No. 704,967. Patented July 15, 1902.

F. L. KINCAID.

ACETYLENE GAS GENERATOR.

(Application filed Nov. 2, 1898. Renewed Mar. 3, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

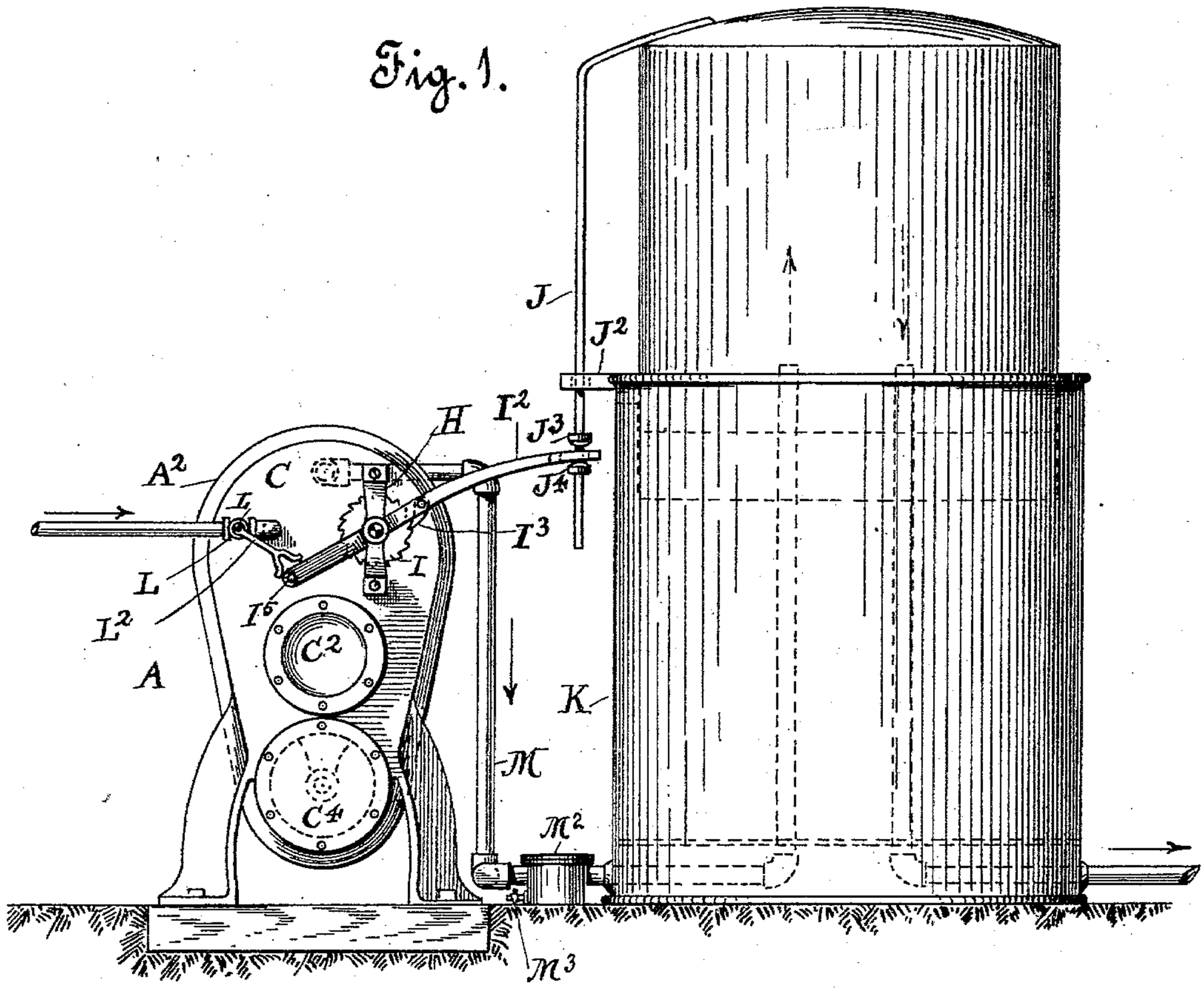
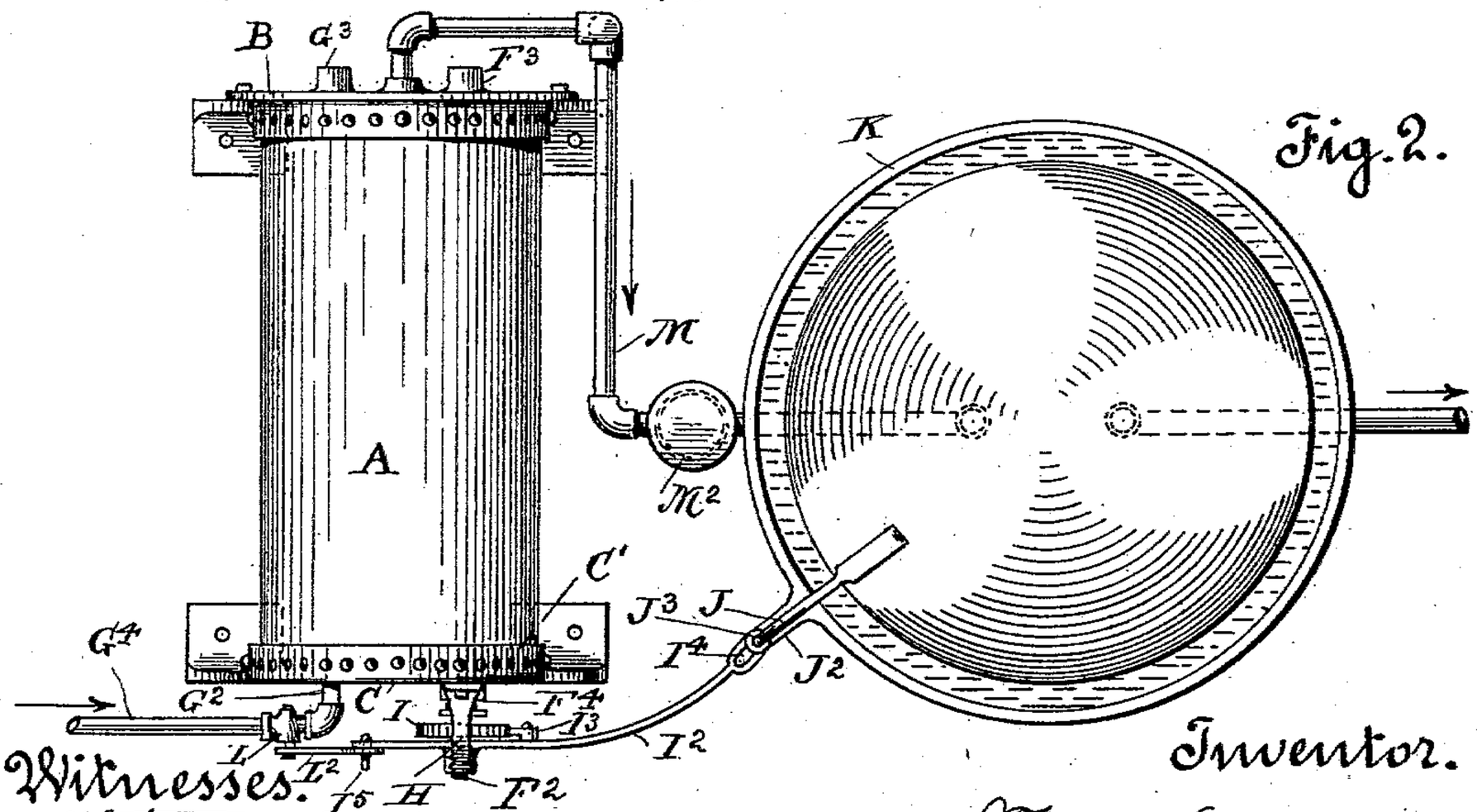


Fig. 2.



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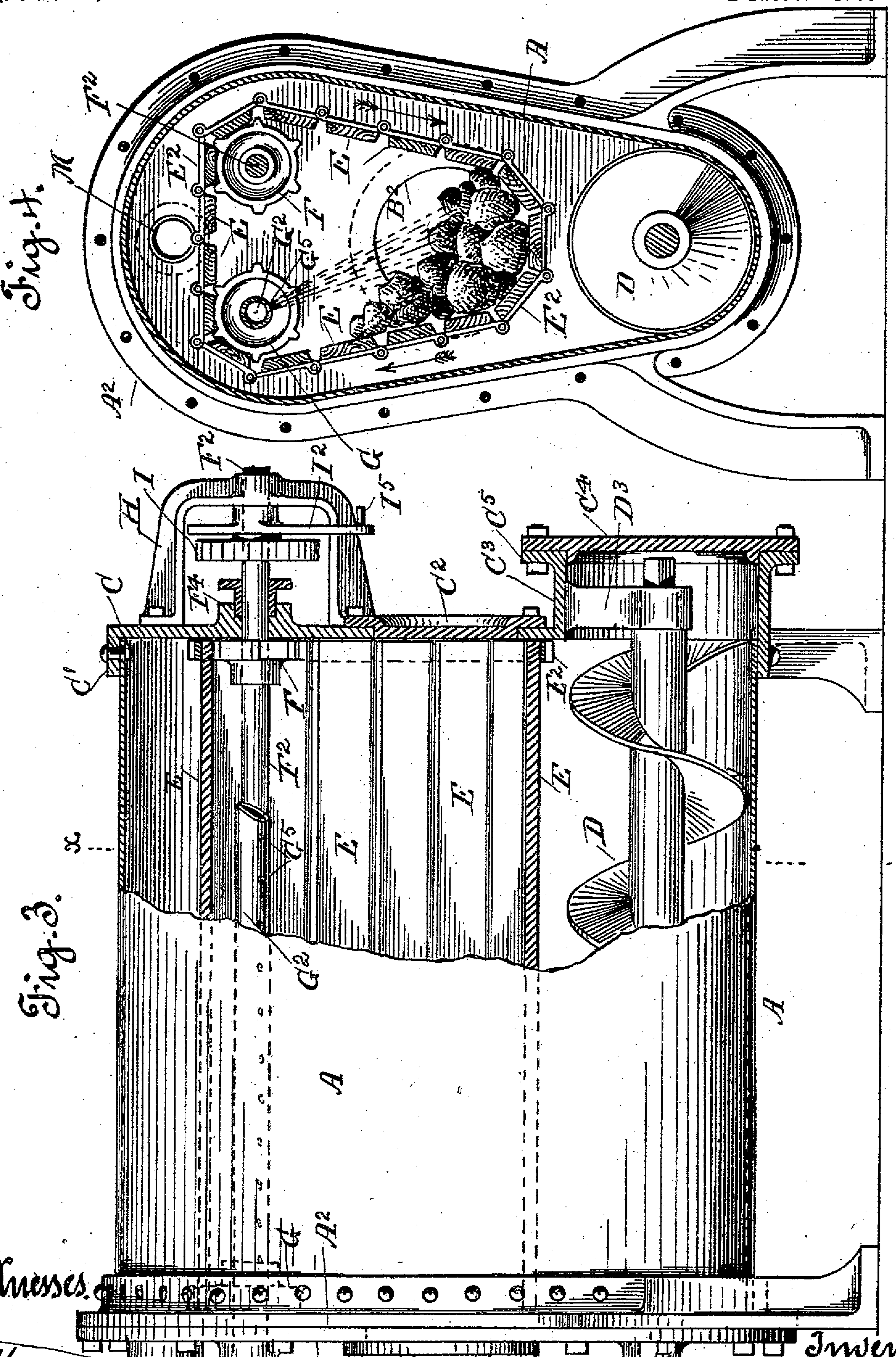

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UNITED STATES PATENT OFFICE.

FRED L. KINCAID, OF STOCKTON, CALIFORNIA, ASSIGNOR TO PACIFIC ACETYLENE GAS COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 704,967, dated July 15, 1902.

Application filed November 2, 1898. Renewed March 3, 1902. Serial No. 96,577. (No model.)

To all whom it may concern:

Be it known that I, FRED L. KINCAID, a citizen of the United States of America, and a resident of Stockton, in the county of San Joaquin and State of California, have invented certain new and useful Improvements in Acetylene-Gas Apparatus, of which the following is a specification.

The object of my invention is to provide an automatic machine which can manufacture acetylene gas in large quantities.

As is well known, acetylene gas is produced by the action of water on carbid of calcium. Heretofore it has been very difficult and for practical purposes impossible to make this gas in any great quantity, because the chunks of carbid of calcium in the generator would soon become covered with a coating of residue, which would prevent the water from acting upon the carbid. I have overcome the difficulty by inventing a mechanism which turns over and stirs up the carbid at the very time the gas is most needed—to wit, as the gasometer becomes empty. The stirring up is accomplished and the supply of water to the carbid is regulated by the fall of the inner tank of the gasometer. The faster the gasometer is emptied the faster the carbid is turned over and the more freely the water is allowed to flow, consequently the more rapidly the gas is generated, all of which is more fully explained in the following specification.

Referring to the accompanying drawings, Figure 1 is a side elevation of the machine complete, giving an end view of the generator and showing the mechanism which connects it with the gasometer. Fig. 2 is a top view of the construction shown in Fig. 1. Fig. 3 is a side elevation, partly in section, of the generator. Fig. 4 is a vertical cross-section of the generator, taken on the line X X in Fig. 3 and looking toward the end B of the generator.

Throughout this specification similar letters refer to similar parts.

The outside or shell A of the generator is ovoid in shape, is gas-tight, and is provided with heads B and C, bolted or riveted to each of its ends. The head B is fastened to the shell A by means of bolts which pass through said head and through the flange A^2, which is riveted around the end of said shell. This head B is provided with a manhole B^2, through which the carbid can be shoveled into the carbid-carrier, hereinafter described. The other end of the shell A is covered by the head C, which may itself have a flange C′ and be bolted directly to the edge of the shell A or may be bolted to a flange riveted to the shell, like the head B. The head C is also provided with a manhole C^2, directly opposite the one in B and similar to it. There is a short cylindrical projection C^3 on the lower part of the head C, in which one end of the screw conveyer D works. This cylinder C^3 has a separate head C^4 of its own, which is fastened to it by bolts which pass through the head C^4 and through a flange C^5, that projects outward from the edge of the cylinder C^3, as shown in Fig. 3. The covers of the manholes B^2 and C^2 and the head C^4 are fastened, respectively, to the heads B and C and are adapted to be easily removed—the manhole-covers for the purpose of loading and reloading the generator with carbid of calcium, the head C^4 for the purpose of removing the slaked carbid or residue by the screw conveyer D. The shaft of this conveyer has a closed bearing D^2 in the generator-head B, and the opposite end is journaled in a hanger D^3, located inside the cylinder C^3. The end of the screw-conveyer shaft which projects through the hanger D^3 is made square to receive a hand-crank, by means of which it is rotated.

The carbid-carrier, hereinabove referred to, is a traveling carrier and is made of iron slats E, which run the entire length of the inside of the shell A, simply leaving room enough at their ends to prevent friction against the heads B and C as the carrier moves. The slats E are flexibly connected or hinged to one another through the links of two sprocket-chains E^2. The whole carrier thus made up is hung on sprocket-wheels F and G. The ends of the several slats are fastened to the inner surface of the two sprocket-chains E^2 in such a manner that the slats lie side by

side, with suitable spaces between them, through which the residue falls as the carrier is turned. There are two sprocket-wheels F, and the same are fastened to a rotary shaft F^2, one next to the inner surface of the head B, the other next to the inner surface of the head C. They are so placed that the ends of the carbid-carrier will ride on them, the slats E falling successively between their teeth and bearing on their periphery as the shaft F^2 is rotated. The slats E are also carried around the two sprocket-wheels G, which fit loosely on a stationary hollow shaft G^2 and which are located similarly to the sprocket-wheels F. The rotary shaft F^2 has a closed bearing F^3 in the generator-head B, passes through the stuffing-box F^4 in the generator-head C, and has a bearing in the bracket H. The hollow shaft has a closed bearing G^3 in the generator-head B, passes through the head C, and connects with the water-supply pipe G^4. This shaft has a line of perforations G^5 running throughout its length inside the shell A and is the means by which the water is conveyed to the carbid in the carrier.

The rotary shaft F^2 is moved by means of a ratchet-wheel I, which is keyed to it and revolves within the bracket H. I have provided a lever I^2 and pawl I^3 to rotate said ratchet-wheel. This lever is fulcrumed loosely within the bracket H on the solid shaft F^2, so that its long arm reaches out toward the gasometer K. A rod J is attached to the top of the inner tank of the gasometer and passes downward through a guide J^2, extending outward from the top of the outer tank of the gasometer, and thence through a slot I^4 in the end of the long arm of lever I^2. The rod J has two collars J^3 and J^4, one above and one below the said slot, so that as the inner tank rises or falls the lever I^2 is accordingly worked up or down by the rod J. The object of the slot in said long arm of I^2 is to give the lever free play and to allow the rod J to work straight up and down. I operate through the same mechanism the cock L, which controls the water-supply. This cock is opened and closed by a forked lever L^2, the branches of which are so turned and situated that they are alternately engaged by a pin I^5 on the short arm of the lever I^2 as it swings up and down.

M is the exit-pipe that conducts the gas from the generator to the gasometer. It is connected with the upper part of the generator and thence runs down by the side of the machine to the bottom of the outer tank of the gasometer. It is provided at its lowest part with a trap M^2, which receives the condensation from the gas. This trap has a cock M^3, by means of which it may be drained.

In operation my invention works as follows: One of the manholes B^2 or C^2 is opened and the carbid of calcium is shoveled into the carbid-carrier, as shown in Fig. 4. The manhole-cover is then replaced and the water allowed to spray on the carbid in the carrier, whereupon the gas is immediately generated and passes off through the exit-pipe M. Thence the gas goes to the gasometer. As the gasometer becomes full the inner tank rises and the rod J, attached to it, lifts the long arm of the lever I^2. The pawl I^3 slides freely over the teeth of the ratchet-wheel I while said long arm is being raised, and at the same time the short arm of I^2 is being depressed and is gradually shutting off the water-supply until the gasometer is about half filled, when the water is completely shut off, the pin I^5 that is on the short arm of I^2 being then disengaged from the forked lever L^2. The long arm of I^2 continues to rise and the pawl to slide on the teeth of the ratchet-wheel until the gasometer has risen to its maximum height. As the gas is consumed the inner tank of the gasometer falls and also forces the long arm of the lever I^2 down, causing the pawl I^3 to engage the teeth of the ratchet-wheel I and rotate the solid shaft F^2, which revolves the sprocket-wheels F, that engage the slats composing the carrier. Moving these wheels F around moves the whole carrier around and tumbles the chunks of carbid over and over until the residue, with which they became coated while the gas was being generated, falls through the spaces between the slats E, down around the screw conveyer D. At about the same time this operation is completed the short arm of the lever I^2 has risen high enough to engage again the forked lever L^2 and gradually opens the cock L, thereby turning on the water to generate more gas. The water is thus turned on when the gasometer is nearly empty and after the carbid has been thoroughly shaken up to free it from its coating of residue.

The main virtue of my invention lies in the fact that it can generate acetylene gas on a large scale and is so constructed that it automatically regulates the supply of water and shakes up the carbid—all by the rise and fall of the inner tank of the gasometer. It causes the gas to be generated most freely at the very time it is most needed—viz., as the gasometer becomes empty.

It will be understood that my invention would accomplish the same purpose and operate fully as well were the turning of the carrier and stirring of the carbid therein effected through the rise instead of the fall of the inner tank of the gasometer and also that other mechanical means than those described could be employed to work the carbid-carrier and the parts coöperating therewith. Therefore I do not wish to limit my invention to the mode of operation nor to the exact forms of operating connections described.

Having now described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A gas apparatus comprising a generator, a rotary shaft therein having suitable driv-

ing-wheels, a spray-pipe running parallel with said shaft in the generator and carrying driven wheels, a carrier composed of hinged slats hung on the driving and the driven wheels, and means to rotate said shaft, substantially as described.

2. A gas apparatus comprising a generator, a traveling carbid-carrier composed of hinged slats suspended at a suitable height therein, a spray device arranged to throw water upon the live carbid in the carrier, and a screw conveyer located beneath the carrier and adapted to remove from the generator the slaked carbid that falls through the spaces between the hinged slats of the carrier, substantially as described.

3. A gas apparatus comprising a generator, shafts placed parallel therein, sprocket-wheels fast on one of said shafts, sprocket-wheels loose on the other one of said shafts, a carbid-carrier composed of flexibly-connected slats hung on said sprocket-wheels, a gasometer, a pawl-and-ratchet mechanism connected with the shaft that carries the fixed sprocket-wheels, and connections between the gasometer and the pawl-and-ratchet mechanism whereby the latter is operated and the carrier turned while the gasometer moves, substantially as described.

4. A gas apparatus comprising a generator, a rotary shaft and a spray-pipe placed parallel therein, sprocket-wheels fast on said rotary shaft, sprocket-wheels loose on said spray-pipe, a carbid-carrier composed of flexibly-connected slats hung on said sprocket-wheels, a gasometer, a ratchet-wheel and pawl adapted to turn the rotary shaft, a water-cock controlling the flow of water to the spray-pipe, a lever arranged to work both the pawl and the water-cock, and means, such as a rod, to swing said lever through the rise and fall of the gasometer, substantially as described.

5. In a gas apparatus, the combination of a generator-casing, a shaft therein having driving-wheels, a spray-pipe parallel with said shaft and carrying driven wheels, a flexible carrier hung on said wheels, and means for operating said shaft, substantially as described.

Signed by me at San Francisco, California, this 22d day of October, 1898.

FRED L. KINCAID. [L. S.]

Witnesses:

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