

No. 766,983.

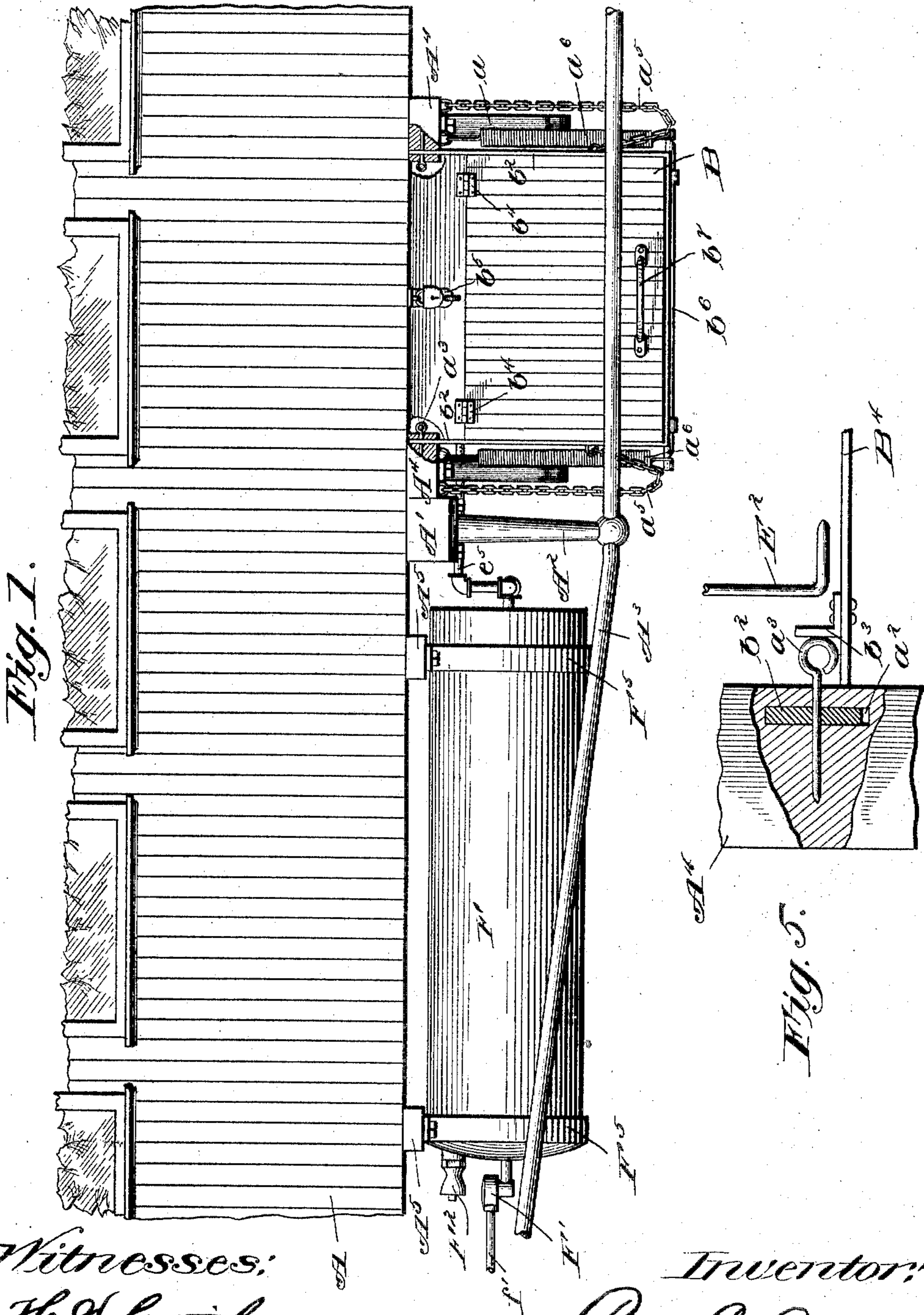
PATENTED AUG. 9, 1904.

P. C. AVERY.
ACETYLENE GAS GENERATOR.

APPLICATION FILED JULY 27, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
H. D. Gaither
Geo. L. Wilkinson

Inventor:
Percy C. Avery
by Walter J. Chamberlain
his Attorney.

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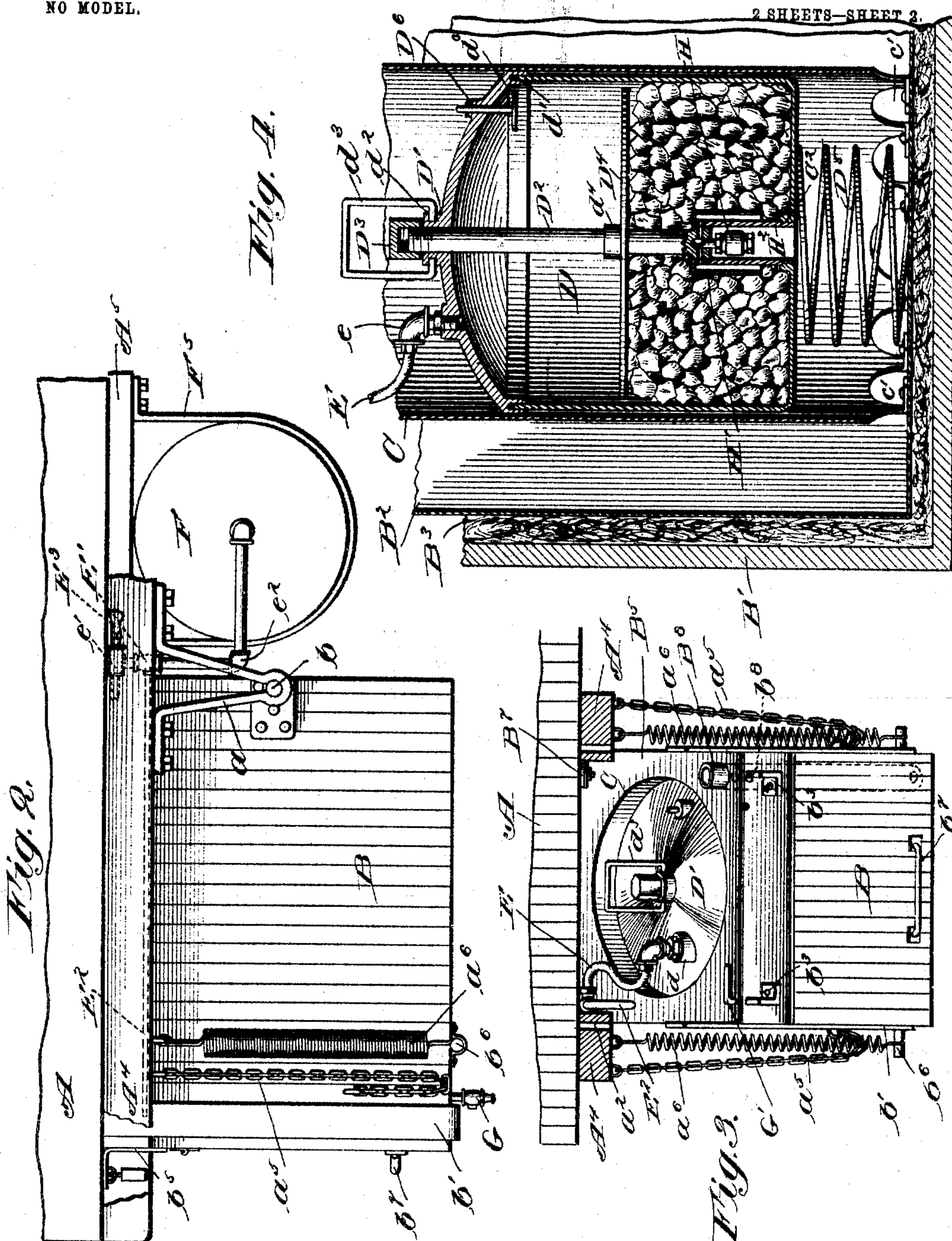
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UNITED STATES PATENT OFFICE.

PERCY C. AVERY, OF CHICAGO, ILLINOIS.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 766,983, dated August 9, 1904.

Application filed July 27, 1901. Serial No. 69,989. (No model.)

To all whom it may concern:

Be it known that I, PERCY C. AVERY, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Apparatus for Generating Acetylene Gas on Railroad-Coaches; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to apparatus for generating acetylene gas, and more particularly to apparatus for generating such gas on a railroad-coach.

The object of my invention is to provide an apparatus of the class referred to the various parts of which are securely and conveniently supported by a car, so that the generator may be readily accessible for recharging.

My invention is hereinafter disclosed as consisting, essentially, in a generator pivotally suspended beneath a car, a condenser communicating with the generator for receiving the gas, and a delivery-pipe connected to the condenser through a reducing-valve and leading through suitable conduits to the channels of the car. The generator comprises a closed water-tank, within which is located a cylinder open at its top and having passageways at its bottom communicating with the water-tank. The cylinder serves as a guide for the cartridge or receptacle containing the carbide to which the water is admitted through a check-valve, whereby the admission of water to the cartridge is automatically controlled by the pressure of the generated gas.

My invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a view in elevation of a portion of a railway-coach having my improved apparatus for generating acetylene gas supported beneath the same; Fig. 2, a view in elevation looking from the right in Fig. 1

and showing so much of a railway-coach as is necessary to illustrate the connection therewith of my invention; Fig. 3, a perspective view showing the generator swung downwardly at one side to permit access thereto; Fig. 4, a vertical sectional view of the cartridge, its surrounding guide-cylinder, and a portion of the water-tank within which the guide-cylinder is secured; Fig. 5, a detail view showing the means for detachably securing beneath the car the end of the generator opposite to its pivotal support.

Similar reference characters indicate the same parts in the several figures of the drawings.

Reference-letter A indicates so much of a railway-coach as is necessary to illustrate the connection therewith of my apparatus for generating acetylene gas.

A' indicates the usual transverse timber beneath the car, which supports the queen-post A², forming the strut of the truss A³.

A⁴ refers to timbers secured beneath the car, from which the generator is suspended.

a a indicate brackets depending from the timbers A⁴ A⁴ and having bearings within which are journaled studs b. These studs are secured to opposite sides of the generator B, near the rear thereof, in any suitable manner—as, for instance, by plates, as shown in Fig. 2. A strap b' passes beneath the generator B, at the front thereof, and extends upwardly at each side, the ends b² projecting above the generator and having perforations through which are adapted to pass pins a³. The timbers A⁴ are provided with recesses a², within which the ends b² of the strap b' extend when the generator is in its normal position. Perforations registering with the holes through the ends of the strap are provided at either side of the recesses a², through which the pins a³ pass to removably support the front of the generator in close proximity to the under surface of the car.

B⁴ indicates a door extending across the upper end of the front of the generator to which it is hinged, as shown at b⁴. The door B⁴ is removably secured to the under surface of the car by any suitable means (indicated at

b^5)—such, for instance, as a hasp and staple, through the latter of which a padlock may pass.

Lugs b^3 project inwardly from the door B^4 and when such door is closed serve to prevent the pins a^3 from becoming disengaged from the ends b^2 of the strap b' . When the door B^4 is lowered, the lugs b^3 do not prevent the removal of the pins a^3 when it is desired to swing the generator down.

Beneath the generator B is located a rod b^6 , the ends of which project beyond the sides of the generator and have notches within which are seated the ends of counterbalancing springs a^6 , the upper ends of such springs being secured to the timbers A^4 by any desired fastening means. Chains a^5 may also be provided at each side of the generator to limit the downward movement thereof, such chains being secured at their ends to the timbers A^4 and to the sides of the generator, respectively. A handle b^7 may be secured to the front of the generator to afford a convenient means for elevating and depressing the same.

The generator B comprises an outer sheathing B' , within which is a metallic lining B^2 , which may be removable, constituting the water-tank. Suitable packing material B^3 is preferably inserted between the sheathing B' and the water-tank B^2 . Located within the water-tank is a cylinder C, having openings c' at its bottom and foot extensions between such openings through which rivets or other fastening devices pass to secure the cylinder to the bottom of the water-tank B^2 . The upper end of the cylinder C is secured, preferably by a water-tight joint, to the top B^5 of the water-tank.

The cylinder C serves as a guide for the cartridge or receptacle D for the carbid. A spring D^5 is located at the bottom of the cylinder C and serves as a counterbalancing support for the cartridge. The resisting capacity of the spring when expanded is substantially equal to the initial weight of the carbid. The cover D' of the cartridge is preferably provided with a depending flange which has a groove adapted to fit over the upper end of the cartridge, packing being preferably located within the groove, so that a tight joint will be formed between the cartridge and its cover. A boss d^2 , preferably located concentrically upon the outer surface of the cover, is provided with an opening through which passes the upper screw-threaded end of a rod D^2 . A screw-threaded cap or blind nut tightly engages the end of the rod D^2 which projects above the boss d^2 . The lower end of the rod D^2 has secured thereto, preferably by brazing, a tubular extension C^2 , the lower end of which is screw-threaded exteriorly to engage an interiorly-threaded collar surrounding an opening in the bottom

of the cartridge. Passages are provided through the lower end of the rod and its tubular projection, which communicate with an opening in the lower end of the rod in which is secured a coupling the other end of which supports a check-valve H, the check-valve being located within a casing, which in turn is located within the tubular extension C^2 . A cylindrical wall surrounds registering openings in the rod and tubular extension to prevent such openings from being choked up by means of the carbid.

A disk D^4 , having a guiding-collar d^4 , the latter of a diameter slightly greater than the rod D^2 and the former of a diameter slightly less than the interior diameter of the cartridge, rests upon the carbid and prevents the same when it expands from entering and choking up the coupling through the cover D' , communicating with the delivery-pipe E.

A rod D^6 passes through a gland or gas-tight packing in a boss provided on the cover D' of the cartridge and is prevented from falling within the latter by any suitable means—such for instance, as a cross-pin. An enlarged head d^6 is secured to the end of the rod D^6 within the cartridge and is engaged by the disk D^4 when the latter is elevated by the expansion of the carbid, whereby the rod D^6 is projected above the cover of the cartridge to indicate that the generator needs recharging. A handle d^3 is provided for conveniently inserting and removing the cartridge from the generator, in the present instance such handle being shown as supported by means of its ends engaging sockets formed in the vertical sides of the boss d^2 .

A drain-cock G is preferably provided at the bottom of the water-tank, as indicated in Fig. 2, such drain-cock being provided with an operating-rod G' , which extends vertically through the water-tank and terminates in a handle above the top thereof, so that the drain-cock may be conveniently operated.

A pipe B^8 extends through the water-tank and is provided with a perforation b^8 there-through at a point below the top of the tank, so that when the generator is swung downwardly, as shown in Fig. 3, and water is allowed to flow into the reservoir when the water-level reaches the opening b^8 it will flow through the pipe B^8 and indicate that a sufficient quantity of water has been placed within the tank. The upper end of the pipe B^8 engages with a coupling B^7 , located on the under surface of the car in position to be engaged by the pipe B^8 when the generator is in its normal position. The coupling B^7 communicates with a steam-pipe, so that steam will pass through the pipe B^8 , and thereby prevent the water in the tank from freezing when the generator is not in action. Any desired number of pipes or flues B^8 may be provided.

A valve E' is located below the elbow e' , and is provided with an operating-rod E^2 , which extends from the rear to the front of the generator and terminates in a right-angle handle.

5 The handle E^2 projects downwardly, as shown in Fig. 3, when the valve E' is closed and in such position prevents the generator from being lifted to its normal position by engaging the upper edge of the front thereof. The handle of the valve must therefore be turned into a horizontal position, which opens the valve E' , before the generator can be lifted to its normal position.

A condenser F is suspended beneath the car in any desired manner—as, for instance, by straps F^5 passing beneath the same at either end thereof and being secured to the cross-timbers A^5 . A suitable conduit e^5 , provided with the necessary elbow-joints, extends from the end of the condenser F to the rear of the generator, where it unites with an elbow e^2 and then continues upwardly to a T-coupling e' , at which point a flexible pipe E , preferably made of steel, leads to an elbow e , secured to a screw-threaded coupling located in a boss in the cover of the cartridge D' . A safety-valve E^3 may be connected with the end of the T-coupling opposite the pipe E .

A delivery-pipe f' communicates with the condenser F through a reducing-valve F' . The delivery-pipe communicates with the chandeliers of the coach by any desired connections. A safety-valve F^2 is preferably provided in the condenser F .

35 The operation of my invention is as follows: The door B^4 is unlocked and swung downwardly, thereby affording a space through which one may insert his hand to press upon the top of the cartridge to determine whether it needs recharging. If the carbid has increased in weight through the absorption of water sufficiently to compress its supporting-spring B^5 , it cannot be depressed when downward pressure is applied to the cover. The elevation of the rod or other indicating device D^6 would also give notification that recharging of the cartridge was necessary. The pins a^3 may then be removed, thereby permitting the generator B to swing downwardly, owing to the pivotal engagement between the studs $b b$ and the depending brackets $a a$. The handle E^2 is then turned so as to disconnect the generator from the condenser and the flexible pipe E uncoupled from the cartridge, thereby permitting the latter to be lifted by grasping the handle e^3 out of the cylinder C . A cartridge with a fresh supply of carbid may then be inserted and the flexible coupling E united thereto. The gas is generated owing to the carbid absorbing the water which is admitted thereto from the surrounding tank through the openings e' at the bottom of the cylinder C , thence through the check-valve H , and through the registering-openings in the

rod D^2 and tubular extension thereon. The pressure of the generated gas automatically cuts off the supply of water through the check-valve H . The carbid as it absorbs the water increases in weight, and thereby compresses the spring D^5 . The absorption of the water by the cartridge lowers the water-level; but as the carbid increases in weight the spring D^5 is compressed, thereby maintaining a substantially constant submergence of the cartridge, which results in a practically uniform hydrostatic pressure.

While I have described a cartridge of specific construction as being used in my improved generating apparatus, I do not wish to be limited thereto, as any suitable cartridge may be used in connection with the apparatus which I have invented for generating acetylene gas upon a railroad-coach. The cartridge possesses certain features of novelty, which will be hereinafter pointed out, and is thereby adapted for use in other connections than with an apparatus for generating acetylene gas on a railroad-coach.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit of my invention.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a railway-coach, of a gas-generator pivotally supported beneath the coach, a strap passing beneath the generator at the front thereof having its ends projecting above the generator, and means for detachably securing said projecting ends to the under side of the coach, substantially as described.

2. The combination with a railway-coach, of brackets projecting downwardly beneath said coach, a gas-generator having laterally-projecting studs journaled in said brackets, straps projecting at each side of the front of the generator, means for detachably securing said projecting straps to the coach, and a door through which access may be had to said means, substantially as described.

3. The combination with a railway-coach, of a gas-generator pivotally supported beneath the coach, a valve controlling the delivery of gas from said generator, a handle for said valve extending into the path of the movement of the generator when the valve is closed, whereby the valve must be opened before the generator can be restored to its normal position, substantially as described.

4. The combination with a railway-coach, of a gas-generator pivotally supported beneath the coach, straps projecting upwardly

from the front of said generator having openings therethrough adapted to register with openings in the timbers secured beneath the coach, pins passing through said registering-
5 openings, a door at the top of said generator having projections extending across the path and preventing the removal of said pins when the door is closed, substantially as described.

5. The combination with a railroad-coach,
10 of an acetylene-gas generator pivotally supported beneath the coach, a pipe passing through said generator and having an opening through the side thereof serving as an overflow for surplus water when the genera-
15 tor is in its lowered position, a coupling projecting beneath the car communicating with a steam-supply, said pipe registering with said coupling when the generator is in its elevated position, substantially as described.

20 6. In a generator for acetylene gas, the combination with a water-tank, of a cylinder open at its upper end located in said water-tank and having openings therethrough near its bottom permitting the free passage of water
25 between said tank and cylinder, a water-tight cover closing the space between the tops of said water-tank and cylinder, and a carbide-cartridge loosely fitted within said cylinder, whereby water may be supplied to said tank
30 through the passage-way between the cylinder and cartridge, substantially as described.

7. In a generator for acetylene gas, the combination with a water-tank, of a cylinder located within said water-tank, and having open-
35 ings therethrough near its bottom permitting the free passage of water between said tank and cylinder; a cartridge loosely fitting within

said cylinder, and a counterbalancing-spring within said cylinder interposed between said cartridge and the water-tank, whereby as the
40 water-level falls by the absorption of the water by the carbide the resulting increase in the weight of the carbide compresses the spring and permits the cartridge to fall, thereby maintaining a substantially uniform hydro- 45 static pressure, substantially as described.

8. In a generator for acetylene gas, a cartridge comprising a receptacle for the carbide, a cover therefor, a central rod in said receptacle secured to the bottom thereof and ex- 50 tending through said cover, a movable device extending through said cover, a follower-plate located within the receptacle and guided by said rod and adapted when elevated by the expansion of the carbide to engage said mov- 55 able device, substantially as described.

9. In a generator for acetylene gas, a cartridge comprising a receptacle for the carbide, a rod within said receptacle, a follower-plate guided by said rod, a cover for said recepta- 60 cle through which the end of said rod passes, a movable device extending through said cover, and a delivery-pipe leading from an opening in said cover whereby when the material within the receptacle expands the fol- 65 lower-plate engages the movable device and also protects the delivery-pipe from the material, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

PERCY C. AVERY.

Witnesses:

GEO. L. WILKINSON,
CLARA C. CUNNINGHAM.