



W. T. LOVE.  
ACETYLENE GAS GENERATOR.

(Application filed June 14, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 6.

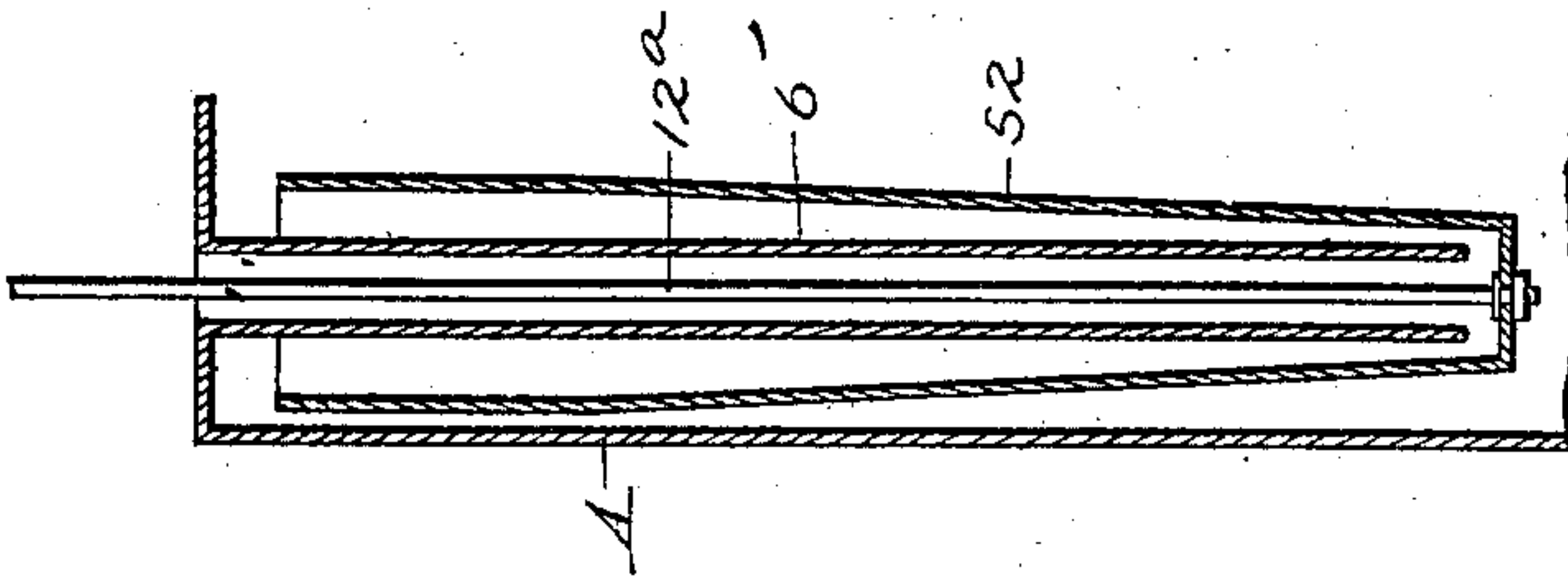


Fig. 5.

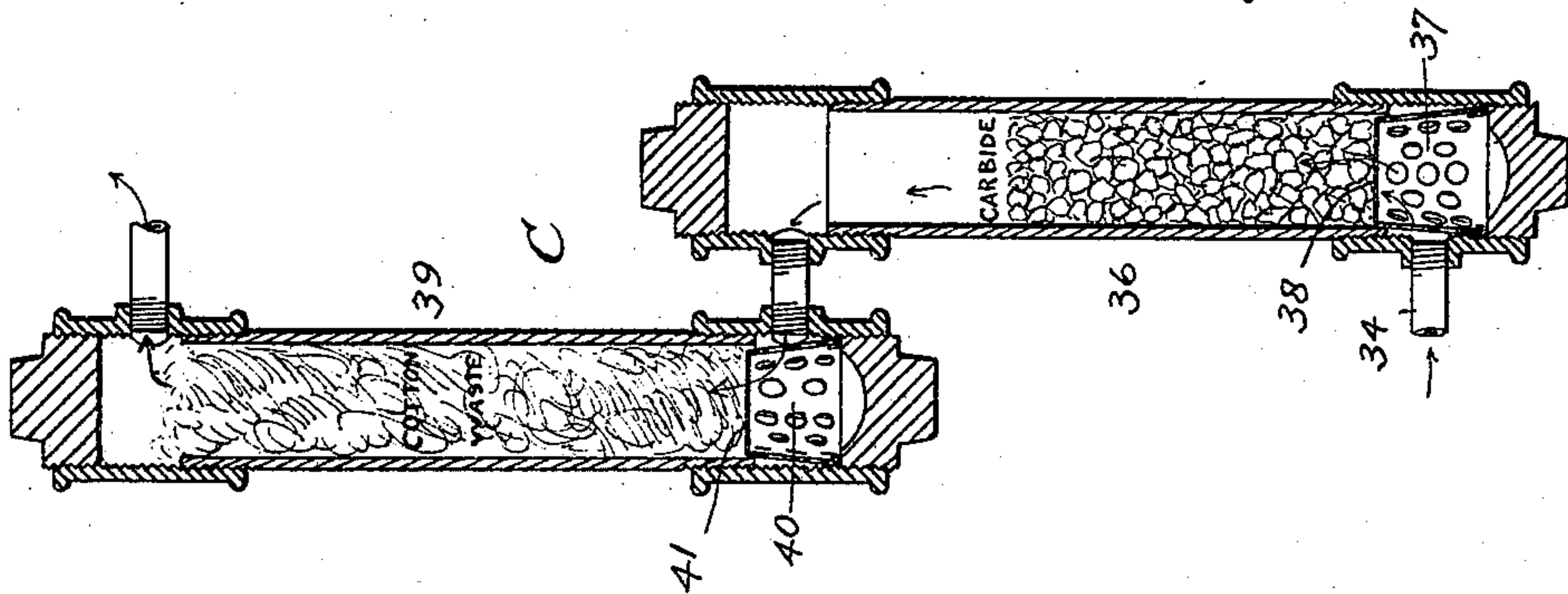


Fig. 9.

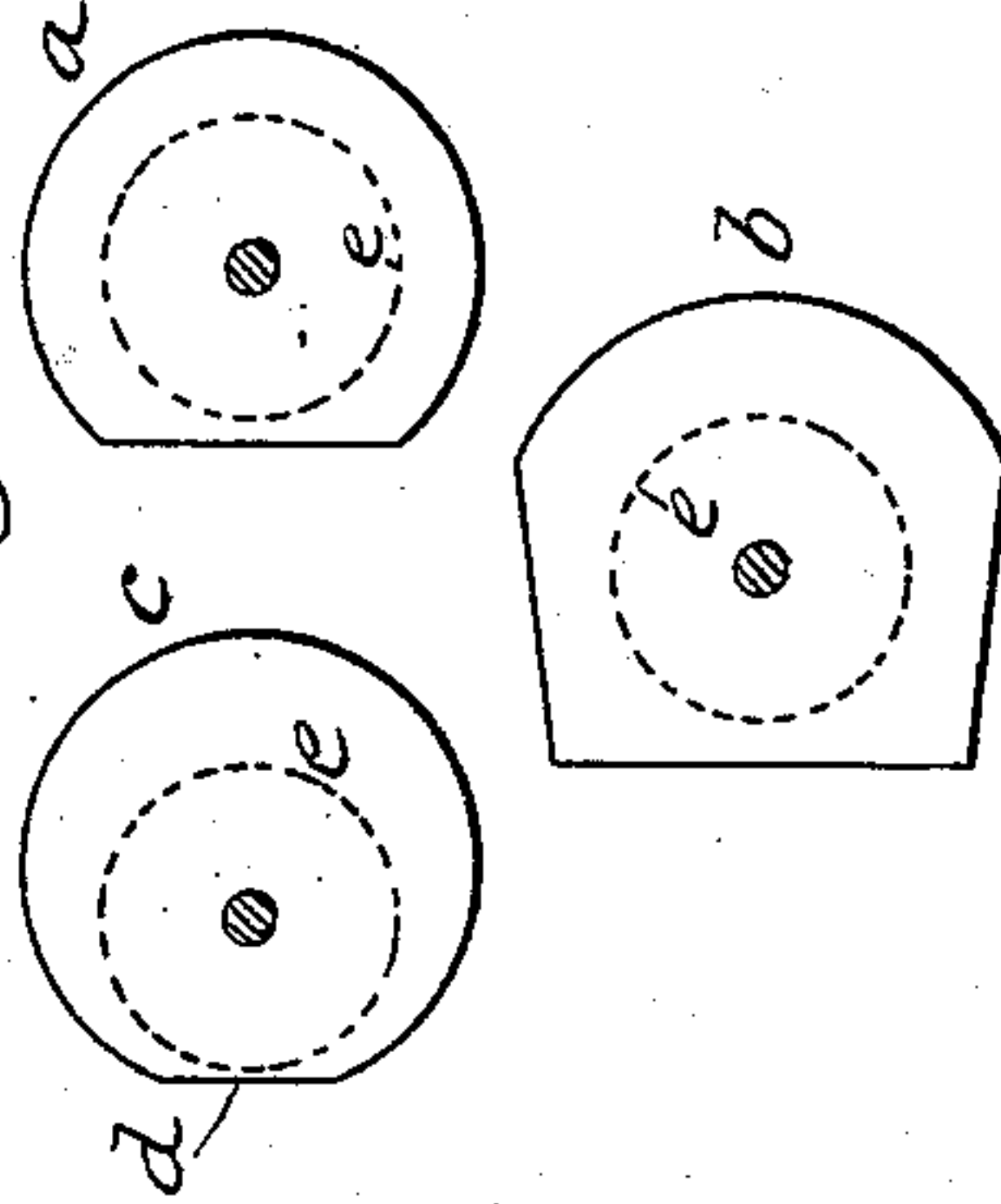


Fig. 4.

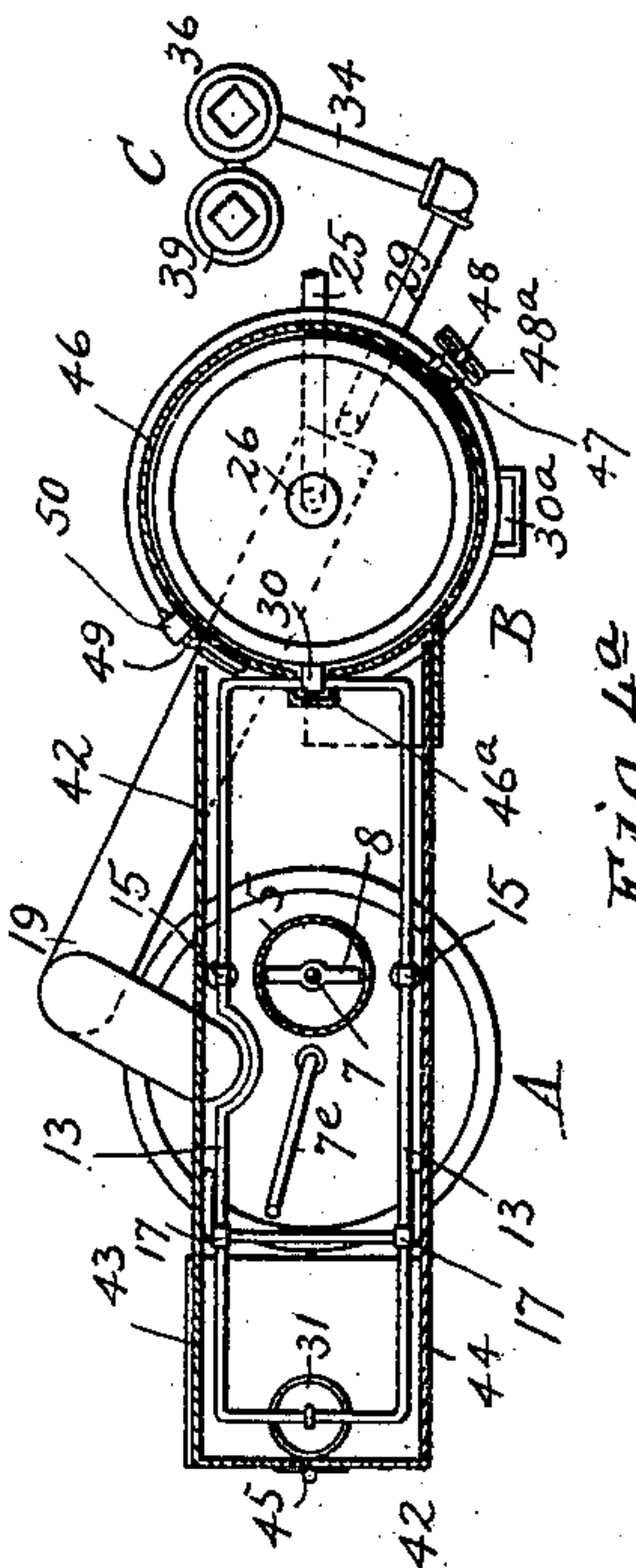


Fig. 8.

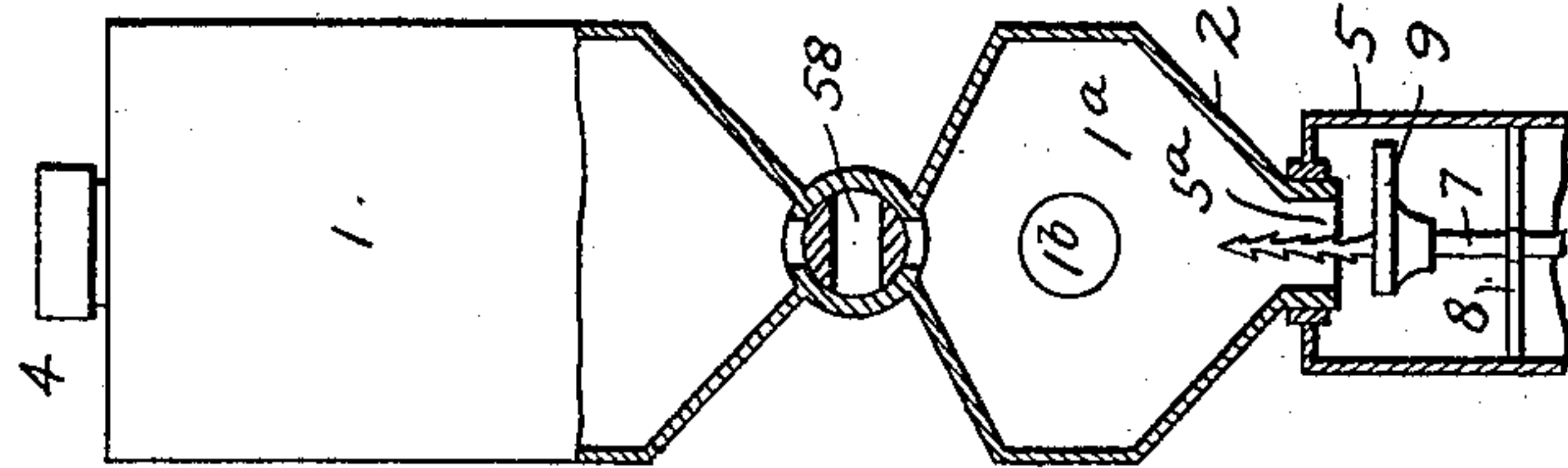


Fig. 4a.

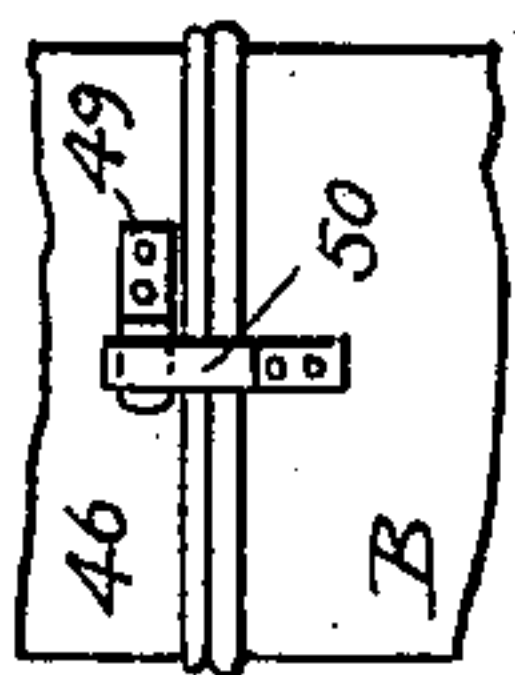
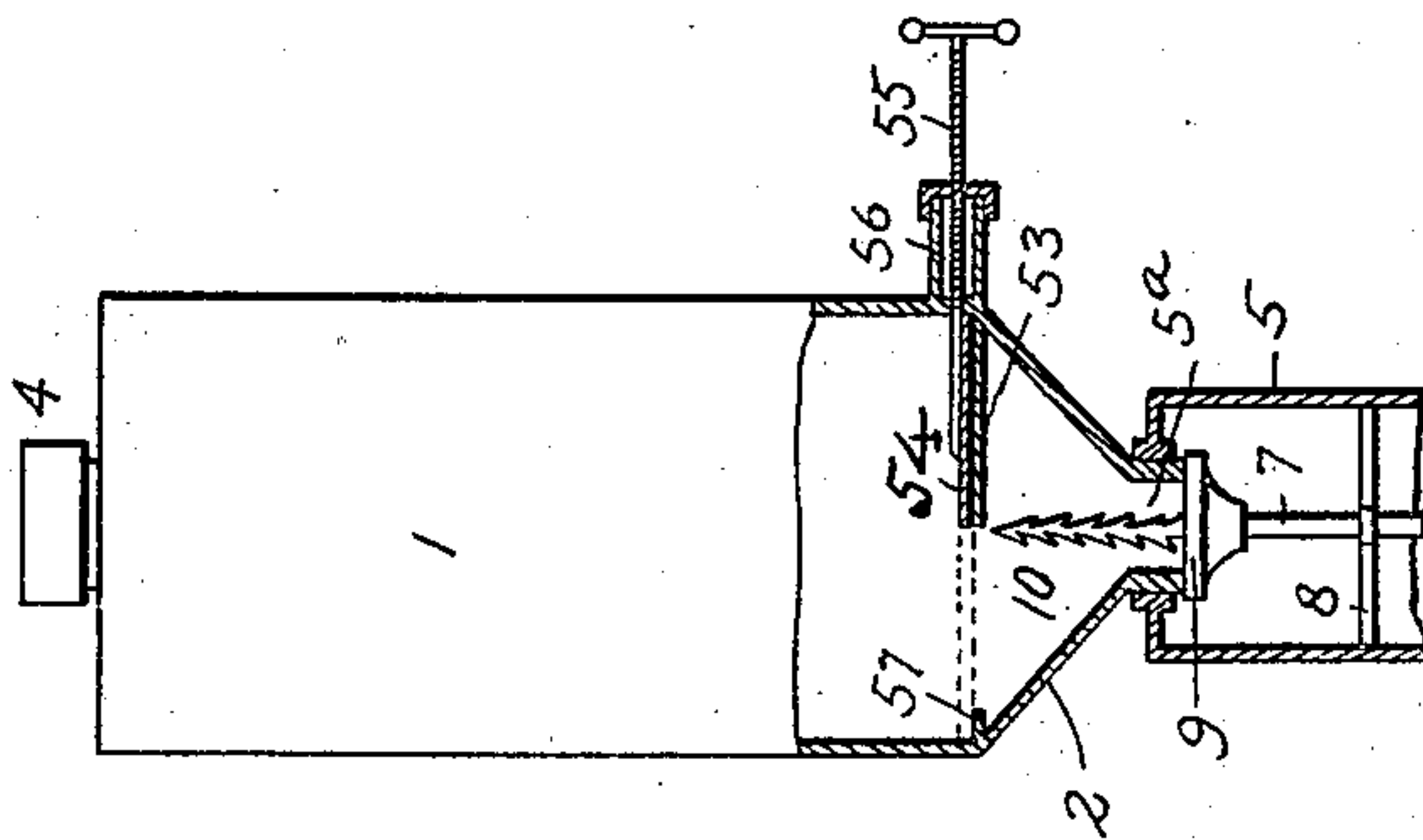


Fig. 7.



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# UNITED STATES PATENT OFFICE.

WILLIAM THOMASSON LOVE, OF SPOKANE, WASHINGTON.

## ACETYLENE-GAS GENERATOR

SPECIFICATION forming part of Letters Patent No. 640,142, dated December 26, 1899.

Application filed June 14, 1899. Serial No. 720,544. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM THOMASSON LOVE, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification, reference being had to the accompanying drawings and to the letters and numerals marked thereon.

My invention relates to improvements in that class of acetylene-gas-generating machines in which the carbide of calcium or other gas-producing material is dropped or fed into a generating-chamber containing water or other liquid to generate gas, which gas is then carried to an exterior gasometer ready for consumption.

One of the objects of my invention is to provide a machine in which the carbide, &c., shall be automatically fed to or shut off from the generating-chamber containing water, and this automatic operation is effected through the medium of mechanism set in action by the rising and falling of a gasometer-bell whenever the gas in the gasometer gets below or exceeds a predetermined quantity.

Another object of the invention is to provide a feeding-valve so constructed that the amount of gas-producing material fed to the generating-chamber may be proportioned to the quantity of gas being consumed, thereby insuring a constant supply of gas in the gasometer and avoiding a generation of gas in excess of the amount required.

A further object is to provide a cover for the working parts of the machine so constructed and arranged that it may be readily removed or swung aside to allow inspection of the mechanism and which may be locked in place by means of an independent cover of the gasometer.

A further object is to provide an improved means of drying and cleaning the gas of all impurities.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the claims hereto appended.

In the drawings, Figure 1 is an elevation of

my improved acetylene-gas-generating machine. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a vertical transverse section on the line *x x*, Fig. 1. Fig. 4 is a section on the horizontal line *y y* of Fig. 1. Fig. 4<sup>a</sup> is a detail view showing the latch and hook used in locking the cover of the generator to the body. Fig. 5 is a vertical section of the gas drying and cleaning device. Fig. 6 is a modification of the mechanism shown in Figs. 2 and 3 for preventing the escape of gas from the generating-chamber. Fig. 7 illustrates the carbide-holder, partly in section, and the valves for feeding the gas-producing substance to the generating-chamber. Fig. 8 is a modification of the devices shown in Fig. 7. Fig. 9 illustrates modified forms of the valves seen in Fig. 7.

Similar numerals and letters of reference refer to similar parts throughout the several views.

A indicates the generating-chamber, B the gasometer or storage-tank, and C the gas drying and cleaning device.

1 is the carbide-holder or charging-hopper, having a funnel-shaped bottom 2, which is located above the generating-chamber A and provided with an opening in its top for the insertion of the gas-producing material, covered by a screw-cap 4. The carbide-holder also has a glass-covered peep-hole 3 to enable the inspection of the interior of the said holder. Embracing the funnel-shaped bottom 2 of the carbide-holder is a tube 5, rising from the top of the generating-chamber A, of a diameter considerably larger than that of the opening 5<sup>a</sup> of the funnel 2.

Depending from the top of the generating-chamber are two tubes 6, adapted to receive the arms 12<sup>a</sup> of the bail 12, which connect with the mechanism for operating the valve for automatically feeding the gas-producing material to the generating-chamber, as will now be described.

Through the center of the tube 5 passes a valve-stem 7, maintained in vertical position by a guide 8 in the said tube, and near its upper end said stem is provided with a valve 9, adapted to open and close the opening 5<sup>a</sup> of the funnel of the carbide-holder 1. The upper surface of the valve 9 is somewhat larger than the opening 5<sup>a</sup> in the funnel of



the carbid-holder 1, the valve closing said opening when the valve-stem 7 is raised to its utmost limit.

The upper end 10 of the valve-stem 7, extending into the funnel 2 of the hopper 1, is provided with barbs 10, which when the valve-stem is fluctuated by the rising and falling of the gasometer-bell, to which it is connected, disintegrate the carbid or other material and when the valve-stem is lowered shake the carbid down and prevent the clogging of the material in the funnel of the carbid-holder. In case the funnel should become clogged, and in order to obtain access to it in that event, I have provided it with a tube 2<sup>a</sup> near the bottom through which the carbid may be removed. This tube is closed by a plug 2<sup>b</sup>. Immediately under the tube 2<sup>a</sup> is located a lip or shelf 2<sup>c</sup>, by means of which the carbid will be carried over the brim of the generator and into a receptacle placed to receive it. The valve-stem 7 is further provided with an eye 11 at its lower end to receive a bail 12, the arms 12<sup>a</sup> of which project through the tubes 6, depending from the top of the generating-chamber, and connect with the lever 13, adapted to be actuated by the falling of the gasometer-bell, as hereinafter explained.

The lower ends of the tubes 6 are provided with conical deflectors 14, as is also the bail 12, at points opposite the lower ends of the tubes 6. These deflectors serve to prevent the escape of gas by way of the tubes 6. On the outside of the generating-chamber A is a tube 6<sup>a</sup>, open at its top and extending from the upper end of the generating-chamber to a point below the proper water-level in said chamber. The tube 6<sup>a</sup> is connected with the interior of the generating-chamber by a pipe 6<sup>b</sup>, which enters it near the bottom. Water is supplied to the chamber through the tube 6<sup>a</sup> and pipe 6<sup>b</sup>. Should the water rise too high in the generating-chamber, it will be visible in the tube 6<sup>a</sup> and can then be drawn off at the cock 6<sup>c</sup>, placed at about the proper water-level of said chamber.

Depending from the top of the generating-chamber A to near the bottom is a tube 7<sup>a</sup>, the lower end of which is provided with a deflector 7<sup>b</sup>, and through the tube 7<sup>a</sup> passes a rod 7<sup>c</sup>, having a stirrer or agitator 7<sup>d</sup> at its lower end and a crank 7<sup>e</sup> for revolving the same. The bottom of the generating-chamber A is conical in shape and has an opening 8<sup>a</sup>, which is closed by a cock 8<sup>b</sup>, the object of which will be hereinafter explained. The generating-chamber A is mounted on a support 8<sup>c</sup>, which permits of a bucket or other receptacle being placed under the cock 8<sup>b</sup> for the reception of water drawn from the generating-chamber.

Located above the generating-chamber A and hinged at 15 to the arms 12<sup>a</sup> of the bail 12 is a lever 13 of the shape shown. This lever is supported from the top of the generating-chamber A by brackets 16, to which it is pivotally connected, the pivots being desig-

nated by 17, which lever is adapted to open and close the valve 9 through the connections with the gasometer-bell and the valve-stem 7, the lever being rocked on its pivots 17 by the falling of the gasometer-bell as the gas in the gasometer decreases in quantity.

At the side of the generating-chamber and connected thereto by a boxing 18 is the gasometer B, into which the gas generated in the chamber A passes by way of the pipe 19, the upper end of which is bent upon itself and enters the top of the generating-chamber at 20. The other end 21 of the pipe 19 is cut away, as illustrated in Fig. 2, and enters a water-chamber 22 in the bottom of the gasometer B, the object being to wash the gas before it enters the gasometer. The purpose of cutting away a portion of that end of the pipe 19 entering the water-chamber 22 is to allow a free and uninterrupted circulation of gas through the water, which might not occur if the end of the pipe were only perforated. I have, however, illustrated the pipe 19 as being cut away and also perforated.

The chamber 22 is filled with water through the tube 22<sup>a</sup>, and a cock 22<sup>b</sup> is provided to draw off any water in the chamber standing above the required level. The water in the chamber 22 not only washes the gas, removing ammonia and other impurities, but also prevents the gas in the gasometer from passing back into the generating-chamber and wasting when the water in the generating-chamber is drawn off at the cock 8<sup>b</sup>, and the consequent falling of the gasometer-bell, which would operate the lever 13 and cause a generation of gas at a time when not desired.

The gas entering the washing-chamber 22 passes into the gasometer through a pipe 23, rising from its bottom 24. To the center of the bottom 24 of the gasometer and opening from the atmosphere is affixed an upright pipe 25, standing higher than the outer wall of the gasometer, and telescoping over this pipe is a tube 26, depending from the top of the gasometer-bell 27. The tube 26 is closed at its top and open at its lower end, which extends to about the bottom of the gasometer-bell. The gasometer-bell is provided with a receptacle 28 at its top, in which sand, water, or other substance may be put to give to the bell the necessary weight to create a sufficient and proper pressure of gas in the service-pipes. From the gasometer the gas is led to a gas drying and cleaning device, hereinafter explained, by the pipe 29, which rises in the gasometer to near its upper end.

30<sup>a</sup> indicates a spout for supplying water to the gasometer to seal the bell and prevent the egress of gas except by the pipe 29.

The gasometer-bell 27 has at its top, at a point in its periphery opposite the generating-chamber A, a projection or finger 30, which when the gas in the gasometer is reduced by consumption below a certain level engages with and presses down the end of the lever 13 adjacent thereto. When a sufficient quan-



tity of gas has again been generated, the gasometer-bell rises, and the outer end of the lever 13 is lowered by the weight 31. In order to keep the gasometer-bell in proper alignment, so that the projection or finger 30, fixed thereto, shall always at the proper time engage the end of the lever 13, the cover 46 of the gasometer-bell has a vertical groove 46<sup>a</sup>, in which the projection 30 slides.

10 The washing and drying apparatus (illustrated in Figs. 1 and 5) is connected to the pipe 29 and preferably located at the side of the gasometer, and any water collecting in the bend of the pipe 29 may be drawn off at the  
15 cock 29<sup>a</sup>. The gas passes through a pipe 34, provided with a stop-cock 35, and enters the lower end of the chamber 36. This chamber is filled nearly to the top with carbide, the function of the latter being to extract any  
20 moisture from the gas. In order to prevent the carbide from getting into the pipe 34, a reticulated ring 37 is located in the bottom of the chamber 36, the top of which ring is covered with gauze or wire-netting 38, so that the  
25 gas may readily pass to the carbide.

The upper end of the chamber 36 is connected to a second chamber 39, of construction similar to that of the chamber 36, and it is also provided in its bottom with a reticulated ring 40, covered by wire-netting or gauze 41, similar to that located in the bottom of chamber 36 and for the same purpose. The chamber 39, however, is filled with cotton waste or equivalent material, having for its  
30 object to catch any particles of lime in the gas passing through the chamber 39. In addition to drying and cleaning the gas the chambers 36 and 39 have a tendency to resist the varying pressure of the gas and prevent  
35 flickering of the lights and preserve an even flow of gas to the jets. The gas after the drying and cleaning process is ready to be distributed through pipes for consumption.

Mounted upon the top of the generating-chamber A is a cover 42, comprising two members, to inclose the working parts of the machine and prevent tampering therewith. One member—that indicated by 43—is rigidly  
45 fixed to the top of the generating-chamber, while the other member 44 is hinged at 45 to the first member and is adapted to be swung aside, so as to give easy access to the lever 13 and its connections. The free end of the cover 44 closes against the end of the member 43  
50 adjacent to the top of the gasometer B, and when the two parts are in this relation they are adapted to be held by a cover 46 of the gasometer B. The cover 46 is provided with a swinging hasp 47 to engage a staple 48 at  
55 the top of the gasometer and to which it is locked by a padlock. To prevent interfering with the projection 30 when the gasometer-bell rises, the cover 46 has a vertical groove 46<sup>a</sup> formed in it in which the projection 30  
60 slides. The cover 46 also serves to limit the vertical movement of the gasometer-bell, and when the latter is raised to its utmost height,

its bottom being at such time slightly above the water-level in the gasometer, the gas is forced to pass off to the atmosphere through  
70 the pipe 25. This occurs when by accident an overfeeding of carbide is caused, and consequently an overproduction of gas.

Diametrically opposite the hasp 47 on the outside of the cover 46 is fixed a catch 49 to engage a hook 50 on the gasometer. The cover 46 is also provided with a hood 51, which when the cover 44 is closed and the cover 46 locked in place overlaps and locks the cover 44.  
75

In locking the covers the member 44 is first  
80 swung to. The cover 46 is then placed on top of the gasometer and rotated to the right until the catch 49 engages the hook 50. This having occurred the hood 51 overlaps the free end of the cover 44. The hasp 47 is then  
85 locked to the staple 48 by a padlock 48<sup>a</sup>.

If desired, the deflectors 14 (illustrated in Figs. 2 and 3) may be dispensed with and in lieu thereof the bail 12, provided with water-seal buckets 52, as shown in Fig. 6, substituted.  
90 In this figure, A indicates the generating-chamber, 6 one of the two tubes shown in Figs. 2 and 3 to receive the arms 12<sup>a</sup> of the bail 12 connecting with the mechanism for operating the valve 9, and 52 a water-seal  
95 bucket, one of which is carried by each of the arms 12<sup>a</sup>. The water-seal bucket 52 telescopes over the tube 6, and its mouth or open end is larger than the bottom in order to avoid the sucking of the water from the bucket  
100 when the water in the generating-chamber is drawn off at the cock 8<sup>b</sup>.

Figs. 7 and 8 are modified forms of the carbide-holder 1. In Fig. 7 is shown a construction similar to that illustrated in Figs. 1, 2,  
105 and 3, except in the following particulars: Immediately above the end of the valve-stem 7 is located a shelf 53, extending only partly across the lower end of the holder 1. The opening left by the shelf 53 may be closed at  
110 will by a sliding valve 54, which is operated by a screw-rod 55, passing through suitable packing 56. When this valve is closed, it is supported by the shelf 53, and a ledge or projection 57, located at the opposite side of the  
115 holder. By this construction the supply of carbide from the carbide-holder 1 can be entirely shut off from the generating-chamber when recharging the former or whenever desired. In Fig. 8 I employ a double-compartment  
120 carbide-holder, the two compartments being separated by a rotary valve or stop-cock 58, of suitable size to allow the passage of finely broken or pulverized carbide without clogging. This cock is operated by hand to cut  
125 off the supply of carbide or waste of gas when charging the machine and to prevent the introduction of dampness from the generating-chamber to the carbide in the carbide-holder. The compartment 1<sup>a</sup> may be provided with a  
130 glass-covered peep-hole 1<sup>b</sup>, if desired, to allow inspection of the interior of the carbide-holder.

The valve 9 may be simply a disk or constructed as illustrated in the modifications



shown in Figs. 8 and 9. In *a*, Fig. 9, one side of the disk is cut away, the object being to permit one part of the valve at the point cut away to feed sooner than the other portions, so that when only a small quantity of the gas capable of being produced by the machine is being consumed the amount of carbid capable of maintaining that quantity in the gasometer will be continuously fed to the generating-chamber. In *b*, Fig. 9, three sides of the valve are removed, one side being cut away more than the other sides. With this form of valve the carbid will feed off the narrowest shelf first when the valve-stem is lowered only a slight degree and then when the machine is not producing the quantity of gas required and the valve-stem is lowered by the automatic action of the gasometer-bell the carbid will feed off the other cut-away portions, and finally, when the valve is lowered sufficiently, from all around the valve. In *c*, Fig. 9, which is the preferable form, the valve is set eccentrically to the valve-stem, and consequently to the opening 5<sup>a</sup> of the funnel 2. The feed of the carbid when this form of valve is used is very similar to the action when the valve in *a*, Fig. 9, is employed and will be readily understood. This valve may also be cut away, as shown at *d*, in which case it will be, so to speak, a combination of the two forms *a* and *b*, Fig. 9, and having the advantages of all three forms. The circles *e*, in dotted lines in the modification shown in Fig. 9, indicate in each case the relative position of the opening 5<sup>a</sup> in the bottom of the funnel 2 of the carbid-holder to the valve.

The operation of the machine is as follows: If the gasometer is not already filled with water to the proper level—i. e., to within a few inches of its top—water is poured into the tank through the lip 30<sup>a</sup> till the proper level is secured. The generating-chamber A is then filled with water through the tube 6<sup>a</sup> to the level of the cock 6<sup>c</sup>, and if the construction shown in Fig. 6 is employed the water-seal buckets 52 are then filled through the tubes 6 in the top of the chamber A. The gasometer-cover 46 is turned on its vertical axis till the projection or catch 30 of the gasometer-bell 27 does not overhang the adjacent end of the lever 13, so that the weight 31, by depressing that end of said lever to which it is attached, will cause it to lift the valve-stem 7, through its connection with the arms 12<sup>a</sup> of the bail 12, to its highest position, and thus close the valve port or opening 5<sup>a</sup> to prevent the dropping of carbid during the process of filling the carbid-chamber 1.

If the generator has a double-compartment carbid-holder, as illustrated in Figs. 7 and 8, the upper portion of the chamber 1 is cut off by closing the sliding valve 54, Fig. 7, or the cock 58, Fig. 8, as the case may be, and finely pulverized or broken carbid or other similar gas-producing substance is poured into the chamber 1 through the opening in the top.

If the projection or finger 30 lies at a lower level than the end of the lever 13 adjacent to the gasometer that end of the lever is slightly depressed to partly open the valve 9 to release only a small amount of carbid, sufficient by the gas it generates to raise the said projection 30 to a level above the adjacent end of the lever 13. The gasometer-bell cover 46 is then rotated to its proper position, thus causing the projection 30 to always remain above the end of the lever 13. Sufficient gas having been generated to start the machine, the action of the machine is thereafter automatic, as will be readily understood, and will produce gas as required within the capacity of the machine till the carbid is exhausted.

The automatic action of the machine is as follows: When by consumption of gas the bell 27 is lowered, the projection or finger 30 engages the end of the lever 13 and depresses it as the gasometer continues to descend, and thereby through the medium of the arms 12<sup>a</sup> of the bail 12, connected to the valve-stem 7, the valve 9 is moved away from the opening 5<sup>a</sup> and the carbid will drop into the generating-chamber, the barbed end of the valve-stem 7 breaking the carbid and preventing any tendency thereof to clog. The carbid thus released falls into the water of the generating-chamber A, producing gas, which, after filling the said generating-chamber is conducted by the pipe 19 to the water-chamber 22 in the bottom of the gasometer-tank, where the gas is washed by the water therein. The gas then passes up the pipe into the gasometer. Before being consumed the gas passes through the drying and cleaning apparatus C.

In recharging the machine if the projection or finger 30 is not an inch or two above the end of the lever 13 said lever must be slightly depressed to release an amount of carbid sufficient to raise the finger 30 a few inches above contact with the said lever, thus closing the valve 9 and preventing the dropping of carbid into the water during the process of filling the carbid-holder. The cap 4 is then removed, broken or pulverized carbid or other material introduced into the carbid-holder 1, and the cap 4 replaced, when the filling is completed.

In order to clean the machine, the agitator 7<sup>c</sup> is vigorously operated for a minute or two or until the refuse from the used carbid is mixed and thinned by the water in the generating-chamber A. The cock 8<sup>b</sup> is then opened, and the refuse, in the form of a thick mixture, with the water, is drawn off into a bucket or other receptacle placed under the generating-chamber. After drawing off the refuse clean water is added to the generating-chamber A to again bring the water to the proper level therein.

In removing the refuse the water in the generating-chamber A should never be lowered



enough to uncover the entrance of the pipe 6<sup>b</sup> in the chamber. This precaution will prevent the escape of gas from the machine.

Having thus described my invention, I claim—

1. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder, a valve consisting of a disk cut away at its periphery regulating the feed from the carbid-holder to the generating-chamber, and means for operating the valve, substantially as set forth.

2. In an acetylene-gas generator, the combination of the generating-chamber, tubes depending therein, a carbid-holder, a valve located between the generating-chamber and the carbid-holder, a valve-stem, a gasometer, a lever operated by the bell of the gasometer, and a bail hinged to the lever, the arms of the bail passing through the tubes and connecting with the valve-stem, substantially as set forth.

3. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder, a segmental valve regulating the feed to the generating-chamber, a valve-stem, a tube through which the valve-stem passes, a lever pivoted to the generating-chamber, a bail connecting the valve-stem to the lever, tubes depending from the generating-chamber through which the arms of the bail pass, and means depending on the supply of gas for operating the lever, substantially as set forth.

4. In an acetylene-gas generator, the combination of the generating-chamber, a carbid-holder, a valve and valve-stem, a lever pivoted to the generating-chamber, a bail connecting the valve-stem to the lever, tubes carried by the generating-chamber through which the arms of the bail pass, means for preventing the egress of gas through the tubes, and means depending on the supply of gas for operating the lever, substantially as set forth.

5. In an acetylene-gas generator, the combination of the generating-chamber, a carbid-

holder, a valve and valve-stem, tubes depending in the generating-chamber, a bail, the arms of which pass through the tubes, connected to the valve-stem, a pivoted lever hinged to the ends of the arms of the bail, and a gasometer the bell of which is provided with a projection adapted to engage the lever and thereby open the valve, substantially as set forth.

6. In a covering for an acetylene-gas-generating machine and gasometer, the combination of a fixed member, a second member hinged thereto, and an independent cover for the gasometer adapted to lock the second member to the first, substantially as set forth.

7. In a covering for an acetylene-gas-generating machine and gasometer, the combination of a fixed member, a second member hinged thereto, and a cover for the gasometer having a hood adapted to lap over the second member and hold it in closed position, substantially as set forth.

8. In a covering for an acetylene-gas-generating machine and gasometer, the combination of a fixed member, a second member hinged thereto, a cover for the gasometer, a hood carried by said cover, adapted to overlap the second member, and means for locking the said cover to the gasometer, substantially as set forth.

9. In a covering for an acetylene-gas-generating machine, the combination of a fixed member carried by the generating apparatus, a second member hinged to the first member, a cover for the gasometer, a hood carried by the said cover and adapted to overlap the second member when closed, a catch carried by the said cover, a hook on the gasometer adapted to engage the said catch, and means for locking the said gasometer against rotation, substantially as set forth.

In testimony whereof I hereunto set my hand this 20th day of April, A. D. 1899.

WILLIAM THOMASSON LOVE.

Witnesses:

JESSIE L. BISHOP,

KATHERINE COUCHMAN.