth.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

RICHARD HENRY SUNDERLAND.
FREDERICK SUNDERLAND.
GEORGE MARSHALL.

Witnesses:

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