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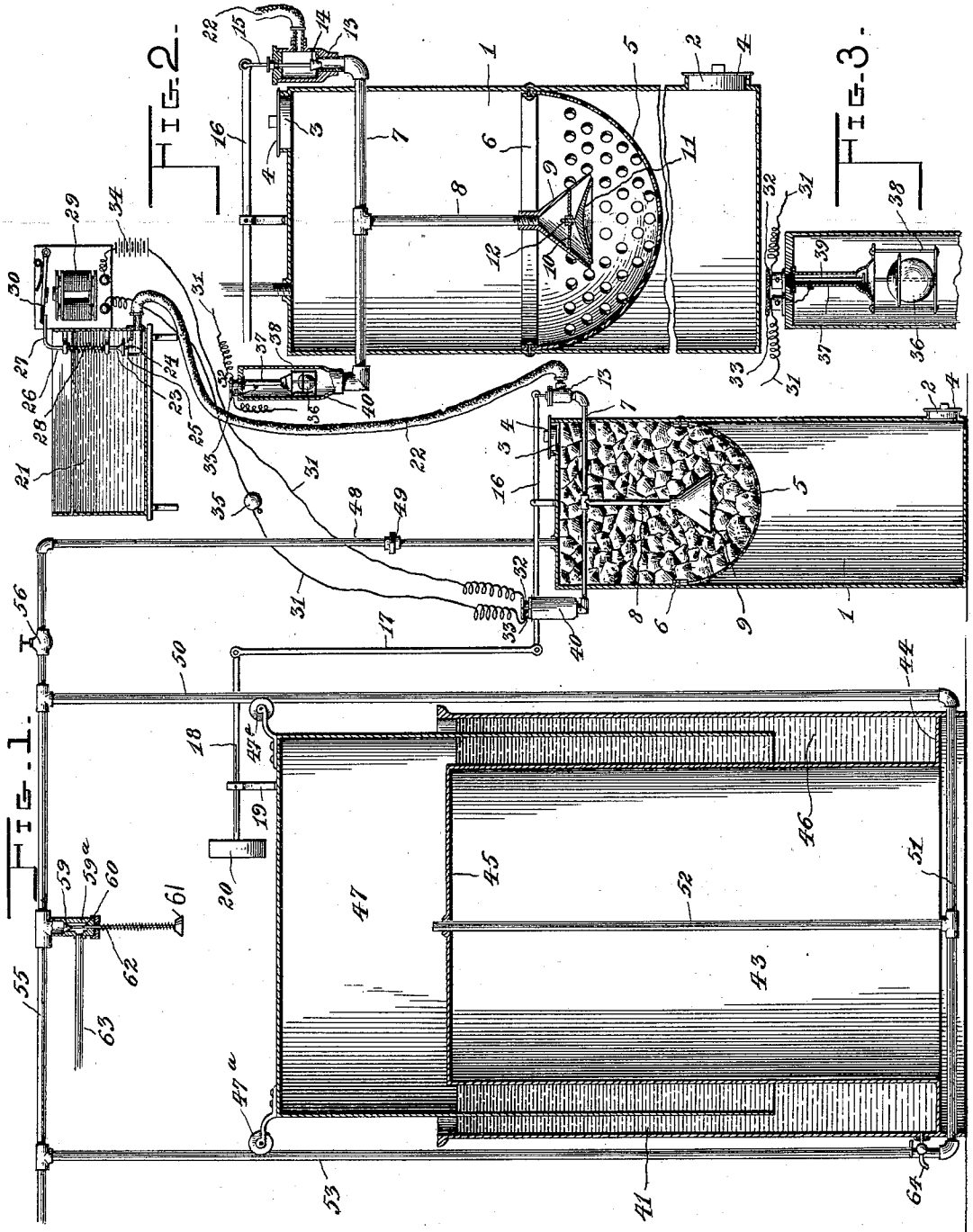
H. P. NIELSEN.

ACETYLENE GAS GENERATOR.

(Application filed Dec. 22, 1898.)

(No Model.)



Witnesses
John F. Dewhurst
H. J. Bewley

Hans P. Nielsen, Inventor
By His Attorneys,
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

HANS PETER NIELSEN, OF ALAMEDA, CALIFORNIA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 648,283, dated April 24, 1900.

Application filed December 22, 1898. Serial No. 700,039. (No model.)

To all whom it may concern:

Be it known that I, HANS PETER NIELSEN, a citizen of the United States, residing at Alameda, in the county of Alameda and State of California, have invented a new and useful Acetylene-Gas Generator, of which the following is a specification.

My invention relates to improvements in apparatus for generating acetylene gas; and one object that I have in view is to provide a generator in which the charge of calcium carbid serves not only to generate the gas when it is attacked by water, but also as the medium for dehydrating the gas subsequent to its generation, because the gas is caused to traverse the active charge of carbid which by its affinity for moisture eliminates the aqueous vapors from the gas before it passes to the gasometer.

A further object of the invention is to automatically give an alarm when the mass or charge of carbid shall have become spent or exhausted and incapable of further or continued generation of gas should water be subsequently admitted to the charge, and this mechanism serves the further purpose of setting in action devices which automatically cut off the flow of water from a source of supply to the generator-chamber.

A further object is to provide a generator having its water-admission devices controlled by improved means actuated by the rising-and-falling movement of the gasometer-bell, so as to renew the generation of gas when the volume contained within the gasometer is reduced below the desired limit by consumption at the burners.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand the invention, I have illustrated the same in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a sectional elevation of an acetylene-gas apparatus constructed in accordance with my invention. Fig. 2 is an enlarged sectional view of the generator. Fig. 3 is an enlarged sectional view through the electrical circuit-closer which controls the water-admission valve in the source of water-supply.

Like numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

The shell 1 of the generator is closed at its top and bottom by suitable heads. In the generator-shell, near the bottom thereof, is provided a hand-hole 2, and in the upper head of the shell is provided another hand-hole 3, said holes being closed by independent covers 4. Within this shell is a carbid crate or basket 5, which may be constructed of foraminous material or perforated sheet metal, and to the upper edge of the open end of said vessel is secured a reinforcing metallic rim 6. This rim 6 is secured within the upper part of the generator-shell to support the carbid crate or basket 5 therein at a suitable elevation above the lower head or bottom of the shell, and a chamber is thus provided below the carbid-crate into which the slacked carbid or refuse may drop, thus eliminating the refuse from the active carbid and permitting the spent carbid to be removed through the hand-hole 2 in the lower part of the generator-shell. The charge of carbid in the crate or basket may be easily renewed through the hand-hole 3 in the upper head of the generator.

7 designates a water-inlet pipe which is arranged in a horizontal position across the generator and the crate or basket 5, the ends of said pipe 7 protruding beyond the shell of the generator. A vertical branch pipe 8 depends from the middle portion of the horizontal pipe 7, so as to occupy a central position in the generator and the crate or basket 5, and to the lower end of this vertical branch are applied the distributer devices by which the water is directed to the carbid contained within the crate 5. One element of the distributer consists of a cone 9, which is secured to the lower end of the branch pipe 8 for the latter to discharge the water through the cone, and within this cone is a horizontal bridge 10, which is situated at a suitable distance above the lower open end of said conical distributer. A dished deflector 11 is provided with a stem 12, secured to the bridge 10 in a suitable way, and this deflector is thus supported within the enlarged open end of the

conical distributer to have its edge free from contact or engagement with the distributer and provide for the free flow of water from the pipes 7 and 8 to the carbid contained in the crate or basket. The distributer devices are supported by the branch pipe 8, close to the bottom of the basket 5, and the pipes 7 8, and the distributing devices are arranged within the calcium carbid which is packed or deposited in the basket, so as to surround said parts.

To one of the protruding ends of the horizontal pipe 7 is secured an inlet-valve shell 13, within which is contained a vertically-movable valve 14, adapted to find a seat within the shell. Said valve has a stem 15, which passes through the upper end of the shell 13, and the protruding end of the stem is connected to a lever 16, arranged exteriorly of the generator and suitably fulcrumed thereon. To one end of this lever is pivoted a vertical link 17, the upper end of which is pivoted to a trip-lever 18. On the head of the traveling bell forming one element of the gasometer is secured as hort standard or post 19, to which is fulcrumed the trip-lever 18, and a balance-weight 20 is attached to this trip-lever to counterpoise the weight of the lever 16 and the connecting-link 17.

Water is supplied to the generator from an elevated tank 21, suitably supported adjacent to the apparatus, and from the bottom of this tank leads a pipe or flexible tube 22, which has its lower end attached in a suitable way to the shell 13 of the water-inlet valve. The water-supply from the tank 21 to the valve 13 may be entirely cut off by a controlling-valve 23, which is arranged within the tank. This valve operates in connection with the shell 24, attached to the tank 21, and having a seat 25 to accommodate the controlling-valve 23, and the stem 26 of this valve is provided with an arm 27, and it is equipped with a spring 28, arranged to act against the valve-stem for the purpose of lifting the valve 23 free from the seat 25 of the shell 24. The valve may be closed by the action of an armature 30 under the attraction of an electromagnet 29, which is included in an electrical circuit 31. To the protruding end of the horizontal water-pipe 7, opposite to the inlet-valve 13, is attached a casing 40, and on this casing are secured the binding-posts 32 33, to which the conductors of the circuit 31 are respectively attached. This electric circuit is energized by a battery 34, and it includes a signal-bell 35. The circuit is normally open; but it is designed to be closed automatically when the water accumulates in the generator to such an extent as to flood the carbid therein or the vent-opening in the distributer devices becomes choked or clogged to such an extent as to preclude the egress of water from the pipe 8 into the carbid crate or basket. This end is attained by the employment of a floatable circuit-closer 36, which is housed within the casing 40. One terminal of electric circuit is in the form of a tube 37, connected electrically with the binding-post 32 and provided at its lower end with a guide-cage 38, within which the circuit-closer 36 is confined. The other terminal of the electric circuit is formed by a stem 39, arranged within the tube 37 and electrically connected with the binding-post 33. The floatable circuit-closer is equipped with a metallic contact-plate, and the foot or lower extremity of the stem 39 terminates at the lower open end of the tube 37, so that on the elevation of the circuit-closer 36 its metallic plate will make contact with the foot of the tube 37 and the foot of the stem 39, thereby closing the electric circuit 31. The battery now energizes the circuit to actuate the signal 35 and move the armature of the magnet 29 to close the tank-valve 23, thereby shutting off the continued flow of water through the pipe or tube 22 to the inlet-valve 13.

The gasometer which I employ has a tank 41, which is constructed or equipped with an inner shell 43. This shell is flanged at its lower edge, as at 44, and united to the tank 41 to form a liquid-seal chamber 46. The upper end of the tank-shell 43 is closed by a head 45, which, however, does not extend across the chamber 46. The chamber between the tank 41 and its inner shell 43 is designed to be filled with liquid substantially to the level of the head 45, and in said liquid is immersed the traveling bell 47, which is designed to contain the gas which flows from the generator. It will be observed that the space within the inner tank-shell 43 and the head 45 thereof is not filled with liquid, and the only liquid employed in the tank is the comparatively-thin body confined between the tank 41 and its inner shell 43. I am thus able to dispense with the employment of a large volume of liquid, which, besides increasing the weight of the apparatus, has a tendency to splash over and flow down the outside of the tank. This is highly objectionable when the apparatus is used in portable form—as, for example, on a railway-car or other movable vehicle.

The gas is conveyed from the generator to the gasometer by a two-part pipe 48. One section of this pipe is attached to the head of the generator, and the sections of the pipe are united detachably together by a coupling or union 49. From the upper end of the pipe 48 a pipe 50 leads in a downward direction alongside of the gasometer, and this pipe 50 discharges to a horizontal branch 51, arranged in the bottom of the tank 41. From the horizontal branch pipe 51 a vertical branch pipe 52 extends through the chamber of the shell 43 and the head 45 thereof, so as to discharge the gas into the movable bell. A supply-pipe 53 is coupled to the horizontal branch pipe 51, and the pipes 50 53 serve as guides to the rollers 47^a, which are supported by the traveling gas-bell 47, said rollers and pipes serving to direct the gas-bell in its vertical travel within the seal contained in the chamber 46.

55 designates a horizontal gas-pipe which is connected with the pipe 48 and the pipe 53. Back pressure of gas from the gasometer to the generator is overcome by the provision of a check-valve 56 in the pipe 48, and this check-valve is arranged to open in a direction to permit the gas to pass freely from the generator to the pipe 50.

I have also provided my apparatus with an automatic vent-valve 59, arranged to be opened by the upward movement of the gasometer-bell in the event of an overproduction of gas and storage thereof in the gasometer. This vent-valve operates in a casing 59ª, which communicates with the horizontal branch pipe 55, and the stem 60 of this valve is provided at its lower end with a head 61, that lies in the path of the gasometer-bell. The vent-valve is normally closed by a spring 62, and from the casing 59 extends a vent-pipe 63, which may lead to the outside of a building. A drain-cock 64 is connected to the gasometer-tank to communicate with the chamber 46, and by opening this cock the liquid contained within said chamber may be drawn off preliminary to cleaning the chamber.

To charge the generator with fresh carbid, the coupling 49 may be operated to disconnect the two parts of the pipe 48, the inlet-valve 14 may be disconnected from the lever 16, and the pipe or tube 22 detached from the valve-shell 13. The generator may now be carried out of doors and then opened, so that the gas contained therein may escape into the outside atmosphere and not fill the room or compartment with a noxious odor. The residue may be removed from the crate or basket, the latter cleansed and dried, and a fresh charge of carbid placed in said crate or basket. The generator may now be connected again to the pipes 22 48 and the valve 14 connected to the lever 16. A descent of the gasometer-bell operates the lever 16 to open the valve 13 and permit a limited quantity of water to pass from the pipe or tube 22 through the pipes 7 8 and thence to the distributer. As the water attacks the carbid acetylene gas is at once generated by the decomposition of the water and carbid, and the gas as it traverses the active carbid is dehydrated by the affinity of the carbid for the moisture contained in the gas. Should the distributer devices become clogged or the water rise in the pipe 7 and the casing 40 to raise the float of the circuit-closer for its plate to make contact with the feet of the tube 37 and stem 39, the circuit 31 will be closed and energized by the battery 34, thereby actuating the signal and closing the tank-valve 23 to cut off the continued flow of water from the tank to the inlet-valve 14, which is controlled automatically by the rising-and-falling play of the gasometer-bell.

Changes may be made in the form of some of the parts, while their essential features are retained and the spirit of the invention embodied. Hence I do not desire to be limited to the precise form of all the forms as shown, reserving the right to vary therefrom.

Having thus described the invention, what I claim is—

1. In an acetylene-gas apparatus, the combination with a generator, and a water-supply therefor, of a water-inlet pipe in communication with the generator and said water-supply, a controlling-valve associated with said pipe and automatically operated by the movement of the gasometer-bell, a separate valve for the water-supply, and means for automatically closing said separate valve by a change of water-level within the generator, substantially as set forth.

2. In an acetylene-gas apparatus, a generator consisting of a shell, a carbid crate or basket supported within the shell, a water-inlet pipe arranged transversely of the shell and above the bottom of the crate or basket, a vertical branch pipe communicating with the inlet-pipe, a conical distributer supported by said vertical pipe, and a deflector within the distributer, said distributer and deflector arranged close to the bottom of the crate or basket, substantially as described.

3. The combination with a gasometer-bell, a generator and a water-supply for the latter, of water-inlet devices to the generator, a controlling-valve connected to said water-inlet devices, a lever attached to said valve, a counterweighted lever fulcrumed on the gasometer-bell to travel therewith, a link connecting said levers and means for automatically cutting off the supply of water from the water-inlet devices by a change of water-level within the generator, substantially as described.

4. In an acetylene-gas apparatus, a generator having a transverse supply-pipe provided with means for distributing water upon carbid contained within said generator, an elevated tank for supplying water to said pipe, an electric circuit including a tank-valve, and a floatable circuit-closer contained within a part of said pipe and arranged to close the electric circuit, substantially as described.

5. In an acetylene-gas apparatus, a generator provided with a transverse water-pipe having means for distributing water to carbid within the generator, a trip-controlled valve connected to said pipe, a casing also connected to the pipe and having the circuit-terminals and a floatable circuit-closer, a tank to supply water to the trip-controlled valve, a valve in said tank, and a circuit which controls the valve and is connected with its terminals with which the circuit-closer is adapted to make contact, substantially as described.

6. In an apparatus for generating acetylene gas, the combination with a generator and a water-supply therefor, of an electric circuit, a valve for said water-supply and controlled by translating devices in said circuit, and means to automatically close the circuit by a change of water-level within the generator, substantially as described.

7. In an apparatus for generating acety-

lene gas, the combination with a generator and a source of water-supply therefor, of an electric circuit having its terminals at a suitable elevation above the active carbid within said generator, a valve in the water-supply and controlled by translating devices in said circuit, and a floatable circuit-closer operated by a change of water-level within the generator to make electrical connection with contacts or terminals of said circuit, substantially as described.

8. In an apparatus for generating acetylene gas, the combination with a generator and a source of water-supply therefor, of an electric circuit having its terminals in communication with the generator-chamber, a floatable circuit-closer operated by a change of water-level in the generator, means for confining said floatable circuit-closer in active relation to the contacts or terminals of said circuit, and a valve in the water-supply controlled by translating devices in said circuit, substantially as described.

9. In an apparatus for generating acetylene gas, the combination with a generator, and a source of water-supply therefor, of an electric circuit, a fixed tube forming one terminal of the electric circuit and in communication with the generator-chamber, a stem constituting the other terminal of the circuit, a floatable circuit-closer operated by the change of water-level within the generator, means on one of said fixed parts for confining the circuit-closer in active relation to the circuit-terminals, and a valve in the water-supply controlled by suitable translating devices in the circuit, substantially as described.

10. In an apparatus for generating acetylene gas, the combination with a generator, and a source of water-supply therefor, of an electric circuit including translating devices, a tube within said generator and provided with a flared foot forming one terminal of the circuit, a stem forming the other terminal of said circuit, a cage attached to the foot of the tube, a floatable circuit-closer confined loosely within the cage and provided with a metallic contact adapted to make electrical connection with the terminals of the circuit, and a valve in the water-supply controlled by translating devices of the circuit, substantially as described.

11. In an acetylene-gas apparatus, the combination with a vertically-movable bell, of a generator, an intermittently-actuated inlet-valve to said generator, an electric circuit having its terminals in communication with the generator, a supply-pipe communicating with the inlet-valve, and a valve in the source of water-supply to said pipe and controlled by translating devices in said circuit, substantially as described.

12. In an acetylene-gas apparatus, the combination with a gasometer-bell and a generator, of an electric circuit having its terminals communicating with said generator, a source of water-supply, an inlet-valve communicating with the generator and operatively connected with the gasometer-bell, a normally-open outlet-valve in the source of water-supply and arranged to permit the flow of water to the inlet-valve of the generator, and a floatable circuit-closer within the generator for closing the electric circuit, substantially as described.

13. In an acetylene-gas apparatus, a generator provided with a water-supply pipe, a shell or chamber communicating with said pipe and having a floatable circuit-closer, and an inlet-valve communicating with the supply-pipe, in combination with a floatable bell having operative connections with the inlet-valve to intermittently actuate the latter, a source of water-supply to the inlet-valve, and an electric circuit connected with the shell or chamber in active relation to the floatable circuit-closer and embracing a valve which controls the flow of water to the inlet-valve, substantially as described.

14. In an acetylene-gas apparatus, a generator having a carbid-chamber, a supply-pipe within said carbid-chamber and provided with a distributer which is adapted to be surrounded by the carbid within the chamber, a controlling-valve associated with the supply-pipe and automatically operated by the movement of the gasometer-bell, and means also associated with the supply-pipe for automatically cutting off the supply of water upon a change of water-level within the generator, substantially as set forth.

15. In an acetylene-gas apparatus, the combination with a generator and a floatable gas-bell, of an inlet-valve communicating with the generator, operative connections between said bell and the inlet-valve to actuate the latter intermittently, a chamber communicating with the generator substantially above the level of active carbid within the same and containing a floatable circuit-closer, a source of water-supply to the inlet-valve, a controlling-valve in the water-supply, and an electric circuit having translating devices for said controlling-valve, substantially as described.

16. In an acetylene-gas apparatus, the combination with a generator, and a source of water-supply, of an electric circuit having its terminals in communication with said generator-chamber and including a signal mechanism, a floatable circuit-closer in active relation to the circuit-terminals, and a controlling-valve in the source of water-supply to the generator and actuated by translating devices in the circuit, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HANS PETER NIELSEN.

Witnesses:
A. S. LEVY,
H. T. MORRIS.