No. 685,260. Patented Oct. 29, 1901.

# G. H. COOK.

## ACETYLENE GAS GENERATOR.

(Application filed Dec. 27, 1900.)

(No Model.)

Fig. 1.

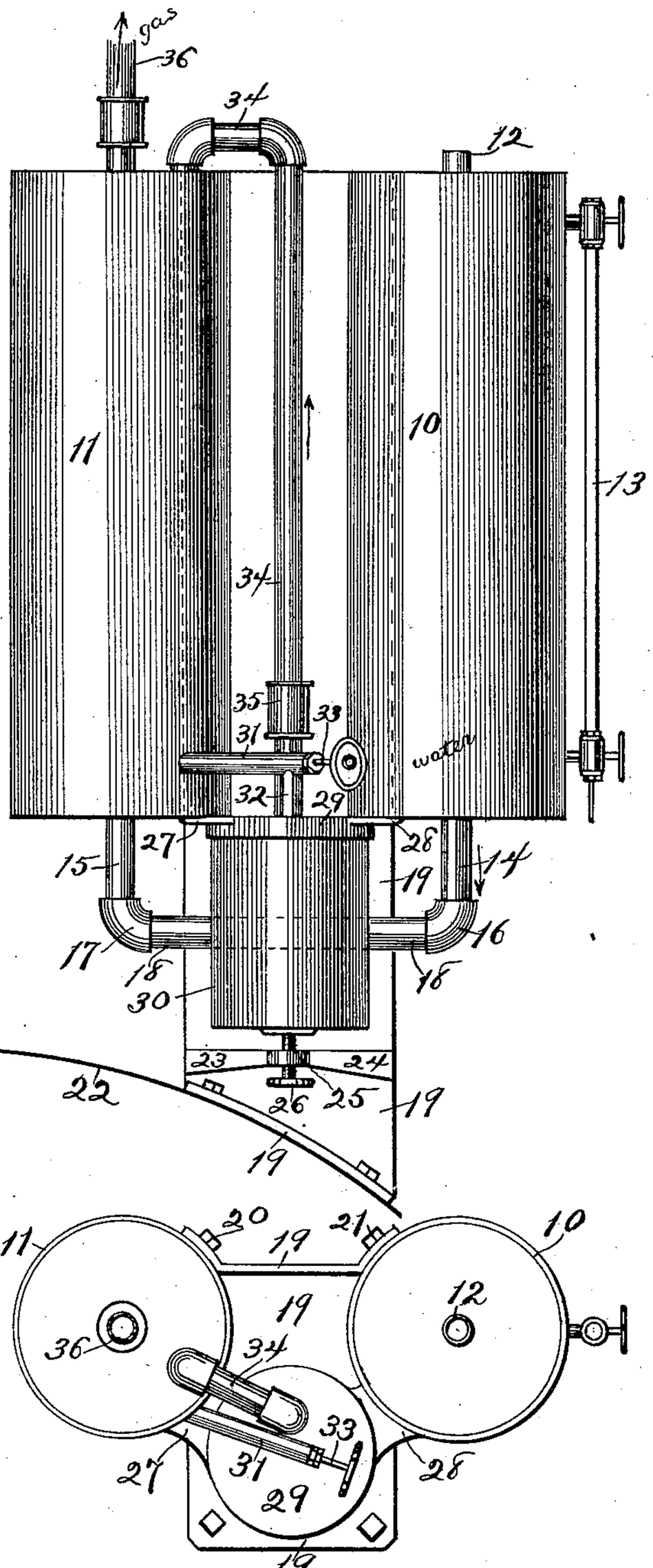


Fig. 2.




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# UNITED STATES PATENT OFFICE.

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## ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 685,260, dated October 29, 1901.

Application filed December 27, 1900. Serial No. 41,229. (No model.)

*To all whom it may concern:*

Be it known that I, GILES H. COOK, a citizen of the United States of America, and a resident of Des Moines, Polk county, Iowa, have invented a new and useful Acetylene-Gas Generator, of which the following is a specification.

The object of this invention is to provide means for adapting acetylene-gas generators for use on locomotives, automobiles, carriages, naval vessels, aerial vessels, and the like, in which the generator is carried by the vehicle or vessel and may be subjected to violent and turbulent motion, vibration, or oscillation.

This invention consists of an acetylene-gas generator comprising an air-tight cylinder or gasometer, a cylinder adjacent to the gasometer and open to atmospheric pressure, water communication between the bottom of the gasometer and the open cylinder, arranged to convey water back and forth between the cylinders and also to serve as a water-trap and prevent the waste escape of gas from the gasometer, a carbid vessel, water communication between the gasometer and the carbid-holder, and gas communication between the carbid vessel and the gasometer.

My invention consists, further, in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is an elevation of the complete generator, together with a portion of a service-pipe leading from the gasometer. Fig. 2 is a plan of the apparatus shown in Fig. 1.

This apparatus belongs to a type of acetylene-gas generators employing a gasometer partially filled with water and arranged to feed water to a carbid vessel as it is desired for use in generating gas, gas communication between the carbid vessel and the gasometer, a service-pipe leading from the gasometer, a water-tank open to atmospheric pressure, and water communication between the water-tank and gasometer. Prior to my invention it has been the practice in this type of generators to connect one end of the water-pipe with the water-tank at some point and connect the other end of said pipe with the gasometer at a point above the horizontal plane of the bottom of said gasometer. When a machine of this type is applied to a locomotive or in any other place where it is subjected to violent and turbulent motion, vibration, or oscillation, there is a liability of the water splashing up from the bottom of the air-tight cylinder or gasometer into the pipe leading to the carbid-holder and there is a considerable loss of gas due to this cause even when the lights are not burning. To this fault, insufficiency or inefficiency of prior devices of this type, may be added the further disadvantage of the waste of the superabundant supply of gas thus generated through undesirable leakage of water from the gasometer to the carbid-holder to the atmosphere, whereas in my apparatus any surplus of gas that may be generated is conserved and retained in place of a quantity of water ejected from the gasometer to give it room, and at the same time the water communication between the gasometer and water-tank serves as a water-trap to prevent the escape of gas to the atmosphere even when the gasometer is entirely emptied of water.

In the construction of the apparatus as shown the numeral 10 designates a water tank or cylinder, and 11 an air-tight cylinder or gasometer adjacent thereto. I prefer to make the water-tank and gasometer of similar size and locate them in the same horizontal plane for convenience in mounting within a locomotive-cab or other restricted place and to avoid an undue and undesirable increase of pressure in the gasometer upon a recession of water therefrom to the tank. The water-tank 10 is provided with a port or pipe 12, affording free communication with the atmosphere and providing that the contents of the water-tank will be subject to atmospheric pressure at all times. On the water-tank 10 and communicating therewith in an ordinary manner I mount a sight-glass 13, of ordinary form and construction. A water-pipe affords communication between the bottoms of the water-tank and gasometer and may be constructed of a pipe 14, open at both ends and communicating through and leading downwardly from the central portion of the bottom of the water-tank 10, a pipe 15, communicating through and leading downwardly from the central portion of the bottom of the gasometer 11, el-

bows 16 17 on the lower ends of said pipe, and a connecting-pipe 18, open at both ends and affording communication between the elbows. The pipes 14 15 are connected with the water-tank, gasometer, and elbows by tight joints, and the elbows are connected with the pipe 18 by tight joints, thus providing against leakage or waste, either of gas or water, through or below the bottoms of the cylinders. A frame 19 is provided and composed of a vertical member, to which the cylinders 10 11 are secured by screws 20 21, and a base member arranged and shaped for mounting on a locomotive-boiler, (indicated by the curved line 22.) The frame 19 is further provided with arms 23 24, projecting horizontally from the vertical member thereof and joined at their outer ends, forming a bearing 25. A vertical screw-seat is formed in the bearing 25, and a hand-screw 26 is mounted therein. Arms 27 28 project horizontally from the bottoms of the cylinders 10 11 and are joined to or formed with a cap or cover-plate 29, preferably of circular form in plan view and provided with a downwardly-extending annular peripheral flange. A carbid-holder 30 is mounted with the center of its bottom resting on and supported by the hand-screw 26, and the upper edge of said holder enters and is confined by a flange of the cover 29. This carbid-holder, frame, and cover are illustrated and described in detail in my application for Letters Patent of the United States filed July 12, 1900, Serial No. 23,416. A water-pipe 31 communicates through and leads horizontally from the side of the gasometer 11 immediately above the bottom of the gasometer, and a pipe 32 affords communication between the outer end portion of the pipe 31 through the central portion of the cap or cover 29 of the carbid-holder 30. A needle-valve 33 controls the communication between the pipes 31 and 32 and is arranged for manual adjustment. It will be observed that the carbid-holder 30 is located wholly below the bottoms of the water-tank and gasometer. This location of the carbid-holder is of material importance to the operation of the machine, in that it permits the location of the water-pipe 31 in the lowermost portion of the gasometer, and thereby provides a maximum space for gas above the water-level in the gasometer, (or pipe 15.) In use it is desirable to maintain a considerable quantity of gas under pressure, as only under pressure can a flame be produced that is of a clear, brilliant, and white quality. Inasmuch as I utilize all of the space above the water-level in the gasometer as a reservoir for gas, the water-level receding from the gasometer to the pipe 15 at times, it is essential to bring the water-level in the pipe as near as possible to the level of the water-pipe 31 to the attainment of practically instantaneous responsive action of the water under variations of the gas-pressure arising from the exhaustion of the gas at the burner. In other words, while I desire that the water-level shall recede into the pipe 15 to avoid splashing through the pipe 31, yet it is very desirable that the water-level may rise and pass through said pipe 31 to the generation of gas in the carbid-holder instantly upon a reduction of the gas-pressure, to the end that the water-head may automatically control the reëstablishment and maintenance of the pressure of the gas. A gas-pipe 34 communicates through and leads upwardly from the cap or cover 29 of the carbid-holder 30 and at its upper end enters and communicates through the top of the gasometer 11. A check-valve chamber 35 is provided in the gas-pipe 34, and it is the function thereof to contain a valve of any desired form that will prevent backflow of gas to the carbid-holder. A service-pipe 36 communicates through and leads from the top of the gasometer 11 and affords communication between said gasometer and the burner or burners where the gas is consumed, whether it be in a locomotive headlight, binnacle, search-light, or other illuminating device.

In the practical use of this apparatus in locomotive-headlighting the cylinders and carbid-holder are mounted on the frame 19, the frame 19 is mounted on the boiler, and the service-pipe is connected to the burners in the headlight-case at the front end of the locomotive. Water is introduced through the port 12 to the water-tank 10 and flows through the communicating pipe into the gasometer 11 to a level at sufficient height to permit the water to flow through the pipe 31. The carbid-holder 30 is supplied with carbid and positioned, as shown in the drawings, by manual replacement on the screw 26 and beneath the cover 29. The needle-valve 33 is operated manually to permit water to flow through the pipe 31 and the pipe 32 upon the carbid in the holder 30. Gas is generated in the carbid-holder and discharged through the pipe 34 into the gasometer. The accumulation of gas in the gasometer increases the pressure upon the water therein and depresses the level of the water to a plane below the mouth of the pipe 31, the depression of the water-level being permitted by the recession of the water through the communicating pipe into the tank 10. As gas is drawn through the service-pipe 36 for use at the burner the water-level in the gasometer 11 may rise and discharge some water through the pipe 31 and pipe 32 upon the carbid in the holder 30. The resupply of water to the carbid-holder causes the generation of a further supply of gas, which in turn is discharged into the gasometer and again depresses the level of the water therein. While a locomotive on which this apparatus is used is in motion gas may be generated and accumulate in the gasometer so long as any water is retained in the said gasometer by reason of the splashing of water into and through the pipe 31; but as soon as the level of the water falls below the upper surface of the bottom of the gasome-

tor such splashing and leakage into and through the pipe 31 will cease and further generation of gas is stopped. Since the generation of gas is stopped by cutting off the supply of water automatically, it is impossible for an undue and unsafe pressure to accumulate in the gasometer even though the burners are closed and gas not being used. At the same time sufficient water is retained in the pipes 14, 15, and 18 and the elbows 16 17 to serve as a trap and prevent the escape of gas downwardly from the gasometer to the tank 10 and thence to the atmosphere. Thus is the superabundant supply or surplus of gas conserved and retained for use. Under ordinary circumstances when a locomotive is still or moving without material vibration the water-level in the gasometer will remain approximately stationary adjacent to the mouth of the pipe 31 and vary slightly from time to time as gas is used and the generation of a further supply is necessary.

By locating the water-tank and gasometer in the same horizontal plane or in such a manner that the bottom of the water-tank is not above the level of the bottom of the gasometer I provide against materially increased pressure under and on account of the recession of water into the tank from the gasometer.

I claim as my invention—

1. In an acetylene-gas generator, a cylinder open to atmospheric pressure, an air-tight cylinder mating therewith, both of which cylinders have their bottoms in approximately the same horizontal plane, a pipe depending from the bottom of each cylinder, a pipe connecting the lower ends of the depending pipes, a carbid vessel located wholly below the bottoms of said cylinders, water communication between the lower part of the air-tight cylinder and the carbid vessel, gas communication between the carbid vessel and air-tight cylinder, and a service-pipe leading from the air-tight cylinder.

2. In an acetylene-gas generator for supplying gas to a locomotive-headlight, two cooperating cylinders whose bottoms are in the same plane, one of which cylinders is open to atmospheric pressure, the other air-tight and having a carbid vessel connected therewith, said carbid vessel being located wholly below the bottoms of said cylinders, a pipe connecting the bottoms of said cylinders and a frame shaped and arranged for mounting on a locomotive-boiler, on which frame said generator is carried.

3. In an acetylene-gas generator for supplying gas to a locomotive-headlight, two cylinders of equal size, whose bottoms are in the same plane, one of which cylinders is open to atmospheric pressure, the other air-tight and having a carbid vessel connected therewith by pipes, said carbid vessel being located wholly below the bottoms of said cylinders, a needle-valve in one of said pipes to control the flow of water into said carbid vessel, a pipe connecting the bottoms of said cylinders, and suitable means for mounting said generator on a locomotive-boiler.

4. In an acetylene-gas generator for supplying gas to a locomotive-headlight, two cylinders of equal size whose bottoms are in the same plane, one of which cylinders is open to atmospheric pressure, the other air-tight, a pipe connecting the bottoms of said cylinders and forming a water-trap, pipes connecting said air-tight cylinder to and communicating through a flanged disk rigidly attached to the bottoms of the two cylinders, suitable means for mounting said parts to a locomotive-boiler, a bracket extending therefrom having a screw-threaded aperture, a screw-threaded bolt mounted therein adapted to support a carbid vessel, open at the top, and hold it against said flanged plate.

5. In an acetylene-gas generator, a frame formed with a curved plate shaped for attachment to a locomotive-boiler, a standard rising from said plate, a bracket extending horizontally from the standard above the plate, which bracket is formed with a screw-threaded aperture having a hand-screw therein, in combination with a carbid-holder mounted on said screw, cylinders mounted on said standard, a cover for the carbid-holder integral with the bottoms of the cylinders, and connecting and service pipes in said cylinders and carbid-holder.

Signed by me at Des Moines, Iowa, this 17th day of December, 1900.

GILES H. COOK.

Witnesses:
N. W. WINTERS,
S. C. SWEET.