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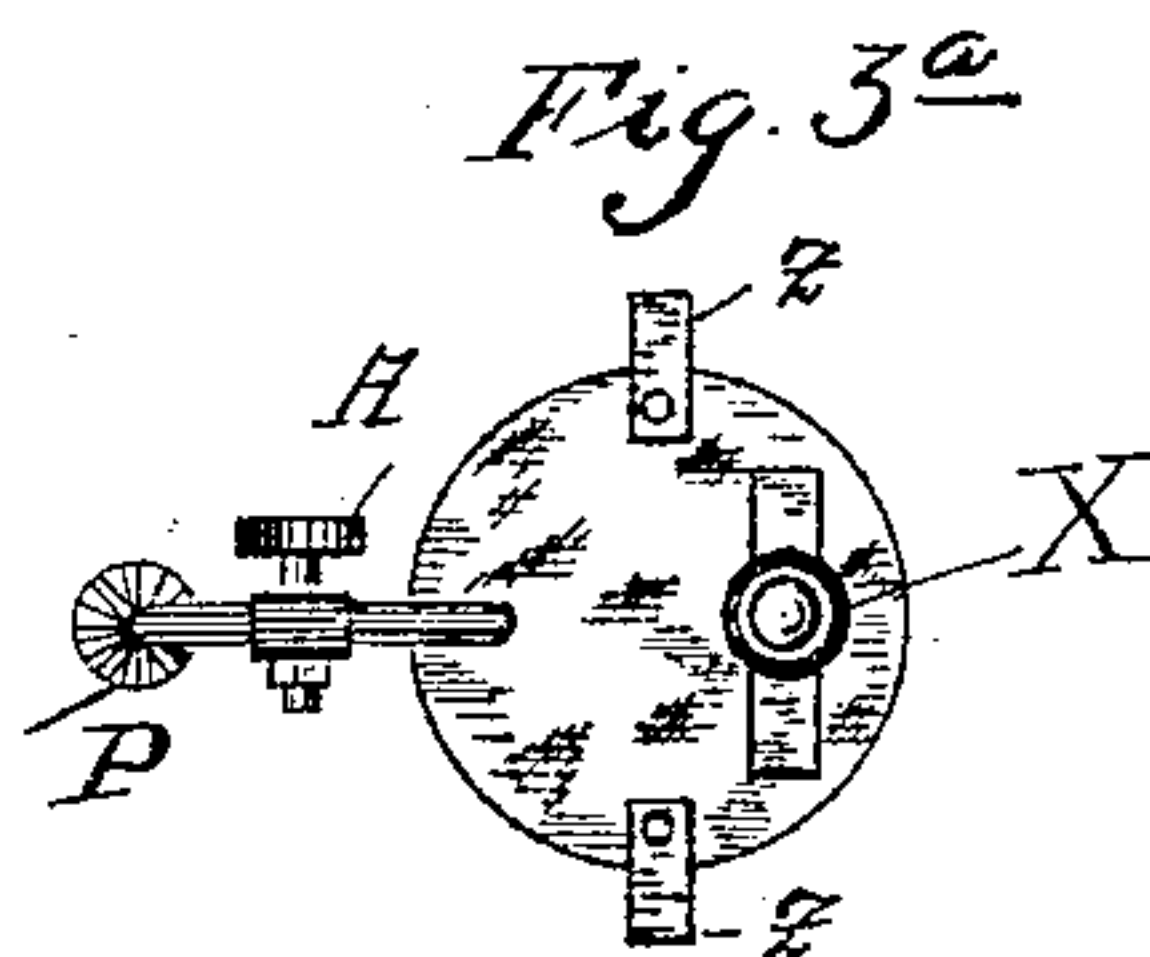
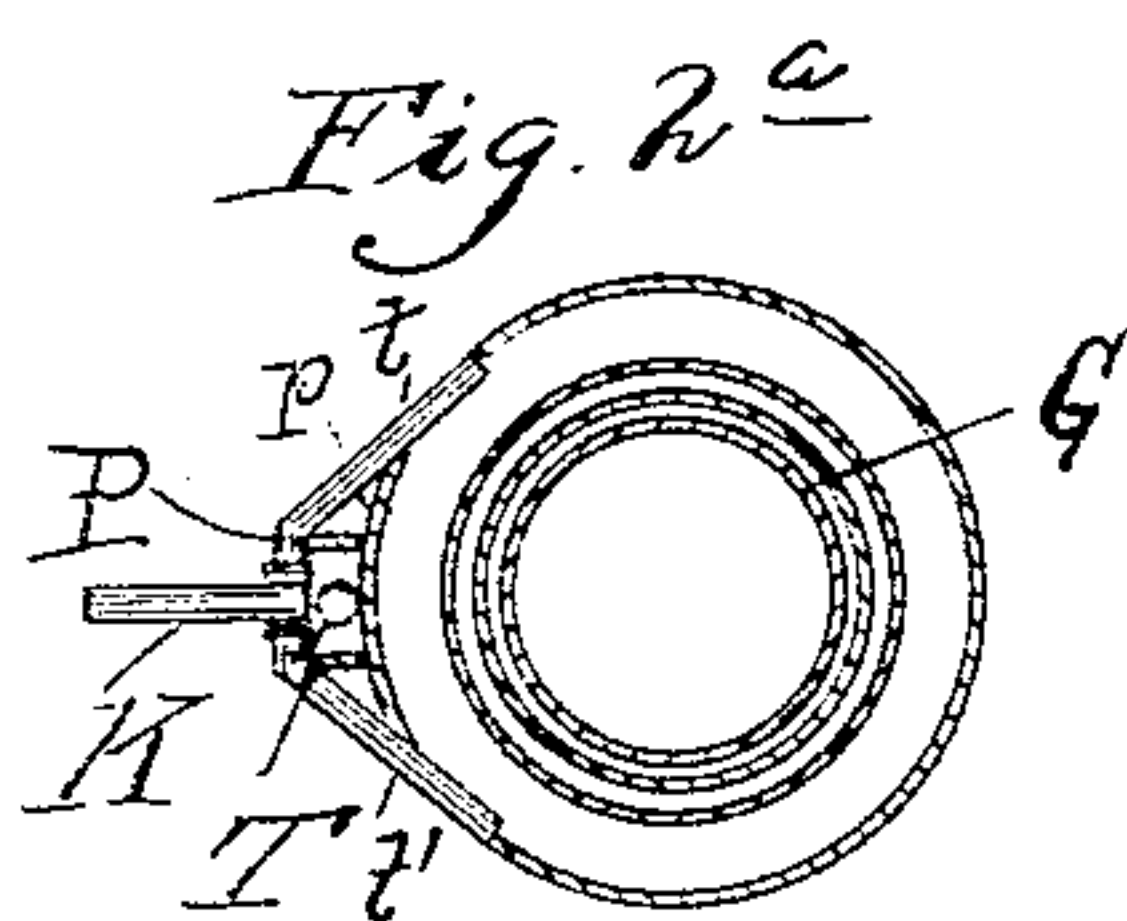
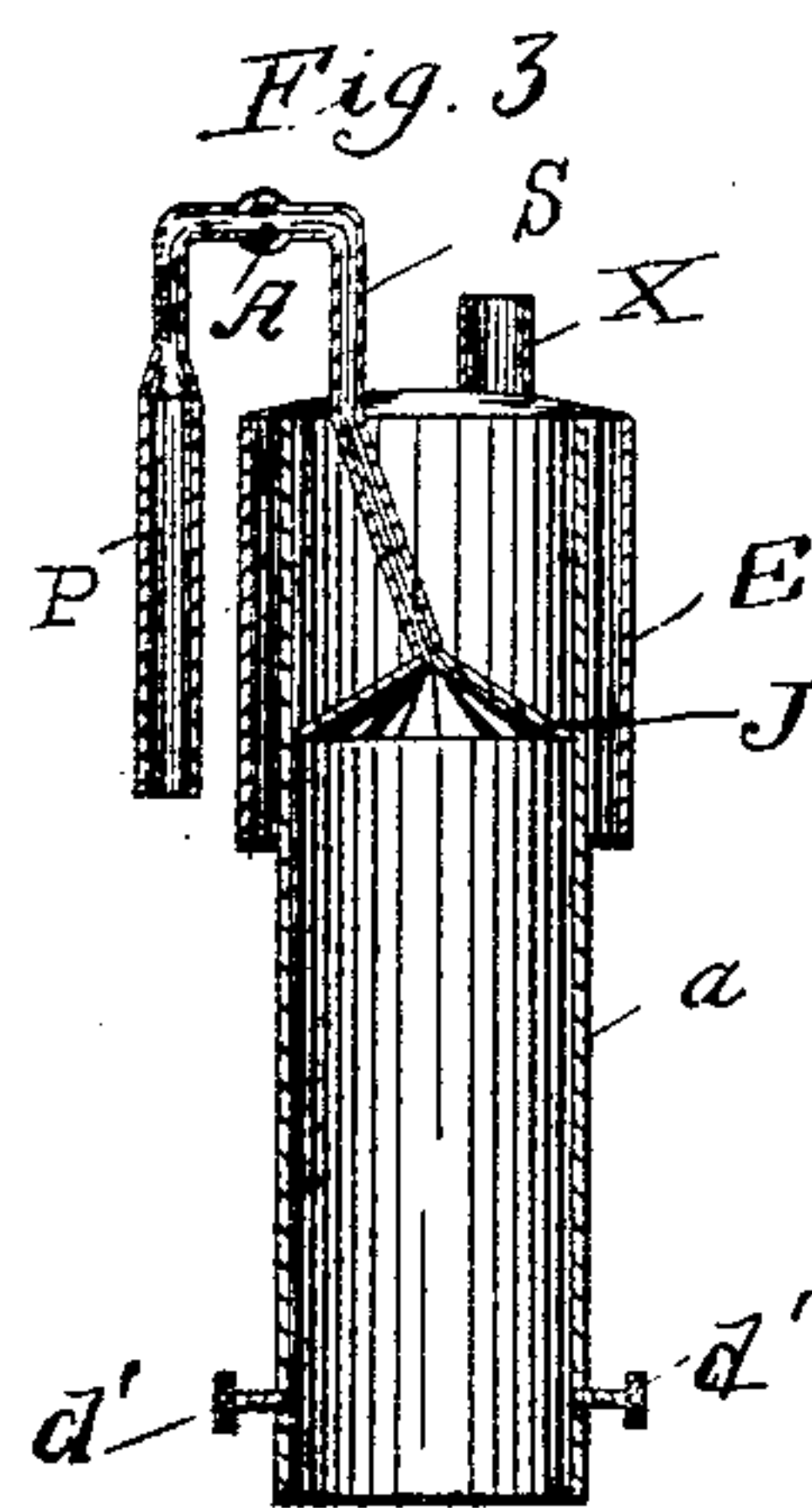
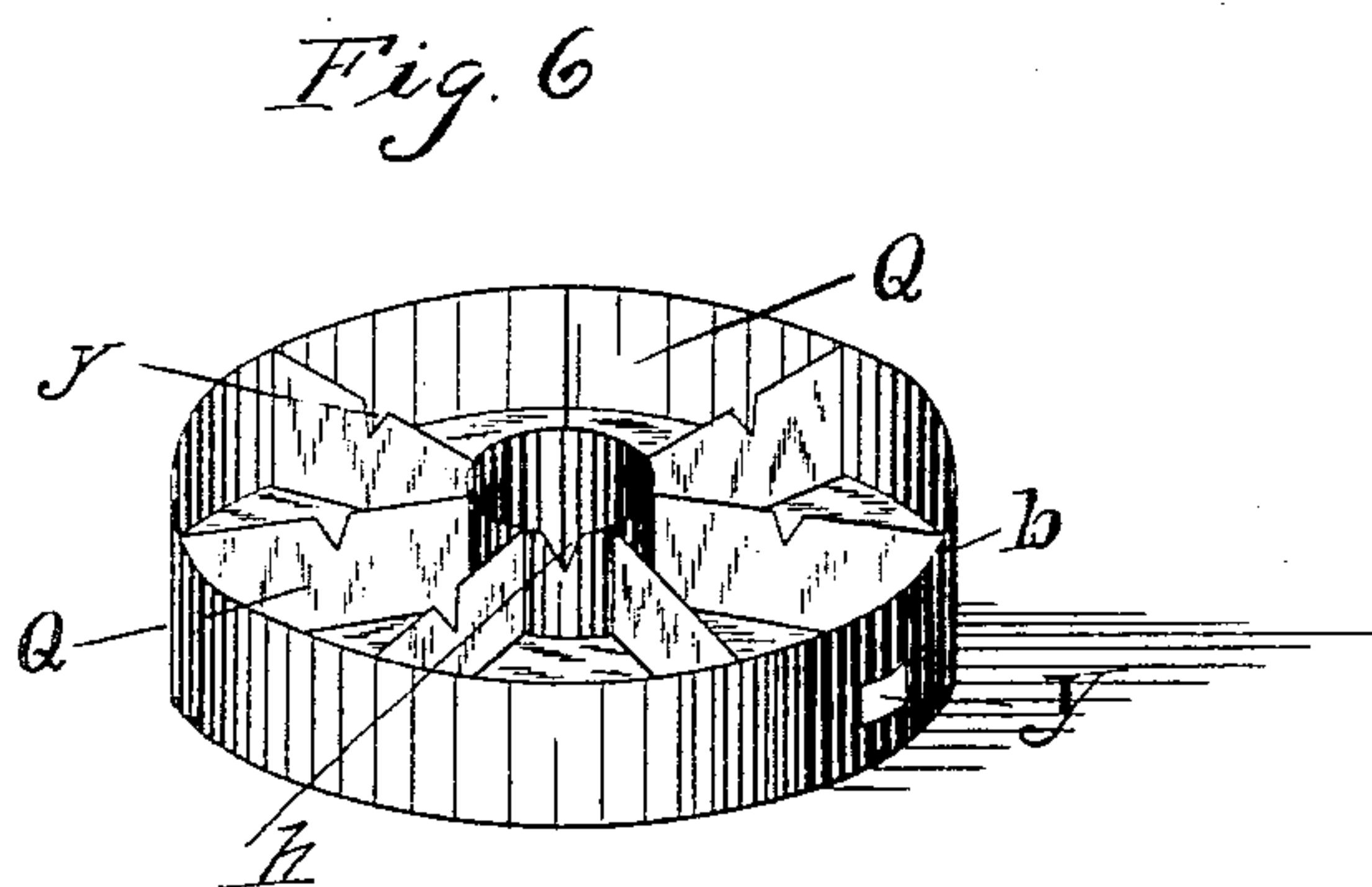
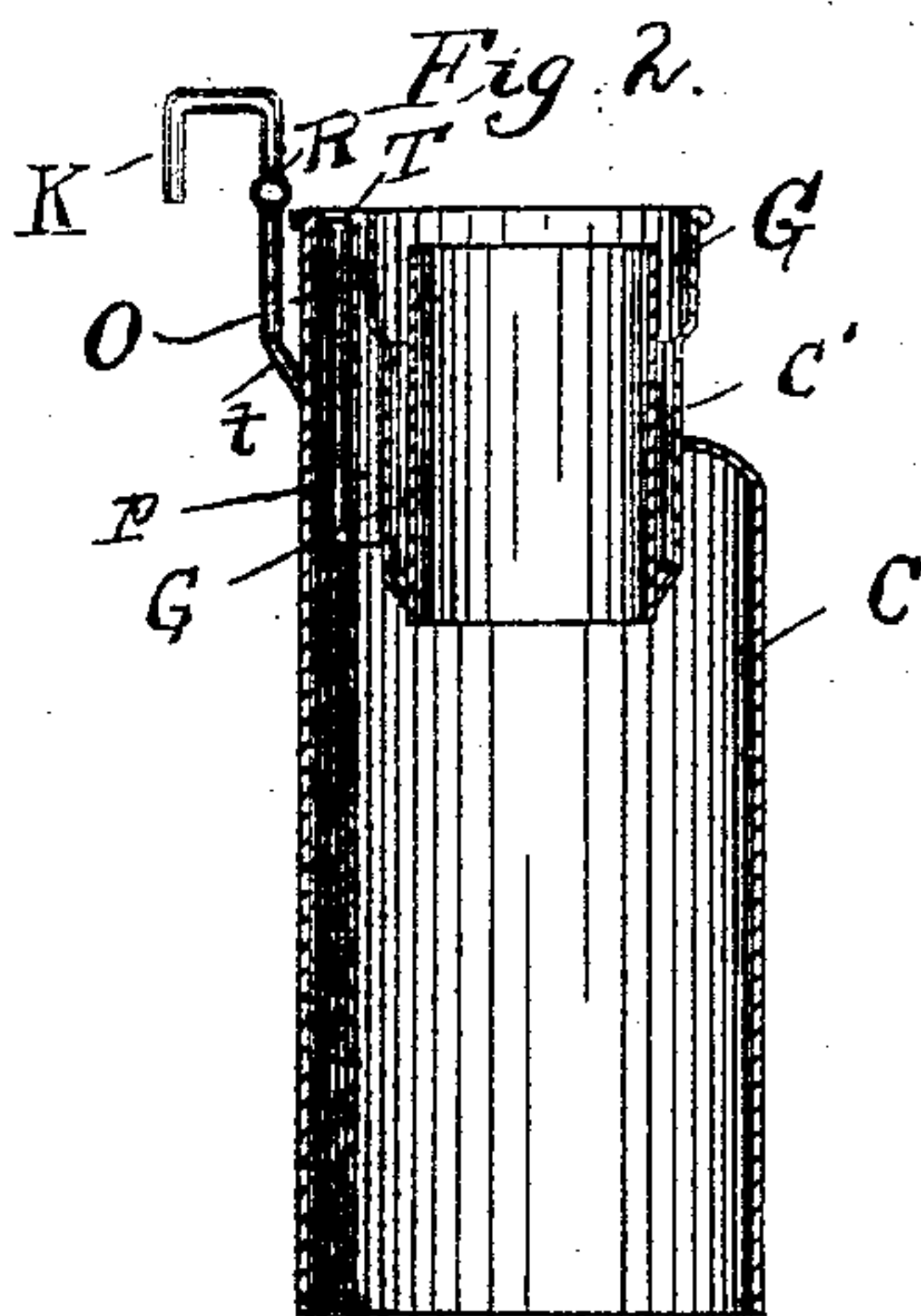
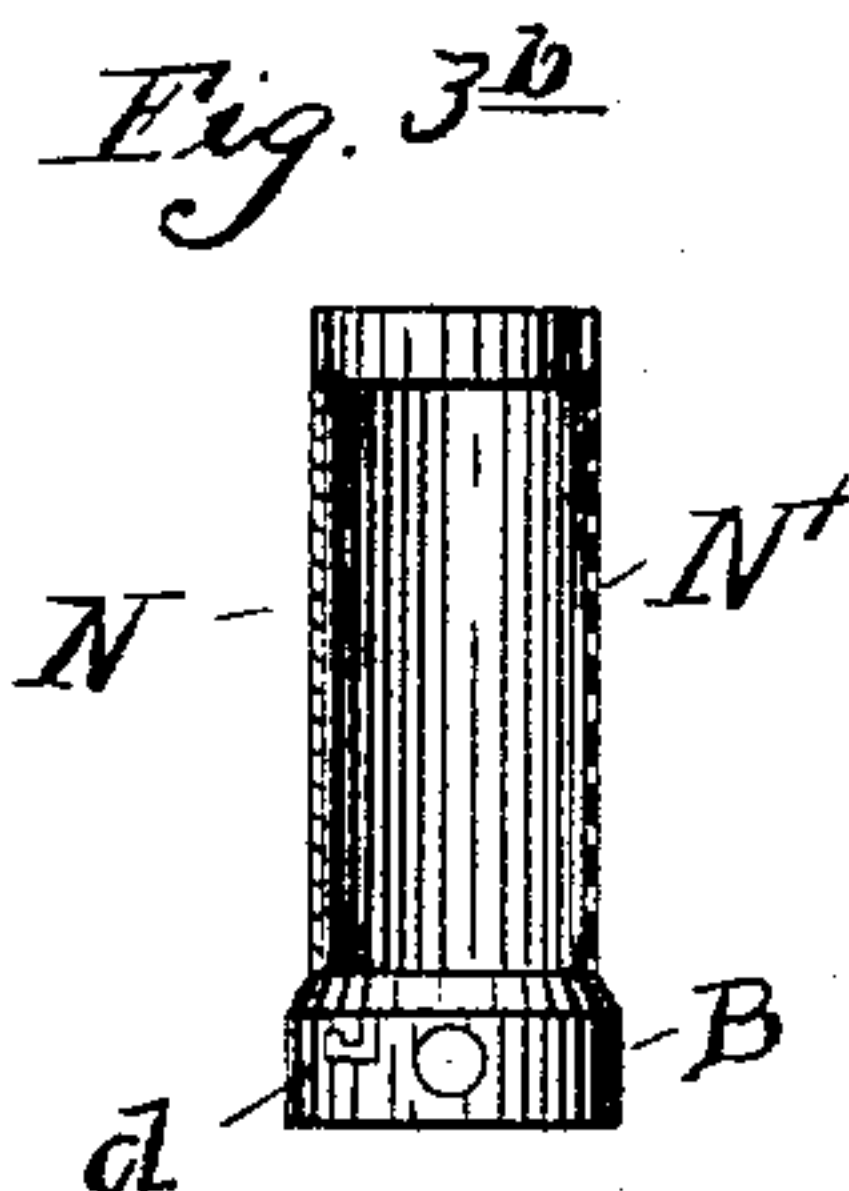
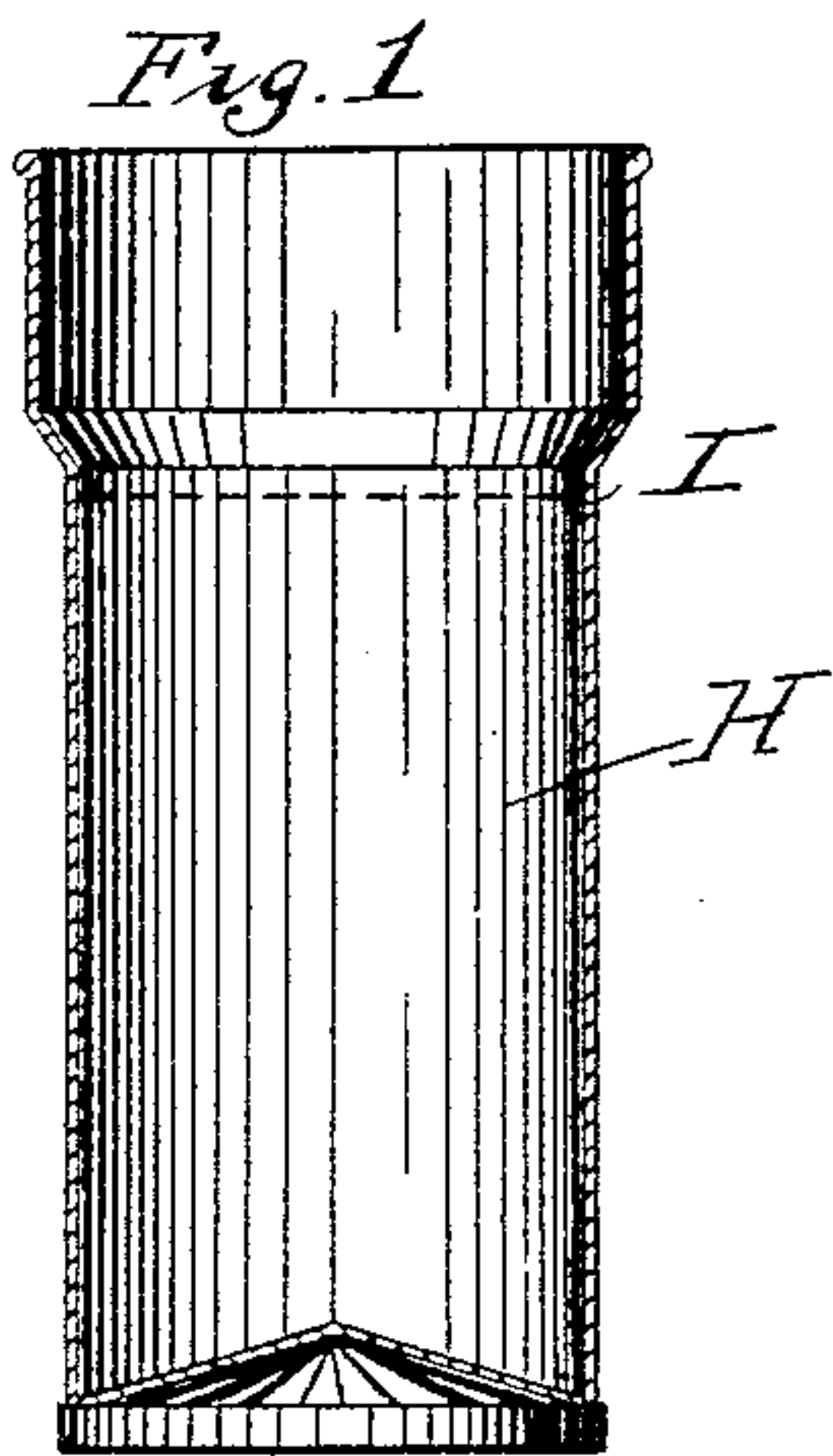
Patented Oct. 11, 1898.

C. MAURIN.
ACETYLENE GAS GENERATOR.

(Application filed Oct. 6, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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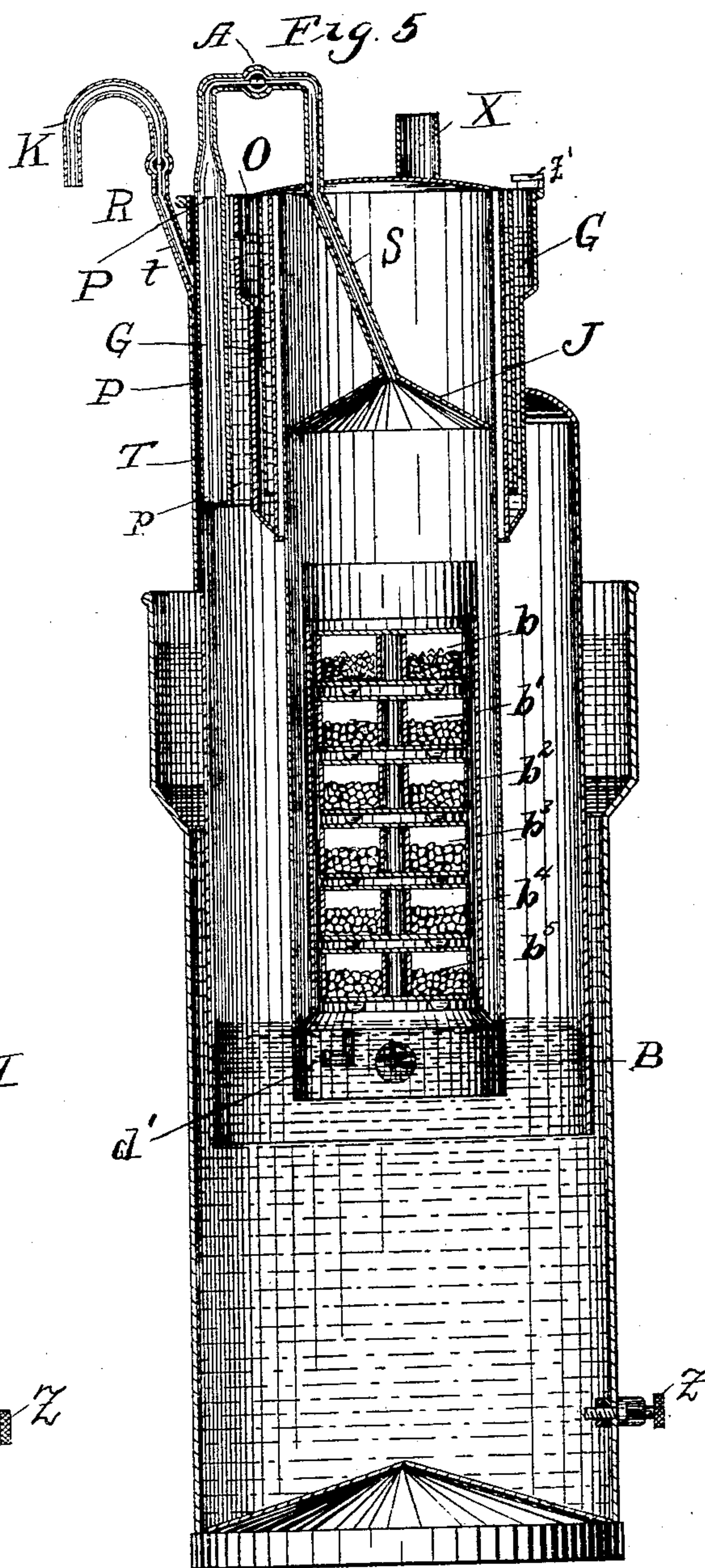
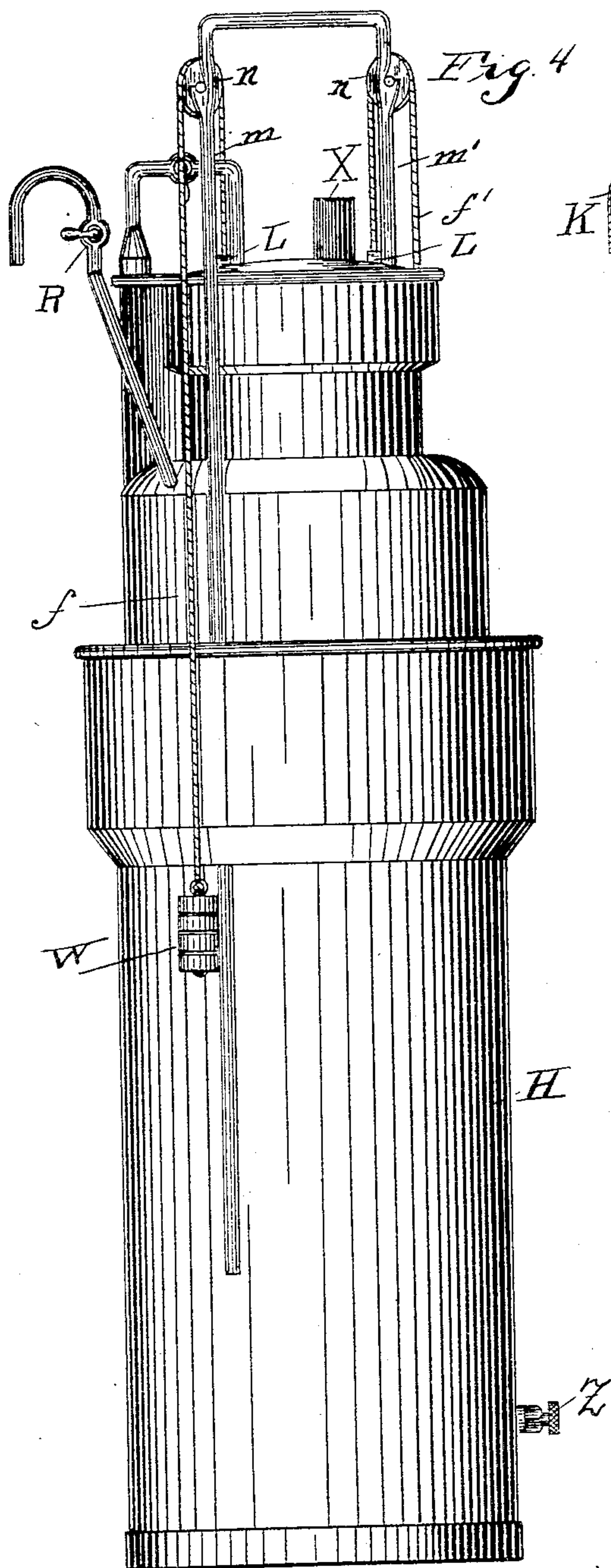
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

CELESTIN MAURIN, OF PARIS, FRANCE.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 612,361, dated October 11, 1898.

Application filed October 6, 1897. Serial No. 654,267. (No model.)

To all whom it may concern:

Be it known that I, CELESTIN MAURIN, a citizen of the French Republic, residing at Paris, France, have invented certain new and useful Improvements in Apparatus for Producing Acetylene Gas, of which the following is a specification.

My invention relates to apparatus for generating acetylene gas; and the primary object of the invention is to construct such an apparatus that will produce a certain limited volume of acetylene gas obtained at a pressure that is always even and constant and that may be readily controlled.

It consists in the novel arrangement and combination of parts, as hereinafter more fully described, and afterward particularly pointed out in the claims.

By means of an intermittent development of gas obtained from a determined quantity of calcium carbide corresponding to the capacity of the gasometer I overcome two serious defects of apparatus of this class—viz., a return of the flame and the presence of a violent or agitated flame, as only a small quantity of calcium carbide is attacked at a time, thus making the apparatus absolutely safe and maintaining the inner pressure always constant, this equilibrium being established between the water and the gas at all times during the production and consumption, and all leaks which may diminish the pressure are compensated by a hydraulic closure or cut-off.

My invention will be fully understood from the following specification, taken in connection with the accompanying drawings, forming part of the same.

In said drawings, Figure 1 is a vertical section through the outer vessel. Fig. 2 is a vertical section through the inner vessel or bell-shaped gasometer. Fig. 2^a shows the same in a plan view. Fig. 3 is a vertical section through the gas-generating chamber. Fig. 3^a is a plan view of the gas-generator. Fig. 3^b is a cross-section of the basket for containing the cases of calcium carbide. Fig. 4 is an outer elevation, and Fig. 5 a vertical cross-section, of the complete apparatus. Fig. 6 is a perspective view of one of the casings to receive the calcium carbide having its cover

removed to more clearly show the sectors or different compartments.

The improved apparatus, of which the elevation Fig. 4 gives a general view, is composed of three principal parts—first, the outer receptacle; second, the bell-shaped gasometer, and, third, the gas-generator with the basket.

The receptacle II, Fig. 1, is provided with two vertical uprights *m m'*, connected at the top ends by a horizontal bar and carrying each a pulley *n*, Fig. 4.

The bell or gasometer, Fig. 2, comprises a greater cylinder *C*, constituting the gasometer proper, and a smaller cylinder *C'*, having double walls and being secured in the top of cylinder *C* and communicating directly with the gasometer, while the space between the two walls of cylinder *C'* forms an annular well *G*. This top part, besides, is provided with a well *p* on one side, (see Figs. 2 and 2^a,) which communicates through the opening *O* with said well *G* and through the pipe *T* with the interior of the gasometer. Besides this pipe *T* two smaller pipes *t t'* communicate with the gasometer and extend therefrom to a joint, where they unite into a single pipe *K*, provided with a valve *R*.

The gas-generator, Fig. 3, comprises as its main part a cylinder *a*, open at the bottom and closed at its top by an inverted cylinder *E*, the walls of which are adapted to be received within the well *G* of the cylinder *C'*. The inner cylinder of the generator is closed at about two-thirds of its height by means of a conical partition *J*, from the apex or point of which a pipe *S* extends upwardly at a slight angle leading to the outside, where after making a bend it descends vertically. This pipe is provided with a valve *A* and terminates in a bell-shaped plunger *P*, adapted to be received over the pipe *T* and communicating thereby with the gasometer. A handle *X* is secured to the dome of the generator to facilitate the manipulation of the same. The latter is adapted to receive a basket *N*, consisting of a cylinder, with openings *N'* in the wall, having a base *B*, whose diameter is equal to that of the cylinder *a* of the generator, upon which it is secured by means of pins and angular slots, forming the well-known bayonet-

joint $d d'$. Said basket is adapted to inclose a plurality of casings $b b' b^2 b^3 b^4 b^5$, Fig. 5, which are charged with calcium carbid in the form of cartridges.

5 The apparatus operates in the following manner: After having placed the outer receptacle H on a suitable base it is filled with water up to the level indicated by the dotted line I, Fig. 1. The bell or gasometer C is then
 10 immersed into the receptacle while the valve R is held open. When the gasometer has reached the bottom of the receptacle, it is held in position by means of a movable bolt or set-screw Z. Thus the gasometer remains wholly
 15 submerged in the water of the receptacle, and not a particle of air can remain inside of the same. The valve R is then closed, and two cords $f f'$, carrying at their ends counterbalance-weights W, are tied to ears L, secured to
 20 the gasometer. Water is then added by pouring the same into the annular well G until it reaches the height of the opening O. Part of this water passes into the well p , which should be filled also until the opening O is under the
 25 level. The basket N in the present instance has a capacity for six cylindrical cases, each one of which is divided inside into seven equal sectors Q, and one of these sectors communicates with the exterior by means of an opening Y, provided on the side of the casing.
 30 The sectors communicate with each other by means of small openings y , provided in the partitions, and the gas evolved has its egress from the casing by means of an opening h in the last sector, as shown in Fig. 6. Each sec-
 35 tor is charged with calcium carbid in proportion to the capacity of the apparatus. Each casing is thus filled and secured in the basket, and the latter is placed in the body of
 40 the generator, whereupon both are connected together. The valve A should then be well closed. The generator thus prepared is placed into the bell by manipulating the handle X, and the plunger P is guided to pass
 45 over the pipe T, while the outer wall E of the generator is plunged into the annular well G. In this position the parts can be connected by means of two ears z , pivotally secured on the dome, Fig. 3^a, engaging with projections
 50 z' , contiguous thereto. When the gas is to be delivered direct from the apparatus to the points of consumption, whether it be for illuminating or for any other purpose, it is sufficient to connect the service-pipe with the
 55 pipe K of the gasometer by means of a flexible rubber tube, whereby the apparatus is made complete for operation. The movable bolt or set-screw is then released and the valve A is opened. The external pressure of
 60 the water in the receptacle will drive out any air that is present in the generator and force it through the pipe S to the plunger P. Meanwhile the water rises in the generator to replace said air and soon reaches the height of
 65 the lowest case, thus coming in contact with the first sector through the opening Y in the casing. The acetylene gas evolved is con-

centrated before the partition J in the generator proper, from whence it passes through
 the connections S, P, and T into the gasom- 70
 eter C. By this initial development of gas the pressure increases in the apparatus. The water is immediately forced back downwardly, the gasometer and the generator rising simultaneously. The production of acety- 75
 lene gas ceases, of course, as the carbid is no longer in contact with the water. The generation of gas continues until the cartridge in the first sector is fully exhausted and has
 80 given up all the gas that it can develop in contact with water. The forty-one remaining cartridges remain absolutely intact and the water can attack a second cartridge only after the first has been fully exhausted. To
 85 supply the burners in a house, the valve R is opened and the gas escapes freely to the various points of consumption. Proportionately to the consumption the gasometer sinks in the outer receptacle until the first case of
 90 sectors again comes into contact with the water, which penetrates into the first exhausted sector and from this on into the second sector, where it meets with an intact cartridge. Thus the production of gas and the rise of
 95 the gasometer are repeated. At each following descent of the gasometer water penetrates into the sector next in sequence, exhausting all seven in the first casing. Then it repeats the same play in the second casing, &c., until the sectors in all the casings have been
 100 exhausted of their cartridges. The operation can be interrupted at any time by closing the valve R, whereupon all parts will remain dormant for any length of time. The apparatus will recommence its work when the
 105 valve R is simply opened.

Generally speaking, all acetylene-gas apparatus heretofore have been constructed on the principle that the carbid is immersed in the
 110 water or that the water is led upon the carbid; but in both cases the carbid inclosed in the apparatus represents one single mass. It is self-evident by the contact of water with calcium carbid gas is evolved and that immediately thereupon the water is forced back
 115 and that the globe, with the basket containing the carbid, ascends and that in this system of apparatus the production of gas ceases in order to recommence when the contact of the water and carbid is repeated. This is true
 120 theoretically, but not in practice. The carbid when moistened preserves this moisture and the development of acetylene gas becomes less turbulent. The operation continues in a permanent and slow fashion and
 125 losses of gas result during the interruptions of the same, especially when the interruption lasts for any length of time. To avoid these losses to a certain extent, the apparatus must necessarily be of very large dimensions, which
 130 are disproportionate for house service, very inconvenient, and, above all, dangerous. My apparatus retains always its small volume and generates but a small quantity of gas due

to each contact of water with a cartridge. The volume of gas produced is maintained in the gasometer always at an even pressure no matter if the operation of the apparatus be discontinued for months, as the apparatus always generates a determined volume of gas proportionate to the charge of carbid placed in the cases.

The charging of the apparatus is very simple. It is only necessary to put a cartridge in the sectors of each casing, which cartridges are ready prepared in size and weight to fit the sectors, while in other systems the carbid must be dealt out for each kind of apparatus, and the larger pieces must be broken, &c., and tedious operations and great care are necessary.

The cleaning and recharging of my apparatus are effected in the following manner: The basket is loosened, the casings are withdrawn and emptied after having removed the cover closing each casing. They are then rinsed and the hands need not come in contact with the exhausted material. After the casings have been dried the cartridges are placed into the same in the above-described manner, the basket is charged, and the bottom is closed, whereupon the generator is returned to its place.

The security of my apparatus is absolute. The division of the charges of calcium carbid into cartridges completely separate from each other permits of obtaining each time a predetermined quantity of gas only, which is incapable of producing a dangerous explosion even when fire is applied voluntarily. A return of the flame cannot occur, as a vacuum or decrease of pressure can never occur in the interior of the gasometer, in which the water maintains always by its equilibrium a constant pressure. In view of the small quantity of carbid attacked at a time there is no danger of a violent development of heat at each production of gas. All the joints are closed hydraulically, and thus no leakage of gas can occur.

It is self-evident that the details of construction may be varied. The number of casings containing the cartridges may be increased or decreased and arranged in different ways in the generator without departing from the nature and spirit of the invention. I do not confine myself, therefore, to the exact details of the construction described, and illustrated in the drawings; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for producing acetylene gas from calcium carbid in the form of cartridges as described, the combination of a bell or gasometer having the form of a cylinder and being surmounted by a smaller cylinder provided with double walls to form an annular well G adapted to communicate with the gasometer, said smaller cylinder being provided at one side with a second well p in open

communication with well G and provided with a pipe T leading to the gasometer; and suitable service-pipes connected with said gasometer, substantially as described. 70

2. In an apparatus for producing acetylene gas from calcium carbid in the form of cartridges as described, the combination of a gas-generator, consisting of a cylinder open at its bottom and closed at its top by an inverted cylinder E adapted to be received into the annular well G of the gasometer, and closed at about two-thirds of its height by means of a conical partition J; a pipe secured in the apex of said partition and adapted to establish communication with the gasometer through suitable intermediate means, substantially as described. 75 80

3. In an apparatus for producing acetylene gas from calcium carbid in the form of cartridges, as described, a water-receptacle inclosing a bell or gasometer, adapted to be plunged into said receptacle, and a gas-generator having a basket adapted to be telescoped into said gasometer, in combination with a plunger P communicating with the interior of the gasometer and comprising with the well p a complete element with separable parts as described, said element forming with the well G a hydraulic closure or cut-off adapted to prevent any leaks which may diminish the pressure, whereby by means of an intermittent development of acetylene from each cartridge of calcium carbid, the gas is maintained at a constant pressure in the gasometer, substantially as described. 85 90 95 100

4. In an apparatus for producing acetylene gas by calcium carbid in the form of cartridges, as described, the combination of a water-receptacle, a gasometer adapted to be plunged into said receptacle, and a gas-generator adapted to be telescoped into the gasometer, said generator provided with a conical partition J, and with a lead-away pipe S terminating in a plunger P adapted to be guided over a pipe T in direct communication with the gasometer; and said generator having a basket N, consisting of a cylinder having openings in its side and having a base B adapted to fit snugly into the generator and to be secured therein by suitable means, said basket being adapted to receive a plurality of casings b arranged one above the other, said casings having a central core or chamber, and divided into a plurality of sectors of equal capacity, said sectors adapted to receive each a cartridge of calcium carbid, and adapted to communicate with each other consecutively, and suitable means for feeding water to said cartridges in succession, substantially as described. 105 110 115 120 125

In testimony whereof I affix my signature in presence of two witnesses.

CELESTIN MAURIN.

Witnesses:

CHARLES CALVANIS,
CHARLES FLEURY.