No. 734,616. PATENTED JULY 28, 1903.

F. K. ROBERTS.

ACETYLENE GAS GENERATOR.

APPLICATION FILED FEB. 28, 1901. RENEWED DEC. 29, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

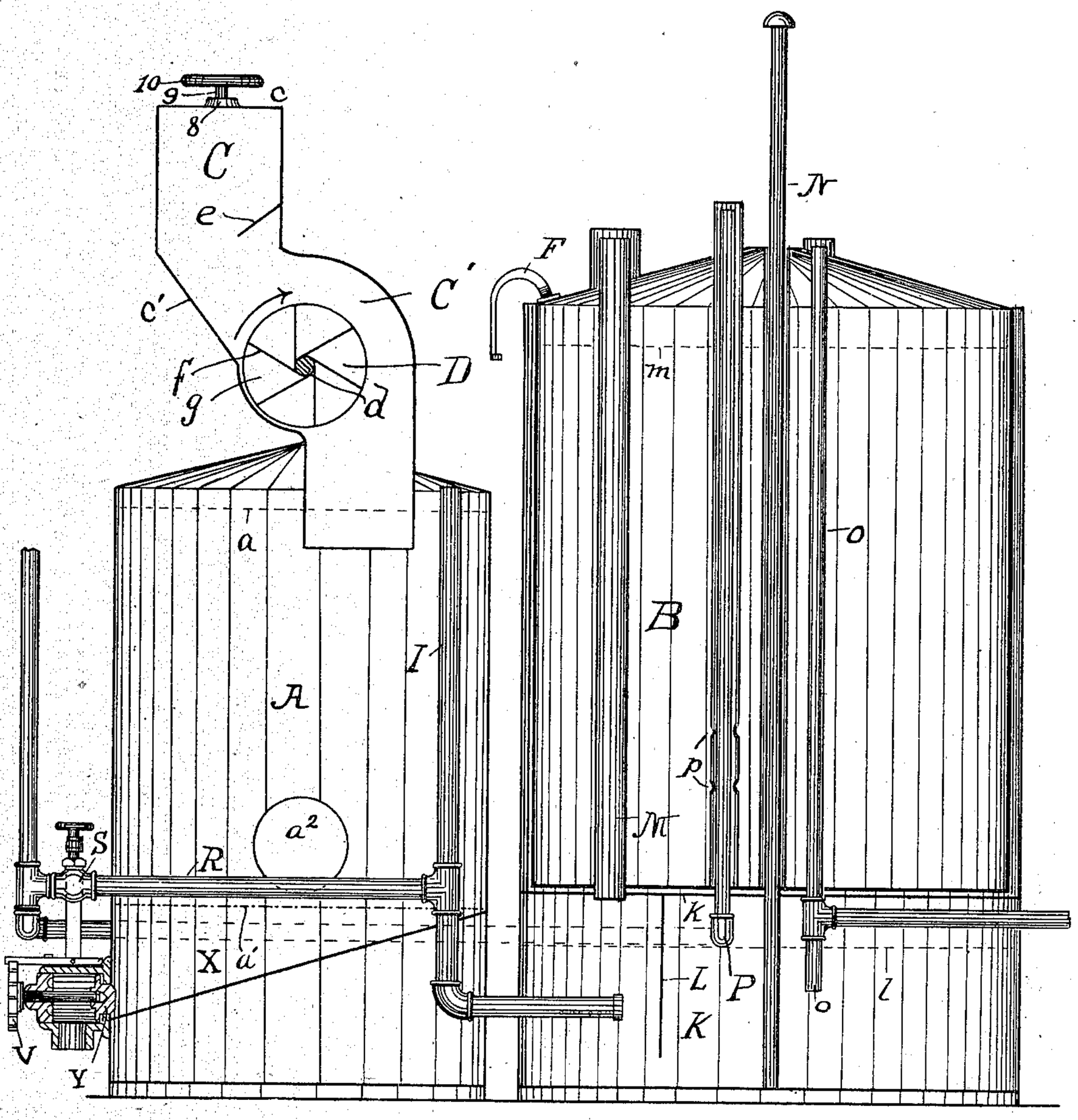

Fig. 1.

Witnesses:
A. W. Plumley.
M. E. Snyder.

Inventor:
Frank K. Roberts,
by his Attorneys,
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NO MODEL. 3 SHEETS—SHEET 2.

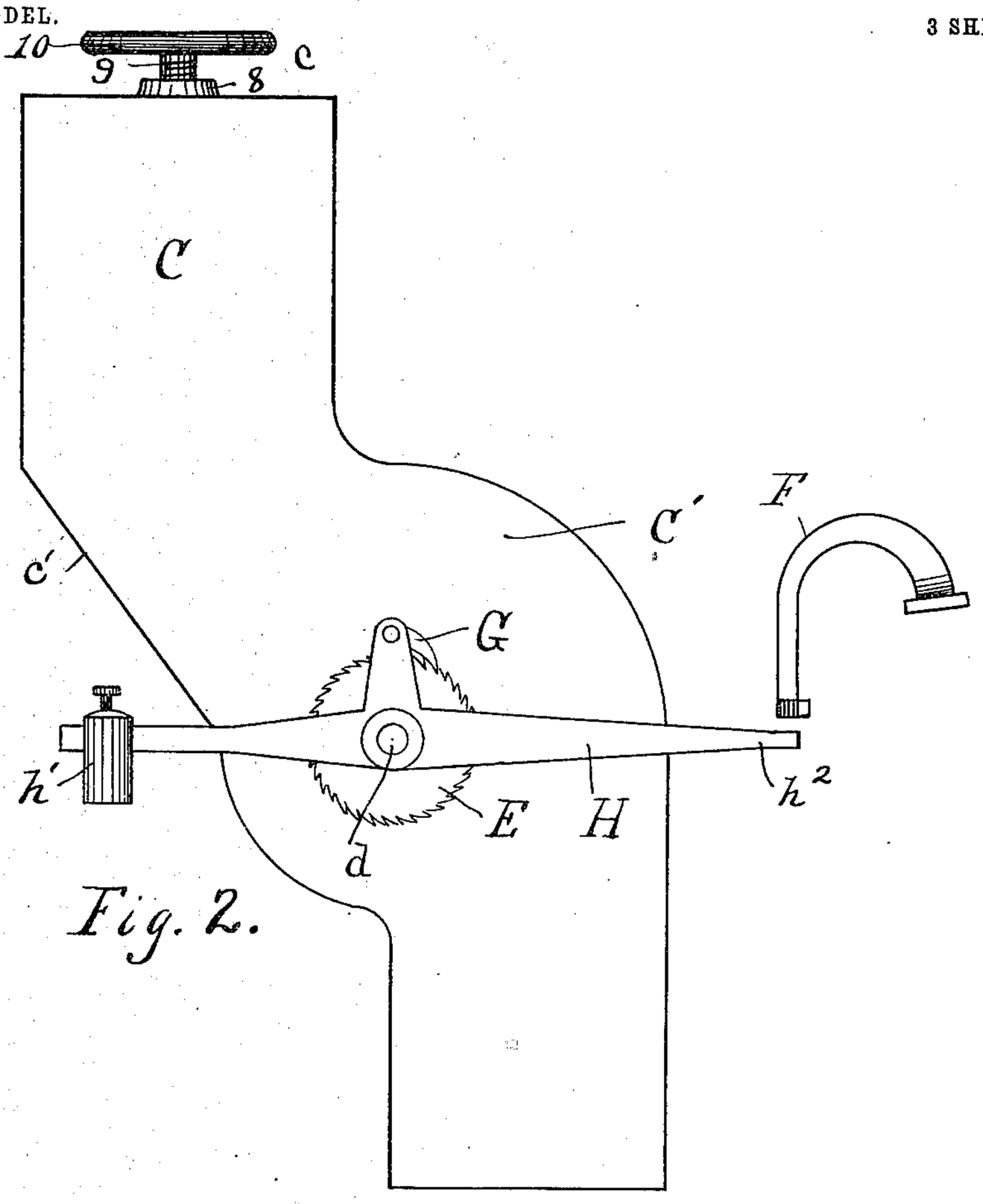

Fig. 2.

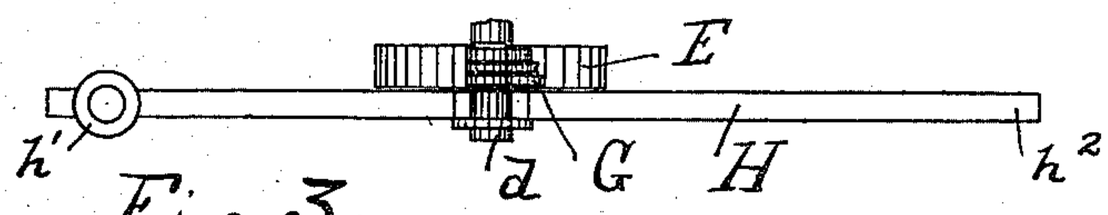

Fig. 3.

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NO MODEL. 3 SHEETS—SHEET 3.

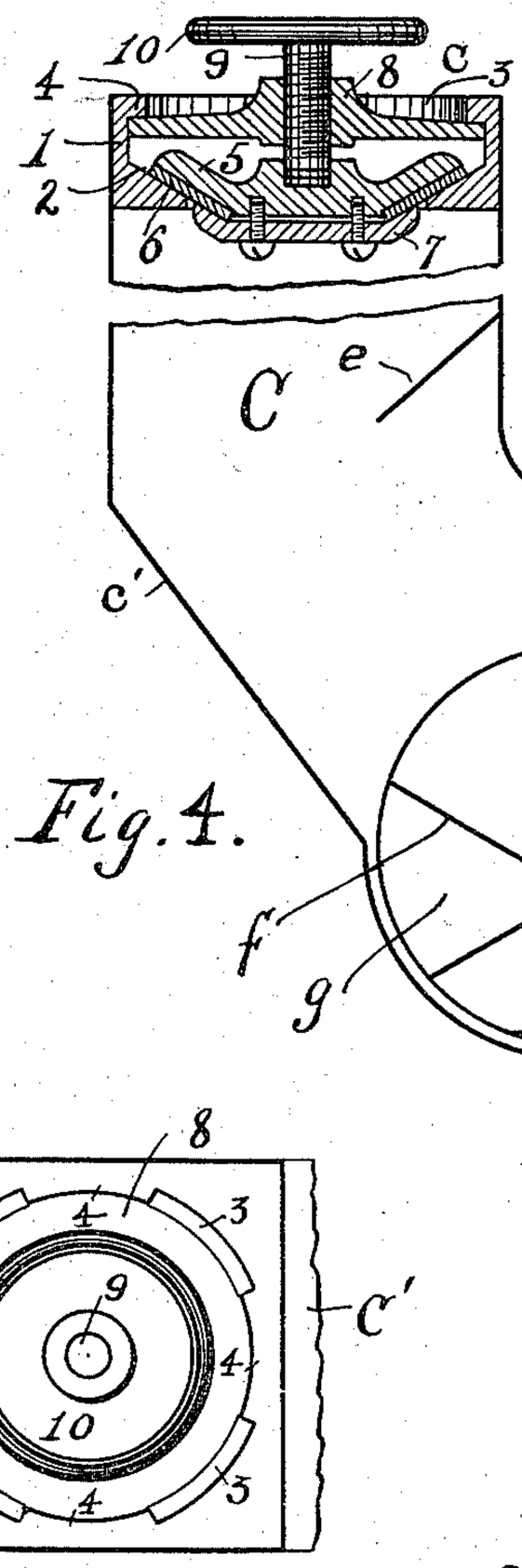

Fig. 4.

Fig. 6.

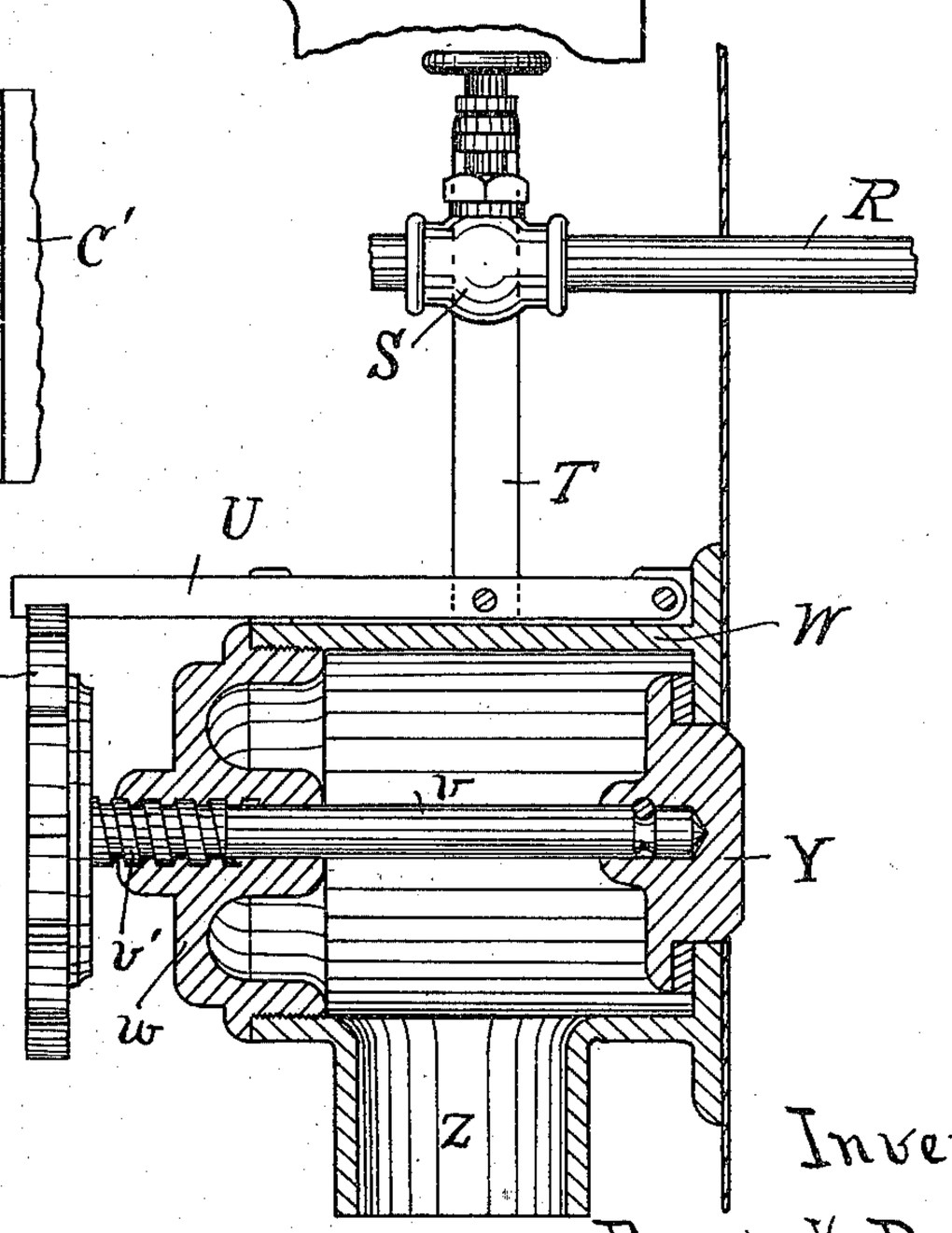

Fig. 5.

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No. 734,616. Patented July 28, 1903.

UNITED STATES PATENT OFFICE.

FRANK K. ROBERTS, OF BUFFALO, NEW YORK, ASSIGNOR TO SARAH A. ROBERTS, OF BUFFALO, NEW YORK.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 734,616, dated July 28, 1903.

Application filed February 28, 1901. Renewed December 29, 1902. Serial No. 137,067. (No model.)

To all whom it may concern:

Be it known that I, FRANK K. ROBERTS, a citizen of the United States, residing at Buffalo, Erie county, New York, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a full, clear, and exact description.

My invention relates to improvements in the apparatus used for the manufacture of combustible gas produced by bringing together two combining substances which by their chemical action produce the resulting gas, and it more particularly relates to the production of what is known as "acetylene gas" from the union of calcium carbid with water.

The object of my invention has been to provide means for producing the gas in constant quantities proportionate to its consumption, and to that end I regulate its production by certain new and novel devices.

An additional object has been to produce a device which could be equally as well used for feeding to the generator-tank large coarse lumps of carbid or other solid substances as well as those that are finely divided.

Referring to the drawings herewith, in which like characters of reference refer to like parts, Figure 1 is a sectional elevation of my device. Fig. 2 is an elevation of the feeding mechanism. Fig. 3 is a top plan view of my ratchet-wheel. Fig. 4 is a sectional view of my feeding mechanism. Fig. 5 is a sectional view of my valve which controls the outlet for the waste matter or sludge. Fig. 6 is a top plan view of my sealing-cap.

A is the generating-chamber; B, the governing gas-holder; C, storage-chamber; C′, wheel-chamber; D, feed-wheel; *c*, a sealing-cap adapted to fit closely over the storage-chamber.

e indicates a shelf located in the storage-chamber C and projecting downward from the side of the chamber which is directly above the feeding-wheel D and inward in the said chamber far enough to entirely relieve the feed-wheel from the direct weight of the mass of material in the said chamber. The functions of this shelf are, first and primarily, to prevent the contents of the storage-chamber from bridging, and, secondly, to relieve the feed-wheel from the vertical pressure of the storage-chamber contents. The wheel D is free to rotate on its shaft *d* in the direction of the arrow and is provided with radial ribs *f*, between which pockets *g* are formed. The wheel-chamber C′ is below and at one side of the storage-chamber C, and the wheel D is placed close to the side of the wheel-chamber which is nearest the storage-chamber, while a free space is provided on the other side of the wheel, between it and the opposite side of the wheel-chamber. The shelf *e* is of such a length and so placed that the perpendicular pressure of the carbid is directed against the inclined chamber-wall *c′*. By this construction the carbid is directed obliquely against the upward-moving quadrant of the feed-wheel, and its pressure is directed in a direction opposite to that of the rotation of the wheel. Thus the pockets of an upwardly-moving quadrant of the wheel are pressed against by the carbid and filled, while the lumps that are too large to pass through the free space between the wheel and the opposite wall are held back, whereby clogging of the wheel is prevented.

E is a ratchet-wheel rigidly attached to the shaft *d* on the outside of my wheel-chamber C′.

Loosely mounted on the shaft *d* is the lever H, weighted at one end, as shown at *h′*, and having the other end *h″* located immediately beneath the arm F, which is suitably secured to the gas-bell B. Pivoted to the lever H is the pawl G, which I have shown as made of three parts of different lengths in order that slight movements of the gas-bell may be delicately governed.

The wheel-chamber C′ leads into the generator-tank A and discharges therein below the water-level *a*. A gas-conducting pipe I leads from the generator-tank A to the chamber K, which is separated from the gas-bell chamber B by a partition-wall K. A partition L shuts off the entering gases from the waste gases.

l represents the water-level in the chamber K.

A pipe M, opening into the chamber K,

conducts the gas coming from the pipe I through the water in the chamber K under the gas-bell B. The water-level in the gas-bell chamber B is represented at *m*. The gas-bell B is free to move up and down on the guide-bar N. A service-pipe *o* leads from the gas-bell B into the chamber K and thence out to the place of use. It is also continued below the water-level *l*, as shown at *o*, so that it may have a suitable water seal. A waste-gas-conducting pipe P leads from the bell-chamber into the outside atmosphere or other suitable place. The casing surrounding the pipe P is perforated at *p*, so that when the bell B lifts these perforations above the water-level the gas then formed is led off as waste through the pipe P.

Connecting the conducting-pipe I with the waste-pipe P is a ventilating-pipe R, and the flow of gas through this pipe is governed by the opening and closing of the valve S. Suitably secured to the valve S and a lever U is a bar T, which is pivoted in any suitable way to the side of the generator-tank A or upon the valve-casing W, as shown, while its free end is adapted to engage with and control the rotation of the hand-wheel V, whose circumference is provided with radial slots. The hand-wheel V is mounted on a stem *v*, which is screw-threaded a part of its distance, as shown at *v'*, and thus secured to the cap *w*, which in turn is externally screw-threaded to engage with the internal threads on the valve-casing W, as shown. The end of the stem *v* is secured in any desirable way to the inner cap Y, which controls the inlet-port into the sludge or waste pit X of the generator-tank A. The cap Y is suitably packed and firmly held by the stem *v* to render the inlet-port water-tight. A discharge-outlet Z is provided for removing the sludge or waste matter. Directly over the waste-pit X is a sieve *a'*, which prevents the coarse particles from passing into the pit. A port-hole *a''*, located just above the sieve *a'*, affords access to the interior of the generator-tank A, and through it all matter collected on the sieve may be removed.

Referring now to Figs. 4 and 6 especially, I will describe my sealing-cap, (generally designated by the character *c*.) To the walls of the chamber C is secured the casting 1. This casting has an annular opening and a beveled seat 2. This seat is at such an angle as to be readily cleared from carbid lodging thereon, which might prevent the valve or cover making a tight joint. The upper and inner periphery of the casting 1 is provided with notches 3, forming segmental lugs 4, a valve or cap 5 having its lower face beveled to correspond to the seat 2. Packing 6 is interposed between the seat 2 and the valve or cap 5 and is secured to the valve 5 by means of a disk 7. A gland 8, which has peripheral lugs to engage in the notches 3 and under the lugs 4, is screw-threaded to the stem 9 of a hand-wheel 10. The stem 9 is secured to the valve 5 in such manner as to be free to rotate independent thereof, but held against axial movement.

The operation is evident from the description of parts. The gland 8 is slipped to place by passing its peripheral lugs down through the notches 3 and then turning it so as to bring its lugs underneath the lugs 4. The stem 9 is screwed downward, forcing the valve 5 to its seat and forcing the gland 8 upwardly firmly in engagement with the casting 1 by means of the lugs. The removal of the cap is simply a reversal of the operations just described.

The feeding device for the generator which I have herein described and illustrated is especially adapted for handling the carbid in the rough condition—that is, without requiring that it be crushed and reduced to a comparatively fine and uniform condition—and I will now refer to some of the features of construction of the feeding mechanism which make it possible to successfully handle such material. The storage-chamber C should be arranged vertically, or substantially so, in handling material of this character. The inclined chamber-wall *c'* and shelf *e* are so disposed relative to each other and to the feed-wheel that the said wall, which acts as a conduit between the storage-chamber and the feed-wheel, supports and directs a mass of the material, which is by the shelf *e* relieved of the weight and pressure of the material within the storage-chamber, and the upper surface of which mass of material while occupying the normal angle of repose of such material is free or unconfined, there being a free and open space between the said upper surface of the material and the shelf and the top of the wheel-chamber C'. This mass of material, relieved of the great weight and pressure of the material within the chamber C and unconfined on its upper surface, is delivered to the upper upmoving quadrant of the feed-wheel, with the result that the forward portion of such mass of material is agitated by the upward movement of the feed-wheel under and through it, this agitation taking place because the said mass is free and unconfined and operating to prevent bridging of the mass. When the parts of the feeding mechanism are arranged as described, the particles of the forward portion of the said mass of material which is being fed to the wheel under the influence of the agitation just referred to tend to fall backward, and hence the danger of the pockets of the feed-wheel being overloaded is reduced to a minimum.

Having thus described my invention, what I claim is—

1. In a feeding device for a gas-generating apparatus, the combination of a storage-receptacle for the material from which the gas is generated, a feed-wheel located below the said receptacle, a conduit from the receptacle to the feed-wheel arranged to deliver to

the upper upmoving quadrant of the latter, a chamber in which the wheel is located having a free space extending from the conduit above the wheel and around the downmoving side thereof, and a shelf located in the storage-receptacle and extending downward from the side of the storage-receptacle which is directly over the feed-wheel and inward into the said chamber sufficiently far to prevent the weight of the contents of the receptacle from bearing vertically upon the wheel, the shelf being arranged at a distance above the feed-wheel to permit the material to accumulate in the space between the wheel and the shelf and to be agitated therein, substantially as set forth.

2. In a feeding device for a gas-generating apparatus, the combination of a storage-receptacle for the material from which the gas is generated, a feed-wheel located below and to one side of the said receptacle, a conduit from the receptacle to the wheel delivering to the upper upmoving quadrant of the latter, means for taking the weight of the material within the receptacle from off the material which is being delivered to the wheel, and a chamber in which the wheel is located having a free space extending from the said conduit, above the wheel, and around the downmoving side thereof, substantially as set forth.

3. In a gas-generating apparatus, the combination with a generating-tank and a gas-holder of a feeding device, comprising a storage-chamber, a wheel-chamber below and at one side of the storage-chamber, a feed-wheel placed close to the side of the wheel-chamber which is nearest to the storage-chamber, a free space between said feed-wheel and the opposite side of said wheel-chamber, rigid, radial ribs on said wheel between which pockets are formed, a shelf in said storage-chamber projecting over said feed-wheel and protecting it from the vertical pressure of the storage-chamber contents, a neck connecting the storage-chamber with the wheel-chamber and so inclined and disposed that said feed-wheel receives its charge near the horizontal center of the side nearest the storage-chamber, and there is left a free space above the material which is being delivered to the wheel and suitable means for revolving said feed-wheel by the rising and lowering of the gas-holder whereby the feed-wheel in rising forces a portion of the contents of the storage-chamber backwardly and upwardly thus preventing "bridging" of the same.

4. In a gas-generating apparatus, the combination with a gas-generator, a gas-holder and a feeding device of means for cleaning said generator, comprising a pipe for conducting away all gas in said generator, a valve controlling the flow of gas in said pipe, a bar secured to and moving with said valve, a lever secured to said bar and pivoted to said generator, a hand-wheel provided with radial slots and adapted to be locked and released by said lever, a screw-threaded stem, carrying said hand-wheel, an outer valve-chamber cap screwed upon said stem, a valve-casing carrying said cap, an inner valve-chamber cap to which the end of said stem is secured, a port-hole opening into the waste-pit of said generator-tank and controlled by said inner valve-chamber cap, and an outlet-port through which the waste matter may be discharged, whereby the inlet-valve to the generator is securely locked and sealed during the process of gas generation and can only be opened when the generator is free from gas, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FRANK K. ROBERTS.

Witnesses:
A. W. PLUMLEY,
D. B. TUTTLE.