No. 775,700. PATENTED NOV. 22, 1904.

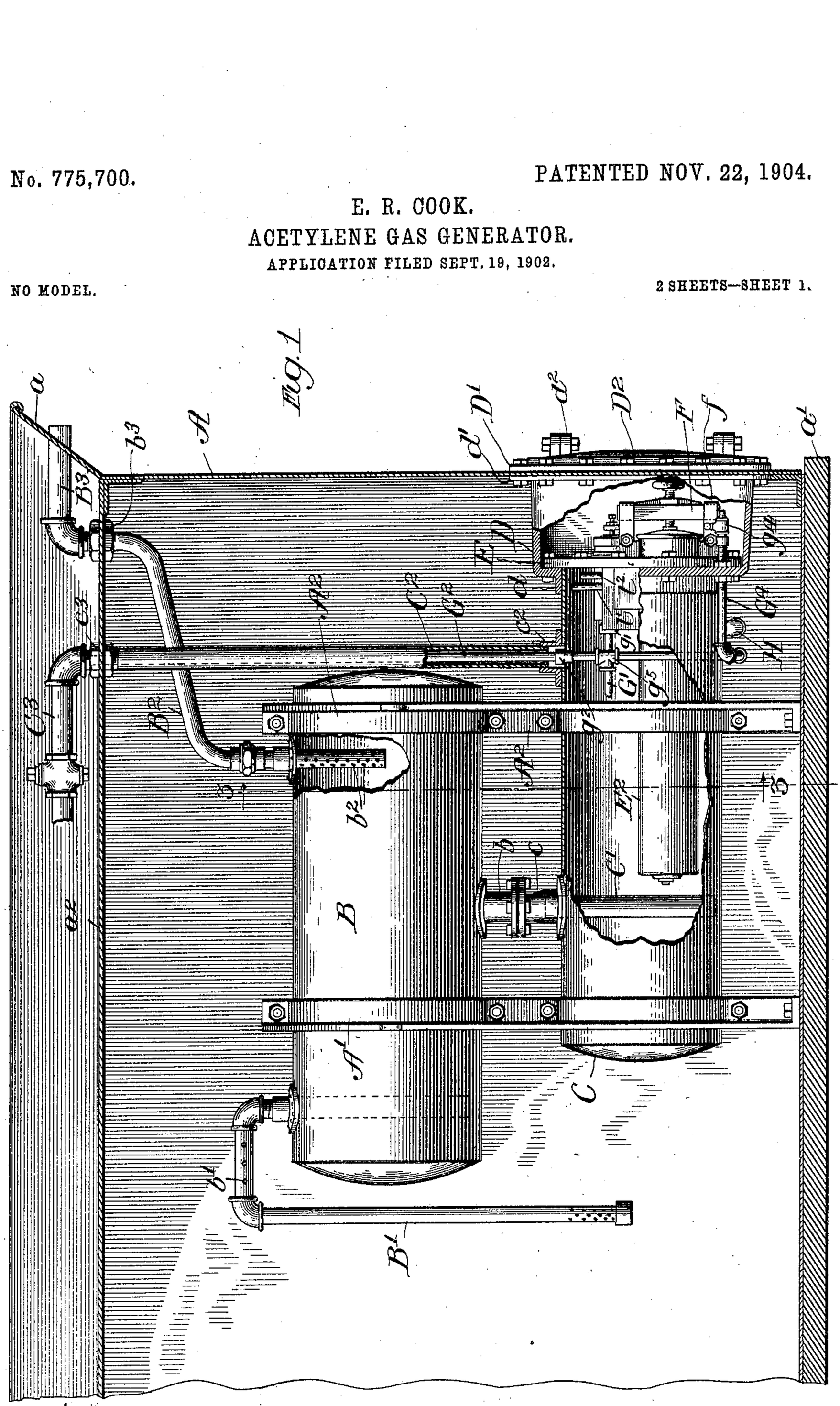
E. R. COOK.

ACETYLENE GAS GENERATOR.

APPLICATION FILED SEPT. 19, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1



Witnesses:
Harold G. Barrett.
M. D. Perry.

Inventor:
Edmund R. Cook
By Lamborn & Wilkinson
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NO MODEL. 2 SHEETS—SHEET 2.

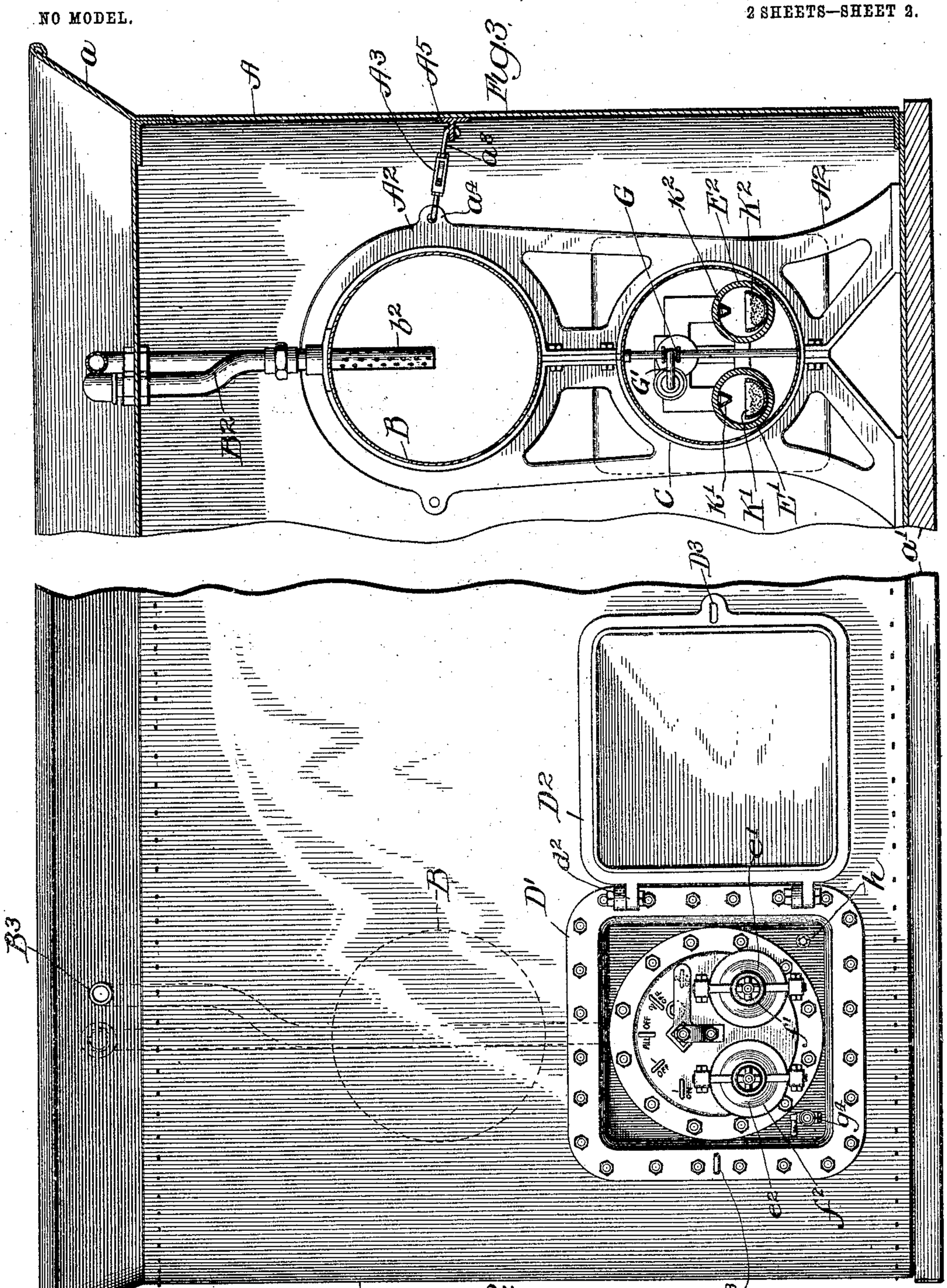

FIG. 2.

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No. 775,700. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

EDMOND R. COOK, OF CHICAGO, ILLINOIS.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 775,700, dated November 22, 1904.

Application filed September 19, 1902. Serial No. 124,091. (No model.)

To all whom it may concern:

Be it known that I, EDMOND R. COOK, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Acetylene-Gas Generators; 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 generally to apparatus for generating gas, and more particularly to acetylene-gas generators especially designed for supplying gas to locomotive-headlights.

It is essential in apparatus for generating acetylene gas that water should be supplied to the generator and that the water should be kept from freezing in cold weather, and, on the other hand, it is necessary that the generated gas should be cooled and condensed prior to its use.

An object of my invention is to provide an acetylene-gas generator the supply of water to which will be automatic, so as not to require the attention of an attendant.

A further object is to provide an acetylene-gas generator in which no special means are needed to prevent the water from freezing or to cool and condense the gas.

A still further object is to provide an acetylene-gas generator for supplying gas to locomotive-headlights which will be so located as to be protected from interference by unauthorized persons and also so located that any danger of explosion of the gas will be avoided and at the same time so as to occupy practically no space on the outside of a locomotive of ordinary construction.

Still another object of my invention is to provide a generator for supplying acetylene gas to the headlight of a locomotive which will be simple in construction, inexpensive in manufacture, and efficient in operation.

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

Figure 1 is a sectional view through the water-tank of a locomotive-tender, showing the location of my invention therein; Fig. 2, an elevational view looking from the right in Fig. 1, and Fig. 3 a vertical sectional view taken on line 3 3 in Fig. 1.

Similar reference characters are used to indicate similar parts in the several figures of the drawings.

My invention generally described consists in locating within the water-tank of a locomotive-tender an acetylene-gas generator of the type covered by my prior patents, No. 670,196, granted March 19, 1901, and No. 708,956, granted September 9, 1902.

Reference character A indicates the water-tank of a locomotive-tender which is provided with the usual flaring receptacle *a* to hold the coal. Mounted upon the bottom *a'* of the tank are two-part standards A' and A^2. Between the two parts of each of these standards are formed circular openings which serve as supports for the two cylindrical chambers of the generator. The two members of the standards are shown as secured together by means of bolts passing through adjoining flanges; but it is obvious that any other suitable means may be provided for securing the members of the standards together, and it is also obvious that other forms of support than these standards may be used for mounting the generator-cylinders within the water-tank. The standards A' and A^2 are preferably provided with guys securing the same to the inner surfaces of the walls of the tank, so as to relieve the strain upon the bases thereof. In Fig. 3 I have shown the standard A^2 as provided with perforated lugs a^4, which are connected by means of a turnbuckle A^3 and interposed hooks a^3 to the brace A^5, which is usually located within the tank of a tender.

The upper cylindrical chamber B is adapted to contain water and to supply the same to the lower generating cylindrical chamber C. The chambers B and C are united by means of couplings *b* and *c*, respectively secured to the under surface of the upper cylinder and to the top surface of the lower cylinder. The couplings *b* and *c* may be united by means of bolts passing through registering perforations in flanges formed thereon. A pipe B' for supplying water to the chamber B ex-

tends downwardly and is provided with a number of perforations at its lower closed end. Perforations b' are formed through the horizontal portion of the pipe B', which is connected to and extends slightly above the chamber B. A pipe B^2 for discharging any gas which may accumulate in the water-chamber B is coupled to the upper surface of the chamber B and is provided with a depending perforated portion b^2, extending within the chamber B. The upper end of discharge-pipe B^2 is supported by means of clamp-lock nuts b^3, located on either side of the top a^2 of the water-tank, through which the discharge-pipe B^2 extends. A pipe B^3 is coupled to the upper end of B^2 and extends through an opening in the flaring wall of receptacle a. A pipe C' depends from the coupling c and terminates near the bottom of the generating-chamber C for supplying water thereto.

The end of the chamber C within the tank is closed, while its opposite end is secured with a circular flange d, formed on the casing D, which is secured by means of a flange d' to the inner surface of a wall of the tank A. The wall of the tank is cut away within the flange d' of the casing D, so as to afford access to the space within the casing. A frame D' is secured on the outside of the tank around the opening in the wall thereof, and preferably by means of bolts passing through openings therein which register with openings formed through the flange d' of the casing D.

A door D^2 is hinged to the frame D' by hinges d^2 of any suitable construction. The door D^2 and the frame D' are provided with means for locking the door closed—such, for instance, as a lug D^3 on the door—having a slot therein adapted to surround a staple d^3, which projects from the frame D' A padlock or any other suitable locking device may be passed through the staple, thereby locking the door D^2 closed, so as to prevent access to the interior of the casing D.

A plate E is secured to the vertical portion of the casing D adjacent to the flange d thereon, thereby closing the end of the generating-chamber C. Two carbid-chambers E' and E^2 are supported by the plate E and extend within the chamber C. The ends of the carbid-chambers extend slightly beyond the outer surface of the plate E and may be closed by any suitable means—such, for instance, as the hand-hole covers e' and e^2. The hand-hole covers may be secured, so as to close the ends of the carbid-chambers by means of clamp-screws f' and f^2, which engage screw-threaded holes through bars F, the ends of which are supported within yokes f, pivotally mounted upon the plate E. A valve G of any suitable construction—such, for instance, as that disclosed in my former patent granted on September 9, 1902, is provided for controlling the supply of water to the carbid-chambers and also for controlling the flow of gas therefrom. As the means for controlling the supply of water to and the delivery of gas from the carbid-chambers forms no part of my present invention I have deemed it unnecessary to describe in detail any specific form of such means, inasmuch as valve mechanism such as disclosed in my pending application, Serial No. 124,092, filed on September 19, 1902, or such as disclosed in my patent granted September 9, 1902, may be employed.

l' and l^2 indicate short upright pipes open at their upper ends and communicating at their lower ends with the carbid-chambers through the controlling-valve G.

The gas-delivery pipe G' communicates by means of a coupling g' with the valve-chamber and is connected at its other end with a substantially vertical delivery-pipe G^2. A reducing-coupling g^2 is inserted between sections of the pipe G^2, as clearly shown in Fig. 1 of the drawings. The upper end of the pipe G^2 terminates at a point adjacent to the top of the tank. A pipe C^2 surrounds the pipe G^2, so as to leave an annular space between the inner surface of the pipe C^2 and the outer surface of the pipe G^2. The pipe C^2 is supported at its lower end in a flanged connection c^2, rigidly secured to the exterior of the chamber C^2. The upper end of the pipe C^2 extends through the top a^2 of the tank and is supported therein by any suitable means—such, for instance, as the clamp-lock nuts c^3. A delivery-pipe C^3 communicates with the upper end of the pipe C^2 and extends to any desired point where the gas is to be used. A regulator of any suitable construction may be employed to maintain a constant pressure of gas in the delivery-pipe C^3. The pipe G^2 is extended below the T-coupling g^5 through the bottom of the chamber C and is there coupled to a pipe G^4, extending within the casing D, where it is provided with a discharge-nozzle g^4.

A discharge-pipe H communicates with the bottom of the generating-chamber C and is extended to a point h within the casing D, where it may be provided with a discharge-nozzle similar to the nozzle g^4.

The carbid-chambers E' and E^2 are provided with trays K' and K^2, which hold the carbid. Immediately above the carbid-trays are located spray-troughs k' and k^2, into which water is delivered from the upright pipes l' and l^2 through the interposed valve G.

The pipes l' and l^2 are preferably of different heights, as clearly shown in Fig. 1 of the drawings. The object of forming these tubes of different heights is clearly set forth in my prior patent, No. 708,956, before referred to.

The operation of my invention will be readily understood from the foregoing description, and is as follows: The trays are supplied with carbid and are then inserted in the carbid-chambers, after which the covers are secured

on the ends of the chambers. Water passes from the tank A through the pipe B′ into the water-chamber B. The lower end of the supply-pipe B′ is supplied with a number of perforations which serve to strain the water and prevent foreign matter from passing into the generator. The perforations b' prevent the pipe B′ from acting as a siphon, so that when the water-line in the tank A falls below the lower perforated end of the supply-pipe B′ the water will not be drawn from the generator. Water passes from chamber B through the couplings b and c, and thence through the pipe C′ into the chamber C, filling the latter and extending upwardly within the pipe C^2 to the water-level in the tank. When it is desired to generate gas, the valve G is turned, by means of its handle g, to the proper position, thereby connecting the short pipes l' and l^2 with the carbid-chambers, so that the water flows through the distributing-troughs upon the carbid in the trays. The generated gas passes through the valve into the discharge-pipe G′, thence through the T-coupling g^5 into the pipe G^2, and thence into the delivery-pipe C^3. The excess of gas generated over the amount consumed passes downwardly between the pipe G^2 and the surrounding pipe C^2 and forces the water downwardly into the chamber C and from there back through the pipe C′ into the water-chamber B. Should the excess of the generated gas force all of the water out of the chamber C and pass into the chamber B, it will escape through the perforations b^2 and be discharged through the pipes B^2 and B^3 to the atmosphere. The perforations b^2 permit the gas to pass in small quantities through the water should there be any in the pipe B^2, which occurs when the water-level in the tank is above the chamber B. The weight of the water in the pipe B^2 would prevent the passage therethrough of the gas should the same be admitted directly to the open end of the pipe B^2, which would result in the water being forced out of the chamber B through the pipe B′ into the tank A′, owing to the pressure of the accumulated gas in the top of chamber B. Any water of condensation which may accumulate in the pipe G^2 is drawn off through the nozzle g^4. All of the water in the generator may be drawn off through the drain-pipe H by means of the nozzle h.

By providing the casing D with a door which may be securely fastened any danger of the apparatus being disordered by any unauthorized persons is avoided. It is consequently of advantage to locate the nozzles of the drain-pipes also within the casing.

From the foregoing description it will be observed that by locating the generating apparatus entirely within the water-tank of the tender a number of advantages result, among which may be mentioned, first, the generator is protected from injury by contact with obstacles and is also out of the way of the trainmen; second, the apparatus is secure from interference by unauthorized persons, as the door through which access is had to the generator may be readily locked; third, the generator being entirely surrounded by water the danger of explosion by reason of the ignition of the gas by a trainman's torch or otherwise is avoided; fourth, the water in the tank surrounding the generator cools and condenses the gas, thereby avoiding the necessity of providing cooling and condensing apparatus; fifth, the water is automatically supplied to the generator from the tank, so that it is unnecessary for the engineer or the fireman to supply the water to the generator; sixth, the water in the tank of the tender must necessarily be kept from freezing in order that it may be supplied to the engine-boiler, and hence its temperature is such as to prevent the water in the generator from freezing. Consequently heating-coils are not required.

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. In an apparatus of the character described, the combination with a water-tank, of an acetylene-gas generator comprising communicating water and generating chambers, located within said tank, and means for automatically supplying water to the water-chamber of said generator from said tank.

2. In an apparatus of the character described, the combination with a water-tank, of an acetylene-gas generator composed of communicating water and gas chambers, a pipe extending through the top of the water-chamber to a point adjacent to the bottom thereof for supplying water thereto, and extending below the same on the exterior, said pipe having perforations at its highest point to prevent the water from being drawn from said water-chamber when the water-level in the tank falls below the same.

3. In an apparatus of the character described, the combination with a water-tank, of an acetylene-gas generator composed of communicating water and gas chambers located within said tank, means for automatically supplying water to said water-chamber from said tank, and a gas-delivery pipe leading from said gas-chamber through the water in said tank to the exterior of the latter.

4. In an apparatus of the character described, the combination with a water-tank, of

an acetylene-gas generator composed of communicating water and generating chambers located within said tank, and a plurality of two-part standards mounted upon the bottom of said tank, the two parts of each standard surrounding and supporting said chambers.

5. In an apparatus of the character described, the combination with a water-tank of an acetylene-gas generator comprising communicating water and generating chambers located within said tank, a gas-delivery pipe leading from said gas-chamber through the water in said tank to the exterior of the latter, and a gas-vent pipe leading from the top of said water-chamber through said tank to the atmosphere.

6. In an apparatus of the character described, the combination with a water-tank, of an acetylene-gas generator, comprising communicating water and gas-generating chambers located within said tank, a gas-vent pipe leading from the top of said water-chamber through said tank to the atmosphere, and a perforated pipe communicating with said vent-pipe and extending downwardly within said water-chamber.

7. In an apparatus of the character described, the combination with a water-tank, of an acetylene-gas generator comprising a generating-chamber, a casing interposed between one end of said chamber and an opening in the wall of said tank, and means located outside the said tank for closing the opening therethrough leading to said casing.

8. In an apparatus of the character described, the combination with a water-tank of an acetylene-gas generator comprising a generating-chamber, a carbid-chamber located in said generating-chamber, a valve for controlling the supply of water to and the discharge of gas from said carbid-chamber, and a casing interposed between said generating-chamber and an opening in a wall of said tank through which access may be had to said carbid-chamber and to operate said valve.

9. In an apparatus of the character described, the combination with a water-tank of an acetylene-gas generator comprising communicating water and gas-generating chambers, a gas-delivery pipe leading from said generating-chamber through the water in said tank to the exterior of the latter, a casing interposed between said chamber and an opening in a wall of said tank, a drain-pipe leading downwardly from said delivery-pipe, and extending to a point within said casing.

10. In an apparatus of the character described, the combination with a water-tank of an acetylene-gas generator comprising communicating water and gas-generating chambers, a gas-delivery pipe leading from said generating-chamber through the water in said tank to the exterior of the latter, a casing interposed between said chamber and an opening in a wall of said tank, a drain-pipe leading downwardly from said delivery-pipe and extending to a point within said casing, and a second drain-pipe communicating with the bottom of said generating-chamber and extending to a point within said casing.

11. In an apparatus of the character described, the combination with a water-tank of a locomotive-tender, of an acetylene-gas generator located within said tank and comprising a generating-chamber, a casing interposed between said chamber and an opening in a wall of said tank, and a plate for closing the end of said chamber adapted to be inserted and removed through said casing.

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

E. R. COOK.

Witnesses:
GEO. L. WILKINSON,
E. H. BELL.