J. BOLAND.

ACETYLENE GAS GENERATOR.

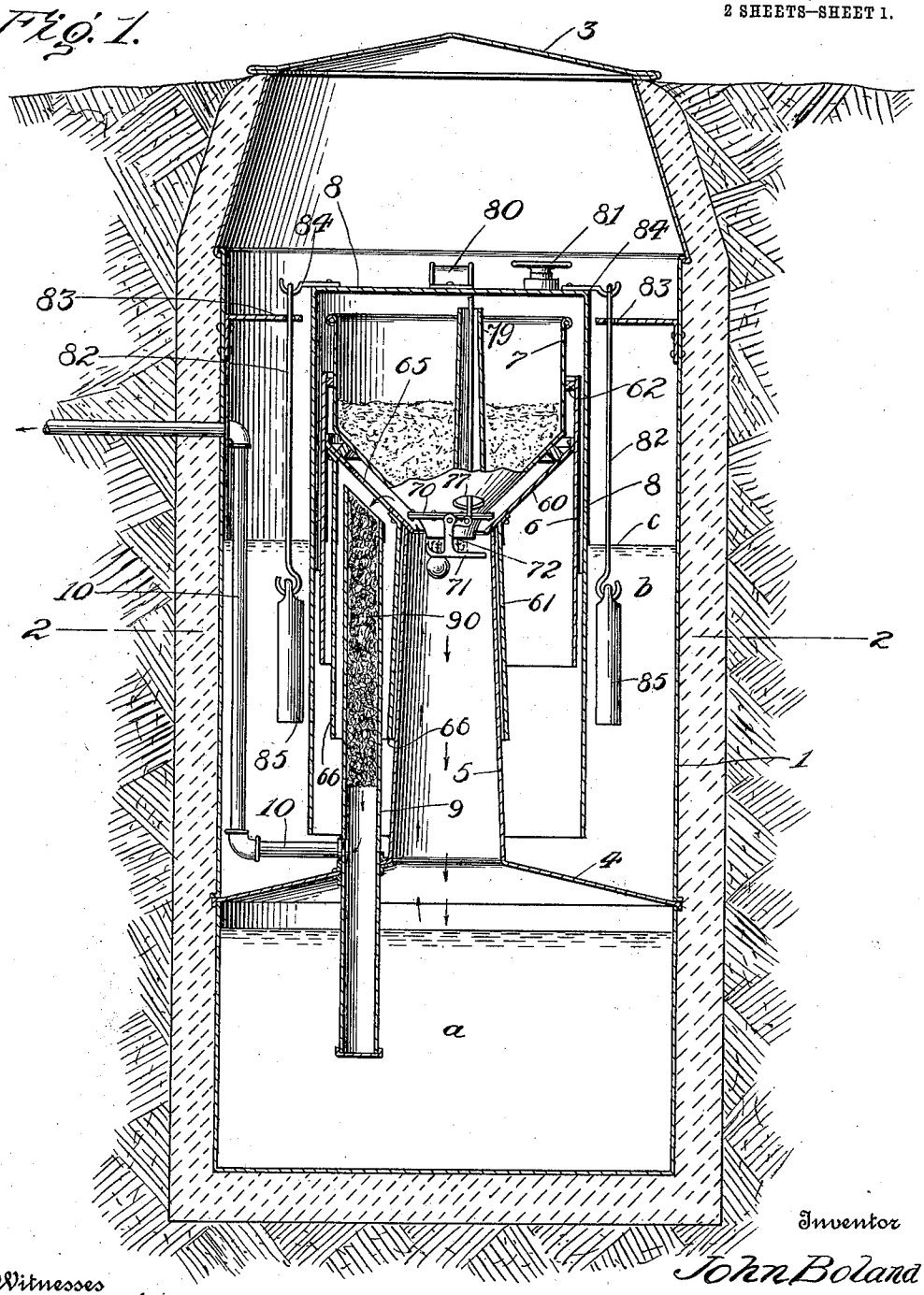
APPLICATION FILED NOV. 18, 1910.

1,001,924.

Patented Aug. 29, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

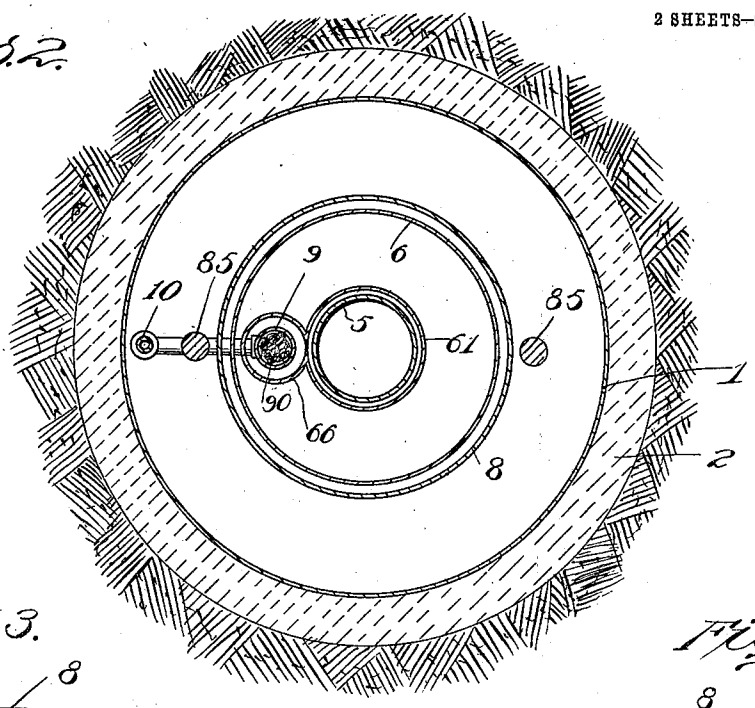


Fig. 3.

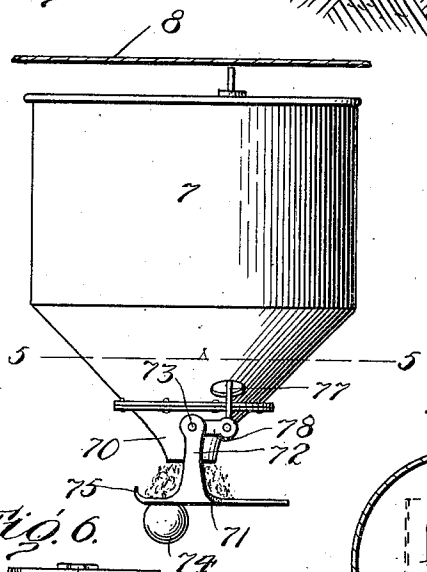


Fig. 4.

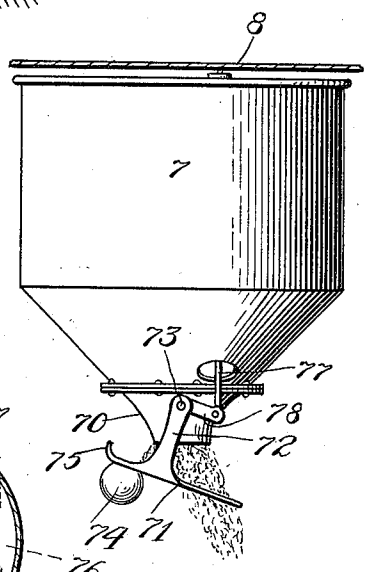
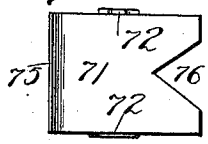


Fig. 6.



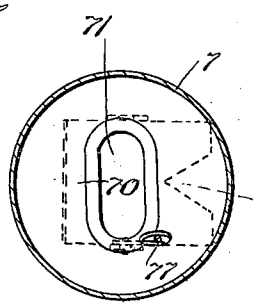


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN BOLAND, OF DECATUR, ILLINOIS.

ACETYLENE-GAS GENERATOR.

1,001,924. Specification of Letters Patent. **Patented Aug. 29, 1911.**

Application filed November 18, 1910. Serial No. 593,112.

To all whom it may concern:

Be it known that I, JOHN BOLAND, a citizen of the United States, residing at Decatur, in the county of Macon and State of Illinois, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

This invention relates to certain improvements in acetylene gas generators; and the objects and nature of the invention will be readily understood by those skilled in the art in the light of the following explanation of the accompanying drawings illustrating what I now consider my preferred embodiment from among other formations within the spirit and scope of my invention.

An object of the invention is to provide certain improvements in arrangements, formation and construction of parts whereby an exceedingly compact and efficient acetylene gas generator will be produced wherein the gas storage and generating portions of the apparatus will be concentrated within one inclosure and arranged under the gas bell.

A further object of the invention is to provide an apparatus for the purpose mentioned having the parts thereof compactly arranged within one inclosure and under a removable gas bell, with operative parts readily removable and accessible, and with fixed parts easily accessible for cleaning and other purposes, on the removal of said gas bell.

A further object of the invention is to provide certain improvements in the carbid feed mechanism whereby certain advantages of utility are attained particularly along the line of regulating the quantity of carbid fed at each operation of the feeding mechanism and in simplifying such mechanism.

A further object of the invention is to provide certain improvements in details of construction and arrangements of parts whereby a highly efficient and simplified acetylene gas generator will be produced.

The invention consists in certain novel features in construction and in combinations and arrangements of parts as more fully and particularly set forth hereinafter.

Referring to the accompanying drawings;—Figure 1 is a central vertical section through the complete apparatus. Fig. 2, is a cross section on the line 2—2, Fig. 1. Fig. 3, is a detail elevation of the feed hopper, the gas bell top wall being shown in section. Fig. 4, is a view similar to that of Fig. 3, but showing said bell wall swinging the carbid gate or valve to feeding position. Fig. 5, is a cross section on the line 5—5, Fig. 3, Fig. 6, is a detail top plan view of said gate or valve.

In the drawings, I show the apparatus arranged within a single casing or inclosure 1, which, as an example, I show arranged in a suitable excavation so that the water contained in the casing will be below the frost line. A suitable concrete or cement wall or inclosure 2, is formed around the casing 1, which can form a mold therefor in the excavation. The casing is formed with an open top normally closed by a cover 3.

The casing is transversely divided into a generating chamber *a*, and a water seal chamber *b*, for the gas bell. The generating chamber *a*, is arranged below the water seal chamber *b*, and said chambers are separated by an upwardly and centrally arched or tapered water tight diaphragm 4, around its edge forming a water and gas tight joint with the surrounding vertical wall of the casing 1. This diaphragm forms the top wall of the gas space above the water in the generating chamber *a*, and also forms the water tight floor of the chamber *b*, and sustains the gas bell sealing water in said chamber.

A rigid vertical open stack or pipe 5, having water tight walls rises centrally from the diaphragm 4, and at its lower end forms a tight joint therewith and opens therethrough into the gas space above the water in chamber *a*, while its upper open end is arranged a suitable distance above the water line *c*, of the chamber *b*. This vertical pipe 5, forms the opening or passage through which the carbid is dropped into the water in chamber *a*, for conversion into gas, and said pipe also forms and constitutes the gas outlet or offtake through which the gas passes to the gas bell in chamber *b*, and also forms an opening through which a suitable pump can be inserted into chamber *a*, for removing the residuum of carbid gas generation from said chamber. This upright stack or pipe 5, carries and supports the holder for the carbid hopper, and this holder consists of a cylindrical open end rim 6, extending from a point considerably below to a point considerably above the water line *c*,

and containing a funnel 60, at its lower end terminating in a depending sleeve 61. The funnel 60, is rigid with and carried by the rim 6, and is arranged therein a distance below the top end of the rim, and the sleeve 61 is rigid with and carried by the funnel, and the entire holder is removably fitted to and rests on the pipe 5, so that it can be lifted vertically therefrom and out through the top opening of the casing 1. The sleeve 61, slips down on the exterior of the pipe 5, and maintains the holder properly centered on and about said pipe while the lower end of the funnel rests on the upper end of said pipe to support the holder with the funnel opening accurately registering with the open top end of said pipe. If so desired, the pipe 5, can longitudinally taper upwardly and the sleeve 61, can correspondingly flare downwardly so as to fit on the pipe and thus support the holder through the engagement of the oppositely flared or tapered walls of the pipe and sleeve.

The carbid hopper 7, is open at the top and is usually cylindrical with a downwardly tapered hopper bottom terminating in a central downwardly projecting discharge mouth. This hopper removably rests within the holder and on the funnel 60 thereof with its discharge mouth smaller in diameter than the funnel opening and upper end of pipe 5, and depending thereinto. Stops or blocks 62, are provided to hold the hopper from tight or direct engagement with the funnel 60, and rim 6, so as to provide spaces or gas passages between the hopper and rim 6 and funnel 60, for free passage of gas from the pipe 5, to the space at the exterior of the hopper holder and under the gas bell. It will thus be observed that the hopper can be lifted from the holder through the open top thereof, and that carbid can be supplied to the hopper through the open top thereof even though said hopper be not lifted from the holder.

8, is the vertically movable gas bell arranged in chamber *b*, and dipping into the water therein the required distance below the water line to maintain the water seal and contain the required volume of gas. This bell is arranged over and incloses the hopper and its holder and forms the gas storage space or chamber in which said hopper and holder are located. The bell is formed with a flat top provided with top handle 80, and air valve 81, which can be opened to admit air to the bell when the bell is to be lifted by handle 80, from the casing 1, through the top opening thereof, to permit access to the parts inclosed by said bell. The bell is guided in its vertical movement by depending metal rods 82, sliding vertically in guides 83, fixed to the vertical wall of the casing 1, and at their upper ends having eyes removably hung on hooks 84, projecting laterally from the top of the bell, and at their lower ends having hooks receiving the weights 85, whereby the bell or gasometer is weighted to maintain the gas therein under the desired pressure. I preferably form these rods or links 82, of such length that the hooks or weights at the lower ends thereof will engage the fixed guides 83, and stop the upward movement of the bell just above the "blow off" point. When it is desired to remove the bell, the rods 82, can be detached from the hooks 84, and be supported and upheld in chamber *b*, by the guides 83, until the bell is replaced in operative position, as will be readily understood by those skilled in the art.

Suitable means are provided for taking off the gas from the gas storage space within the gas bell for service, and if so desired, said means can provide for filtering the gas and for purifying the same. For instance, I show an elongated vertical pipe or cylinder 9, supported by the diaphragm 4, and extending from a point below the water line in the generating chamber *a*, upwardly through said diaphragm and through chamber *b*, to a point above the water line *c*. This stand pipe 9, forms a water tight joint with diaphragm 4, where it passes through the same and the portion of said stand pipe depending in chamber *a*, is closed against communication with the interior of said chamber. The stand pipe rises under the gas bell and within the rim of the carbid hopper holder and its gas-intake open upper end is located immediately below a gas outlet opening 65, in the funnel 60, and is thus in direct communication with the gas storage space within the gas bell. I show a sleeve 66, rigid with the funnel 60, around opening 65, and depending therefrom between rim 6, and sleeve 61, to longitudinally receive the fixed stand pipe 9.

10, is the gas offtake or service pipe which is tapped into the stand pipe 9, immediately above the diaphragm 4, and extends outwardly through the chamber *b*, casing 1, and concrete wall to supply the gas at the desired point or points for consumption.

The stand pipe can be supplied with suitable gas filtering material 90, arranged therein between the open upper end of said stand pipe and the outlet to service pipe 10. This stand pipe forms a combined gas filter and condensation chamber, and the closed depending lower end thereof serves as a trap to catch and retain the condensed products. The lower end of the hopper is usually provided with a depending cast iron or otherwise formed discharge funnel or nozzle 70, having its discharge mouth or opening transversely elongated or approximately oblong or elliptical in formation. The discharge of carbid from this mouth or nozzle is controlled by a table, gate, valve or basket 71,

consisting of a plate enlarged in length and breadth with respect to the size of the discharge mouth and normally arranged horizontally a distance below the lower edge of said mouth. This basket or table is of such relative size and is normally located such a distance below said discharge mouth, that the carbid will drop through the mouth and pile up on the basket and seal the mouth against passage of carbid therefrom, before the carbid overflows the edges of the basket (see Fig. 3). Hence to discharge carbid from the basket it is necessary to tilt the same so that the carbid will slide down the top face thereof and drop from the edge thereof into pipe 5, and from thence into the water in the generating chamber *a*, (see Fig. 4). The basket is carried by a pair of hangers 72, rigid therewith and extending up from the opposite side edges thereof and at their upper ends pivotally joined to the nozzle 70, so as to swing on a horizontal axis 73. The basket is so balanced as to normally assume (and when tilted return to) the normal nozzle sealing position shown by Fig. 3. The basket can be counterweighted, see 74, for this purpose. The rear end of the plate or table forming the basket is preferably flanged or turned-up, see 75, to retain the material and prevent the same spilling over the rear end of the basket. The somewhat extended flat front end of the basket is formed with a central inwardly or rearwardly extending V-notch 76, which forms the carbid feeding opening and performs an important function as will be hereinafter recited.

The carbid feeding basket is automatically controlled through or by the rise and fall of the gas bell 8, to shut off the carbid feed when there is a sufficient supply of gas and the bell consequently rises, and to permit feed of carbid when the supply of gas has become exhausted below a certain predetermined quantity and the bell consequently falls. I provide a very simple mechanism for this purpose consisting of a vertical basket-tilting push rod 77, at its lower end pivotally joined to the outer end of a crank or lateral arm 78, rigid with one of the hangers 72, and with its upper end located below the top wall of the gas bell 8, and so arranged with respect thereto that as the gas bell drops the top wall of the bell will move down on the upper end of rod 77, and depress said rod (as the bell reaches the point indicating exhaustion of the gas supply below the predetermined point) and hence cause the rod to swing the basket back to the position shown by Fig. 4, to drop an approximately predetermined charge of carbid into the generator chamber *a*. The gas pressure in the storage chamber under the bell will then immediately rise under the almost instantaneous generation of gas, lifting the gas bell and permitting the push rod to freely rise to normal position as the basket under the impulse of weight 74, returns to hopper-nozzle closing position.

Various means can be employed to guide the push rod and maintain the same in vertical position. For instance, I show an off-center tube 79, extending vertically through the carbid hopper and opening through the inclined bottom to one side of and above the nozzle 70, and loosely receiving said push rod. As the carbid feed basket swings up and back to deliver a charge of carbid to the generator chamber, the inner end of the notch 76, passes under the discharge mouth of nozzle 70, and in effect forms a triangular feed opening through which a comparatively small quantity of carbid is discharged, the quantity depending on the distance the basket is swung back. This notch is designed to regulate each charge of carbid that is, to enable an approximate predetermined quantity of carbid to be discharged at each feeding operation, avoiding the sudden delivery of an excessive charge, or avalanche, of carbid which might occur if the basket were formed with a straight or unbroken delivery edge. I find that certain advantages are also attained by elongating the discharge mouth of the nozzle 70, transversely of the basket, as indicated by Fig. 5.

It is evident that various changes, modifications and variations might be resorted to without departing from the spirit and scope of my invention and hence I do not wish to limit myself to the exact disclosure hereof.

What I claim is;—

1. In an acetylene gas generator, a carbid hopper having a depending open gravity feed discharge nozzle, in combination with a feed basket comprising a table normally arranged about horizontally a distance below the mouth of said nozzle and provided with upwardly extending side hangers at their upper ends pivotally joined to said nozzle to swing on a transverse axis whereby said table swings upwardly and rearwardly on its carbid dropping movement, the front discharge edge of said table being centrally notched inwardly to form an inwardly reduced carbid discharge opening, and means for swinging said basket on its carbid dropping movement.

2. In an acetylene gas generator, a carbid receptacle having a discharge mouth through which carbid is adapted to drop by gravity, and a vertically swingable carbid feed basket comprising a generally-flat table normally arranged about horizontally below said mouth and sealing the same against carbid feed and having its front edge notched to form an inwardly tapered feed opening, and means for tilting said basket.

3. A carbid hopper having a bottom dis-

charge opening, a vertically tiltable carbid feed table arranged below and normally sealing said opening, against carbid discharge, and having a carbid sustaining top surface with its front carbid-discharging-end recessed inwardly intermediate its width, for the purpose substantially as described, and means for periodically tilting said table upwardly and rearwardly to drop charges of carbid through said recess.

4. A carbid hopper having an open depending discharge nozzle, a swingable counter-weighted carbid feed basket carried thereby and hung therefrom and having its bottom table normally arranged about horizontally below said nozzle with an upturned rear end and an inwardly notched front discharge end.

5. In an acetylene gas generator, in combination, a casing forming a generator chamber, a vertical neck rising from said chamber for the downward passage of carbid thereto and for the upward passage of gas therefrom, said neck having an open upper end, a hopper holder mounted on said neck and vertically removable therefrom and comprising an open top funnel, a carbid hopper seated in said funnel and vertically removable therefrom and provided with carbid feeding means adapted to drop carbid charges into said neck, and a vertically removable gas bell arranged over said hopper and about the hopper holder and neck, said holder providing gas passages from said neck to said bell.

6. In combination, a casing having a transverse diaphragm formed with a vertical open neck rising therefrom, a vertically-removable hopper holder mounted on and supported by said neck and comprising a vertically elongated open-end rim containing and provided with a funnel having a depending sleeve around said neck with the funnel opening coinciding therewith, a carbid hopper fitted in said rim and on said funnel and provided with means to drop carbid into said neck, a vertically movable gas bell above and surrounding said hopper and holder, said neck providing for the upward passage of gas, and said holder providing for the passage of gas from said neck to said bell.

7. In an acetylene gas generator, in combination, a casing having a transverse diaphragm formed with a vertical open neck rising therefrom and opening into a generator chamber below the diaphragm, a hopper holder mounted on said neck and vertically removable therefrom, a carbid hopper mounted in said holder and vertically removable therefrom and provided with carbid feeding means to drop carbid into said neck and having an operating device extending upwardly to be engaged and actuated by the gas bell, a vertically removable gas bell above and surrounding said hopper and holder, and a gas offtake standpipe carried by said diaphragm and having an upper portion rising therefrom with its gas intake end under said bell and holder, said holder providing a passage for the gas from said neck to said bell and intake end of said pipe, and a service pipe opening into said standpipe.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN BOLAND.

Witnesses:
E. S. McDONALD,
ROSA VOELCKER.